OCEAN CLIMATE ACTION: SOLUTIONS TO THE CLIMATE CRISIS

H.R. 8632, H.R. 3548, H.R. 3919, H.R. 4093, H.R. 5390, H.R. 5589, H.R. 7387, H.R. 8253, and H.R. 8627

LEGISLATIVE HEARING

BEFORE THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

Tuesday, November 17, 2020

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LEGISLATIVE HEARING ON OCEAN CLIMATE ACTION: SOLUTIONS TO THE CLIMATE CRISIS

The hearing will be on the following bills:

H.R. 8632, To direct the Secretary of Commerce, acting through the Administrator of the National Oceanic and Atmospheric Administration, to provide for ocean-based climate solutions to reduce carbon emissions and global warming; to make coastal communities more resilient; and to provide for the conservation and restoration of ocean and coastal habitats, biodiversity, and marine mammal and fish populations; and for other purposes, "Ocean-Based Climate Solutions Act of 2020"; H.R. 3548, To improve data collection and monitoring of the Great Lakes, oceans, bays, estuaries, and coasts, and for other purposes, "BLUE GLOBE Act"; H.R. 3919, To require research in coastal sustainability and resilience, to ensure that the Federal Government continues to implement and advance coastal resiliency efforts, and for other purposes, "Creating Opportunity And Sustainability Through Science Act" or "COASTS Act"; H.R. 4093, To improve the National Oceans and Coastal Security Act, and for other purposes, "National Oceans and Coastal Security Improvements Act of 2019"; H.R. 5390, To designate Regional Ocean Partnerships of the National Oceanic and Atmospheric Administration, and for other purposes, "Regional Ocean Partnership Act"; H.R. 5589, To establish an Interagency Working Group on Coastal Blue Carbon, and for other purposes, "Blue Carbon for Our Planet Act"; H.R. 7387, To require the Secretary of Commerce to establish a grant program to benefit coastal habitats, resiliency, and the economy, and for other purposes, "Shovel-Ready Restoration Grants for Coastlines and Fisheries Act of 2020"; H.R. 8253, To amend the Outer Continental Shelf Lands Act to require 30 percent of revenues from offshore wind energy to be deposited in the National Oceans and Coastal Security Fund, and for other purposes, "Strengthening Coastal Communities Act of 2020"; and H.R. 8627, To express the sense of Congress that the Chesapeake Bay Office of the National Oceanic and Atmospheric Administration shall be the primary representative of the National Oceanic and Atmospheric Administration in the Chesapeake Bay, to require the Secretary of the Commerce, acting through the Administrator of the National Oceanic and Atmospheric Administration, to provide grants supporting research on the conservation, restoration, or management of oysters in estuarine ecosystems, and for other purposes, "Chesapeake Bay Oyster Research Act"

Tuesday, November 17, 2020
U.S. House of Representatives
Committee on Natural Resources
Washington, DC

The Committee met, pursuant to notice, at 12:02 p.m., via Webex, Hon. Raúl M. Grijalva [Chairman of the Committee], presiding.

Present: Representatives Grijalva, Huffman, Lowenthal, Cox, Neguse, Levin, Haaland, Cunningham, DeGette, Dingell, Soto, Cartwright, Tonko, García, Barragán; Bishop, Gohmert, Westerman, Graves, González-Colón, and Stauber.

Also present: Representatives Bonamici and Beyer.

The CHAIRMAN. Good morning, the Committee on Natural Resources will now come to order. The Committee is meeting today to hear testimony on H.R. 8632, the Ocean-Based Climate Solutions Act; H.R. 3548; H.R. 3919; H.R. 4093; H.R. 5390; H.R. 5589; H.R. 7387; H.R. 8253; and H.R. 8627.

Under Committee Rule 4(f), any oral opening statements at hearings are limited to the Chair and the Ranking Minority Member or their designees. This will allow us the opportunity to hear from our witnesses sooner, and help Members keep to their schedules and afford them the opportunity to ask questions.

Therefore, I ask unanimous consent that all other Members' opening statements be made part of the hearing record if they are submitted to the Clerk by 5 p.m. Eastern Standard Time today, or at the close of the hearing, whichever comes first.

Hearing no objection, so ordered.

Without objection, the Chair may also declare a recess subject to the call of the Chair.

I am also asking unanimous consent that the gentleman from Virginia, Representative Beyer, and the gentlewoman from Oregon, Representative Bonamici, be permitted to participate in today's proceedings.

I ask unanimous consent to enter into the record a written statement by Representative Kathy Castor.

As described in the notice, statements, documents, or motions must be submitted to the electronic repository at HNRCdocs@mail.house.gov. Additionally, please note that as with in-person meetings, Members are responsible for their own microphones. And as with in-person meetings, Members can be muted by staff only to avoid inadvertent background noise. Finally, Members or witnesses experiencing technical problems should inform the Committee staff immediately.

Thank you for that, and thank you for joining us at this hearing. Let me recognize myself for the opening statement.

Ms. SNYDER. Chair Grijalva——

The CHAIRMAN. Yes?

Ms. SNYDER. Sorry, this is Lora. The audio is not working on the streaming device right now, so can you hold just 1 second, please?

The CHAIRMAN. Do I need to begin from the get-go on calling the meeting to order and everything?

Ms. SNYDER. Sarah Lim, what do you think? OK. No, we are good.

[Pause.]

Mr. BISHOP. Perfect time for you to give your speech.

[Laughter.]

[Pause.]

Ms. SNYDER. I just got a note the audio is back, so we can start.

The CHAIRMAN. OK. We apologize for the technical glitch, but let me recognize myself for the opening statement and then recognize the Ranking Member or his designee.

STATEMENT OF THE HON. RAÚL M. GRIJALVA, A REPRESENTATIVE FROM THE STATE OF ARIZONA

The CHAIRMAN. Thank you to all the Members of Congress and witnesses for joining us today, as we have a conversation about my bill, the Ocean-Based Climate Solutions Act.

At over 300 pages long, the bill includes a number of provisions, many of which are bipartisan, to address the very serious problem of climate change. As the incoming Biden administration is going through its transition process, we must lay the groundwork to address climate change with the speed that this crisis demands.

Turning to the legislation, the idea here is simple: A healthy ocean can help us fight the climate crisis. Our ocean has absorbed over one-third of our carbon emissions and 90 percent of the excess heat we have generated. This has consequences, which has resulted in ocean acidification, sea level rise, shifting fish stocks, coral reef die-offs, and much more. The ocean and atmosphere are closely connected, which is good news for us. Scientists have found that 21 percent of the carbon equation could be solved globally through the ocean.

The climate proposals have ignored the ocean for far too long. That is why we have put forward the Ocean-Based Climate Solutions Act, a bill that provides a roadmap for ocean and coastal climate resilience and curbs greenhouse gases.

Since this bill is the first of its kind, we continue to expect and welcome feedback. I look forward to working with all of you to improve this legislation as it goes forward.

The bill develops a plan to protect 30 percent of the ocean by 2030, which is good for everybody. A new study finds that expanding existing global marine protected areas by just 5 percent could improve future fisheries catch by at least 20 percent.

The bill also prepares our fisheries and blue economy for climate change, improves coastal zone management, strengthens marine mammal conservation, and confronts ocean acidification and harmful algal blooms. It improves coastal resilience, and specifically promotes resilience and justice for U.S. territories, Indigenous people, and communities of color.

Critically, the Ocean-Based Climate Solutions Act captures and reduces carbon dioxide by creating a pathway forward for renewable offshore energy, and enhances natural carbon capture and storage in ocean ecosystems like seagrass beds, kelp forests, and mangroves, in a concept known as “blue carbon.”

The way I look at it, we are in a reciprocal relationship with nature. You reap what you sow. Greedy polluters have harmed our planet for decades, and now we are all having to deal with the consequences. But with solutions like this legislation and other proposals to confront climate change, we can and will do better.

The legislation is a compilation of the work of many of my colleagues: Representative Bonamici, Representative Seth Moulton, Representative Don Beyer, Representative Charlie Crist, Representative Debbie Mucarsel-Powell, Representative Anthony Brown, Representative Haaland, Representative Lowenthal, and Representative Velázquez. So, to them I thank them for their work on the pieces of the legislation, their legislation, that has been incorporated into the overall bill.

[The prepared statement of Mr. Grijalva follows:]

PREPARED STATEMENT OF THE HON. RAÚL M. GRIJALVA, CHAIR, COMMITTEE ON NATURAL RESOURCES

Thank you to all of the Members of Congress and witnesses for joining us today to have a conversation about my bill, the Ocean-Based Climate Solutions Act. At over 300 pages long, this bill includes a number of provisions—many of which are bipartisan—to address the very serious problem of climate change.

As the incoming Biden administration is going through its transition process, we must lay the groundwork to address climate change with the speed this crisis demands.

Turning to the legislation, the idea here is simple. A healthy ocean can help us fight the climate crisis.

Our ocean has absorbed over one-third of our carbon emissions and 90 percent of the excess heat we have generated. This has consequences which has resulted in ocean acidification, sea level rise, shifting fish stocks, coral reef die-offs and more. The ocean and atmosphere are closely connected, which is good news for us. Scientists have found that 21 percent of the carbon equation can be solved globally through the ocean.

But climate proposals have ignored the ocean for far too long. That's why we've put forward the Ocean-Based Climate Solutions Act, a bill that provides a roadmap for ocean and coastal climate resilience and curbs greenhouse gases.

Since this bill is the first of its kind, we continue to expect and welcome feedback. I look forward to working with all of you to improve this legislation.

The bill develops a plan to protect 30 percent of the ocean by 2030, which is good for everybody—a new study finds that expanding existing global marine protected areas by just 5 percent can improve future fisheries catch by at least 20 percent.

The bill also prepares our fisheries and blue economy for climate change, improves coastal zone management, strengthens marine mammal conservation, and confronts ocean acidification and harmful algal blooms. It improves coastal resilience and specifically promotes resilience and justice for U.S. territories, Indigenous people, and communities of color.

Crucially, the Ocean-Based Climate Solutions Act captures and reduces carbon dioxide by creating a pathway forward for renewable offshore energy and enhances natural carbon capture and storage in ocean ecosystems like seagrass beds, kelp forests, and mangroves, a concept known as "Blue Carbon".

The way I look at it, we are in a reciprocal relationship with nature. You reap what you sow: greedy polluters have harmed our planet for decades, and now we are all facing the consequences.

But with solutions like this bill and other proposals to confront climate change, we can and will do better.

Thank you.

The CHAIRMAN. With that, the Chair will now recognize the Ranking Member or his designee for the opening statement.

Mr. Ranking Member.

STATEMENT OF THE HON. ROB BISHOP, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Mr. BISHOP. Thank you, Mr. Chairman, and thank you for holding this hearing in such a manner that easily produces interaction and understanding of the issues that we are facing.

Before I actually begin my comments, I would ask unanimous consent that three documents be added to the record. I think you have them electronically already.

One is a letter of opposition to H.R. 8632 that is signed by 831 organizations. Basically, anyone who knows about fishing, uses fishing, or eats fish is in opposition.

The second is a letter of the Family Farm Alliance expressing concerns over the impact on Western agriculture.

Third, a letter from Stronger America Through Seafood also expresses their concerns with H.R. 8632.

Mr. Chairman and members of our wonderful Committee, today we meet in what will likely be the last Natural Resources Committee hearing of the 116th Congress. We are considering nine bills, most of which were included in the Chairman's H.R. 8632. There really is no reason to add to this hearing—unless it is to give Members another 5 minutes to campaign, or speak on the bills. It is kind of a waste of time. But I would remind you all that the election is over. We should move on.

Jessica Hathaway, the editor-in-chief of *National Fisherman*, described the Chairman's bill perfectly when she wrote that, "Reading its 324 pages felt like swinging a piñata packed with a mix of treats and lit fireworks." I think Hathaway got it perfectly.

The bill authorizes billions in new grants and programs to distract from the economically devastating policies that are also being pushed in this bill. The Majority is pushing a so-called 30x30 idea, locking up 30 percent of our oceans by 2030, all under the guise of protecting biodiversity while tackling climate change.

The reality is really much different. The policy is woefully misguided. It does not improve fisheries. It undermines the Magnuson-Stevens Act. And even worse, it is detrimental to America, and especially American fishermen.

Our fisheries are not on the brink of collapse. According to NOAA, 91 percent of the stocks for which we have assessments are not subject to overfishing. Further, nearly 90 percent of Federal mandated fisheries fall below their annual catch limits, meaning that our commercial recreational fishermen are not being allowed to harvest the maximum sustainable levels.

Dr. Hilborn, who is one of our distinguished guests here today, a marine biologist and fisheries scientist at the University of Washington, has stated that "the major threat to sustainable jobs, food, recreational opportunities, and revenue from U.S. marine fisheries is not overfishing, but underfishing." I look forward to his testimony as we realize once again what that actually means, and that we may be looking at things as we did in the past, not what is presently needed, and definitely not for what the future requires.

So, I think it is worth repeating: the Magnuson-Stevens Act is not just for the conservation and management of fishery resources, but also to assure that our citizens benefit from employment, food

supply, and revenue which could be generated from these resources.

Just like locking up large sums of land has been a terrible and expensive idea, locking up 30 percent of our oceans does not translate into good stewardship. There are better ways of managing our fishery resources—again, the Magnuson-Stevens Act, that does not put the industry that supports 1.6 million U.S. jobs at risk.

I would be remiss if I didn't point out the timing of this bill. Our fishing industry has been hard hit by COVID-19. Instead of helping, it seems the Majority is more interested in putting fishermen's livelihood at risk in the name of faux conservation.

And last, I want to point out that this bill bankrupts the LWCF by banning its main revenue source. Mr. Grijalva has constantly reminded us that LWCF is one of the Nation's bedrock conservation laws. I want to remind him that OCS revenues provide 100 percent of the funding for the LWCF, as well as significant revenues to the Gulf of Mexico coastal states for coastal restoration.

This ban is even more ridiculous after we just locked in mandatory spending of $900 million in perpetuity in the not-so Great American Outdoors Act.

So, with that, let the festivities begin. Thank you for letting me see you on my screen, and I yield back.

[The prepared statement of Mr. Bishop follows:]

PREPARED STATEMENT OF THE HON. ROB BISHOP, RANKING MEMBER, COMMITTEE ON NATURAL RESOURCES

Today we meet in what will likely be the last Natural Resources Committee hearing of the 116th Congress.

We are considering nine bills, most of which are included in Chairman Grijalva's H.R. 8632, the Ocean-Based Climate Solutions Act. There is no reason these have been added to this hearing, unless it is to give those Members 5 minutes to speak. It's a waste of my time and of the Committee's time.

Jessica Hathaway, the editor in chief of *National Fisherman*, described the Chairman's bill perfectly. She wrote that "Reading its 324 pages felt like swinging at a piñata packed with a mix of treats and lit fireworks."[1] I agree with Ms. Hathaway. The bill authorizes billions in new grants and programs to distract from the economically devastating policies being pushed.

The Majority is pushing a so-called "30 by 30" idea of locking up 30 percent of our oceans by 2030 all under the guise of "protecting biodiversity while tackling climate change."[2] The reality is much different. This policy is woefully misguided, it does little to improve fisheries, undermines the Magnuson-Stevens Act, and even worse it is detrimental to American fishermen.

Our fisheries are not at the brink of collapse. According to NOAA, "91 percent of stocks for which we have assessments are not subject to overfishing and 84 percent are not overfished."[3]

Further, nearly 90 percent of federally managed fisheries fall below their annual catch limits,[4] meaning that our commercial and recreational fishermen are not being allowed to harvest at maximum sustainable levels.

Dr. Hilborn, a distinguished marine biologist and fisheries scientist at the University of Washington and our witness has stated that "[t]he major threat to sustainable jobs, food, recreational opportunities and revenue from U.S. marine

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[1] https://www.nationalfisherman.com/national-international/ocean-climate-bill-is-a-grab-bag-for-marine-stakeholders.

[2] https://naturalresources.house.gov/media/press-releases/chairs-grijalva-castor-introduce-landmark-oceans-solutions-bill-to-tackle-climate-crisis.

[3] Testimony of Chris Oliver, Assistant Administrator for the National Marine Fisheries Service, to the House Committee on Natural Resources, September 26, 2017.

[4] http://www.nmfs.noaa.gov/sfa/laws_policies/msa/.

fisheries is no longer overfishing, but underfishing."[5] I look forward to listening to his testimony.

I think it's worth repeating that the Magnuson-Stevens Act is not just for the conservation and management of fishery resources, but also "to assure that our citizens benefit from the employment, food supply, and revenue which could be generated"[6] from these resources.

Just as locking up large sums of lands has been a terrible and expensive idea, locking up 30 percent of our oceans does not translate to good stewardship. There are better ways of managing our fishery resources, again the Magnuson-Stevens Act, that do not put an industry that supports 1.6 million U.S. jobs at risk.

I would be remiss if I didn't point out the timing of this bill. Our fishery industry has been hard hit by COVID-19. Instead of helping, it seems the Majority is more interested in putting our fishermen's livelihoods at risk in the name of conservation.

Lastly, I want to point out that this bill bankrupts the LWCF by banning its main revenue source. Chairman Grijalva constantly reminds us that LWCF is one of our Nation's bedrock conservation laws. I want to remind him that OCS revenues provide nearly 100 percent of the funding for LWCF, as well as significant revenues to Gulf of Mexico coastal states for coastal resources restoration.

This ban is even more ridiculous after we just locked in mandatory spending of $900 million in perpetuity with the so-called Great American Outdoors Act.

I yield back.

The CHAIRMAN. Thank you very much, Ranking Member Bishop.

And a point of personal privilege—you have mentioned that this might be the last possible hearing that we have before our new Congress and our new session. I just want to take this personal time, Mr. Bishop, to thank you for your service to Congress, and to this Committee, both as Chairman and Ranking Member of the Natural Resources Committee. It has been a pleasure and a chore to work with you all these years.

And I think it is important to note, as I have noted in the past, that you have been a consistent voice for your point of view and the philosophy, and one can ask no more of a Representative but to be consistent. And I want to thank you for that, and wish you the best.

Let me now begin by introducing our witnesses for this hearing. Our first witness is Dr. Jane Lubchenco, a University Distinguished Professor of Marine Biology at the Oregon State University. Following her, we will hear from Dr. Kelsey Leonard, Steering Committee Member, Mid-Atlantic Committee on the Ocean, and Enrolled Citizen of Shinnecock Indian Nation. Next will be Dr. Ray Hilborn, a professor of the School of Aquatic and Fishery Sciences at the University of Washington. And, finally, our last witness will be Dr. Kelly Kryc, Director of Ocean Policy at the New England Aquarium.

Let me remind the witnesses that under our Committee Rules, they must limit their oral presentation to 5 minutes, but that their entire statement will appear as part of the hearing record.

When you begin, the timer will begin, and it will turn orange when you have 1 minute remaining. I recommend that Members and witnesses joining remotely use grid view, so they may pin the timer on their screen.

And as your testimony is complete, please remember to mute yourself to avoid any inadvertent background noise.

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[5] Testimony of Ray Hilborn, Professor at the University of Washington, given to the House Committee on Natural Resources, September 11, 2013.

[6] 16 U.S.C. 1801(a)(7).

I will also allow the entire panel to testify before the questioning of the witnesses begins by Members.

I will now recognize Dr. Lubchenco to testify. The time is yours.

STATEMENT OF JANE LUBCHENCO, UNIVERSITY DISTINGUISHED PROFESSOR, WAYNE AND GLADYS VALLEY PROFESSOR OF MARINE BIOLOGY, MARINE STUDIES ADVISOR TO THE PRESIDENT OF OREGON STATE UNIVERSITY, CORVALLIS, OREGON

Dr. LUBCHENCO. Chair Grijalva, Ranking Member Bishop, and distinguished members of the Committee, thank you for the opportunity to join you today. I am an ocean ecologist. I study connections in ecosystems, including interactions between people and their ecosystems.

When I read the Ocean-Based Climate Solutions Act, I saw oceans of opportunity for exciting, urgently needed progress on climate change. But much more, as well. You are all painfully aware and have mentioned some of the multiple crises facing the Nation and the world. With COVID-19, we are facing an unprecedented health crisis that has also triggered an economic crisis; the racial injustice crisis, long ignored, has burst onto the national conscience; we know there is a biodiversity crisis on land and in the ocean; and multiple threats have produced an ocean crisis; and, of course, the climate crisis that brings us together today.

Each of these six crises is complex and demands attention. Making serious headway with any of them is tough. But taken together, they might seem impossible. But what if? What if we could find synergies that would allow us to address multiple crises at the same time? Now, that would be worth doing.

This bill provides just such an opportunity, with obvious synergies between the ocean and the climate crisis.

True, the ocean has been mostly out of sight, out of mind in dialogues about climate mitigation. We have focused primarily on land-based opportunities to produce renewable energy; enable more efficient transportation, buildings, and appliances; and tap nature-based solutions through forest action. But now, thanks to new analyses from scientists organized for the High-Level Panel for a Sustainable Ocean Economy, we know that the ocean also has powerful solutions that might provide as much as 20 percent of the emission reductions we need to achieve the 1.5 degree target by 2050.

Until recently, these solutions were not even on our radar screens. Multiple ocean-based climate actions are ripe for action. You have begun the exciting process to realize their potential. Renewable ocean energy, decarbonizing shipping, tapping the power of blue carbon ecosystems, encouraging consumption of sustainable seafood instead of animal protein from the land, and protecting 30 percent of the ocean by 2030 are all powerful, timely actions. Together, they provide both mitigation and adaptation solutions.

But if we are smart about tapping this ocean climate synergy, we can also achieve even greater benefits across other urgent crises. For example, economic stimulus funds could be put to excellent use to create the jobs needed to protect and restore seagrass beds, salt

marshes, and mangroves. These blue carbon wetlands would remove massive amounts of carbon from the atmosphere, a climate mitigation benefit.

Restored wetlands would be a boon to the commercial and recreational fisheries by restoring critically important nursery areas, bringing economic and social benefit. Restored wetlands provide wildlife habitat, creating biodiversity benefit. They provide recreational opportunities, providing health and economic benefit. And those same restored wetlands also provide buffers against storm surge, resulting in climate adaptation and resilience benefit.

Finally, if done smartly, many of those jobs and outcomes could benefit communities of color. So, with just this one example, we see exciting possibilities to derive powerful co-benefits that address the economic, social justice, biodiversity, and ocean crises. A quintuple win-win-win-win-win. Talk about synergies.

Marine protected areas provide another strong pathway to achieve multiple benefits, including both mitigation and adaptation benefit, while also creating jobs, protecting biodiversity, enhancing resilience, protecting carbon stores, and providing recreational benefit.

When crises loom, what is needed most is knowledge that there is light at the end of the tunnel: hope. This bill provides hope because it provides a pathway for tackling multiple crises simultaneously. The time for climate action is now, using the full suite of tools to achieve the greatest social, economic, and environmental benefit. Thank you.

[The prepared statement of Dr. Lubchenco follows:]

PREPARED STATEMENT OF JANE LUBCHENCO, DISTINGUISHED UNIVERSITY PROFESSOR, OREGON STATE UNIVERSITY

Chair Grijalva, Ranking Member Bishop, and distinguished members of the Committee, it is an honor to submit this written testimony concerning the Ocean-Based Climate Solutions Act.

I am a marine scientist with expertise in ocean-climate interactions, and their connections to human well-being. My contributions to these topics have been recognized by multiple scientific organizations including the National Academy of Sciences—who elected me a Member 24 years ago, and presented me with its highest award, the Public Welfare Medal, 3 years ago—and by the National Science Foundation who bestowed on me its most prestigious honor, the Vannevar Bush Award. I received my bachelor's degree from Colorado College, my master's degree from the University of Washington and my PhD from Harvard University. I have been an academic scientist for most of my career, serving on the faculties of Harvard, Stanford, and Oregon State Universities.

I have also had the opportunity to serve my country in a different way through positions in the Federal Government. From 2009–2013, I was honored to serve as the Under Secretary of Commerce for Oceans and Atmosphere and the Administrator of NOAA. It was a pleasure to work with many of you and many of your colleagues during those 4 years on issues ranging from fisheries and coastal habitats to climate change, from weather forecasts and weather satellites to oil spills. Then from 2014 to 2016, I served as the first U.S. State Department Science Envoy for the Ocean doing science diplomacy in developing countries around fisheries, healthy oceans, climate change, ocean acidification, and sustainable development.

Since moving back to Oregon, I have worked to produce the knowledge and solutions needed to meet serious challenges like climate change. I have been delighted to find that people at all levels of organizations have a genuine hunger for durable, practical, scalable solutions—from the leaders at the tops of governments and organizations to those whom they serve.

I am therefore pleased to see the introduction of the Ocean-Based Climate Solutions Act. This bill focuses on the under-appreciated connections between the ocean and climate change and it highlights solutions. Moreover, the bipartisan

nature of many of the related referred bills gives me hope that this Committee can provide much-needed bipartisan leadership to address one of the most urgent problems of our time, climate change.

Solutions to Climate Change are Urgently Needed

As amply documented in the National Climate Assessments and the Intergovernmental Panel on Climate Change (IPCC) reports, climate change is already affecting people's health and safety, opportunities and quality of life, and economic growth. In addition, climate change exacerbates existing inequities and functions as a threat multiplier for peace and security, increasing the likelihood of political instability and terrorism around the world. Global action to reduce greenhouse gas (GHG) emissions as rapidly as possible is urgently needed and can substantially reduce climate-related risks. The ocean has much to offer toward solutions.

In my testimony, I wish to (1) emphasize the urgency of moving decisively; (2) highlight the need to embrace the full suite of science-based ocean solutions in this bill, and (3) underscore the added bonus of multiple co-benefits that many of the solutions bring, ranging from economic to health to biodiversity benefits. This is not a time for timid action, nor for piecemeal solutions. Time is short and failing to act aggressively will have dire consequences. It is time for a full-court press using every play in our playbook.

The Role of the Ocean in the Climate System and Climate Impacts on the Ocean

Until recently, most discussions of the ocean and climate change focused either on the (1) *central role the ocean plays in regulating the climate system* or (2) on the *impacts of climate change to the ocean*. Scientists have documented that the ocean absorbs over 90% of the excess heat trapped by GHG emissions and it absorbs nearly a third of the carbon dioxide that we emit. The ocean has literally 'taken the heat' for us, modulating some of the impacts of excess greenhouse gases.

The 2019 IPCC Special Report on the Ocean and the Cryosphere in a Changing Climate and the 2018 National Climate Assessment document in depressing detail the myriad ways that climate change has impacted the ocean and the consequences of those impacts to people's lives, health, safety, livelihoods, and economic opportunities. (a) *Sea level rise* is an obvious example, and it disproportionately affects some coasts—such as our mid- and south-Atlantic coastlines—more than others. The ocean is also (b) *warmer* and (c) *more acidic*; it is experiencing (d) unprecedented ocean *heatwaves* and (e) *loss of oxygen*. And the ocean is (f) *more variable* and (g) *less predictable*.

Each of these impacts has consequences, but a deeper dive into one of these changes, a warmer ocean, can illustrate the far-reaching implications for people. According to NOAA, the average global sea surface temperature has increased by approximately 2.3°F (1.3°C) over the past 100 years. This might seem like a small amount, but it is having disastrous consequences for many coastal communities and economies, and for people far inland as well. For example, we are seeing the consequences of *warmer water* in the changing nature of *tropical storms including hurricanes*. There is unequivocal evidence that climate change is affecting hurricanes. Let me be clear: there is no evidence that climate change affects the *number* of tropical storms and hurricanes each year. However climate change does affect the *intensity, speed, and water content* of tropical storms including hurricanes. The results are more powerful Category 4 and 5 storms, storms that move more slowly (for example Hurricane Harvey in 2017 that caused catastrophic flooding and many deaths in Texas and Louisiana), and storms that hold more water (contributing to flooding). Just last week, a new analysis was published (Li and Chakraborty 2020) suggesting that the greater moisture in hurricanes also acts like an extra battery pack to keep them stronger and last longer once they have made landfall. Hurricanes in North America are decaying at slower rates over land than they used to. These three climate-related impacts enhance the power and destructive impact of hurricanes, as well as the intensity of storm surge, coastal and inland flooding, and the destructive impact of more powerful winds. Sea level rise makes some of these impacts even worse. In short, we can connect the dots directly between climate change, warmer ocean waters and air temperatures, and threats to coastal and inland inhabitants. Warmer Atlantic, Caribbean, and Gulf of Mexico waters are supercharging hurricanes, fueling rapid intensification, and enhancing the power and longevity of the destruction.

Another impact of warmer water is seen in the heatwaves now being documented globally. One particularly well studied heat wave was the so-called 'Blob' of warm water off the West Coast in 2013–2015, stretching some 2,000 miles from Alaska to California, with water temperatures close to 7° Fahrenheit above average! The

Blob triggered the largest harmful algal bloom ever recorded on the West Coast, shutting down crabbing and clamming for months, and resulted in multiple declared fishery disasters and triggered the death of thousands of marine mammals and seabirds.

Clearly, many climate change impacts are multifaceted and serious. And the impacts to people are profound, underscoring the urgency of tackling climate change aggressively and effectively.

Ocean Solutions to the Rescue—the Ocean Panel's Analysis of *Mitigation* Options

Thanks to new scientific analyses, we now know that the ocean could provide a powerful source of solutions to slow down climate change. These would not supplant other parallel, terrestrial-based mitigation efforts, but when combined with them would enhance the likelihood that we can tackle climate change effectively and smartly.

Although earlier discussions about ways to mitigate climate change focused primarily on land-based solutions, we now have a newly appreciated, powerful suite of ocean-based tools to add to the climate mitigation toolbox. Moreover, many of these new tools could also bring multiple benefits to other parallel issues.

A report published last year by the High Level Panel for a Sustainable Ocean Economy (hereafter called simply the 'Ocean Panel') (Hoegh-Guldberg et al. 2019a; see also Hoegh-Guldberg et al. 2019b) concluded that a set of five ocean-based mitigation solutions could achieve as much as 1/5 of the carbon emission reductions needed to achieve the 1.5°C degree Paris Agreement target by 2050. The experts analyzed the potential emission reductions that could result from 5 different categories of actions: ocean-based renewable energy, ocean-based transportation and shipping, protecting and restoring coastal and marine ecosystems, seafood, and carbon storage in the seabed (Figures 1 and 2).

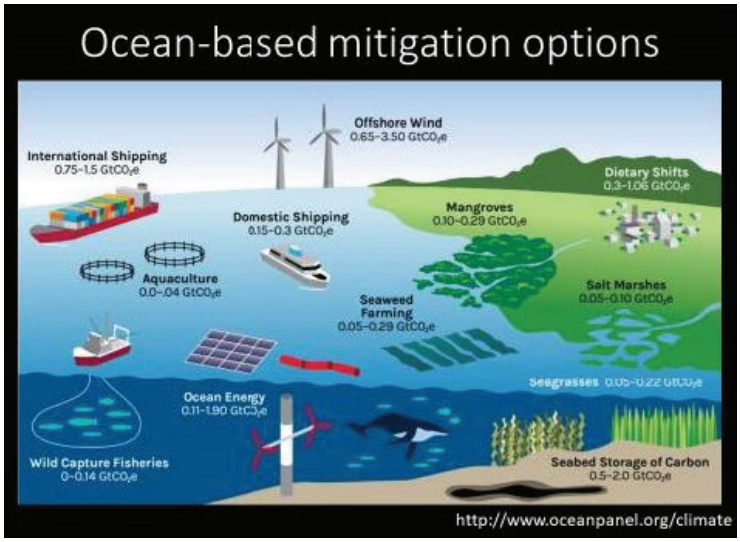

Figure 1. Ocean-based Mitigation Options Explored in Hoegh-Guldberg 2019a and their Associated Annual Mitigation Potential in 2050. From Hoegh-Guldberg 2019a.

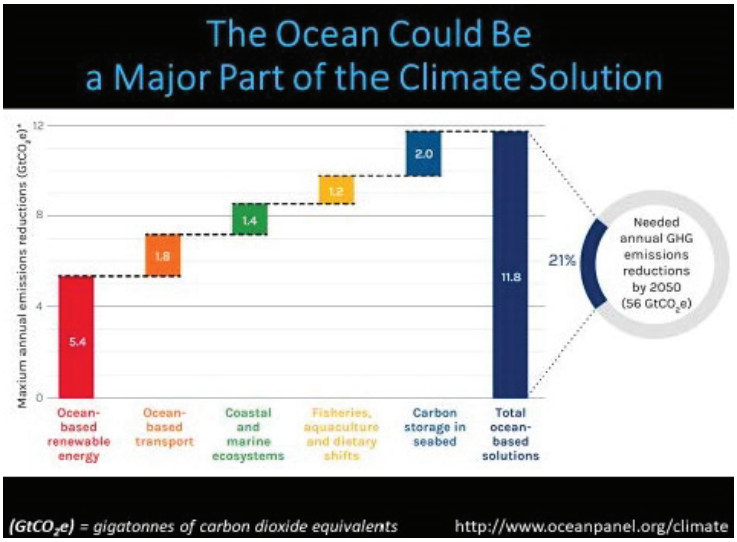

Figure 2. Contribution of Five Ocean-based Climate Action Areas to Mitigating Climate Change in 2050 (Maximum gigatonnes of carbon dioxide equivalents). From Hoegh-Guldberg 2019a.

As shown in Figures 1 and 2, each of these solution categories can contribute to the emission reductions needed. But the power lies in using multiple solutions. Together they reduce emissions by up to 21% of the annual greenhouse gas emission reductions needed by 2020 to achieve the 1.5° target (Figure 3).

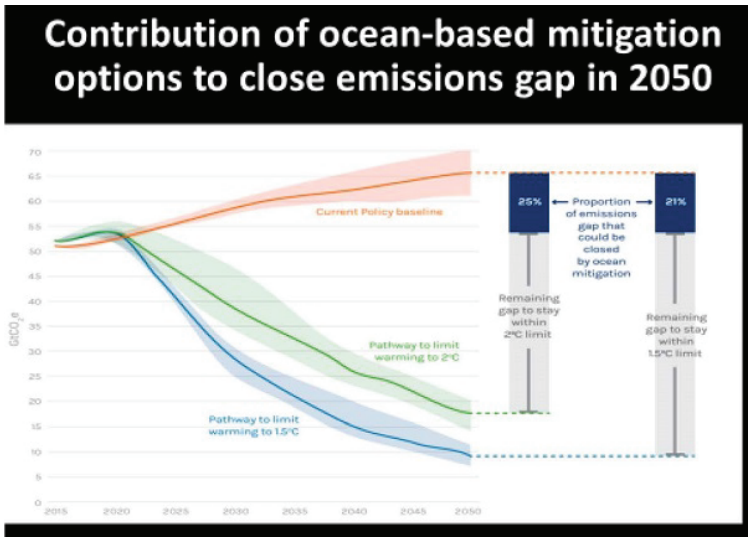

Figure 3. Contribution of Ocean-based Mitigation Options to Closing the Emissions Gap in 2050. From Hoegh-Guldberg et al. 2019a.

The analysis further suggests that the first four of these mitigation solutions would provide immediate opportunities for action while the fifth—sequestering carbon on the seabed—is not ready for deployment, and requires significantly more

research and analysis before it might be considered for adoption. The four categories that are ripe for action, and the Ocean Panel Report's description of each include:

1. **Ocean-Based Renewable Energy:** Reduce barriers to scaling up offshore wind (fixed and floating turbines) and invest in new, innovative ocean-based energy sources such as floating solar photovoltaics, wave power, and tidal power.
2. **Ocean-Based Transport:** Implement available technologies to increase energy efficiency now (e.g., improved hull design), and support the development of low-carbon fuels as part of a broader decarbonization of ocean industries and energy supply chains, including port facilities. Start with decarbonizing domestic fleets.
3. **Coastal and Marine Ecosystems:** Conserve existing "blue carbon" ecosystems (mangroves, seagrass beds, and salt marshes) to prevent further release of greenhouse gas emissions and scale up effective restoration efforts.
4. **Fisheries, Aquaculture, and Dietary Shifts:** Reduce emission intensity of fisheries and aquaculture by optimizing wild catch and shifting to low-carbon feed options. Shift diets toward low-carbon marine sources such as sustainably harvested fish and seaweed including kelp as a replacement for emissions-intensive land-based sources of protein.

After analyzing each of the above options through multiple lens of geophysical, technical, economic, and social/political feasibility and potential, the Ocean Panel report authors concluded that these four options, while not necessarily easy, are feasible and ready for adoption. Many of these options are included in H.R. 8632.

Blue Carbon

Of the above four solutions, the 'blue carbon' category might be useful to consider in greater detail because this ocean-based mitigation solution is less well known. '*Blue carbon*' is simply the carbon that is captured and stored by the world's ocean and coastal ecosystems. ('Green carbon' is the carbon that is captured and stored by trees and other plants on land.) Capturing carbon alone is not sufficient to create climate mitigation benefit. The carbon must also be stored, or sequestered so that it is functionally removed from the atmosphere. In Blue Carbon ecosystems, the plants capture carbon from the air and effectively lock it away in the sediment.

Three blue carbon ecosystems are particularly important from the standpoint of *capturing and sequestering* carbon: *seagrass beds*, *mangrove forests* and *salt marshes*. These three habitats sequester carbon at a much faster rate than do forests and they can sequester carbon for centuries to thousands of years as long as they are not damaged or destroyed. If these habitats are damaged or destroyed, the massive amounts of the carbon they have stored, sometimes for millennia, are released into the atmosphere, contributing to climate change.

So, first and foremost, *preventing the destruction* of these wetlands is a smart and powerful climate-mitigation action. Moreover, because these coastal habitats also provide protection from storm surge, nursery habitats for commercial and recreational fisheries, and recreational opportunities, their protection brings multiple benefits.

The second most important climate-mitigation action on the blue carbon front is *restoring seagrass beds*, *mangrove forests*, and *salt marshes* that have been lost or degraded. A recently reported exemplary success in effectively restoring seagrass beds comes from Virginia, where scientists from the Virginia Institute of Marine Sciences and The Nature Conservancy have recovered over 3,000 hectares of seagrass beds in a number of bays and inshore lagoons (Orth et al. 2020). The restored beds now sequester on average about 3,000 metric tons of carbon each year, locking it away permanently. Moreover, recovering the beds has also enhanced water quality and benefited several commercial and recreational fisheries.

Incorporation of blue carbon into Nationally Determined Contributions and carbon trading schemes would be useful tools to recognize the importance of this mitigation tool and provide resources and incentives to both reduce loss of and effectively restore blue carbon ecosystems.

Ocean-based Solutions for *Adaptation*

As noted earlier, climate change impacts on the ocean, fisheries, wildlife, and coastal and ocean ecosystems have been apparent for at least two decades and are accelerating. This in turn affects the people and economies that depend upon healthy ocean ecosystems for a wide array of benefits. Moreover, scientists have documented unprecedented rates of loss of biodiversity at the genetic, population, and species levels, in marine systems as well as on land and in freshwater (IPBES 2019). Therefore, in addition to forceful efforts to reduce emissions, strong, smart

efforts are needed to enhance the resilience of coastal and inland communities, coastal and ocean ecosystems, fisheries, and other key sustainable uses of the ocean.

Fisheries. Supporting climate-smart and climate-ready fisheries is obvious and important. I am proud that our federally managed fisheries are a model for excellent stewardship and have been steadily improving, due in large part to visionary leaders within the fishing community, strong science, and well-crafted management policies stemming primarily from the 2005 Reauthorized Magnuson-Stevens Act. Fisheries managed by states, however, are highly variable, with the status of many stocks simply unknown. There is clear evidence that one of the best ways to minimize the impact of climate change on fisheries is to ensure they are well managed (Gaines et al. 2018). Therefore, ensuring that all U.S. fisheries are sustainably managed should be high priority.

However, fishery management needs to be more nimble, more precautionary, and more anticipatory than it is at present. This is especially true as stocks shift from their historic locations to new places, especially when they move across Fishery Management Council boundaries or national boundaries.

Policies to increase the fuel efficiency of fishing vessels without penalizing fishermen and women are needed. In addition, the U.S. can exert stronger leadership to eliminate fish and fuel subsidies through international agreements and management programs.

Marine Protected Areas (MPAs) are a well-known, but underutilized tool to protect biodiversity, provide safe havens for wildlife, help recover depleted stocks and species, restore the ecological balance within an ecosystem, protect stores of carbon, provide reference areas for evaluating impacts of fishing, and enhance ecosystem resilience—on a permanent basis. For these benefits to accrue, an MPA must have good enabling conditions, including being well designed, resourced, managed and enforced.

Not all MPAs are the same. For example, they vary in the level of protection they provide from extractive and abatable destructive activities. Only *Fully Protected or Highly Protected MPAs* provide the benefits listed above; Lightly and Minimally Protected Areas simply do not. (The MPA Guide, 2019, explains these four types of MPAs.) At present, only 2.6% of the global ocean is in Fully to Highly Protected, Implemented MPAs (MPA Atlas 2020). And 23% of U.S. waters are in Fully and Highly Protected, Implemented MPAs (MPA Atlas 2020).

There is a compelling need for MPAs to help *protect biodiversity*. The international scientific assessment of biodiversity concluded that the biggest threat to marine biodiversity is fishing and impacts of fishing gear (IPBES 2019). Fully and Highly Protected MPAs provide safe havens from extraction and gear. Moreover, modern technology through remote sensing, machine learning and other tools coupled with international agreements to fight Illegal, Unregulated and Unreported (IUU) Fishing are enhancing the ability to protected MPAs from poaching.

A recent comprehensive, global analysis concluded that Fully and Highly Protected MPAs can also play a central role in helping *provide healthy seafood* to feed a growing human population (Cabral et al. 2020). The authors conclude that *at the global scale*, "protecting an additional 5% of the ocean could increase future catch by at least 20%, generating 9–12 million metric tons more food annually than in a business-as-usual world with no additional protection." Most of this benefit is achieved in countries where fisheries are poorly managed or not managed at all, not where they are relatively well managed such as in U.S. waters. Hence, this food provisioning benefit of MPAs is highly applicable elsewhere, but not particularly relevant for U.S. waters.

And finally, there is increasing evidence that MPAs hold great promise as a *climate mitigation and adaptation tool* (Roberts et al. 2017). In protecting genetic, population, and species diversity, Fully and Highly Protected MPAs can enhance the resilience of ecosystems, protect stores of carbon in the sediment, and protect the ability of blue carbon ecosystems to capture and sequester additional carbon. The greater the genetic diversity, the greater the likelihood there will be genotypes that are suited to a climate-impacted world.

Numerous scientific analyses have concluded that to achieve the biodiversity and climate benefits of MPAs, at least 30% of the ocean should be safeguarded in Fully and Highly Protected MPAs. The urgency of the biodiversity and the climate crises underscores the importance of moving rapidly toward this goal.

Note that even the best fishery management cannot substitute for effective Fully and Highly Protected MPAs in terms of protecting biodiversity or enhancing resilience of ecosystems to climate change. Good fishery management is necessary but not sufficient for a healthy ocean. Even the best-managed fisheries have impacts on target and non-target species. Simply removing massive amounts of biomass from

fished areas has significant impacts on the other species in the ecosystem. Even well-designed, selective gear has unintended impacts on habitats and non-target species. We need both excellent fishery management, highly selective gear, and MPAs. They are not substitutes for one another. They have different goals, all of which are important and needed. Good fishery management and Fully and Highly Protected MPAs should go hand-in-hand.

Marine Spatial Planning that is science- and ecosystem-based and goal-oriented is a good tool to harmonize different uses of the ocean. Regional Ocean Plans are a smart approach that allows a range of stakeholders and interests to consider options for using the ocean in ways that address climate change, protect the integrity and resilience of the ocean ecosystem, and deconflict various uses.

Economic Recovery Opportunities in the Aftermath of COVID-19

A healthy ocean is the foundation of a vibrant economy. Fisheries, tourism, shipping, and other ocean industries have been disproportionately impacted by the COVID-19 pandemic, in the U.S. and around the globe. As leaders look to jumpstart the economy, ocean-based opportunities have been mostly overlooked, but in fact provide some golden opportunities for smart investment. Another report from the Ocean Panel provides timely ideas and analysis of high-priority action items that could contribute directly to rebuilding economies, in ways that support a sustainable, equitable, and resilient ocean economy. Three of the five priority actions discussed in the report overlap with topics discussed above: (1) Investing in coastal and marine ecosystem restoration and protection, (2) Incentivizing sustainable ocean-based renewable energy, and (3) incentivizing the transition to zero emission marine transport (Northrup et al. 2020). Two additional opportunities include (4) Investing in sustainable, community-led non-fed mariculture, and (5) Investing in sewerage and wastewater infrastructure for coastal communities. Many of these options provided economic, social and environmental benefits and should be seriously considered.

In Summary

Climate change affects all Americans. It affects our health and safety and our economic opportunities. But it disproportionately affects the poor, people of color, and the elderly. This is true within the U.S. and it is true globally. The beauty of the action items discussed above is that they provide timely opportunities to address climate change while also boosting the economy, strengthening communities, benefiting health, and addressing racial inequities.

Many of the solutions provide both mitigation and adaptation benefit. Across all of these topics, investments in science, monitoring, assessment and training will pay off handsomely.

It is high time for ocean actions to be appreciated for the significant power they provide as solutions. The ocean connects and sustains us. It is our past and our future. When we pay attention to the ocean, people win, the economy wins, and nature wins.

I am happy to provide additional information on these and related topics if that would be useful to you.

Thank you.

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QUESTIONS SUBMITTED FOR THE RECORD TO JANE LUBCHENCO, PH.D., UNIVERSITY DISTINGUISHED PROFESSOR, OREGON STATE UNIVERSITY

Questions Submitted by Representative Cox

Question 1. Like many of my colleagues, I come from a landlocked district—but that doesn't mean that we don't all benefit from ocean-based climate solutions. The High Level Panel for the Sustainable Economy's report on the Ocean as a Solution for Climate Change finds full implementation of ocean-based climate solutions could deliver one-fifth (up to 21 percent) of the annual greenhouse gas emissions cuts the world needs by 2050 to keep global temperature rise below 1.5 degrees Celsius, which the IPCC says we must strive to do. How does the Chairman's bill address their findings? Are there any areas we need to improve or expand upon?

Answer. Thank you, Rep. Cox, for drawing attention to the overarching importance to all Americans of reducing greenhouse gas emissions as rapidly as possible. The Chairman's bill notes a number of ways in which ocean-based activities can help achieve that goal. I would underscore the importance of using ***all*** of the tools in our ocean toolbox: already highlighted in the bill are protecting and restoring blue carbon ecosystems, Marine Protected Areas that are fully to highly protected, ocean renewable energy, and making fisheries more energy efficient. I would add making ports more energy efficient and decarbonizing shipping to that list—at the national as well as international scale. Working in close collaboration with other countries on all of these issues will leverage more, more efficient, and smarter actions. In addition to more aggressive actions to reduce emissions and thus slow down the rate of climate change, parallel efforts are needed to adapt to changes already underway. A robust National Ocean Policy would be a nice complement to help integrate actions across sectors and issues, and to enable smart planning at the regional scale, for both mitigation and adaptation.

Questions Submitted by Representative Velázquez

Question 1. Dr. Lubchenco, in 2012 Superstorm Sandy tore through New York City and research shows that sea level rise played a major role in driving Sandy's surge, resulting in severe flooding in the region. Consequentially, New York City experienced an estimated $19 billion in damages and lost economic activity. To better prepare coastal communities from future catastrophes, I've introduced the National Sea Level Risk Analysis Act, which is included in H.R. 8632. Can you explain how a National Coastal Data Information System will better protect and prepare businesses, governments, and citizens from current and future flooding risks?

Answer. Thank you, Rep. Velázquez, for your leadership to prepare and enhance the resilience of coastal communities to climate and other changes. I agree with you that integrated, user-friendly information is absolutely needed for smart planning and action. When I was the NOAA Administrator, and understanding the grave threats posed by coastal inundation and inland flooding, NOAA formed a new

partnership with USGS and the Army Corps of Engineers, each of whom had one piece of the larger puzzle needed for accurate, more unified and comprehensive understanding of flood risks. That program was called Integrated Water Resources Science and Services (IWRSS (pronounced iris). The goal was to integrate and harmonize information across these agencies and provide one-stop shopping to communities, businesses and states. Since I am no longer at NOAA, I can't provide an update on the state of IWRSS, but I suspect you've already investigated that. It strikes me as one element needed to provide your and other vulnerable communities with better information to plan and to act. I also draw your attention to the work done by Climate Central to create user-friendly risk zone maps, GIS layers and more https://ss2.climatecentral.org/#12/40.7298/-74.0070?show=satellite&projections=0-K14_RCP85-SLR&level=5&unit=feet&pois=hide. In short, although there are good elements in place for a robust and useful coastal data information system, a truly functional, comprehensive system does not exist and is urgently needed. Businesses, communities, citizens and governments need to plan and for that, they need accurate information, a better understanding of risk and trade-offs to evaluate options and make smart decisions. I applaud your focus on this topic.

Questions Submitted by Representative Bishop

Question 1. During the hearing you seemed to agree that state management of fisheries in state waters should not be pre-empted by a federal regime. Could you please confirm that position in writing?

Answer. Thank you, Rep. Bishop, for the chance to clarify my position on this issue. Both states and the Federal Government should play key roles in managing fisheries. As you are aware, there are various agreements between different states and the Federal Government to allocate responsibility for specific fisheries, in particular those where the fish move back and forth from state waters to federal waters. I noted in the hearing that in my experience, although federally managed fisheries have improved significantly through time and are generally well managed, many state-managed fisheries are not well resourced and do not have a good handle on the status of their stocks. I was not commenting on who should manage different stocks, but only noting that without adequate resources, it is difficult for many states to manage their fisheries well.

The CHAIRMAN. Next I recognize Dr. Leonard. The floor is yours.

STATEMENT OF KELSEY LEONARD, STEERING COMMITTEE MEMBER, MID-ATLANTIC COMMITTEE ON THE OCEAN, ENROLLED CITIZEN SHINNECOCK INDIAN NATION, LONG ISLAND, NEW YORK

Dr. LEONARD. Thank you. Chairman Grijalva, Ranking Member Bishop, and members of the House Committee on Natural Resources.

Tabutne. Thank you for this opportunity to testify on ocean policy solutions for coastal resiliency, and for your dedicated work and the work of your staff in bringing this bill together.

I am an Assistant Professor in the Faculty of Environment at the University of Waterloo, and have served since 2013 in a regional ocean planning capacity, as a former Tribal Co-Lead for the Mid-Atlantic Regional Planning Body, and now as a member of the Steering Committee for the Mid-Atlantic Committee on the Ocean.

I speak before you today not only as a water scientist and legal scholar, but as a Shinnecock woman. Although I should note that I am not here in an official capacity as a Tribal governmental representative. However, I am an enrolled citizen of the Shinnecock Indian Nation. Our territory is located on the eastern end of Long Island, New York, and we are a coastal Tribal Nation that has

existed on our aboriginal lands and waters for more than 10,000 years.

Shinnecock, in our language, means "People of the Shore." We are water people. We are fishermen and baymen, and have harvested the bounty of the sea since time immemorial. But above all, we are ocean protectors.

In 2012, when Superstorm Sandy hit our community and countless other communities along the Atlantic coast, we knew climate change would have irreparable consequences for our territory if we did not take swift action to address the climate crisis. Increasing extreme storm events mean more flooding, saltwater intrusion, infrastructure vulnerabilities, power outages, and the potential for loss of life.

Eastern Tribal Nations were severely impacted by Hurricane Sandy, and some reservations, like my own, went weeks without power. With rising sea levels, Tribal Nations are on the front lines of coastal communities with little protection within existing legislation for adaptation and capacity building. This is why we need the Ocean-Based Climate Solutions Act.

I go into more detail in my written testimony, but I would like to highlight a few high-level points with you today.

Global studies have found that nearly 80 percent of the world's land-based biodiversity is located on Indigenous peoples' territories. And if the United States is to set a national goal of conserving at least 30 percent of the land and 30 percent of the ocean by 2030, that goal should also support Tribal sovereignty and Indigenous-led conservation.

Protection of land and ocean areas should not limit Tribal access to food sovereignty, stewardship practices, or maintenance of heritage sites and cultural resources. As Indigenous peoples, our communities cannot benefit from the ocean-based solutions presented in the bill if we are not counted.

Data collection and monitoring of the Great Lakes, oceans, bays, estuaries, and coasts must be done in consultation with Tribal Nations and align with Indigenous data sovereignty principles of free, prior, and informed consent.

Our role as Tribal Nations is not that of stakeholder, but of sovereigns and rights holders in a government-to-government relationship with the United States. As former Tribal Co-Lead for the Mid-Atlantic Regional Planning Body, I saw firsthand the shift in ocean governance when intergovernmental coordination is mandated, and Tribal Nations are included in equal parity to state and Federal representatives.

Tribes should not be made to compete with state governments for funds to conserve ocean ecosystems. The Ocean-Based Climate Solutions Act fills a gap in the Coastal Zone Management Act (CZMA) where, previously, Tribal Nations were ineligible to access CZMA funds. This type of funding would allow Tribal Nations, such as Shinnecock, to continue our coastal habitat restoration work, and build shoreline resiliency through nature-based solutions that are grounded in our Indigenous knowledge systems.

As Shinnecock people, we have a deep cultural connection to whales, and the recent unusual mortality events in the Mid/North Atlantic waters have terrified our community and other Indigenous

communities in the region. I believe the whale is like a miner's canary, a foreboding and sacrificing alarm of our current climate crisis, and the need to take immediate action not only to protect our whale relatives, but the planet.

I want to conclude today by sharing one remaining story from my community, the Shinnecock Nation. Like many coastal communities, if sea levels continue to rise, half our reservation could be inundated by water by 2050. With a growing population and a depleting land base and no existing legislative process for relocation of Tribal Nations to lands of cultural patrimony, where we would retain our land status, what will become of us?

We echo the calls of our Pacific Island brothers and sisters—"We are not drowning, we are fighting." And we need the Federal Government to fight for us.

Tabutne. And thank you for your time today.

[The prepared statement of Dr. Leonard follows:]

PREPARED STATEMENT OF DR. KELSEY LEONARD

Chairman Grijalva, Ranking Member Bishop, and members of the House Committee on Natural Resources—Tabutne/ thank you for this opportunity to testify on ocean policy solutions for coastal community resiliency and to ensure the conservation and restoration of ocean and coastal habitats.

I am an Assistant Professor in the Faculty of Environment at the University of Waterloo and have served since 2013 in a regional ocean planning capacity as a former Tribal Co-Lead for the Mid-Atlantic Regional Planning Body and now as a member of the steering committee for the Mid-Atlantic Committee on the Ocean.[1] Our regional ocean planning work has received international recognition and was awarded the Peter Benchley Ocean Award for Excellence in Solutions in 2017. I speak before you today not only as a water scientist and legal scholar, but as a Shinnecock woman. Although, I should note that I am not here in an official capacity as a Tribal governmental representative.

However, I am an enrolled citizen of the Shinnecock Indian Nation, our territory is located on the eastern end of Long Island, New York and we are a coastal Algonquian Tribal Nation that has existed on our aboriginal lands and waters for more than 10,000 years. Shinnecock in our language means "People of the Shore." We are water people. We are fishermen and baymen and harvested the bounty of the sea since time immemorial. But above all we are Ocean protectors.

In 2012 when Superstorm Sandy hit our community and countless other communities along the Atlantic coast, we knew climate change would have irreparable consequences for our territory if we did not take swift action to address the climate crisis. Increasing extreme storm events mean more flooding, saltwater intrusion, infrastructure vulnerabilities, power outages, and potential for loss of life.[2] Eastern Tribal Nations in New Jersey, Delaware, New York, and Connecticut were severely impacted by Hurricane Sandy. Some reservations went weeks without power after the storm hit.[3] With rising sea levels Tribal Nations are frontline coastal communities with little protection within existing legislation for adaptation and capacity building. This is why we need the Ocean-Based Climate Solutions Act. However, full engagement by Indigenous Peoples is critical to fulfilling the policies described in the Ocean-Based Climate Solutions Act and the operationalization of the bill must honor treaties and support Tribal Sovereignty, the Federal Trust Responsibility, Tribal Self Determination, and the Government-to Government relationship between Tribal Nations and the Federal Government.

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[3] ICTMN. (2012). "Hurricane Sandy Passes, Tribes Begin Assessing Damage." Indian Country Today Media Network, Verona, NY.

I. ESTABLISH A NATIONAL GOAL OF CONSERVING AT LEAST 30 PERCENT OF THE LAND AND OCEAN OF THE UNITED STATES BY 2030

Global studies have found that nearly 80% of the world's land-based biodiversity is located on Indigenous Peoples' territories[4] and if the United States is to set a national goal of conserving at least 30 percent of the land and 30 percent of the ocean within the United States by 2030 that goal should also support Tribal Sovereignty and Indigenous-led conservation. Protection of land and ocean areas should not limit Tribal access to food sovereignty, stewardship practices or maintenance of heritage sites and cultural resources. As Indigenous Peoples and Tribal Nations we have been stewards of these lands and waters for thousands of years and our conservation practices represent an applied science based on dynamic and cumulative observational data. In the establishment of new protected areas there should be established co-governance arrangements with Tribal Nations. There are examples of Indigenous-led protected areas around the world[5] and the Ocean-Based Climate Solutions Act could shape the United States as a world leader not only in conservation but Indigenous rights restoration. It is past time the Federal Government begins to fulfill its 2010 endorsement of the United Nations Declaration on the Rights of Indigenous Peoples.

II. IMPROVE DATA COLLECTION AND MONITORING OF THE GREAT LAKES, OCEANS, BAYS, ESTUARIES, AND COASTS, AND FOR OTHER PURPOSES

As Indigenous Peoples our communities cannot benefit from the ocean-based solutions presented in the bill if we are not counted. Data collection and monitoring of the Great Lakes, oceans, bays, estuaries, and coasts must be done in consultation with Tribal Nations and align with Indigenous data sovereignty principles including free, prior, and informed consent. Within the BLUE GLOBE Act there are areas for enhanced coordination with Tribal Nations and Indigenous Peoples. Through my work with the Mid-Atlantic Regional Ocean Data Portal I have seen the immense benefit ocean data can have when made accessible to Tribal Nations for planning and policymaking. However, our ocean data infrastructure, especially funding streams available for Tribal Nations' data collection and monitoring, is severely underfunded. You have the opportunity with these bills to remedy that and to create tools that will allow for best-available science to include Indigenous science and traditional ecological knowledges to inform sound decision-making for ocean governance.

However, in building these data sources with Indigenous partners additional care is needed. I support portions of the bill that call for Indigenous communities to retain rights of ownership over data provided to Federal agencies and would encourage the adoption of the Global Indigenous Data Alliance C.A.R.E. principles for Indigenous data governance[6,7] which include: Collective benefit; Authority to Control; Responsibility; and Ethics.

- **Collective benefit:** Data ecosystems shall be designed and function in ways that enable Indigenous Peoples to derive benefit from the data.
  - —*C1. For inclusive development and innovation*
  - —*C2. For improved governance and citizen engagement*
  - —*C3. For equitable outcomes*

[4] Schuster, Richard, et al. "Vertebrate biodiversity on indigenous-managed lands in Australia, Brazil, and Canada equals that in protected areas." *Environmental Science & Policy* 101 (2019): 1–6.

[5] Ban, Natalie C., and Alejandro Frid. "Indigenous peoples' rights and marine protected areas." *Marine Policy* 87 (2018): 180–185.

[6] Global Indigenous Data Alliance. "CARE principles for Indigenous data governance." GIDA https://www.gida-global.org/care (2019).

[7] Carroll, Stephanie Russo, et al. "The CARE Principles for Indigenous Data Governance." *Data Science Journal* 19, no. 1 (2020).

- **Authority to Control:** Indigenous Peoples rights and interests in Indigenous data must be recognized and their authority to control such data respected. Indigenous data governance enables Indigenous Peoples and governing bodies to determine how Indigenous Peoples, as well as Indigenous lands, territories, resources, knowledges, and geographical indicators are represented by and identified within data.

  —*A1. Recognizing rights and interests*

  —*A2. Data for governance*

  —*A3. Governance of data*

- **Responsibility:** Those working with Indigenous data have a responsibility to share how that data are used to support Indigenous Peoples' self-determination and collective benefit. Accountability requires meaningful and openly available evidence of these efforts and the benefits accruing to Indigenous Peoples.

  —*R1. For positive relationships*

  —*R2. For expanding capability and capacity*

  —*R3. For Indigenous languages and worldviews*

- **Ethics:** Indigenous Peoples' rights and well-being should be the primary concern at all stages of the data life cycle and data ecosystem.

  —*E1. For minimizing harm and maximizing benefit*

  —*E2. For justice*

  —*E3. For future use*

Moreover, data collection on the Blue Economy must include Tribal industries. In this way Tribal-level statistics should be included to measure the contribution of the Great Lakes, oceans, bays, estuaries, and coasts to the overall economy of the United States.

III. REQUIRE RESEARCH IN COASTAL SUSTAINABILITY AND RESILIENCE, TO ENSURE THAT THE FEDERAL GOVERNMENT CONTINUES TO IMPLEMENT AND ADVANCE COASTAL RESILIENCY EFFORTS, AND FOR OTHER PURPOSES

Indigenous Peoples are on the frontlines of climate change. Indigenous communities, like my own, face severe livelihood risks due to increasingly extreme climate events and as such must be equal partners in the development of scalable best practices and solutions to ensure more resilient and sustainable communities. Our role as Tribal Nations is not that of stakeholder but of sovereigns and rights holders in a government to government relationship with the United States. Our research practices must therefore reflect that distinct relationship and the United States must honor the federal fiduciary responsibility to Tribes.

IV. DESIGNATE REGIONAL OCEAN PARTNERSHIPS OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND FOR OTHER PURPOSES

As former Tribal Co-Lead for the Mid-Atlantic Regional Planning Body I saw first-hand the shift in ocean governance when intergovernmental coordination is mandated, and Tribal Nations are included in governance with equal parity to state and federal representatives. This form of ocean justice in intergovernmental coordination led to the first U.S. National Ocean Policy and regional ocean action plans[8] that were unprecedented in American history. I also saw the development of a regional ocean assessment[9] process that valued Indigenous science and can now serve as a model for integration of Indigenous data and science into the ocean planning process through regional ocean data portals. We need more of that level of coordinated action. The Ocean-Based Climate Solutions Act positions the United States once more to be a leader in ocean governance that prides itself on fairness, equity, and participation of all peoples in ocean decision-making.

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[8] Mid-Atlantic Regional Planning Body. "Mid-Atlantic regional ocean action plan." (2016). https://www.boem.gov/environment/mid-atlantic-regional-ocean-action-plan.

[9] Mid-Atlantic Regional Planning Body. "Mid-Atlantic Regional Ocean Assessment." (2015). https://roa.midatlanticocean.org/.

However, within the Regional Ocean Partnership Act there is not a pathway for intergovernmental coordination among Tribes. It would be my recommendation that the path set forward to promote intergovernmental coordination among states is provided equally to Tribal Nations and the funding streams would be equally accessible and operationalized. Unfortunately, coastal Indian Tribes in regions outside of the West Coast are absent from the bill and the replacement of Regional Planning Bodies by Regional Ocean Partnerships for intergovernmental coordination has hindered progress for ocean planning and conservation. Tribes should not be made to compete with State governments for funds to conserve ocean ecosystems and maintain habitats of cultural patrimony.

V. OFFSHORE ENERGY

I support Title III of the bill limiting oil and gas leasing in the outer continental shelf and would echo the concerns of Tribal leaders across the country who through the National Congress of American Indians in 2009 issued a resolution calling for greater coordination on the impacts of outer continental shelf developments on Tribal rights and sovereignty.[10] Moreover, other offshore energy developments should occur in consultation with Tribal Nations in a government-to-government relationship. Tribal rights extend to ocean related activities and Tribes have reserved rights and inherent sovereignty for purposes of ocean and marine development. Moreover, wealth gained from offshore energy leasing should be shared with Tribal Nations and Indigenous communities who are ocean rights holders that predate the United States.

VI. ESTABLISH AN INTERAGENCY WORKING GROUP ON COASTAL BLUE CARBON, AND FOR OTHER PURPOSES

With regards to the Blue Carbon for Our Planet Act I support the development of Integrated Pilot Programs To Restore Degraded Coastal Blue Carbon Ecosystems among Tribes, ensuring that Indigenous communities are not only included in the program but equitably represented based on disproportional impacts of climate change on our communities.[11] Moreover, the Federal Government must ensure that data included in the Coastal Carbon Data Clearinghouse includes disaggregated data accessible for Tribal Nations and Indigenous communities.

VII. PROVIDE GRANTS SUPPORTING RESEARCH ON THE CONSERVATION, RESTORATION, OR MANAGEMENT OF OYSTERS IN ESTUARINE ECOSYSTEMS, AND FOR OTHER PURPOSES

Indigenous Peoples throughout the Mid-Atlantic have harvested oysters sustainably for thousands of years. Our own Shinnecock oysters are prized among some of New York City's top restaurants. Historically, we harvested the meat and with the shells we created vast mounds—known as shell middens—that show an archaeological record of oyster stewardship that can and should inform sustainable practices for oyster habitat restoration today.[12] The portions of the bill that call for increased research on the conservation, restoration, or management of oysters in estuarine ecosystems are needed and we hope that Tribal Nations and Indigenous communities can be listed as eligible entities for receipt of those research grants.

VIII. GRANTS TO FURTHER ACHIEVEMENT OF TRIBAL COASTAL ZONE OBJECTIVES

The Ocean-Based Climate Solutions Act fills a needed gap in the Coastal Zone Management Act (CZMA) where previously Tribal Nations were ineligible to access CZMA funding. This type of funding would allow Tribal Nations, such as Shinnecock, to continue our coastal habitat restoration work and build shoreline resiliency through nature-based solutions grounded in our Indigenous knowledge systems.[13]

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[10] The National Congress of American Indians, Resolution #PSP-09-024, "Outer-Continental Shelf Protection and Coordination" (2009) (https://www.ncai.org/attachments/Resolution_TOwvMXRiPywSFtMIWInuAkzlOotkWKpxzfTXPvSHIUZCwSTGKZt_PSP-09-024_final.pdf).

[11] Norton-Smith, Kathryn, et al. "Climate change and indigenous peoples: a synthesis of current impacts and experiences." *Gen. Tech. Rep*. PNW-GTR-944. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station. 136 p. 944 (2016).

[12] Jansen, Alex. "Shell middens and human technologies as a historical baseline for the Chesapeake Bay, USA." *North American Archaeologist* 39, no. 1 (2018): 25–50.

[13] Sengupta, Somini and Shola Lawal. (2020, March 5). The Original Long Islanders Fight to Save Their Land From a Rising Sea. Retrieved from https://www.nytimes.com/2020/03/05/climate/shinnecock-long-island-climate.html.

IX. STRENGTHENING MARINE MAMMAL CONSERVATION

As Shinnecock People we have a deep cultural connection to whales and the recent Unusual Mortality Events in Mid/North Atlantic have caused grave alarm within our community and other Indigenous communities in the region. I believe the whale is like a miner's canary a foreboding and sacrificing alarm of our current climate crisis and the need to take immediate action not only for their protection but for the planet. Therefore, Title VIII of the Ocean-Based Climate Solutions Act is needed to protect these relations and that the conservation practices implemented would be informed by Indigenous and western science and support Tribal Sovereignty.

X. BUREAU OF INDIAN AFFAIRS TRIBAL RESILIENCE PROGRAM

Title IX of the Act is important to ensure the Federal Government can meet its fiduciary obligations to Tribes. Tribal Nations are frontline communities and require these grants to be able to build resiliency in our nations and ensure our deteriorating infrastructure can be rebuilt to withstand climatic changes.

XI. COASTAL RESILIENCY AND ADAPTATION

I want to conclude today by sharing one remaining story from my community, the Shinnecock Nation. Like many coastal communities if sea levels continue to rise half our reservation could be inundated by water by 2050.[14,15] With a growing population and a depleting land base and no existing legislative process for relocation of Tribal Nations to lands of cultural patrimony where we would retain our land status what will become of us? We echo the calls of our Pacific Island brother and sisters "We are not drowning. We are fighting." And we need the Federal Government to fight with and for us. The Federal Trust Responsibility is "a legally enforceable fiduciary obligation on the part of the U.S. to protect Tribal treaty rights, lands, assets, and resources, as well as a duty to carry out the mandates of Federal law with respect to American Indian and Alaska Native Tribal Nations and Villages" as well as to non-federally recognized Indigenous Peoples. Sea Level Rise poses a direct threat to the lands, waters, assets, resources, and ecosystems that are protected by the Federal Trust Responsibility. I support portions of the bill that establish processes for relocation of communities and humbly call for the Federal Government to do more. Tribal Nations currently confront a significant unmet funding need for relocating or protecting infrastructure threatened by climate impacts. There is not only a need for funding but for legislative guarantees that our land status will transfer with our people as we are forced to relocate due to the climate crisis. The Ocean-Based Climate Solutions Act is the opportunity to create a world where the United States is a leader in ocean justice for the benefit of all peoples.

Tabutne. Thank you for your time today.

QUESTIONS SUBMITTED FOR THE RECORD TO DR. KELSEY LEONARD, SHINNECOCK INDIAN NATION

Questions Submitted by Representative Cox

Question 1. The Chairman's bill would also establish a Blue Carbon Program at NOAA to improve the management of coastal carbon sinks. What benefits would this new program bring to the management of coastal carbon sinks? What existing management practices need to be improved?

Answer. Existing management practices can be improved through greater consultation of Tribal governments and inclusion of Indigenous Knowledge ensuring the best available science for decision-making in the management of coastal carbon sinks. Coastal ecosystems such as mangroves, sea grass, and tidal marshes, are essential to climate change resilience due to their roles in storm surge buffering and food security and their unique capacity for carbon storage. Coastal carbon sinks, referred to as blue carbon ecosystems, sequester more carbon per area unit than do terrestrial forests. They are also extremely threatened due to both climate change

[14] Shepard, Christine C., et al. "Assessing future risk: quantifying the effects of sea level rise on storm surge risk for the southern shores of Long Island, New York." *Natural hazards* 60, no. 2 (2012): 727–745.

[15] NOAA Coastal Services Center. (2012). "Sea Level Rise and Coastal Flooding Impacts Viewer." http://coast.noaa.gov/digitalcoast/tools/slr.

and anthropogenic forces. For example, the IUCN predicts that all mangrove ecosystems could disappear in the next century under a business-as-usual scenario. Destruction of coastal carbon sinks not only releases the carbon stored therein, but also reduces overall capacity to uptake carbon from the atmosphere.

The program established under Title I of this bill would ensure that the most valuable blue carbon ecosystems are identified, protected, and continuously studied and monitored to better understand their role in mitigating and adapting to climate change. The comprehensive blue carbon program would facilitate interagency cooperation and management of coastal carbon sinks, promote public understanding of these valuable resources, support partnerships between federal agencies, Tribes, state and local governments or NGOs, and increase protection from agency actions for areas designated under the program.

Importantly, the program would also assess the economic, social, and environmental impacts and co-benefits of carbon storage, such as reduced flood risk, maintenance of biodiversity, and healthy fisheries, as well as the makeup of communities served by these ecosystems. The program prioritizes funding for blue carbon restoration projects that would benefit communities of color, low-income, and Tribal Nation or Indigenous communities.

Questions Submitted by Representative Velázquez

Question 1. Dr. Leonard, H.R. 8632 includes important provisions for the U.S territories, which have been heavily impacted by natural disasters during the last 4 years. Specifically, Section 704, requires the NOAA Administrator to provide technical assistance to improve data collection and forecasting for extreme weather. How will technical assistance like this benefit territories like Puerto Rico, which has limited resources and is still recovering from Hurricane Maria?

Answer. This year has already seen the greatest number of hurricanes in the Atlantic Ocean since NOAA began recording hurricanes in the 1850s.[1] Studies show that climate change is increasing the risk of severe weather events, and the brunt of that risk will be borne by areas already impacted by major tropical storms, typhoons, and hurricanes. Additionally, higher sea levels and atmospheric moisture increase levels of flooding associated with major oceanic weather events. Shifts in the range and severity of storm events weaken the reliability of existing predictive data, which has already proven insufficient to prevent tragic losses of life and billions of dollars in damage. Hurricane Maria was the wettest hurricane on record to hit Puerto Rico, and severe rainfall of that degree is now five times more likely to hit the island than it was 50 years ago.[2] In addition to causing at least 3,000 deaths, Hurricane Maria destroyed Puerto Rico's main weather radar used for hurricane forecasting, and significant investment is needed to both rebuild and improve the island's forecasting capabilities. For all U.S. territories facing the risk of natural disasters, more comprehensive data collection and weather forecasting is essential to supporting impacted-based decision services in and facilitating pre-disaster preparations.

Technological advances over the past decade have increased forecasting abilities, and additional funding is needed to both implement existing technology and continuing to develop new forecasting methods. NOAA's recent deployment of hurricane gliders to increase data availability on ocean conditions and improve the accuracy of hurricane forecasting is an example of the highly beneficial technology that can be implemented when sufficient funding is available. Minimizing uncertainty in forecasting means increasing the time that potentially impacted territories have to prepare for threats facing them. Section 704's grant program would ensure that territories can engage with and benefit from such technology to live-saving ends. Additionally, Section 704 would also provide needed resources to ensure technological advances are inclusive of Indigenous Knowledge from U.S. Territories.[3] A recent study by David-Chavez et al. (2020) found that resource limitations were a significant obstacle to Indigenous Knowledge mobilization in the Caribbean including Borikén (Puerto Rico).[4]

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[1] https://www.noaa.gov/news/2020-atlantic-hurricane-season-takes-infamous-top-spot-for-busiest-on-record.

[2] https://www.nature.com/articles/d41586-019-01280-w.

[3] David-Chavez, D.M. & Gavin, M.C. (2018). A global assessment of Indigenous community engagement in climate research. *Environmental Research Letters*, 13(12), 123005.

[4] David-Chavez, D.M., et al. (2020). Community-based (rooted) research for regeneration: understanding benefits, barriers, and resources for Indigenous education and research. *AlterNative: An International Journal of Indigenous Peoples*, 16(3), 220–232.

Question 2. Dr. Leonard, climate change issues are deeply intertwined with injustice and human rights disputes. As you know, LMI and communities of color are unfairly exposed to, and impacted by, hazardous pollution and industrial practices. Can you explain how H.R. 8632 guards our Nation's waters and redistributes resources, protection, and power to LMI and minority frontline communities where environmental injustices are most pervasive?

Answer. Multiple sections of the Ocean-based Climate Solutions Act prioritize the needs and interests of LMI and minority frontline communities in light of the disproportionate risk of harm from climate change that these communities face and the disproportionate burden of environmental and resource degradation placed on these communities by present and historic government practices.

Sec. 107 secures protections for coastal areas that buffer frontline communities from storm surges and requires increased agency consultation regarding actions that would impact areas designated under the section. Sec. 201 calls for the protection of marine habitats that mitigate threats to vulnerable coastal communities by protecting natural resources vital to health and economies of those communities. It also requires the section to be implemented in such a way as to increase access to nature for low-income and communities of color. Sec. 1005 creates a grant program for shovel-ready restoration of coasts and fisheries and prioritizes projects that would benefit communities without adequate resources. Sec. 1302 likewise creates a grant program for coastal and estuary resilience projects that advance environmental justice by reducing the disproportionate impact of climate change on frontline communities.

These sections, among others, both dedicate resources to increasing the resilience of vulnerable communities in the face of climate change and ensure the consideration of these communities in the development and implementation of federal policy.

The CHAIRMAN. Thank you very much, Dr. Leonard.

Let me now turn to and recognize Dr. Hilborn for his testimony. Thank you, Doctor.

STATEMENT OF RAY HILBORN, PROFESSOR, SCHOOL OF AQUATIC AND FISHERY SCIENCES, UNIVERSITY OF WASHINGTON, SEATTLE, WASHINGTON

Dr. HILBORN. Mr. Chairman and Members, thank you for this opportunity to address the Committee on this important issue.

As someone who has worked in fisheries for over 50 years, and done field work in Alaska for almost 40 years, I know that global warming is real, and climate change is the major challenge to American fisheries. The question is, what are the most appropriate tools to respond?

Before we discuss how to respond to climate change, we first need to set the stage. What is the state of U.S. fisheries and oceans?

U.S. fish stocks are healthy and increasing in abundance, and U.S. fisheries management is highly precautionary. A recent paper in *Proceedings of the National Academy of Sciences* showed that overfishing is causing only a 3–5 percent loss in potential yield from U.S. fisheries, whereas precautionary underfishing is causing far more loss of yield. Overfishing is simply not a concern for U.S. fisheries production. Science-based management under the Magnuson-Stevens Act is working.

So, how should we respond to the challenges of climate change?

The United States has an admirable set of laws and institutions that can do this. The Regional Fisheries Management Councils have the authority, and the Magnuson-Stevens Act, the Endangered Species Act, the Marine Mammal Protection Act, and other legislation give councils the tools to respond to climate change. We don't need a fixed set of closed areas; we need adaptive response to climate.

In the years ahead, it will be important for fisheries management to be more flexible, allowing for changes in the distribution and productivity of marine species. Areas and stocks that are high priority for protection now may not be the same in 20 years.

This brings me to Title II of the Ocean-Based Climate Solutions Act, which would require establishment of marine protected areas that ban all commercial fishing activity in 30 percent of U.S. ocean waters by 2030. Such fixed marine protected areas are simply the wrong tool to adapt to climate change.

There are three primary objectives in the 30x30 proposal: (1) to increase target species production; (2) to better protect non-target species; and (3) to protect sensitive habitats. MPAs will either not help achieve these objectives, or there are far better tools.

Both theory and empirical evidence shows you cannot increase target species yield with MPAs unless overfishing is widespread. This is not the case in the United States. We would not expect MPAs to increase the yield from our fish stocks. Certainly, there are typically more fish in closed areas than outside, but remember that the fishing effort that was previously inside the MPA has been moved outside. The evidence shows that when MPAs are put in place and stocks are well managed, abundance goes up in the closed area, but goes down outside with no net gain. MPAs would help to increase yield in places where overfishing is common, such as South and Southeast Asia, but not the United States.

It has been clearly demonstrated that bycatch can be best reduced by changes in fishing technology, fishing gear, or changes in incentives to alter fleet behavior. Bycatch reduction of 90 percent has been achieved by turtle excluder devices for trawls, acoustic pingers for gill nets, and a combination of tori lines, change in bait, circle hooks, and night setting for longlines. The spatial location of bycatch problems will change as species distribution changes. Closing fixed areas of the oceans based on current distributions will not be effective.

Certainly, vulnerable marine ecosystems need protection, but Fishery Management Councils are doing that in a way that is science-based, and has credibility with industry and other stakeholders. These areas should be mapped and protected from fishing gear that impacts certain species, but the distribution of these species may well shift with climate change, and fixed closed areas are not the right tool.

MPA advocates argue that areas with no fishing are more resilient to climate change than fished areas, but they ignore the fact that a 30x30 would cause 70 percent of U.S. oceans to see increased fishing pressure from vessels that move out of the 30 percent closed. Thus, if the areas inside the reserve are more

resilient, the areas outside would be less resilient. Do we really want to make 70 percent of our oceans less resilient to climate change?

For none of these issues are no-take areas the most appropriate tool, but the proposed legislation would draw staff time, resources, and industry engagement away from the really effective tools. MPAs will also not help other threats to the ocean, such as ocean acidification, exotic species, land-based runoff, plastics, or illegal fishing.

I certainly agree with my colleagues in the environmental movement that we need protection of our oceans. But Title II takes the wrong approach, and we can do better if we apply the same resources that will work. Let councils use the effective tools to protect 100 percent of the U.S. oceans, not apply an ineffective tool to 30 percent.

Thank you very much.

[The prepared statement of Dr. Hilborn follows:]

PREPARED STATEMENT OF RAY HILBORN, PROFESSOR, SCHOOL OF AQUATIC AND FISHERY SCIENCES, UNIVERSITY OF WASHINGTON

Good morning and I want to thank the members and staff for the opportunity to address this committee. My name is Ray Hilborn, I am a Professor of Fisheries and Aquatic Sciences at the University of Washington. I have been studying fisheries management for 50 years, both in the U.S. and in a number of other countries and international commissions. I currently serve on the SSC of the Western Pacific Council. My research has resulted in 300 peer reviewed journal articles, and several books including "Quantitative fisheries stock assessment and management" which is a standard reference work on fisheries management. My work has been recognized by several awards including the Volvo Environmental Prize, the International Fisheries Science Prize, and the Ecological Society of America's Sustainability Science Prize.

I am not representing any group, although I do receive research funding from a wide range of sponsors including major U.S. foundations such as the Gordon and Betty Moore Foundation, the David and Lucielle Packard Foundation and the Walton Family Foundation; NGOs such as the Environmental Defense Fund, The Nature Conservancy and the Natural Resources Defense Council; agencies including the National Science Foundation and NOAA; and commercial and recreational interest groups.

As someone who has worked in fisheries for over 50 years, and done field work in Alaska for almost 40 years, I know that global warming is real, and climate change is the major challenge to American fisheries. The key question is what are the most appropriate tools to respond?

Before we discuss how to respond to climate change we first need to set the stage. What is the state of U.S. fisheries and Oceans? U.S. fish stocks are healthy and increasing in abundance, and U.S. fisheries management is highly precautionary. Figure 1 shows the median abundance of scientifically assessed stocks in the U.S. relative to the reference point of the abundance that would produce maximum sustainable yield.[1] As you will see the median abundance has always been above the target level and has been increasing since 2000.

[1] Data from NOAA stock assessments and can be found in www.ramlegacy.org.

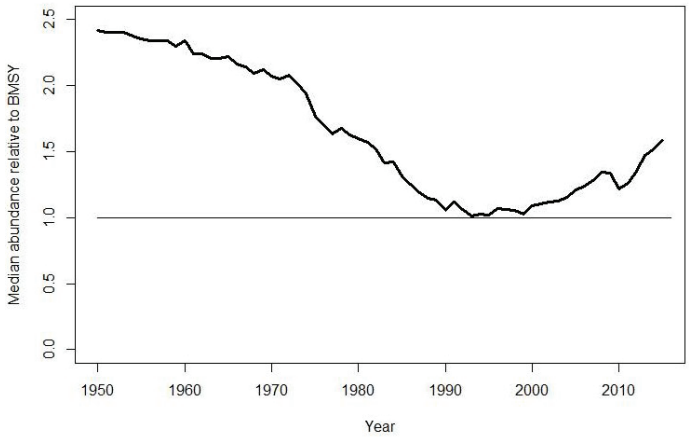

Figure 1. Median stock abundance of U.S. stocks relative to the target biomass that would produce maximum sustainable yield.

In a recent paper in Proceedings of the National Academy of Sciences (1), we showed that overfishing is causing only a 3–5% loss in potential yield from U.S. fisheries, whereas precautionary underfishing is causing far more. Figure 2 shows the loss of U.S. fish production in millions of tons from overfishing, and from underfishing. Underfishing is simply harvesting less than would produce maximum sustainable yield. If we were to fully exploit all of our underfished resources we might increase yield by 40%. Overfishing is simply not a major concern for U.S. fisheries production: science-based management under the Magnuson-Stevens Act is working.

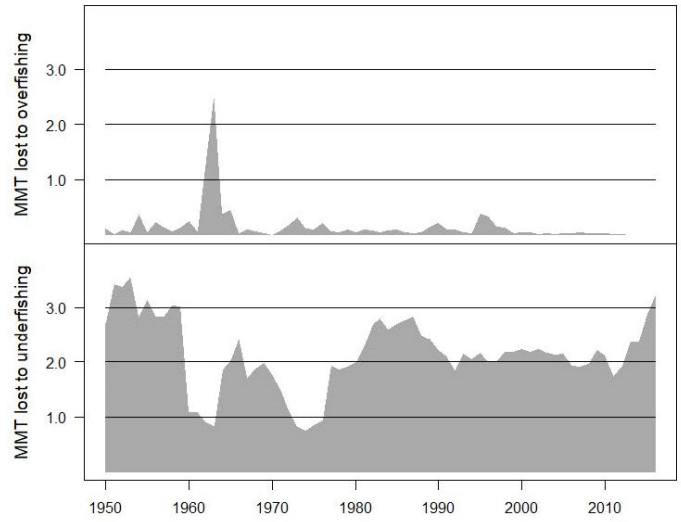

Figure 2. The amount of yield lost to overfishing and underfishing from U.S. fish stocks.

Also to set the stage, the Committee should be aware that in general U.S. fisheries produce food, protein and nutrients at much lower environmental cost than alternative land-based production methods (2). Expanding crops production requires destroying native ecosystems, with most growth in global production coming from

conversion of tropical forests. In contrast the well-managed U.S. fisheries maintain largely natural ecosystems that are little altered when compared to the conversion from forest to crops. Anything that reduces U.S. fish production will either cause us to import more fish from places with lower environmental standards, or rely on more land based production.

The impact of fishing on non-target species such as birds, and mammals, and on vulnerable marine ecosystems, is less well known but of more concern than overfishing target species, and to me the major challenge to sustaining our oceans and producing food from the ocean.

Climate change has two major dimensions, warming and increased variability in weather. Warming has been shown to cause species to shift their ranges (3), generally but not always toward the poles, and some species will become less productive and others will become more productive. We may also expect more variation from year to year in the abundance of fish stocks.

Recent examples of shifting distributions include the movement of pollock in the Bering Sea northwards, and North Atlantic right whales moving into areas of intense lobster and crab fishing. Responding to these changes in distribution requires dynamic real time management.

So how should we respond to the challenges of climate change? The U.S. has an admirable set of laws and institutions that can do this. The Regional Fisheries Management Councils have the authority, and the Magnuson-Stevens Act, the Endangered Species Act, the Marine Mammal Protection Act and other legislation gives Councils the tools to respond to climate change. We don't need a massive overhaul of existing law to tackle the challenge.

In the years ahead it will be important for fisheries management to be more flexible, allowing for changes in distribution and productivity. Areas and stocks that are high priority for protection now may not be the same in 20 years.

That brings me to Title II of the Ocean-Based Climate Solutions Act, which would require the establishment of marine protected areas that ban all commercial fishing activity in 30 percent of U.S. ocean waters by 2030. Such marine protected areas are simply the wrong tool for adapting to climate change. There are three primary objectives of the 30x30 proposal; (1) to increase target species production, (2) to protect non-target species and (3) to protect sensitive habitats. MPAs will either not help or there are better tools.

Both theory and empirical evidence shows that you cannot increase target species yield with MPAs unless overfishing is wide spread (4),(5),(6). Overfishing is rare in the U.S. and we would not expect MPAs to increase the yield from our fish stocks. Certainly there are typically more fish in the closed areas than outside, but remember that the fishing effort that was previously inside the MPA has been moved outside. The evidence shows that when MPAs are put in place and stocks are well managed, abundance goes up inside the closed area, and goes down outside with no-net gain.

In the highly publicized MPA network set up in California it has been shown that abundance of target species increased inside reserves, but declined outside (7) and that the result was no measureable increase in fish abundance (6).

It has been clearly demonstrated that bycatch can be best reduced by changes in fishing technology, fishing gear, or changes in incentives to alter fleet behavior. The dramatic reductions in bycatch from turtle excluder devices for trawls, acoustic pingers for gill nets, and a combination of tori lines, change in bait, circle hooks and night setting for longlines has often reduced bycatch by 90%. The distribution of bycatch problems will change as species distribution changes. Setting aside fixed areas of the oceans is not going to be effective.

Certainly, vulnerable marine ecosystems need protection, but many Fishery Management Councils are doing that—and in a way that is science-based and has creditability with industry and other stakeholders. Moreover, these areas only need protection from mobile bottom contact gear such as trawls and dredges. There is no need to ban midwater trawling, purse seining, longlining or surface gill nets to protect corals, sponges or sea grasses. Moreover the distribution of these species may well change with climate change.

MPA advocates argue that MPAs are more resilient to climate change than fished areas; however a recent review article (8) entitled "Climate change, coral loss, and the curious case of the parrotfish paradigm: Why don't marine protected areas improve reef resilience?" has shown no evidence for this. Furthermore, the MPA advocates ignore that fact that 30x30 would cause 70% of U.S. oceans to see increased fishing pressure from the vessels that moved out of the 30% closed, and thus potentially be less resilient to climate change. Do we really want to make 70% of our oceans less resilient to climate change?

For none of these issues are no take MPAs the most appropriate tool, but the proposed legislation would draw staff time, resources and industry engagement away from the really effective tools. The oceans in the U.S. are under many threats beyond climate change, including ocean acidification, exotic species, land based run-off, plastics and illegal fishing. There are solutions to each of these problems, but it is not no-take MPAs—they do nothing to mitigate these problems.

I certainly agree with my colleagues in the environmental movement that we need to protect our oceans, but Title II takes the wrong approach and we can do much better if we apply the same resources to the tools that will work. Let Councils use the effective tools to protect 100% of U.S. oceans, not apply an ineffective tool to 30%. No take areas are an inflexible, static tool, whereas agency management we already have can respond to climate change in real time.

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QUESTIONS SUBMITTED FOR THE RECORD TO DR. RAY HILBORN, PROFESSOR, SCHOOL OF AQUATIC AND FISHERY SCIENCES, UNIVERSITY OF WASHINGTON

Questions Submitted by Representative Bishop

Question 1. During the hearing we heard testimony that the Magnuson-Stevens Act isn't a conservation statute, and that additional statutory authority is needed. Do you agree with that characterization?

Answer. I strongly disagree with that statement. The implication was that Regional Fisheries Management Councils are only concerned with target species management. This is simply not true.

The Act is entitled the Magnuson-Stevens Fishery Conservation and Management Act. Conservation is the first reason for its existence. Public Law 94–265 describes it as an act "to provide for the conservation and management of fisheries and other purposes."

Among the "other purposes" are the protection of habitats; article 104–297 states "One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." Further, article 104–297 charges the Regional Fisheries Management Councils to "promote the protection of essential fish habitat in the review of projects conducted, under Federal permits, licenses, or other authorities that affect or have the potential to affect such habitat."

In addition to the mandates of the Magnuson-Stevens Act, Regional Fisheries Management Councils and NOAA are regulated by a range of other federal laws that mandate biodiversity protection. These include especially the Marine Mammal Protection Act and the Endangered Species Act, which require the councils and

NOAA to devote considerable attention to a wide range of non-target species and ecosystems.

Let us be clear, Marine Protected Areas in the U.S. and globally, have been almost exclusively a fisheries management measure; they simply move fishing effort. MPAs have had little if any impact on any of the other forces affecting marine ecosystems, and in the U.S. the Regional Fisheries Management Councils are required by law to consider fisheries impacts on all species of conservation concern and on marine habitats.

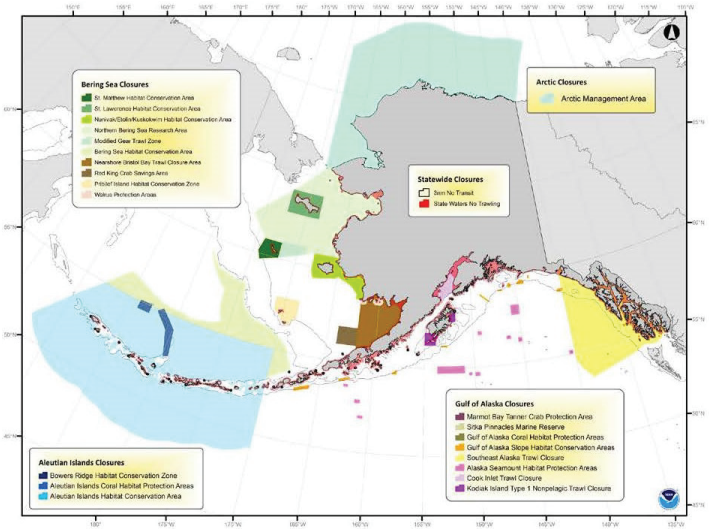
Further, a very high proportion of the scientific understanding of trends in marine biota is housed in the NMFS Regional Science Centers. NOAA's Office of Protected Resources is responsible for the conservation, protection, and recovery of species under the Endangered Species Act and the Marine Mammal Protection Act. The ecosystem division of the Regional Science Centers are a major hub of knowledge of the overall changes in the marine ecosystem. So there is an existing science and management structure well able to protect marine biodiversity as required by U.S. law. The notion that we should bypass this existing structure through the creation of new Marine Protected Areas is deeply misguided and would lead to duplication of effort.

Question 2. During the hearing we heard testimony that target species managed under the Magnuson-Stevens Act only comprise a small percentage of the biomass in any given ocean area, and that therefore MPAs are essential to achieve broader marine biodiversity objectives. Do you agree?

Answer. Regional Fishery Management Councils—drawing on the expertise of the Regional Science Centers and the Councils' Scientific and Statistical Committees—are responsible for managing fishing activity and considering its impacts on marine ecosystems. The idea that management is only concerned with the health of target species is simply untrue.

Certainly the target species are only a small portion of the marine ecosystems, but the fisheries management system is designed, and required, to consider a broad range of biodiversity. The Regional Science Centers conduct surveys that track changes in abundance of hundreds of species that are not target species, and the Regional Fisheries Management Councils devote much of their time and resources to minimizing the impact of fishing on non-target species and habitats.

As examples of how the existing legislation has protected ecosystems, the map below shows areas that are managed in a variety of ways to protect a wide range of marine biodiversity. Large areas of the marine ecosystem are closed to fishing to protect sensitive benthic species such as corals in the Aleutian Islands, and other areas closed to protect breeding grounds of birds and mammals.



This map courtesy of John Olsen, National Marine Fisheries Service.

It is not widely recognized how much of the US EEZ has been closed to fishing. At least 67% of the U.S. EEZ is closed to bottom trawling, and 24% of the area of the continental shelf. Over 3.8 million square kilometers of the US EEZ is in protected areas such as Marine Monuments, Wildlife Refuges, and Marine Sanctuaries. That is over 30% of the U.S. EEZ

Our federal system of fisheries management has evolved over more than four decades to put science at the center of the decision-making process. Council deliberations relating to biodiversity objectives are rigorous, and they are achieving considerable success. Creating a cabinet-level Task Force that would simply designate permanent Marine Protected Areas in large tracts of the U.S. Exclusive Economic Zone will encroach on the ability of Fishery Management Councils to achieve their management objectives. Overall biodiversity outcomes would be weakened, not improved.

The CHAIRMAN. Thank you, Dr. Hilborn, for your testimony.

And now let me recognize Dr. Kryc for her testimony.

You are recognized.

STATEMENT OF KELLY KRYC, DIRECTOR OF OCEAN POLICY, NEW ENGLAND AQUARIUM, BOSTON, MASSACHUSETTS

Dr. KRYC. Thank you, Chairman Grijalva, Ranking Member Bishop, and all of the Committee members for inviting me to testify on the topic of ocean climate action.

As a former resident of Arizona, a non-ocean state, I want to acknowledge Chairman Grijalva's leadership in introducing this bill, and recognizing that no matter where we reside, a healthy and thriving ocean is critical to all of us.

I am Dr. Kelly Kryc, the Director of Ocean Policy at the New England Aquarium in Boston, Massachusetts. I am also an oceanographer and a geoscientist. My career has focused on both the energy and environmental sides of climate. And although I currently serve in a role advocating for a healthy ocean, I also have experience working with the energy sector to achieve a balance between energy extraction and protecting the environment, conserving natural resources, and promoting safety. I am testifying today in support of H.R. 8632.

On the whole, the Ocean-Based Climate Solutions Act proposes a comprehensive, yet pragmatic framework for taking immediate action to limit the impacts of the climate crisis by harnessing the power of the ocean.

Let me be clear: the provisions outlined in the bill are absolutely necessary if we are to prevent the worst of what has been predicted under a business-as-usual scenario.

The evidence is overwhelming: we must severely curb emissions of greenhouse gases, and we need to do it now. Prohibiting new offshore oil and gas leasing, while simultaneously enhancing offshore wind energy production will help the United States meet its energy needs as the country works to achieve its climate targets.

In 2018, when the Trump administration announced a draft plan to open nearly the entire U.S. Outer Continental Shelf for potential oil and gas lease sales, the Aquarium opposed this course of action because of the risks posed to the ocean and coastal communities that depend on it for their living. We still oppose any new oil and gas activities offshore.

Despite our reservations related to offshore oil and gas development, the Aquarium fully supports the development of offshore renewable wind energy, with the caveat that the industry use the best-available science to inform the siting, construction, and ongoing operation of the platforms. While we recognize that offshore wind will likely impact the marine environment, we support this because climate change represents a much greater threat to the ocean and its wildlife.

Furthermore, by conducting scientific research, exercising the precautionary principle, and making decisions informed by the best scientific information available, we believe that the benefits of offshore wind in mitigating climate change far outweigh the costs.

One of the potential costs that the Aquarium is deeply vested in is the fate of the endangered North Atlantic right whale. Ensuring the ongoing recovery of vulnerable marine mammal populations is an essential component of any ocean-based solution to climate change. This bill addresses the important issue of marine mammal mortality caused by lethal strikes with vessels transiting the animals' habitats. In 2020 alone, two young endangered North Atlantic right whales were killed by vessel strikes. The current estimate of remaining North Atlantic right whales dropped to just 366 animals in 2020.

The bill's solution to reduce shipping speeds in U.S. waters addresses three complementary issues: first, slowing ships down directly reduces carbon emissions; second, slower vessel speeds are proven to reduce the lethality of strikes with marine mammals; third, slower vessel speeds reduce underwater noise through decreased propeller cavitation, which improves marine mammals' abilities to communicate and navigate. The Aquarium supports the bill's provision establishing a nationwide voluntary ship slowdown program, and encourages the Committee to consider mandatory speed restrictions in areas where right whales are present.

Taken together, the provisions in this title of the bill will make a meaningful difference in securing the health of marine mammals, which will ensure that they continue providing climate benefits as carbon reservoirs and fertilizers of the ocean.

In closing, the Aquarium is grateful to the Chairman and the Committee for their leadership on addressing ocean-based solutions to climate change. As an ocean scientist and an ocean advocate, I personally am grateful for the opportunity to shift the narrative of the ocean as a victim of the climate crisis to the ocean as the hero in this story. The solutions detailed in this bill should be implemented sooner, rather than later, to reduce the intensity of projected climate impacts, and set us on a sustainable path where humans find balance with the planet.

Thank you again for inviting me to serve as a witness in support of this important and groundbreaking legislation, and I look forward to your questions.

[The prepared statement of Dr. Kryc follows:]

PREPARED STATEMENT OF DR. KELLY KRYC, DIRECTOR OF OCEAN POLICY, NEW ENGLAND AQUARIUM

Thank you to Chairman Grijalva, Ranking Member Bishop, and all the committee members for inviting me to testify on the topic of ocean climate action: solutions to the climate crisis. As a former resident of Arizona—a non-ocean state—I want to acknowledge Chairman Grijalva's leadership in introducing H.R. 8632: The Ocean-Based Climate Solutions Act and the recognition that no matter where we as U.S. citizens reside, a healthy and thriving ocean is critical to all of us. I also want to thank the lead sponsors of the other bills (H.R. 3548, H.R. 3919, H.R. 4093, H.R. 5390, H.R. 5589, H.R. 7387, H.R. 8253, and H.R. 8627) being considered during this hearing for their efforts to keep the ocean front of mind and sustain the necessary science and research that informs decision making critical for managing our ocean ecosystems.

I am the Director of Ocean Policy at the New England Aquarium (Aquarium) based in Boston, Massachusetts. The New England Aquarium is a catalyst for global change through public engagement, innovative scientific research, commitment to marine animal conservation, leadership in education, and effective advocacy for vital and vibrant oceans.

For decades, scientists at the Aquarium's Anderson Cabot Center for Ocean Life have been working to protect marine and freshwater ecosystems from human impacts and conserve threatened and endangered animals and habitats. The Aquarium's scientists conduct cutting-edge research to understand, quantify, and reduce the consequences of human activities on the health of marine species and ecosystems by developing science-based solutions and advocating for policies that balance human use of the ocean with the need for a healthy, thriving ocean now and in the future.

I am an oceanographer and a geoscientist. While I was an active scientist, I conducted geochemical research on ocean sediments to understand Earth's climate history. My focus was on reconstructing the climate history of Antarctica for the past 10,000 years. The goal of this research was to understand the causes of past extreme climate events and to use that information to anticipate what we might expect in the present or future as Earth's climate changes in response to excess carbon dioxide and other greenhouse gasses being emitted into the atmosphere. My career in policy has focused on both the energy and environmental sides of climate and, although I currently serve in a role advocating for a healthy ocean, I also have experience working with the energy sector to achieve a balance between energy extraction and protecting the environment, conserving natural resources, and promoting safety.

While the ocean has a central role in my life, I have to remind myself that not everyone is as attuned to the role that the ocean plays in all of our lives whether we live on the coast or not. For those of us that live on the ocean, it may be easier to see how the ocean is connected to our health and well-being. It provides food, tourism, transportation, and increasingly, clean energy from offshore wind resources. The ocean comprises 71% of the Earth and is responsible for keeping the planet habitable, whether by providing oxygen, absorbing excess carbon dioxide and heat from anthropogenic sources, or storing vast amounts of carbon in deep-sea sediments. The ocean's reach extends far beyond the coasts. It is responsible for controlling weather patterns that determine precipitation for farms and ranches in Oklahoma, prolonged droughts in Colorado, and flooding in Missouri. Persistent heat waves or the intensifying polar vortex are also attributed to changes in our ocean.

Prior to the COVID-19 pandemic, 2020 held the promise of being the "Super Year" for the ocean and climate. The year kicked off with the United Nations Framework on Climate Change (UNFCCC) 25th Conference of Parties (COP) in December 2019. I was at that meeting and appreciated that the Chairman and other members of the committee attended as well. Promoted as the "Blue COP," it was the first time the ocean was integrated in the international climate negotiations with the result that an ocean section was agreed to in the COP decision text. The "Blue COP" was to be followed by the United Nations Ocean Conference, the IUCN World Conservation Congress, the Our Ocean Conference, the 15th meeting of the Conference of the Parties to the Convention on Biological Diversity, and concluding with the 26th UNFCCC COP. Each of these international conferences represented an opportunity to continue reinforcing the need to include the ocean as part of the solution to the climate crisis.

By introducing H.R. 8632: The Ocean-Based Climate Solutions Act, the House of Representatives and the leadership of the House Natural Resources Committee has ensured that efforts to integrate ocean-based solutions to climate change remain at

the forefront of decision making and policies that recognize the role of the ocean in keeping the planet healthy and habitable for all life on Earth.

The 15 titles that comprise H.R. 8632 leverage the ocean's capacity to serve as a solution to climate change by advancing offshore renewable energy and limiting offshore conventional energy from fossil fuels, protecting the vast carbon reservoirs stored in the ocean (i.e. "blue carbon"), supporting climate-ready fisheries, expanding marine protected areas, and welcoming all stakeholders to the dialogue.

I am testifying today in support of H.R. 8632 in my capacity as both the Director of Ocean Policy at the New England Aquarium and as a geoscientist with professional experience working directly on many of the solutions proposed in the bill. On the whole, the Ocean-Based Climate Solutions Act proposes a comprehensive yet pragmatic framework for taking immediate action to limit the impacts of the climate crisis by harnessing the power of the ocean.

While the Aquarium supports the goals outlined in all 15 titles of the bill, my written testimony addresses those that Aquarium works on directly or has taken a position on in the past.

Blue Carbon and Coastal Resilience

Blue carbon is defined as the carbon captured by the planet's ocean and coastal ecosystems.[1] In particular, coastal ecosystems comprising mangroves, seagrasses, tidal and salt marshes, and estuaries are incredibly effective at storing carbon. Development projects that degrade or destroy these ecosystems not only release the stored carbon back into the atmosphere further exacerbating climate change, they also leave coastal communities vulnerable to the impacts of rising sea levels and intensifying storms.

Coastal wetlands represent less than 1% of the ocean, but they store more than 50% of the seabed's carbon reserves. Moreover, they sequester enough carbon to offset one billion barrels of oil annually. One hectare of mangrove forest is capable of offsetting the equivalent of 726 tons of emissions from burning coal, and one hectare of seagrass can store twice the amount of carbon than that of a terrestrial forest.[2]

By providing a mechanism to increase carbon storage in coastal ecosystems and supporting mapping, restoration, and protection of these critically important, but vulnerable, ecosystems, the Ocean-Based Climate Solutions Act capitalizes on the many co-benefits these systems offer in the fight against climate change.

By investing in coastal restoration and resilience, the bill supports nature-based solutions and prioritizes front-line communities. As a cultural institution based on the Boston waterfront, the Aquarium has experienced first-hand the devastating impacts from sea-level rise and flooding from storm surge. Funding that supports efforts to enhance coastal resilience and protect and restore important coastal ecosystems from climate threats is needed for communities like Boston and organizations like the Aquarium to adapt to future climate scenarios. Protecting and restoring coastal ecosystems uses "natural infrastructure" to provide cost-effective solutions that increase resilience for coastal communities and also enhance habitats for birds and fish, improve water quality, and sequester carbon.

As evidence of the value of restoring these ecosystems, a recent study developed an economic evaluation of the Boston Harbor cleanup that was mandated under the Clean Water Act and initiated in 1986. The results from the study show that the cost of the cleanup itself was $4.7 million and that the resulting ecosystem restoration has provided $30–100 billion in services to society.[3] The numbers here speak for themselves regarding the co-benefits of restoring and protecting coastal habitats both to protect coastal communities and store carbon.

Marine Protected Areas

The Aquarium supports the provisions pertaining to Marine Protected Areas proposed in the Ocean-Based Climate Solutions Act. New England Aquarium together with Mystic Aquarium provided the scientific justification that was used to designate the Northeast Canyons and Seamounts Marine National Monument (Monument) in 2016.[4] We subsequently opposed President Trump's proclamation weakening protections of the Monument in June 2020. The Aquarium conducts regular aerial surveys of the Monument to monitor and measure marine biodiversity visible at the surface and uses this information to inform decision making on the Monument and advocate for the need to maintain strong protections for this highly diverse, but extremely fragile, ecosystem.

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[1] https://oceanservice.noaa.gov/facts/bluecarbon.html.
[2] https://oceanwealth.org/why-blue-carbon-is-redd-hot/.
[3] https://www.frontiersin.org/articles/10.3389/fmars.2018.00478/full.
[4] https://www.frontiersin.org/articles/10.3389/fmars.2020.00566/full.

The Aquarium also supports the global call to protect 30 percent of lands and seas by 2030 and sees this as the minimum amount of protection required to ensure that the ocean continues to produce oxygen, absorb heat, support healthy and diverse ecosystems, provide a plentiful source of healthy, low-carbon protein for billions, and enhance resilience to climate impacts.

While the Aquarium recognizes that setting aside places in the ocean to protect them from the impacts of human activities may not have wide appeal amongst all ocean users, we view this as a critical and necessary component of any ocean-based solution to climate. The Aquarium also supports balanced uses of ocean and advocates for science-informed decision-making to ensure that human uses of the ocean are sustainable and minimize impacts to habitats and wildlife.

The science on this topic routinely demonstrates the benefits of highly protected Marine Protected Areas. Recently published results show that protecting just 5% more of the ocean can increase future fish catches by at least 20%.[5] These results reinforce the complementary benefits that marine protected areas have for fisheries and make a strong case for expanding marine protected area specifically designed to support productive and sustainable fisheries.

In New England, over the past decade, the Gulf of Maine has warmed faster than 99% of the global ocean.[6] Warming temperatures combined with slow adaptation has contributed to the collapse of the Gulf of Maine cod fishery. In addition, the lobster fishery has been migrating north with estimates that the fishery in Maine may also collapse within 5 years.[7] The dire outlook for fisheries in New England and elsewhere supports arguments on behalf of strongly protecting marine environments from human activities to enhance resilience and support fisheries. Because of this, the Aquarium recognizes the need to balance both the human communities that depend on the ocean with those of a vibrant ecosystem too often impacted negatively by the industrialization of the ocean. We strongly support conducting the science necessary to ensure this balance is achieved and believe that the ocean—if healthy and well managed—can accommodate multiple uses that support both conservation measures and some extractive uses.

Offshore Energy

The provisions outlined in the Ocean-Based Climate Solutions Act are absolutely necessary if we are to prevent the worst of what has been predicted under a business-as-usual scenario. The evidence is overwhelmingly clear. We must severely curb emissions of greenhouse gasses, and we need to do it now. Prohibiting new oil and gas leasing in all areas of the Outer Continental Shelf while simultaneously enhancing offshore wind energy production to 25 gigawatts by 2030 will help the United States meet its energy needs while also enabling the country to achieve its climate targets. Both of these goals are consistent with the Aquarium's overarching mission to protect the blue planet.

In 2018 when the Trump administration announced a draft plan to open nearly the entire U.S. Outer Continental Shelf for potential oil and gas lease sales, the Aquarium vehemently opposed this course of action because of the risks posed to the ocean and coastal communities that depend on it for their living. The Deepwater Horizon oil spill in 2010 demonstrated the devastating impact that this industry can have on the environment. The commercial fishing industry in the Gulf of Mexico is estimated to have lost $247 million as a result of post-spill fisheries closures with an estimated total loss of upwards of $8.7 billion and 22,000 jobs by 2020. Lost tourism dollars were estimated to have cost Gulf of Mexico states up to $22.7 billion in just the 2 years after the spill.[8] New England fisheries are the most valuable in the country with scallop and lobster landings worth a combined $1.18 billion in 2018. In New England and elsewhere along the Atlantic coast, these costs simply don't outweigh any benefits for allowing offshore oil and gas to proceed in the Atlantic or elsewhere.

As of November 2, 2020, there were 2,286 active leases in the Gulf of Mexico representing 12,148,609 acres, most of which are in the Western and Central Planning Areas and cover nearly 13% of the total available acreage.[9] In 2012, the Department of the Interior released a report showing that nearly two-thirds of the acreage leased by the industry was neither producing or under active exploration

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[5] https://www.pnas.org/content/117/45/28134.
[6] https://science.sciencemag.org/content/350/6262/809.
[7] https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2006.
[8] https://www.nrdc.org/sites/default/files/gulfspill-impacts-summary-IP.pdf.
[9] https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/regional-leasing/gulf-mexico-region/Lease%20Statistics%20November%202020.pdf.

or development.[10] While these numbers have invariably changed since 2011, the fact remains that companies still have the right to develop and produce oil and gas offshore on existing leases. In other words, we do not need to issue more leases when so many go unused, particularly at a time when we must be planning for a clean energy economy instead of planning for more fossil fuel extraction.

Given the Aquarium's commitment to conserving and protecting North Atlantic right whales, we also opposed NOAA's issuance of Incidental Harassment Authorizations to geophysical companies interested in conducting seismic surveys seeking potential offshore oil and gas reservoirs in the Atlantic. The sound produced by these seismic arrays would have been detrimental to North Atlantic right whales and other marine life in the Atlantic. Further, we view these surveys as unnecessary given our view that oil and gas development should not proceed.

Despite our reservations to conventional oil and gas development and production in the Atlantic, the Aquarium fully supports the development of offshore renewable wind energy with the caveat that the industry use the best available science to inform the siting, construction, and ongoing operation of the platforms. The Aquarium is actively involved in the research to support these decisions and mitigate any impacts to North Atlantic right whales and other vulnerable, threatened, and endangered species. We recognize that offshore wind will likely impact the marine environment, but by engaging scientists early and exercising the precautionary principle, the Aquarium strongly feels that the benefits far outweigh the costs by mitigating climate change through this critical energy transition from conventional fossil fuels to clean, renewable offshore wind energy.

This isn't the first time Massachusetts—or New England for that matter—has gone through an energy transition. From the 1700s to the late 1800s, whales were used for energy. Oil from whale blubber lit entire cities until the first modern oil well was established near Titusville, Pennsylvania. Communities dependent on whaling went out of business. Now, Massachusetts and New England residents stand to gain immensely in the form of jobs, a clean environment, low-cost energy, and reduced risks from climate change as we transition yet again to benefit from offshore renewable energy. As lessons are learned off our coast, they can be applied elsewhere to help facilitate a wider transition and provide economic benefits across the country.

Climate Ready Fisheries

New England is on the front line of a rapidly changing ocean that is altering our fisheries and forcing us to adapt. Because the Aquarium believes that a healthy ocean is part of the solution to climate change, we also believe that sustainable fisheries are a key component of not only a resilient ocean, but also a low-carbon source of protein for billions of people. As with every other issue pertaining to ocean use, the Aquarium supports strong, science-based decision making and cooperative research that involves the fishing community. Innovative tools and approaches in addition to a robust scientific process are needed to support and implement adaptive measures that help fisheries managers adapt to shifting stocks, decreasing biomass, changes in distribution and abundance, and changes in recruitment, which is supported by the provisions of the bill.

Marine Mammal Conservation

Beyond being an iconic cultural institution and tourist destination, the New England Aquarium is most well-known for its 40-year old research program on the North Atlantic right whale. In addition, our scientists study other cetaceans, pinnipeds, and sirenias (i.e. manatees). As experts in marine mammal research and conservation, the Aquarium was pleased to see marine mammals included as an ocean-based climate solution.

Marine mammals, and specifically large whales, are an essential element of a low-carbon future. Whales not only store a vast amount of carbon in their bodies by virtue of their size (to the tune of 1 Gt per large whale), but also distribute nutrients throughout the water column that support phytoplankton growth, which in turn removes carbon dioxide from the atmosphere and produces oxygen. Ensuring the ongoing recovery of marine mammal populations and the survival of threatened and endangered species is an essential component of any ocean-based solution to climate change.

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[10] https://www.doi.gov/news/pressreleases/DOI-Releases-Update-on-Unused-Oil-and-Gas-Leases.

By directing the National Marine Fisheries Service to establish and implement climate impact management plans for vulnerable populations of marine mammals with the goal of effectively conserving species in the face of climate change, the bill ensures we are planning for the impacts that a changing climate will have on these species.

This bill also addresses the important issue of marine mammal mortality resulting from interactions with shipping vessels. The United States is heavily reliant on the commercial shipping industry; according to NOAA, approximately 75% of all U.S. trade involves some form of marine transportation.[11] Each year, dozens of large whales in the United States are killed when they are struck by vessels transiting their habitats.[12] In 2020 alone, two young (one was just days old) endangered North Atlantic right whales were killed by vessel strikes. The current estimate of remaining North Atlantic right whales dropped to just 366 animals in 2020.

In addition, widespread shipping activity translates to a sizable carbon footprint. In 2019, domestic and international shipping accounted for 4% of the U.S. transportation sector's energy-related carbon emissions.[13] Shipping contributes to underwater noise, which interferes with marine mammal communication, foraging, and navigation. The ambient noise in the oceans is generally doubling each decade, led by a rise in commercial shipping.[14]

The bill's solution to reduce shipping speeds in U.S. waters addresses all three of these issues. Slowing ships down directly reduces carbon emissions and increases fuel efficiency,[15] which may provide an economic incentive to comply. As an added benefit, slower vessel speeds are proven to reduce the lethality of strikes with marine mammals as well as reduce underwater noise through decreased propeller cavitation.[16] The Aquarium supports the bill's provision establishing a nation-wide voluntary ship slowdown program administered by the National Oceanic and Atmospheric Administration as a necessary step to both reduce greenhouse gas emissions from shipping and reduce lethal interactions between vessels and marine mammals. The Aquarium hopes that mandatory speed restrictions will be considered in the future in areas that serve as critical habitat for North Atlantic right whales during times when the animals are present.

Taken together, the provisions in the Ocean-Based Climate Solutions Act will make a meaningful difference in securing the health of marine mammals, which will ensure that they continue providing climate benefits as carbon reservoirs and fertilizers of the ocean.

In closing, the Aquarium is grateful to the Chairman and the committee for their leadership on addressing ocean-based solutions to climate change. As an ocean scientist and an ocean advocate, I am personally grateful for the opportunity to shift the narrative of the ocean as a victim of the climate crisis to the ocean as the hero in providing solutions that mitigate and help humans as well as marine wildlife and ecosystems weather the gathering storm. The solutions detailed in the Ocean-Based Climate Solutions Act, if implemented sooner rather than later, are the key to reducing the intensity of projected impacts and setting us on a sustainable path where humans find balance with the planet.

The Aquarium looks forward to continuing to work with committee members to achieve the ambitious goals of the Ocean-Based Climate Solutions Act.

Thank you again for inviting me to serve as a witness in support of this important and ground-breaking legislation.

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[16] https://www.researchgate.net/publication/292345445_Propeller_cavitation_noise_and_background_noise_in_the_sea.

QUESTIONS SUBMITTED FOR THE RECORD TO DR. KELLY KRYC, DIRECTOR OF OCEAN POLICY, NEW ENGLAND AQUARIUM

Questions Submitted by Representative Cox

Question 1. The COVID-19 pandemic is far from over, as we have seen the number of cases skyrocket over the past few months. Not only are we dealing with a public health crisis, but COVID-19 has also created an economic fallout that we are still grappling with. With unemployment around 7% and an estimated 11 million unemployed, this crisis is not over. According to NOAA, in 2018, the ocean economy was responsible for $373 billion to our GDP, while supporting 2.3 million jobs. How can we leverage ocean and coastal restoration and ocean-climate solutions to help individuals get back to work, while also helping us address the climate crisis?

Answer. The New England Aquarium and other cultural institutions across the United States have experienced the serious economic fallout of the COVID-19 pandemic first hand. According to the American Alliance of Museums, 1/3 of all museums in the United States may close permanently as funding sources and financial reserves are exhausted as a result of the financial crises brought on by the pandemic.[1] New England Aquarium is responsible for the health and welfare of 20,000 animals in our collection. To continue caring for our animals, the New England Aquarium has reduced as many costs as feasible, including reducing our staff by 42% since March 2020. As contributors to and beneficiaries of the ocean economy, we recognize the critical role that a healthy ocean plays in our own ability to deliver our mission to serve as is a catalyst for global change through public engagement, innovative scientific research, commitment to marine animal conservation, leadership in education, and effective advocacy for vital and vibrant oceans. Funding provided through the American Recovery and Reinvestment Act of 2009 (ARRA) provides an example of how impactful ocean and coastal restoration projects can be in helping individuals get back to work and supporting economic recovery and growth. ARRA provided $167 million to NOAA that supported 125 habitat restoration projects. That funding and those projects created 2,280 jobs, restored 25,000 acres of habitat, and has generated $260.5 million in economic output annually. Not only that, these projects opened river habitat, removed marine debris, reconnected tidal wetlands, and restored coral reefs. The provisions outlined in Section 1005 of the Ocean-Based Solutions to Climate Act build on the success of the ARRA coastal restoration program by authorizing $3,000,000,000 to restore marine, estuarine, costal, or Great Lake habitat that provides adaptation to climate change. The New England Aquarium supports this approach as both pragmatic and effective with the added benefit of producing co-benefits that support the economy and address climate change.

Questions Submitted by Representative Velázquez

Question 1. Dr. Kryc, as the Chairwoman of the House Small Businesses Committee and a Representative of coastal communities, I'm deeply concerned about the impacts of climate change on small businesses located along our waterfronts. Can you explain the unique challenges faced by small businesses located in our coastal communities? How can small businesses utilize the climate change relocation initiative program in H.R. 8632 to better prepare for the effects of global warming?

Answer. As a small business located on the Boston waterfront, the New England Aquarium shares the Chairwoman's concerns. During a storm surge event in early 2018, flooding in the plaza in front of the Aquarium and at the Aquarium "T" stop forced the Aquarium to close to the public at a substantial loss in revenue from ticket sales. A little more than 50 years ago, the Aquarium was one of the first non-industrial businesses to establish a presence on the waterfront, which at the time was not as desirable a location as it is now due to water quality issues in the Boston Harbor. The Boston Harbor cleanup that was initiated in 1986 under the Clean Water Act helped to transform the Boston waterfront into the tourist destination and business hub it is now. Now, the Boston waterfront is facing a new threat from climate change and associated sea level rise. A 2013 report by the Organization for Economic Cooperation and Development ranked Boston as the world's eighth most vulnerable to flooding among 136 coastal cities.[2] This has profound impacts on the

[1] https://www.aam-us.org/2020/07/22/united-states-may-lose-one-third-of-all-museums-new-survey-shows/.

[2] https://www.worldbank.org/en/news/feature/2013/08/19/coastal-cities-at-highest-risk-floods.

residents of Boston and its businesses. As the COVID-19 pandemic has painfully demonstrated, small businesses in coastal communities (and elsewhere) simply don't have the resources to weather these storms in the absence of support from the U.S. Government, state and local governments, and the communities themselves. While the New England Aquarium has a long-term plan to work with other Boston waterfront businesses and communities to develop a climate resilient waterfront, and the city of Boston is implementing a strategy to defend it from the impacts of climate change, we appreciate the actions detailed in Section 1006 of the Ocean-Based Solutions to Climate Act to proactively launch an initiative to coordinate Federal agency activities to identify and assist communities that have expressed interest in relocating due to health, safety, and environmental impacts from climate change.

Question 2. Dr. Kryc, due to these unprecedented times, we have the opportunity for economic restructuring that incentivizes clean energy jobs. In your testimony, you discuss how offshore wind energy production promotes jobs for coastal communities and provides economic benefits across the country. As we work toward re-opening our economy, what role can clean energy jobs play in improving public health, labor productivity, and economic output?

Answer. Transitioning to a clean energy economy—whether powered by wind, solar, geothermal, or the ocean itself—is the critical first step in mitigating the impacts of climate change, which represents a threat to the health, well-being, and livelihoods of all Americans. The United States has not only gone through several energy transitions during its history, but led them by embracing innovation and change. Clean energy represents an opportunity for American citizens to benefit greatly from this transition. New England is leading the way on developing offshore wind resources off its coastline and demonstrating that these projects create high-paying jobs for local residents, provide the resources to revitalize aging coastal infrastructure in port cities, and contribute millions of dollars in economic impacts to the region annually. The 2018 Massachusetts Offshore Wind Workforce Assessment[3] estimates between 6,800 and 10,000 construction jobs will be created for the four planned projects off of Massachusetts. Ongoing operations and maintenance will contribute an additional 1,000 to 1,800 jobs annually. In addition, the Assessment estimates that the direct impact on the state's economic output resulting from these projects is estimated at $678.8 million to $805.1 million per year, with total economic gains of between $1.4 billion to $2.1 billion including direct, indirect, and induced impacts. Similar assessments for other regions of the United States demonstrate similar benefits to their local workforces and economies.[4,5] The U.S. Offshore Wind Power Economic Impact Assessment[6] published in 2020 by the American Wind Energy Association suggests that 20,000–30,000 megawatts of offshore wind capacity will be operational by 2030, which would support up to 83,000 jobs and produce as much as $25 billion annually in economic output by 2030. In addition, the Assessment reports that wind developers have already announced investments of $307 million in port-related infrastructure, $650 million in transmission infrastructure, and $342 million in U.S. manufacturing facilities and supply chain development. All of these benefits translate to benefits to American households that will have access to clean, renewable energy at price parity with electricity generated from oil, gas, or coal with the added public health benefit of access to clean air and water. The Ocean-Based Solutions to Climate Act recognizes the need to transition to a clean energy economy and provides the framework for how the United States works to accelerate the responsible development of this resource in U.S. waters. The New England Aquarium supports offshore wind and is working with the developers and Massachusetts to conduct research that will be used to inform decision-making that aims to minimize impacts to marine ecosystems and wildlife.

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[3] https://files.masscec.com/2018%20MassCEC%20Workforce%20Study.pdf.

[4] https://www.nrel.gov/docs/fy13osti/57565.pdf.

[5] https://www.nrel.gov/docs/fy14osti/60445.pdf.

[6] https://supportoffshorewind.org/wp-content/uploads/sites/6/2020/03/AWEA_Offshore-Wind-Economic-ImpactsV3.pdf.

Questions Submitted by Representative Bishop

Question 1. Your testimony relies heavily on the premise that MPAs can help restore overfished fisheries. You push the approach hard for the U.S., but we have healthy, sustainably management fisheries in the U.S. Isn't your position inconsistent with the reality of how well-managed fisheries in the U.S. are?

Answer. The New England Aquarium strongly supports the Magnuson Stevens Act (MSA) and agrees with the ranking member that U.S. fisheries are some of the most well managed in the world. That said, implementation of MSA across the regions has yielded inconsistent results, and there is still room for improvement. For example, fisheries in New England have failed to attain the same success as fisheries in other regions under the MSA. The National Marine Fisheries Service's 2018 Status of the Stock Report [7] reported that 91% of managed U.S. fish stocks are not subject to overfishing and 82% are not overfished. Of 43 stocks on the overfished list, 14 are in New England—the most of any region. Of 28 stocks on the overfishing list, 6 are in New England. At its core, MSA is a fisheries law and, while MSA does allow the Council to protect marine habitats "as practicable" for the benefit of the fisheries, the law prioritizes maximizing sustainable yields of fish stocks. Furthermore, MSA focuses on managing 479 fish stock or stock complexes, which represent less than 1% of the documented ocean species in U.S. waters. While fisheries management tools and laws play an important role in ensuring a healthy ocean, they were not meant to protect the full biodiversity of the ocean. For that, marine protected areas (MPAs) are necessary. Fully and highly protected MPAs support ecosystem health and resilience by protecting genetic diversity, and species abundance, size and fecundity.[8] Increased biodiversity has been shown to increase resilience in ecosystems to the impacts of climate change including lower pH, increased temperatures, and/or disease.[9] The New England Aquarium considers marine protected areas and well-managed fisheries to be complimentary to each other as tools to keeping the ocean (and its fisheries) healthy today and in the future. That's why we support the provisions in Title II of the Ocean-Based Climate Solutions Act. The ocean is a complex environment and requires a diverse and flexible arsenal of tools to balance the competing uses of its resources. For the ocean to continue providing those resources, it must be able to restore itself. For that, marine protected areas are needed.

The CHAIRMAN. Thank you very much, Dr. Kryc, and I want to thank the panel for their testimonies.

And reminding Members that Committee Rule 3(d) imposes a 5-minute limit on questions, I will not recognize myself at this point, but I afford the Members that are participating in the hearing the opportunity to make their statements, ask their questions. Let me begin with Representative Huffman.

Sir, you are recognized.

Mr. HUFFMAN. Thank you very much, Mr. Chairman, and I want to thank you for your leadership in pulling this bill together, bringing it forward to this hearing. I also want to thank the Committee staff for their work on what is a very big, very ambitious, comprehensive bill that incorporates a lot of good science-based ideas on how to tackle climate change through our oceans.

Many of these ideas were raised by the Select Committee on the Climate Crisis, where I have served in this Congress to raise awareness of the dangers of continued offshore drilling, as well as possible solutions such as blue carbon, which I am pleased to see reflected in this bill.

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[7] https://www.fisheries.noaa.gov/national/2018-report-congress-status-us-fisheries.

[8] https://tos.org/oceanography/article/planning-for-change-assessing-the-potential-role-of-marine-protected-areas.

[9] https://onlinelibrary.wiley.com/doi/abs/10.1111/ele.12598.

I am also pleased that the bill contains a prohibition on new oil and gas leasing in all areas of the Outer Continental Shelf, which would include two areas that I have been fighting to protect: the West Coast and the Arctic.

We are all aware of the impacts of the climate crisis, and the need for bold, progressive legislation in my district and also across the country. Coastal communities are all too familiar with the consequences of inaction, whether it is sea level rise, ocean heat waves, or loss of important coastal habitat. We are facing a dire situation.

This legislation is a starting point. It is a set of proposals that includes tangible solutions to not only protect our ocean resources and biodiversity, but to harness the power of our oceans to tackle the most important issue of our time. It is probably the biggest, most ambitious ocean and climate bill this Committee has ever considered.

And it is not perfect. I appreciate that staff has already made some technical changes to improve concerns that I have raised, and addressed feedback that I have given. I am confident that this bill will continue to improve as it moves forward through the legislative process. And I also believe many of the concerns that have been raised, particularly from the fishing community, can and will be resolved.

But we have to find a way to tackle this challenge, and it is so important that today we are getting started.

My question is for Dr. Kryc about offshore wind energy. Obviously, it is very important that we pursue renewable energy sources, and we see the opportunities to stimulate the economy and create jobs, as well. What kind of economic opportunity do you think offshore wind provides?

And what other forms of renewable energy in our oceans do you think we should be exploring?

And then I also want to invite you to speak to the way in which you think this legislation supports research and development into those types of energy sources.

Dr. KRYC. Thank you, Representative Huffman, for that question. I am delighted to answer that. We are very excited about the offshore wind industry that is starting to develop off of our coast in New England and further down the Atlantic Coast.

Current estimates have the offshore wind industry by 2030 as having generated 83,000 new jobs, and $25 billion in annual economic output. That is a really important resource for our region. And, also, as other regions look to develop this resource in their waters, it shows the potential of what this has to offer.

You also mentioned other energy sources, and marine hydrokinetic energy is one of my favorite types of energy. That is energy from the tides, from currents, and in waves, as well as OTEC, the energy that is generated from thermal gradients.

Anyway, those are boutique energy sources that offer an awful lot of potential for folks on the coasts, and they offer the potential to overcome some of the intermittency issues that might happen with other renewable energy sources. Tidal energy can be predicted 100 years out, which is, really, a kind of remarkable thing.

The resources that are needed to develop those pieces of energy are included in this bill. And I am looking at Dr. Lubchenco here—Oregon State is one of the marine energy centers, as well as in Florida, and also in Hawaii. So, increasing the amount of resources available to continue developing those resources will help us add yet one more tool to the arsenal of clean energy options for energy generated from the ocean, going forward.

Mr. HUFFMAN. OK. Dr. Kryc, I want to try to sneak in one more question. We know the ocean is a busy place, and we have to carefully site these renewable energy projects, not just to avoid environmental impacts, but to avoid unnecessary impacts on the fishing industry and other users. How do you think this bill supports collaboration and thoughtful planning to avoid those conflicts?

Dr. KRYC. Thank you for that question, as well. I think that New England is representing an opportunity for us to test all of those things, and engage stakeholders at the table to overcome some of the challenges associated with the multiple uses, and finding that balance.

So, I just want to flag for people a resource called the Responsible Offshore Science Alliance that brings scientists, fishermen, and the industry together in the Atlantic Region to have those discussions, and figure out how to balance the need to develop the energy source, to continue the fisheries, and to make sure that all of those decisions are science-based.

Mr. HUFFMAN. Thank you. I yield back.

The CHAIRMAN. The gentleman yields. Thank you, Mr. Huffman. Let me now recognize the Ranking Member, Mr. Bishop.

Mr. BISHOP. Mr. Chairman, I think Mr. Stauber has an appointment. Can I ask if you would go to him first?

The CHAIRMAN. Not a problem.

Mr. Stauber, you are recognized, sir.

Mr. STAUBER. Thank you, Member Bishop. I appreciate this opportunity.

Thank you all for testifying today.

Chairman Grijalva, the so-called Ocean-Based Climate Solutions Act fits neatly within the Green New Deal and the goals of the House Democrats. Like other previous bills, this legislation sacrifices affordable energy development done by union men and women under the highest environmental standards in the world. Instead, these types of policies will only increase demand for dirtier energy sources in Russia and other countries that we compete with that lack environmental and labor standards.

The average American household spends a little more than $3,500 a year on energy alone. Last year, it reached 60 below zero with the wind chill in my district for several days in a row. I am sure that is a little colder than the Chairman's district. And as you can imagine, energy costs are something that my neighbors are closely familiar with. I cannot support legislation that will make it harder for families in my district to heat their homes, put food on their table, and further financially burden the middle class because some millionaire on a beach somewhere doesn't want his view of the ocean obscured due to an oil or gas rig.

Energy independence is our Nation, and energy independence is critical for our Nation to continue on.

Dr. Hilborn, the goal of this bill is to supposedly mitigate climate change. Could you tell me how increasing the cost of energy for American families, importing energy from abroad, and killing American jobs mitigates climate change?

Dr. HILBORN. I am afraid I haven't prepared anything on that, and it is really outside my area of expertise.

Mr. STAUBER. OK.

Dr. HILBORN. I am a fisheries guy.

Mr. STAUBER. Dr. Hilborn, what policies should this Committee be pursuing to actually benefit marine conservation, instead of focusing on hurting American families?

Dr. HILBORN. Well, my expertise is in the fisheries realm, and in fisheries we do have the issue of the more precautionary we are in the United States, the more we import fish from places that have lower standards.

But we need to become more dynamic and responsive to changes in fish distribution and changes in fish productivity, and we have the system for doing that. The councils can do that. They are just starting to do it on a major basis. But we need to change the assumption that nature is stable over time, and realize that things are changing, and we need to be able to respond to those changes.

Mr. STAUBER. Thank you, Dr. Hilborn.

Mr. Chair, I yield back. Thank you, Ranking Member Bishop.

The CHAIRMAN. Thank you, sir. Let me now recognize Representative Dingell if she has any questions, or—is she still with us?

[No response.]

The CHAIRMAN. If not, let me now recognize Mr. Levin for any questions that he might have.

Mr. LEVIN. Thank you, Mr. Chairman. I appreciate your leadership on this legislation, and for holding today's hearing. Obviously, I care a great deal about this, representing a district with 52 miles of coastline. And I appreciate our witnesses today.

Dr. Kryc, the bill bans all new offshore leases for oil, gas, or methane hydrate exploration and development. There are some that will tell you that this means we will be indebted to Russia or others for energy, which, frankly, is a tired argument with very little basis in fact.

Could you explain why we need to ban new offshore drilling leases as soon as possible, and move toward onshore renewable energy instead?

Dr. KRYC. Thank you, Congressman Levin, for that question. I would be happy to answer. Anticipating this question, I looked it up, and at the moment we do import 11 million tons, or about 6 percent, of fuel from Russia.

We also have achieved a great deal of energy independence in the recent past.

Offshore production on the Outer Continental Shelf represents 16–18 percent of the total production in the United States of oil, and only 4 percent of gas. So, if you were to take those two things off, that does not exclude any existing leases that still exist and remain to be produced. The average time for a well production, once a platform is in place, the life span could be as many as 25+ years. So, there is plenty of runway.

But the real key here in our perspective, from the Aquarium's perspective, and from the ocean conservation perspective, it is the need to transition as quickly as possible to clean, greenhouse-gas-free emissions. And that comes in the form offshore wind and marine hydrokinetic energy, as that gets developed, as well as land-based sources of renewable energy, going forward.

Mr. LEVIN. Thank you for that. And in your testimony you say that the New England Aquarium supports offshore wind development, and I quote, "with the caveat that the industry use the best-available science to inform the siting, construction, and ongoing operation of the platforms."

So, Dr. Kryc, how can science-based approaches to offshore wind siting reduce harm to wildlife and the environment?

Dr. KRYC. Thank you. Again, for the Atlantic, and from the Aquarium's perspective, one of the primary species that we are concerned about is the North Atlantic right whale. We are involved in early studies to understand how those animals are using the habitats, where the leases and the siting of the platforms will be, so that the siting can accommodate those animals as they migrate through and transit through those lease sites.

We are looking at fisheries. We are looking at the impacts on sharks, turtles, and other vulnerable and threatened species to develop mitigation plans that enable the balance to exist between what is needed for the energy transition of the future, as well as providing for the ecosystem and the wildlife needs of the ocean habitats themselves, to ensure that the ocean remains healthy for the future.

Mr. LEVIN. Thank you for that. And one more question for you, Doctor.

A number of places, including my home state of California, are laying out ambitious plans to transition to 100 percent of new cars being zero emissions, and also new requirements for trucks, which I believe will have benefits not only for climate action, but also obvious benefits for public health, along with air quality, environmental justice, and the list goes on.

I wanted to ask you about ships and, specifically, when can we expect ships to transition to cleaner fuels?

And are there additional policies we could add to this bill to help catalyze the zero-emission vessel transition in international shipping?

Dr. KRYC. Thank you. That is a really good point. I think that in my written testimony I make the point that, right now, shipping in the United States represents 4 percent of emissions, and that is only expected to grow as international trade grows, and our dependence on marine transportation grows.

The bill already sets the path and the policy forward for reducing those emissions through fuel efficiency, through the slowdowns of the ship speeds, and then those have the co-benefits that I mentioned for marine mammals.

So, leaning on programs in your home state that have been so successful, like the Blue Skies, Blue Whales initiative, I think is a really great start for reducing shipping emissions in U.S. waters.

Mr. LEVIN. I am out of time, but I want to thank you for all your great work, Doctor, and I thank my colleagues for their great work on this bill.

And I will yield back.

The CHAIRMAN. Thank you, Mr. Levin.

Mr. Bishop, you are recognized.

Mr. BISHOP. Thank you. I appreciate it, sir.

Dr. Hilborn, let me ask you a question. Ms. Lubchenco's testimony made a rather alarmist claim that, if I quote this right, even the best fishery management cannot substitute for effective, high-protected MPAs, in terms of protecting biodiversity, et cetera, et cetera.

Your testimony, Mr. Hilborn, actually takes a different approach. Can you explain to the Committee how our current system is, in your mind, a better approach?

Dr. HILBORN. Yes, thank you. Thanks for this question.

The current system protects biodiversity over 100 percent of the Economic Zone of the United States through the councils. That is, I serve on the SSC of the Western Pacific Council, and it is our job to meet U.S. legislation, like the Endangered Species Act, the Marine Mammal Protection Act, over the entire Economic Zone. Proposed 30x30 closures would simply protect 30 percent of the Zone, whereas using the existing tools of bycatch avoidance, protecting vulnerable ecosystems, protecting target species, we can protect 100 percent of the Economic Zone, and the biodiversity in 100 percent of the Economic Zone. And certainly the track record with respect to target species is outstanding.

Mr. BISHOP. Thank you. Let me give you another question, if I could, sir.

Both Ms. Lubchenco and Ms. Kryc quote a recent study that says, if you protect an additional 5 percent of the ocean, you can increase future catch by at least 20 percent. Considering we only pass laws that have jurisdiction over the United States, are these claims really relevant?

Dr. HILBORN. Well, certainly there are places in the world where marine protected areas would increase catch. And the biggest potential is South and Southeast Asia, that has very ineffective fisheries management. Overfishing is rampant. But there is really no potential to increase the yield of American fisheries in the U.S. Economic Zone by marine protected areas.

Mr. BISHOP. So, as I think Ms. Kryc said in her written testimony, if that wind power disturbs fishery efforts, but it is worth the cost—and this may be out of your area of expertise, so I will just ask you this—what do you say would be the effect on fishing in the United States, the industry as a whole, if certain areas are put off limits and then certain areas which do have these types of good kinds of energy developments are also going to be included in the areas that are on limits, and still have an impact that is negative, even if it is worth the cost?

And, once again, maybe I am asking you something that is out of your area of expertise, and it is an unfair question.

Dr. HILBORN. Well, I don't think there is a general answer to that. It would all depend on where these things were sited, and how much catch was coming from those places, how mobile the

species are, whether they would effectively be caught elsewhere. So, I just don't think that there is an answer to that. It would have to be done on a case-by-case basis.

Mr. BISHOP. All right, thank you. Do I have time for one question? I have 1 minute, I am told.

Ms. Lubchenco, you made suggestions that state management of their jurisdictions are not as efficient and effective as the Federal Government would be. So, there is an implication that we should federalize management areas.

I just want to know if those comments are aimed at simply the offshore fishing, or are you talking about fishery management that is on shore? Because there is very clear evidence, especially on onshore fish managements that don't come under NOAA, that there is an incompetence on the Federal Government that far exceeds what the states are able to do in their fish hatcheries. So, is that statement only dealing with ocean issues and ocean fishing, or are you talking about all fishing?

Dr. LUBCHENCO. Ranking Member Bishop, thanks for the opportunity to clarify this. I am not in any way, shape, or form suggesting federalizing the management of all fisheries. States are responsible for managing the fisheries in their state waters, except when there are agreements where the stocks go back and forth.

My point was simply that——

Mr. BISHOP. OK, before you run out of time, you weren't talking about all fisheries. We are dealing with only those issues that deal with offshore ocean fishing. Is that correct?

Dr. LUBCHENCO. My point is simply that state-managed fisheries are not managed, generally, as well as our federally-managed fisheries, and we need to do a better job to help the states do their management better.

Mr. BISHOP. OK. And if you are talking about all fisheries, then I think there is clear evidence that that is not an accurate statement. And I think many of those local fisheries on the coast would have some quibbling with your jurisdictional approach, as well. But if you are talking about all fishery management, especially those that are onshore and not offshore, especially those hatcheries, that clearly is not the case. Mismanagement is worse with the Federal Government on all—that is why I wanted to clarify if you were talking about all fisheries. So, I appreciate you stating that fact.

Dr. LUBCHENCO. Certainly some state fisheries are well managed. My point is they all need to be, and they aren't. There is much room for progress in state-managed fisheries.

Mr. BISHOP. And, obviously, state management gives you a greater opportunity of having success than if you have a Federal Government management system that treats everything as a one size fits all, and then doesn't meet the needs of those local areas, which I have seen, once again.

Dr. LUBCHENCO. I agree.

Mr. BISHOP. That is why I wanted to make the distinction. I have seen that clearly in onshore fish management regulations and jurisdiction. So, I appreciate you clarifying that.

Mr. Grijalva, thank you. I yield back.

The CHAIRMAN. Thank you, sir.

Let me now recognize Representative Haaland.

Ms. HAALAND. Thank you, Chairman. I ask unanimous consent to enter into the record three scientific papers that support Title II, and a letter submitted by 180 organizations and businesses demonstrating broad support for the goal to protect 30 percent of our oceans and lands by 2030, as set forth in Title II of the Ocean-Based Climate Solutions Act.

[No response.]

Ms. HAALAND. Thank you, Chairman.

Dr. Lubchenco, I would like to give you the opportunity, if you would like to take it, to respond further to Mr. Hilborn on his last——

Dr. LUBCHENCO. Thank you, Congresswoman. I appreciate that opportunity. Both the question and the response framed fishery management against conservation, as if we have an either/or choice. And in my view, we absolutely need good fishery management, and we absolutely need good conservation.

The Magnuson-Stevens Act, which is the law that regulates federally-managed fisheries, is a fishery management act. It is not a conservation act. It does not manage biodiversity. So, suggesting that it is a good tool for managing biodiversity is simply inaccurate.

We need better tools to achieve biodiversity conservation that are a complement to the Magnuson-Stevens Act. The opportunity exists to expand our protection and management of biodiversity with all the other benefits that MPAs bring in parallel to continuing good fishery management.

And, in particular, much of Dr. Hilborn's statements are focusing on the fact that our federally-managed fisheries do a good job with target species, which, for the most part, they do. But they have not had as strong a track record with weak stocks, and with many of the bycatch species. In both of those instances, spatial protection through fully or highly protected MPAs can, in fact, be a very nice complement. So, this is not either/or. We need both.

Ms. HAALAND. Thank you, Dr. Lubchenco.

And Dr. Leonard, how does the bill maintain or accelerate the much-needed intergovernmental coordination for ocean justice, in your opinion?

Dr. LEONARD. Thank you, Congresswoman, for that question.

In particular, the bill has a section to support the Regional Ocean Partnerships, which are kind of a new evolution of what I previously talked about, in terms of the regional planning bodies that came out of the national ocean policy in the prior administration.

With the Regional Ocean Partnerships, that is where we see the intergovernmental coordination happening on the ground right now. In my specific instance, with the Mid-Atlantic Committee on the Ocean—through MARCO, NROC, the West Coast Pacific states, as well as tribes working together to think through what does ocean planning look like in our regions—how do we sustainably use ocean resources and coordinate all of our ocean activities with one another.

The one thing that I will point out in the way the current portions of the bill reads I would say that we need some additional review and modernizing around tribes. Right now the Regional Ocean Partnerships are structured to give states power and allow

for states and Federal agencies to have greater intergovernmental coordination. But there is nothing that really allows for there to be supportive funding and infrastructure for tribes amongst ourselves to have that intertribal coordination as it pertains to ocean conservation and ocean resiliency.

So, I think we almost need something that is a blend of what is stated, in terms of Regional Ocean Partnerships and what we previously had with the regional planning bodies, where there was a mandated intergovernmental coordination of equal parity of tribes, states, and Federal representatives coming together on an equal footing. And I just don't really see that playing out right now in the Regional Ocean Partnerships, as it currently stands.

Ms. HAALAND. Thank you so much.

And Dr. Kryc, I just have just a few seconds. How do we convince those in landlocked states that the ocean does, in fact, impact them, and their Representatives should support ocean climate policy?

Dr. KRYC. Thank you. I will answer that as quickly as possible. The ocean controls all of the weather patterns that we see across the United States and across all of the continents. So, the rain that is happening in the middle of the country; the droughts that are happening in Colorado, New Mexico; the wildfires, all of these things are ultimately tied to the interconnected nature of our entire planet. And those patterns are driven by the ocean. So, we all have an investment to make in a healthy ocean.

Ms. HAALAND. Thank you so much, Chairman. I yield.

The CHAIRMAN. The gentlelady yields. Let me now recognize Mr. Gohmert.

Sir, the time is yours.

[No response.]

The CHAIRMAN. Let me then turn to Mr. Westerman.

Sir, you are recognized.

[No response.]

The CHAIRMAN. We turn to the gentleman from Louisiana, Mr. Graves.

You are recognized, sir.

Mr. GRAVES. Thank you, Mr. Chairman. I want to thank the witnesses for their testimony. I appreciate the opportunity to join you today.

A number of things to counter. First, I want to briefly respond to my friend in California who made the comments on saying there was no relationship between stopping domestic energy production and increased importation. I will be willing to make a bet or wager with my friend right now that I can produce evidence showing that that is exactly the case in history.

We have had expert witnesses before this very Committee that have testified that, including during the Obama administration. In fact, during the moratorium or permitorium in the aftermath of the *Deepwater Horizon*, that is exactly what we saw. And if my friend can produce some evidence or facts showing otherwise, then I would be willing to yield you my future time on the Committee. But the reality is that that data doesn't exist.

In any case, Mr. Chairman, I ask unanimous consent to submit for the record House Resolution No. 38 that was passed by the

Louisiana Legislature, including unanimously passed by the Louisiana Senate, that is in total opposition to the underlying bill, the blue ocean legislation.

Mr. Chairman, look, this bill is written and referred to five different committees. We know that that is not going to go anywhere, because we are not going to get through five different committees.

I certainly share my friend's objectives of having a cleaner energy future and reducing emissions. My home state of Louisiana—if any state is affected by sea rise and the symptoms of climate change, it is the people that I represent. So, we have a great stake in ensuring that we have sustainable coastal communities, that we have a clean energy future, that we have sustainable, affordable energy policies. But this legislation really doesn't even do that. And I think we all know that.

For example, if this legislation were implemented years ago, we would have lost $200 billion—that is with a B—$200 billion to the United States Treasury. I ask any of my friends on the other side, how would you fund senior citizen programs, health care programs, education programs, environmental programs, transportation programs, how would you do that without $200 billion?

There is this concept out there, there is this belief out there, Mr. Chairman, for many folks on the other side that the target, or the enemy is the energy source. That is not it. And we have to stop saying that, and stop believing it, because it is going to prevent us from implementing suggestions or policies that actually make sense.

It is the emissions, and there are proven strategies today, technologies today, where you can actually sequester emissions, you can utilize emissions: CCS, CCU-type technologies that complement our conventional energy sources.

Look, we all know. We can sit here and ban cars in California and everywhere else for next year. You don't have the energy infrastructure in place to supplant the energy that is brought to the table with 30 times more energy density than the next closest alternative. That is what conventional fuels provide.

So, we have to stop this dream world that some people are operating in.

I want to ask perhaps the sponsor of the bill one question, one question. As you know, this bill will stop—will stop—the investment of revenues into wetlands restoration in the coast of Louisiana, which is the greatest wetlands loss in the continental United States. And it will stop investment in hurricane protection and coastal resiliency programs.

I mentioned in our last hearing, this year alone we had Hurricane Laura and Marco that came at the same time, we had Hurricane Delta and Zeta, and then caught the edge of Hurricane Sally. We had people die. What would you say to the family members of people in Louisiana that lost loved ones, when your legislation would actually take future investments in the restoration of our coast and the protection of these communities?

[Pause.]

The CHAIRMAN. We can deal with this question, or we can continue to avoid it, as we have in the past, dealing with climate

change and of the important role of oceans in the mitigation and resiliency that has to be built up. But the legislation——

Mr. GRAVES. I am happy to have that discussion.

The CHAIRMAN [continuing]. Does not intend to do any restoration.

Mr. GRAVES. Reclaiming my time, I have tried to have this conversation with my friend many, many times in the past. And here is the reality—all you people sitting there on your pedestals, and telling us what we need to do—we produce more offshore energy than every other state in the Nation combined. We have the top commercial fisheries in the continental United States in the same exact area.

All these people are coming to try to prescribe solutions for us that have no idea what in the world they are talking about, what the on-the-ground conditions are. And the people that actually represent these areas, they are opposed. The people that actually represent these very communities, that understand this stuff much better than any of you and your little towers out there around the United States that don't even represent, don't even live, don't even spend time in these very areas.

It is really embarrassing to continue to see legislation like this that is so offensive to the people that I represent, and simply doesn't respect the science or on-the-ground conditions. It offends those that repeatedly have lost loved ones as a result of the inaction by this very Committee.

I yield back.

The CHAIRMAN. I couldn't agree with you more, sir. And our exploration of constituents, perhaps even within your district and other districts in Louisiana, considering the cancer corridor, and the environmental justice and frontline communities across portions of Louisiana need to be dealt with. There are life and death issues there, as well, and I hope you join with us in working on that.

With that, let me recognize Mrs. Dingell, if she is available now, for her time.

[No response.]

The CHAIRMAN. Mr. Cartwright, if he is available. You are recognized.

Mr. CARTWRIGHT. Thank you, Mr. Chairman. Late Monday morning, Hurricane Iota became the latest in-season hurricane in recorded history to reach Category 5 intensity in the Atlantic Basin. As this dangerous hurricane makes landfall in Central America, in Nicaragua, we are again reminded of the disastrous effects of climate change.

The scientific community agrees that a healthy ocean is going to help us fight the climate crisis.

As Vice Chair of the Appropriations Subcommittee on Commerce, Justice, and Science, I, along with my Democratic colleagues, have fought for robust funding for the National Oceanic and Atmospheric Administration, NOAA, an agency designed to protect and restore our coastal regions.

I have also introduced two bills, the PREPARE Act and the SAFE Act, which improve adaptation and resiliency to extreme weather events and climate change. That is why I applaud our

Chairman, Chairman Grijalva, for introducing H.R. 8632, the Ocean-Based Climate Solutions Act, the bill that would provide the resources we need to protect our ocean and coastal communities.

The investments we make now will save us significant hardship and expense in the future.

As we rebuild our communities after each natural disaster, we have quickly learned the lesson that the costs of inaction on climate change are incredibly high. A recent study and scientific report states that not acting right now to mitigate climate change will result in a projected additional $600 billion every year in damage.

Given all of this, I would like to ask Dr. Kryc, if you could elaborate on what you think the long-term fiscal and real-world impacts of the investments called for in the Ocean-Based Climate Solutions Act would be.

Dr. KRYC. Thank you, Congressman Cartwright, for that question.

We firmly believe that these investments will be not only good for the ocean, but good for Americans and for the economy.

In a recent example in the American Recovery and Reinvestment Act, $160 million was awarded to NOAA that supported 125 habitat restoration projects. Those projects have paid a great deal of dividends over the following years—not only in jobs, they created a little over 2,200 jobs, they restored 25,000 acres of habitat, and have generated $260 million in economic output annually.

Natural infrastructure is known to be more cost effective than gray, or hard infrastructure, and it has the co-benefits of not just providing resilience, but the ability to store carbon to support nurseries of fisheries and, in our own Boston Harbor, sharks, which is a really delightful development, since Boston Harbor has been cleaned up.

So, I think that there are so many benefits to these types of investments, and they have been shown time and time again to pay dividends on more than the initial investment.

Mr. CARTWRIGHT. Thank you, Dr. Kryc.

As I mentioned earlier, the climate crisis not only impacts our environment, our economy, and our health, but it also harms our oceans. Current laws like the Magnuson-Stevens Act only manage 0.2 percent of the ocean's known species. With one in six species at risk of extinction, this hands-off approach is terribly inadequate to address the existential risk to our oceans posed by climate change.

The Ocean-Based Climate Solutions Act addresses the dangerous consequences of the climate crisis by holistically protecting the ocean's biodiversity and natural resources.

Dr. Kryc, Dr. Leonard, Dr. Lubchenco, can you elaborate on why protections outlined in this bill are critical for the health of our oceans?

Dr. KRYC. I will jump off and just say that the protections afforded through marine protected areas go beyond fisheries. And they, through increased biodiversity within the boundaries of a marine protected area, impart resilience to things like ocean acidification. And those types of studies have been done in places where, if you have the entire range of, all the way up through apex

predators, that those systems have been shown to withstand changes in temperature and pH that we are unable to control.

So, as we can control things like setting aside special places that give those places resilience, that just benefits the entire ocean, as a whole.

Mr. CARTWRIGHT. Dr. Leonard?

Dr. LEONARD. Thank you. I would say that the bill really supports the mitigation effort that we need right now to address the climate crisis within ocean conservation and ocean ecosystems. But what does that actually look like in practice?

That is research going to oyster habitats and oyster hatcheries, and thinking about the way in which we can use oysters to rehabilitate ecosystems grounded in Indigenous knowledge systems, which is something that we have been doing in this part of the world for thousands of years.

And then, in addition, other mitigation efforts, like nature-based solutions, again, grounded in Indigenous knowledge systems. As Shinnecock, we have done some great coastal habitat restoration through seagrass planting. I think we need to have more of those mitigation efforts, and this bill provides the funding to be able to do those types of exact conservation measures.

Mr. CARTWRIGHT. And Dr. Lubchenco?

Dr. LUBCHENCO. Thank you, Congressman Cartwright. I really appreciate the fact that you have painted a picture of the vast biodiversity that is not really under fishery management. And let me bring that home to U.S. waters, because the numbers that you cited were global.

The Magnuson Fisheries Act manages around 474 stocks and stock complexes. But there are nearly 50,000 documented species in U.S. waters. So, the Magnuson-Stevens Act actually manages less than 1 percent of all known species in U.S. waters.

Again, I would repeat that the Magnuson-Stevens fishery management is a fishery management law. It is not an ocean management law. So, managing oceans more holistically, where we have vibrant fisheries, as well as 30 percent in fully to highly protected areas, is really essential to achieve the kind of benefits that Dr. Kryc was alluding to: safe havens for wildlife, enhanced resilience to climate change, to help recover weak stocks, to contribute to food security where fisheries are not well managed, and that is mostly elsewhere in the world.

But they also provide reference areas, where we can evaluate the impacts of fisheries for areas—so to compare inside and outside of MPAs. And we have recently discovered that there are vast stocks of carbon on the seabed. And using protected areas to protect those stores of carbon can prevent them being released into the atmosphere.

So, marine protected areas here are really a powerful, but underutilized tool that will bring not only biodiversity benefit, but climate resilience and many other benefits to a healthy ocean that we all need.

Mr. CARTWRIGHT. Thank you, Doctor.

Mr. Chairman, I am sorry for going over. I yield back.

The CHAIRMAN. The gentleman yields.

Mr. Westerman, sir, you are recognized.

[No response.]

The CHAIRMAN. Let me now recognize, then, Mr. McClintock.

Sir?

[No response.]

The CHAIRMAN. All right, let me now turn to the gentleman from Florida, Mr. Soto.

You have 5 minutes, sir, you are recognized.

Mr. SOTO. Thank you, Mr. Chairman. We just had an election. Climate change was on the ballot, and President-elect Joe Biden won. A majority of Americans, especially our young people, want significant change. My colleagues across the aisle should take note.

We once again have a national mandate for the United States to combat climate change at home. And, as the most advanced Nation on the planet, we have a duty to lead the world effort. Climate change denial and the fact that it is caused by human activities—again, is an extremist political position. It is a dangerous view that threatens the future of our Nation and our planet. Scientists, Federal agencies, the U.S. military, even the Federal Reserve and SEC are starting to recognize the long-term risks.

And the American people want us to stop bickering and work together on a bipartisan solution.

The facts? The largest energy bill of the term was bipartisan: the Clean Economy Jobs and Innovation Act, where 213 Democrats and 7 Republicans voted yes. We revised the Department of Energy grants relating to energy storage, microgrids, including renewables, nuclear, and, yes, natural gas. It moved the ball forward on combating climate change in a reasonable and incremental fashion.

But here is what I find so interesting about that vote. The rest of you voted no. Other than seven Republicans, you voted no, along with the very Green New Deal proponents you attack here today.

The path forward is clear. We need to come together to pass bipartisan bills, and to continue to act on climate. The oceans are part of that solution, and we have seen many bills dealing with that here today.

In my own home state, Florida's coasts remain in danger of offshore oil drilling, and our great Florida reef is in danger of massive coral bleaching from warming seas. We must protect these environmental treasures for all Americans.

And my fellow Floridians, Congressman Crist and Congresswoman Debbie Mucarsel-Powell, have presented important reforms here today.

Ms. Leonard, looking at Representative Crist's bill to designate Regional Ocean Partnerships of NOAA, and for other purposes, you had talked about it at length already. How are communities of color left behind? How are poorer communities left behind without these Regional Ocean Partnerships?

Dr. LEONARD. Well, I think, put blankly, the lack of coordination means that communities are going to be left behind. So, the Regional Ocean Partnerships create a forum by which states, Federal representatives, Tribal representatives, Fishery Management Council representatives, as well as our broader

stakeholders actually have forums and entities that they can come to to share concerns.

Also, on the ground, we have been doing a lot of work around diversity, equity, inclusion, and justice to think about how do we make sure that there is ocean justice for all. And I think one pathway is supporting innovative bills like the Ocean-Based Solutions Act to do just that, and to continue to support our work through Regional Ocean Partnerships.

You do great work. And to have best available science means that we need funding to support that research and to support the data collection. And that then, in turn, allows us to support justice movements that benefit local communities, communities of color, and marginalized communities, based on economic impacts, as well.

So, I think that is why this is needed.

Mr. SOTO. Thank you.

Mr. Chairman, how much time do I have left? I can't see it on the screen.

The CHAIRMAN. Take your time, about 45 seconds.

Mr. SOTO. OK. Dr. Lubchenco, Debbie Mucarsel-Powell has a bill to establish a grant program to benefit coastal habitats, Shovel-Ready Restoration Grants for Coastlines and Fisheries Act of 2020. How would this be important in really moving ahead some of these projects?

Dr. LUBCHENCO. Congressman Soto, it is extremely important that we pay close attention to these coastal habitats, especially the seagrass beds, mangroves, and salt marshes that are what we call the blue carbon ecosystems. They just suck up carbon much, much faster than do forests on land. And protecting them is one of the first lines of defense, so that we don't lose them, we don't release all of the carbon that has been stored there for millennia into the atmosphere.

But we also have learned that it is possible to protect them—I mean to restore them after they have been degraded. And up the coast from you—not your state, but up the coast, in Virginia—and I note in my written testimony, there is a very nice example of restoration of seagrass beds in Virginia recently that has shown the power of being able to utilize these coastal ecosystems to reduce carbon emissions and help directly, significantly with mitigating climate change.

Because those habitats also provide a wealth of other benefits: they restore nursery areas, they provide recreational opportunities, they are buffers against storm surge—they are critically important in multiple dimensions. And having the resources to do that coastal restoration is critically important.

And, as Dr. Kryc mentioned, when I was Administrator of NOAA, the ARA funds that we utilized to do habitat restoration, we had only $160 million. And as it turned out, we got $3 billion worth of proposals from communities around the country. So, there is huge latent opportunity and interest in——

The CHAIRMAN. I am going to need you to wrap up your answer, so we can——

Dr. LUBCHENCO. Apologies, Chairman.

The CHAIRMAN. We have gone over quite a bit. No problem.

Mr. SOTO. I yield back.

The CHAIRMAN. Thank you. On my Republican colleagues' side of the dais, is there anyone that wishes to ask questions—we don't have a name at this point.

Miss GONZÁLEZ-COLÓN. Yes, sir.

The CHAIRMAN. Oh, yes, Miss González-Colón, you are recognized. Thank you.

Miss GONZÁLEZ-COLÓN. Thank you, Mr. Chairman. I would like to yield my 5 minutes to my friend, Garret Graves.

[Pause.]

Mr. GRAVES. Mr. Chairman?

The CHAIRMAN. You are recognized, sir.

Mr. GRAVES. Thank you.

Mr. Chairman, I want to show you a graphic here, and I ask unanimous consent that this be included in the record.

This is a graphic that shows crude oil supply sources to California refineries. As you can see here, Mr. Chairman, as energy production in California has gone down, as they have reduced the energy coming in from Alaska, all of that has been supplanted or replaced by energy from foreign sources.

And, Mr. Chairman, you can see there is not a reduction. It is not a reduction in oil. None. It is simply replacing or supplanting all of that domestic production with foreign.

Mr. Chairman, I can't vouch for the source of this information, but I can tell you it is from energy.ca.gov. Ouch.

Mr. Chairman, look, just bringing more fact into this thing—the reality is, as you all know, you all are a scientist panel, our expert panel, our witnesses, you are scientists. This is a global issue. For every one ton of emissions we have produced in the United States, four tons, four additional tons of emissions, have come out of China. That is not a global reduction. It is a global increase. The Paris Accords result in a global increase.

This whole thing, we are not even bringing science to the table. I am asking for more science, not less, more science to inform our decisions, moving forward.

The facts clearly show that when you reduce domestic production, you increase your dependence upon foreign sources of energy. Facts and science and history shows you have greater emissions from foreign sources of energy than you have from domestic.

So, look, we can sit here and do all this pretty window dressing. We can talk about this in a way that makes us all feel really good. None of this is based on science. None of this is based upon fact. And it is incredibly frustrating to watch people wander down this emotional path without any type of scientific support.

Dr. Lubchenco, you and I have worked together before, extensively. And you made a comment, and I want to push back on it. You made the comment about state-managed fisheries. Look, I will give you one quick fact. The fact is that I can't think of—and I am fairly certain on this—there is not a single state-managed fishery that has required a restoration plan or a rebuilding plan, yet I can sit here and think of a whole lot of federally-managed fisheries that have been overfished that required it. So, I don't think it is fair to take shots at state-managed fisheries. In fact, my home state of Louisiana, we developed an LA Creel system which

has a 90 percent certainty level, whereas the MRIP program is 80 percent or less.

So, we have better science and better data informing our fish management than what the Federal Government does, so I don't think comments like that are necessarily accurate or fair. And I do want to give you a chance to respond, in case I misconstrued something that you said.

Dr. LUBCHENCO. Congressman Graves, it is great to see you again. Thank you, sir, for your comment.

I did not intend at all to throw state fisheries under the bus, to criticize them. I am simply pointing out that we need effective state-managed fisheries, just like we need effective federally-managed fisheries. Some state fisheries are well managed. Others are absolutely not. And most of them, we simply don't have enough information to know how they are doing. Most states simply don't have the resources to do the kind of effective fishery management that is really needed.

Thanks for letting me clarify that.

Mr. GRAVES. We have imposed additional fees on ourselves to make sure that we had the resources that were needed to properly manage our fisheries in Louisiana. So, we did that to ourselves to make sure that the resources were there.

Dr. LUBCHENCO. And that is a great model.

Mr. GRAVES. Thank you.

So, Mr. Chairman, I will say this again, and I will offer this to you every day of the week. In regard to a cleaner energy future, reducing emissions, the United States continuing to be the global energy technology leader, I am 100 percent in. I would be happy to work with you any day of the week.

But continuing to throw out legislation that has no chance of going anywhere and, quite frankly, is only going to result in higher energy prices, higher emissions, and creating more jobs in other countries, I don't think that is a solution for America.

I yield back.

The CHAIRMAN. Thank you. The gentleman yields back.

Mr. Lowenthal, you are recognized, sir.

Dr. LOWENTHAL. Thank you, Mr. Chair. And first I would like to ask unanimous consent to enter into the record a written statement from the World Shipping Council on the Ocean-Based Climate Solution Act, H.R. 8632.

The CHAIRMAN. So ordered, without objection.

Dr. LOWENTHAL. Thank you. And I also want to thank you, Mr. Chair, I would like to thank the staff for working so hard, and the other Members that have contributed to this, and the discussion that we are having today.

I truly appreciate also listening to Representative Graves talking about that we are not focusing enough on emissions. We tend to focus more on the source, rather than emissions. I will say, in California, we have tried to address that question by being relatively neutral on what are the solutions, and more focusing on emissions reduction. And I think it is always important for us to look at the concept, and I appreciate your raising that issue.

I want to talk first to some of the things that have been on here, if I can open up my questions. I want to talk first to Dr. Kryc.

Dr. Kryc, first of all, I want to thank you and the New England Aquarium for your great work. You have worked with my staff, especially Shane Trimmer, on many questions over the years on aquaculture, on marine mammal protection. You have helped us as we have worked on marine debris, especially plastic and the reduction of plastic pollution. And I look forward to working with you and the Aquarium on these important issues, because they are not going away.

But I want to talk about one thing that you talked about, and that I have direct experience with, and that was the legislation that we are talking about today really addresses and establishes the Quiet Seas and the Clean Skies Vessel Speed Reduction Award program.

I represent the Port of Long Beach, and my adjacent port is the Port of LA. We are the busiest commercial maritime hub in terms of much of international trade and international cargo.

Our shipping lanes cross the Santa Barbara Channel, which is a vital marine ecosystem where whales congregate to feed. We had established a program from the Santa Barbara Channel down to the Ports of LA Long Beach, a voluntary program called the Blue Whales, Blue Skies program that you talked about, which is attempting to both accommodate commerce, and also to protect marine mammals in the Santa Barbara Channel.

And given all the work that you have done in the New England Aquarium to protect the North Atlantic right whale, I am really interested in the data that you have about the threats that marine mammals face, especially around ship strikes, which is what we tried to deal with. You have already talked a little bit about it, and I am kind of interested. Do you think a voluntary program that encourages the reduction of ship speeds is going to help marine mammals, and is going to promote ecosystem resilience?

In the Quiet Seas and Clear Skies Vessel program there is both a voluntary program and also, in other parts where maritime conservancies, we have a more mandatory program.

I am interested in how do you see the voluntary program working?

Dr. KRYC. Thank you, Congressman Lowenthal, for that question. As I mentioned in my oral testimony and my written, we would like to see a mandatory ship restriction specifically for North Atlantic right whales. That said, this bill and the provisions that it outlines for shipping, and the voluntary measures, and the rewards-based system, we think will help. That is not something that has been implemented in the Atlantic.

And to answer your question about the impacts of shipping specifically on the North Atlantic right whale, as I mentioned, we lost 2 North Atlantic right whales of the remaining 366 this year, both juveniles, to vessel strikes. And they weren't ships, they were small vessels, maybe 25 feet, going faster than 10 knots. The science that we have done at the Aquarium demonstrates that we can reduce mortality to North Atlantic right whales by upwards of 90 percent by reducing ship speeds to 10 knots or less.

We have also been very successful in using science to recommend shifts in shipping lanes to avoid the most concentrated areas where these animals are congregating to feed.

I think that time is up, but I am happy to explore this more with you.

Dr. LOWENTHAL. Thank you. Do I have time? I don't see the——

The CHAIRMAN. I don't have my clock up right now.

Dr. LOWENTHAL. I don't either, so I am going to ask one more question, and you will just have to cut me off if I have gone over——

The CHAIRMAN. Yes, OK.

Dr. LOWENTHAL. And I will be quick.

Dr. Lubchenco, we have heard a lot today about offshore wind, but everything has been focused on the North Atlantic and the Atlantic. I am interested in, even though we are talking about this on a national level, what research and development is going to be needed to overcome hurdles—and is this something a technology, offshore wind, that can be expanded into the Gulf of Mexico and the Pacific?

And what are we going to do—what types of research and development is needed to make it more cost effective? Because we are not seeing it in those areas like we are in the North Atlantic.

Dr. LUBCHENCO. Congressman Lowenthal, thanks. I think the evidence shows that there are likely to be different types of ocean energy that are going to be appropriate for different places around the country. In some places it is going to be wind, but in others it will be tidal or current or, in some cases, wave energy. And the R&D that is required to really determine what is most appropriate, how continuous the energy provision would be, what kind of infrastructure is needed, much of that is in the very elementary stages.

Investments in R&D that can, and the research that enables us to understand what works best in this place, and how it connects to grids on land is absolutely needed, and would be a very smart path forward.

Dr. LOWENTHAL. Just before I yield back, I would like to follow up that conversation with you.

As we begin to talk about a comprehensive approach, we have really only focused so far on offshore wind and turbines. And you are saying, if we are going to look at other parts of the country, it would be appropriate to do research and development, and to really look at the opportunities to create energy in other ways than just through wind. I thank you.

And I yield back.

The CHAIRMAN. Thank you.

Again, I'm not seeing any names on the Minority side, unless there is one that isn't on my list, or hasn't been provided to me. If not, let me now recognize Ms. Barragán for her 5 minutes.

Ms. BARRAGÁN. Thank you. Thank you, Chair Grijalva, for holding this important hearing on ocean solutions to the climate crisis.

Climate change is impacting everyone, especially our most vulnerable coastal communities. However, there is an opportunity to build a sustainable ocean economy that creates new industries and jobs, while reducing greenhouse gas pollution.

We are leading the way at the Port of Los Angeles, where I happen to represent, where a new public-private ocean institute called AltaSea is creating a world class, ocean-based, 35-acre campus where scientists, entrepreneurs, and educators can come up with

innovative solutions to food, energy, and climate security. It is estimated that, in Los Angeles, the ocean-based economy will produce more than 126,000 jobs, paying a combined $37.7 billion in wages by 2023.

The bills the Committee is hearing today will drive climate solutions, restore our oceans, foster innovation, and help us realize the potential of a sustainable ocean economy.

Dr. Lubchenco, an important part of the Ocean-Based Climate Solutions Act is the permanent protection of the Outer Continental Shelf from offshore drilling. Prior to this pandemic, fishing, tourism, and recreation along the Pacific, Atlantic, and Florida's Gulf Coast supported over 2.5 million jobs. Ten years ago, you led NOAA's response to the *Deepwater Horizon* oil spill off the coast of Louisiana. Can you speak to the potential dangers and impacts of an oil spill in the Outer Continental Shelf that make permanent protection from drilling so important?

Dr. LUBCHENCO. Thanks, Congresswoman. We have seen in no uncertain terms the devastation that massive oil spills can have. But even smaller spills can have really nasty impacts on ecosystems, not only on the most obvious target species, like oiled birds, whose images are very graphic, but also for the other species below the surface, whether it is marine mammals that get oiled or very, very small microscopic species in the plankton that then get incorporated into the rest of the ecosystem.

The bottom line is that oil is really toxic. The hydrocarbons that are in the oil are really nasty to living creatures. And starting with the Santa Barbara oil spill, just up the coast from you in 1969, we have seen how devastating oil spills can be. So, doing everything possible to avoid those spills is really smart.

When we add to that consideration the consequences of burning that oil, and the contributions it makes to climate change, and all of the devastating impacts that has on the ocean and on people, it seems a no-brainer that we shift as rapidly as possible to green energy sources, and to do so in ways that are innovative and that really create jobs.

I love what is happening in the Ports of LA, in Congressman Lowenthal's district. Those ports are doing really innovative, great work that is conservation and smart business in ways that I think are a wonderful model.

Ms. BARRAGÁN. Great. Thank you. Representative Lowenthal has Long Beach, and I have Los Angeles. We partner together, and it is a great way to have a duo team.

Dr. Leonard, thank you for your incredible work as a Tribal leader on the Mid-Atlantic Regional Planning Body of the U.S. National Ocean Council.

How should Congress ensure our ocean climate policy addresses the needs of environmental justice communities, and builds trust between government and these communities?

Dr. LEONARD. Well, I think one step forward is the Ocean-Based Climate Solutions Act, and the provisions within the bill that allow for increased funding, increased research, and increased data collection.

But in doing all of that, it also needs to support Tribal sovereignty, and support the Federal trust responsibility in

ensuring that tribes, in a government-to-government relationship are a part of that research, are a part of the data collection, are integral partners in how the United States envisions ocean conservation and ocean justice moving forward.

And one issue that is of particular importance and of particular severity for myself, being a Shinnecock woman, is relocation. And I think provisions of the bill that provide for our coastal communities to relocate are much needed. And we actually even need more.

One thing that I see in the bill right now, and that doesn't exist for Tribal Nations, are legislative guarantees. The bill allows for funding for relocation, which is very much needed, and an unmet need currently for Tribal communities and coastal communities broadly. But what we need, as well, are legislative guarantees that, as our people are forced to relocate due to the climate crisis, that our Tribal Nations, our land status, will transfer with our people as we are forced to relocate to new lands of cultural patrimony. And I don't see that currently in the provisions, but I am hopeful that a bill like this could envision that, and could chart a path forward so that relocation, which is real—we have environmental climate refugees currently in the United States—can have more pathways for funding that can support that relocation, and support the overall health of American citizens. Thank you.

Ms. BARRAGÁN. Thank you. I yield.

The CHAIRMAN. The gentlelady yields. Let me now, absent any indication from the Minority side—if they have some of theirs that want to address the panelists. Let me now ask the gentleman from Chicago, Mr. García.

The time is yours.

Mr. GARCÍA. Thank you, Mr. Chairman and Ranking Member, and to the witnesses joining us today. Today, we speak on the existential threat of global climate change, and the devastating impacts on wildlife and our communities, impacts that will affect generations to come.

Although Chicago is far from the ocean, we are no strangers to the impacts of climate change. Climate change is causing significant and far-reaching impacts on the Great Lakes. Unchecked human activity over the last two centuries has led to habitat losses, invasive species outbreaks, and polluted air, water, and sediments. The Great Lakes, one of the world's most abundant freshwater resources, hold more than 90 percent of North America's fresh surface water. Unless we take action, it will suffer from severe pollution, hurting the 34 million people who live within its basin, and especially communities of color.

Dr. Leonard, thank you for joining us today. In your testimony you mentioned that, "data collection and monitoring of the Great Lakes, ocean, bays, estuaries, and coasts must be done in consultation with Tribal Nations."

Two questions: Why is it so important to consult with Tribal Nations and other communities traditionally left out of the policymaking process?

And second, Section 1505 of the Ocean-Based Climate Solutions Act authorizes a study to assess public access to the Nation's

coasts, including the Great Lakes. What barriers to accessing our coasts do some communities face?

Dr. LEONARD. Thank you very much for those questions. I would say, for the first question, to be informed decision makers related to marine environments, our Great Lakes, as well as ocean environments, we have to have the best available science. And right now we don't, because we are not including Indigenous science and data collection within Indigenous communities in the data that informs our best available science that then informs our decision makers.

So, what we are looking for in the Great Lakes region, as well, because we are doing an international region of both Canada, the United States, states, provinces, First Nations, Tribal Nations, communities—a really complex space—we need data collection that allows for, again, intergovernmental coordination, and for the ability for our tribes and other Indigenous communities to be able to contribute our data to the best available science that is informing decision making in the basin.

And one way that we see that sort of having a disconnect right now is some of the best science coming out about Great Lakes habitat restoration, protection against aquatic invasive species is coming from the Great Lakes Indian Fish and Wildlife Commission, and they are bootstrapping their budget because they don't have funding streams available to them to really have that influx that they need to do the research, and continue the great science work that they are doing, and then to have that contribute to the larger national best-available science conversation.

So, that is one area we need more Indigenous involvement in data collection and science, because it should inform our best available science for decision making.

And your second question about access in communities to our oceans, we have a legacy and a history of segregation across America. Those segregation policies and laws have had a systemic influence on the way in which communities of color, disenfranchised economic communities, are able to access our oceans and coastlines.

There have been some great studies coming out about even just the cost of a parking permit to access a beach. Our beaches and our coastlines are not really in the public domain, and they have been disenfranchised from communities of color and communities who are economically deprived because of the way in which we have set up systemic laws and segregation policies that have purposely aimed at excluding those communities for decades, if not centuries.

So, we have to do a lot more to remedy those historic injustices if we are going to tread a path of ocean reconciliation and ocean justice for our future.

Mr. GARCÍA. Thank you, Dr. Leonard.

Dr. Lubchenco, in my last half-a-minute plus, the living shorelines provision in this bill sets aside funds for the Great Lakes. Can you please explain what living shorelines are, and how they specifically benefit the Great Lakes?

Dr. LUBCHENCO. Sure, Congressman, thank you so much for that question.

Living shorelines are simply shorelines that have vegetation and creatures that live there. And those dune systems, grass systems, et cetera, are providing very important functions to stabilize shorelines, to absorb carbon dioxide, to help provide critical nursery areas for important fisheries.

The vegetation that is along the shoreline is critically important to the healthy adjacent waters of the Great Lakes. They interact in very complex fashion. So, having them be intact, having them be healthy contributes both to the livelihoods of people in the vicinity, but also to the resilience to climate change. So, both protecting and restoring them are important.

Mr. GARCÍA. Great, thank you.

Mr. Chairman, I applaud you for introducing this landmark ocean solutions bill to tackle the climate crisis, and for including critical provisions that would benefit the Great Lakes. Thank you.

The CHAIRMAN. Thank you very much, Mr. García, and let me now, absent any indication from the Minority side—Mr. Tonko, you are recognized, sir.

Mr. TONKO. Thank you, Chairman Grijalva, for organizing this hearing. It is very thoughtful and very timely. And thank you to each and every witness for the invaluable testimony you have provided. Oceans are unmistakably critically important in the fight against climate change, so I appreciate the opportunity today.

Dr. Lubchenco, over the past 15 years, and particularly in the Trump administration, climate scientists have often been targeted for producing work that has been viewed as politically inconvenient to those who deny the impacts of anthropogenic climate change. Such attacks have been visible in the last 4 years as Federal scientists have been silenced and sidelined, keeping them from sharing their work with the public and informing our national response.

My question is, how do strong scientific integrity protections at agencies working on climate science serve to benefit the public good?

Dr. LUBCHENCO. Congressman Tonko, it is nice to see you again, and thank you for being such a strong and effective champion for scientific integrity.

The importance of scientific integrity is paramount. People need to trust the information that is provided by the Federal Government.

The most obvious examples are weather forecasts and disaster warnings. If people think that they have been manipulated for political reasons, then they won't take them seriously, and they won't take the actions that are needed to protect their lives, their families, and their property.

The same is true for fisheries information or any other kinds of information that the Federal Government is providing to people. We need to trust that that information is based on the best available science, and has not been cherry-picked or manipulated or, in some cases, the science is distorted.

The scientific integrity policies that agencies created under President Obama—my agency, NOAA, included—are intended to ensure that the information is not cherry-picked, manipulated, or distorted.

And that is important not only for public trust, but it is also important so that the agencies can have the best possible scientists working for the government. Scientists are not going to work in a government where their science is ignored or altered or suppressed. They will leave, and new scientists aren't going to come and take their places if they think that their science is unwelcome.

So, to have a thriving scientific enterprise in agencies, we need to have scientific integrity. And the public needs to be able to trust what the government says. And for both of those reasons, not only do agencies need to have good, strong scientific integrity policies, but it is important that there be a public expression of the importance of that, as well, through legislation that says this is our expectation, this is what we want of Federal science.

Mr. TONKO. Thank you for that. And what recommendations would you make to our President-elect Biden to strengthen scientific integrity policies across the gamut of Federal Government?

Dr. LUBCHENCO. Congressman, we have seen from some of the violations of scientific integrity policies—for example, at NOAA—that happened in the last few years, that there are multiple ways that the scientific integrity policies that exist need to be improved, and also need to be enforced so that political appointees are aware of those policies and abide by them.

But it is not sufficient to have an agency such as NOAA have a scientific integrity policy if the department that it is part of, the Department of Commerce, ignores that policy. So, there needs to be harmonization and mutual respect for the integrity of science at all levels within the Federal Government.

Those are some of the ideas, but I am happy to explore others, if that would be useful.

Mr. TONKO. Yes, a rather holistic and inclusive process.

Mr. Chairman, I don't know how much time I have left, I don't see the clock.

The CHAIRMAN. Not a lot. You have 10 seconds.

Mr. TONKO. Let me just quickly ask Dr. Lubchenco—your testimony highlights the increasing intensity, speed, and water content of tropical storms due to warming water temperatures. Could you expand on impacts warmer water could have on upstate New York?

Dr. LUBCHENCO. Certainly, Congressman. The first time you and I interacted was in the aftermath of Hurricane Sandy, when your district, which is far inland, was flooded in some horrific fashion. And what we are seeing now, as climate change changes the hurricanes so that they are more likely to be really strong, more Category 4 and 5, they move more slowly. So, when they come up over land, they sit there and dump massive amounts of water like Hurricane Harvey did on Houston. But they also have more water, because warmer water and warmer air holds more water, so there is more water to cause flooding.

A paper that just came out last week that I mentioned in my written testimony alludes to the fact that those storms that are more powerful——

The CHAIRMAN. I am going to have to call it. Wrap up your answer, because everybody is going 1 to 3 minutes over, and we need to ask other panelists questions.

Dr. LUBCHENCO. Yes, sir. Those storms last longer and are more likely to go inland and be more powerful and flood districts like yours.

Mr. TONKO. Thank you so much.

Mr. Chair, I yield back.

The CHAIRMAN. Thank you.

Mr. Beyer, you are recognized, sir.

Mr. BEYER. Thank you, Mr. Chairman, very much. And I want to thank you especially for having this hearing today. I am really proud to see the Natural Resources Committee be a leader on tackling climate.

America needs to know that our climate conversations happen not just on the land, but also in the water and the ocean, too. And for areas that I represent, northern Virginia, it is just expensive homeowner flooding. But if you move down to Virginia Beach or in Norfolk, you are talking about an entire way of life.

The ocean is part of the solution, and we know that full implementation of ocean-based climate solutions could deliver one-fifth of the annual greenhouse gas emission cuts that the world needs by 2050 to keep that temperature below 1.5 degrees Centigrade.

So, I really want to thank the Oceans-Based Climate Solutions Act and Lora, Rachel, Casey, Zach, and Beth, the team at WOW, for creating this comprehensive, meaningful bill led by our Chairman. And I am really pleased that I got to work with Republican Francis Rooney in a bipartisan way to build some of the coastal resiliency pieces that are in this bill.

It is wonderful to see Dr. Lubchenco again. We miss you here. But welcome back.

And when we talk about ocean and climate, we often focus locally here on nuisance flooding, but when you think about marshes, how important are they to climate change and the whole idea of blue carbon?

Dr. LUBCHENCO. Marshes are incredibly central and important in absorbing carbon, and then storing that carbon, locking it away so that it is not part of, is not contributing actively to climate change. Protecting those marshes and restoring marshes that have been degraded is really smart action that has multiple benefits. Not only does it help mitigate climate change, but those marshes are important nursery areas for fisheries. They provide recreational opportunities. And critically important, they provide buffers against storm surge and winds that are coming ashore.

So, for all of those reasons, we need to value the marshes, but also the seagrass beds and the mangroves, depending on what part of the coastline you are living in. For you, the marshes and the seagrass beds are the ones that are really important as blue carbon ecosystems. They are a hidden treasure that has just recently been revealed, and we need to make the best use of them possible.

Mr. BEYER. Thank you very much. I know, with a home on the Chesapeake Bay, we look at those grasses every year, and their restoration, how important they are.

Dr. Leonard, you said we are not drowning, we are fighting. Why are the coastal resiliency pieces in the bill so important?

Dr. LEONARD. Thank you for the question. I think the coastal resiliency pieces in the bill are so important because it is potentially the first acknowledgment of the long-time suffering that coastal communities have been going through in recent decades due to the climate crisis and, in particular, for Tribal coastal communities.

It is the first recognition, both through the Tribal resilience program funding provisions in the bill, as well as the relocation funding provisions in the bill, where our harm and our suffering is being acknowledged, and that the Federal Government is stepping forward to say we have a fiduciary responsibility, a treaty obligation to meet these relocation needs, and to meet the needs of the coastal communities, not only Indigenous coastal communities, but other coastal communities who are really suffering right now, and are in need of solutions for a path forward so that we can envision ourselves as American citizens who aren't going to be sacrificial lambs for the climate crisis, and that we won't be sort of sacrificed to drown in our homes.

Mr. BEYER. I know my friend, Mr. Graves, is probably not on the call any longer, but you talk to him about how much of his district has disappeared because of the absence of coastal resiliency.

Dr. Kryc, I only have a minute, but the fourth National Climate Assessment said that more than half of the damage to coastal communities is avoidable if we take real-time adaptation measures. Are we doing the right thing in this bill to move forward on that?

Dr. KRYC. Yes, definitively. Doing the type of work that is included in this bill will help to impart that coastal resiliency, which will protect coastal communities and, as I have mentioned before, will pay dividends on the original investment to the benefits that come for years beyond.

Mr. BEYER. Thank you all very much.

Mr. Chairman, I yield back. Thank you for your leadership.

The CHAIRMAN. Thank you, Mr. Beyer. And let me recognize another important contributor to the legislation.

Ms. Bonamici, you are recognized.

Ms. BONAMICI. Thank you so much, Chairman Grijalva, for your leadership on ocean climate action. And thank you to our witnesses for joining us, especially my good friend, Dr. Lubchenco.

We live in Oregon, where public access to our majestic coastline has been protected, basically, by a permanent public easement back since 1913.

We know that every person on this planet benefits from a healthy ocean. The ocean covers more than 70 percent of the planet's surface. It supplies much of the oxygen we breathe, and it regulates our climate, as we have discussed. It is linked to the water we drink, and it is home to more than half of life on the planet. The ocean drives our economy. It feeds, employs, and transports us, and the power of its waves generates clean energy.

We can capture this potential to help mitigate the climate crisis. Earlier this year, I joined my colleagues on the House Select Committee on the Climate Crisis. We released our bold, comprehensive, science-based climate action plan that sets our

Nation on a path to reach net zero emissions no later than mid-century, a net negative after.

As the co-chair of the House Oceans Caucus and Congressional Estuary Caucus, I am thrilled that this plan includes many of the pieces of legislation recognizing the power of our ocean as part of the solution. And I appreciate Chair Grijalva's leadership to incorporate many of these recommendations into the Ocean-Based Climate Solutions Act. That includes four of my bipartisan bills and six bills that I am co-leading.

Dr. Lubchenco, in your testimony you noted the value of protecting and restoring blue carbon ecosystems. I know you talked about that with Representative Beyer. And you also worked on the High-Level Panel for a Sustainable Ocean Economy. That report was released last year, and indicated that the protection and restoration of coastal blue carbon ecosystems could prevent approximately one gigaton of carbon dioxide from entering the atmosphere by 2050.

So, my questions are, do we have an accurate map and inventory of blue carbon ecosystems across the country, and how would a better assessment of the sequestration potential of blue carbon ecosystems be useful as the United States looks to rejoin the Paris Climate Agreement?

Dr. LUBCHENCO. Congressman Bonamici, thank you for doing such an effective job of representing Oregon and your district, but also being such a staunch champion for science, and for working in bipartisan ways on so many important pieces of legislation. We really, deeply appreciate it.

Having the numbers that you cite from the ocean panel's report, which I helped oversee, that are the 20 percent, the one-fifth of the carbon emission reductions needed to get us to the 1.5 degree Paris target, are obviously global numbers. We do not have comparable numbers for the United States, and we need them. That would be an obvious next step, to be able to better inform the kinds of actions that would be taken. And knowing how much bang we can get for the buck is critically important.

The High-Level Panel also produced a second report, which draws attention to the opportunities to advance climate and ocean synergies through economic restoration in the aftermath of the economic downturn following the COVID pandemic that we are seeing play out again in very real time. So, I just want to draw attention to the importance of that report as you and your colleagues consider these activities, moving ahead.

Ms. BONAMICI. Thank you. And Dr. Lubchenco, as we prepare for the United Nations' Decade of Ocean Science for Sustainable Development, I worked with my House and Senate Oceans Caucus colleagues to introduce the Blue Globe Act to rapidly accelerate the collection, management, and dissemination of data on the Great Lakes, the ocean, bays, estuaries, and coasts. This bill will assess the potential for an Advanced Research Projects Agency-Oceans, or ARPA-O, to help overcome the long-term and high-risk barriers in the development of ocean technologies.

Based on your experience at NOAA, how could an ARPA-O help us better understand the effects of the climate crisis on our ocean and coastal communities?

Dr. LUBCHENCO. Congressman, as you know, knowledge is power, and having information is golden, because then we know how much we need to do, and where, and can be as smart and strategic as possible.

So, having both the assessments and the monitoring on an ongoing basis so we can see how things are changing, but also the research to understand the processes that are driving climate change and the responses that we are seeing from ecosystems, are all critically important to help inform a better understanding of this new world that we are in that is a climate-changed world.

So, great opportunities. Thank you for your leadership in moving those ahead.

Ms. BONAMICI. Thank you, Dr. Lubchenco and all the witnesses.

And Mr. Chairman, thank you again for your leadership, and I yield back.

The CHAIRMAN. Thank you very much, Ms. Bonamici.

Now that Members are done with their questions, let me ask my questions as we wrap up this hearing. But I once again thank the witnesses.

I have a set of questions that I will be submitting to the panelists for their response, so questions are specific to them. But I am not really going to go off of those at this point.

Dr. Leonard, I think your points on parity and resource investment for tribes, and for Tribal regional efforts, parity at the table, and parity in terms of incorporating data and science coming from Indigenous knowledge is very good. And I appreciate that point, and it is something that needs to be looked at in the legislation.

Part of what we are going to hear in almost any discussion on climate change—and I want to thank the WOW staff and the leadership of Mr. Huffman for bringing the issue of oceans and the important role they play in the abatement of climate change and the climate crisis that we are confronting to the center point, and to making our response a much more comprehensive response from this Committee. And I want to thank the staff for their fine work, and the leadership of the Subcommittee, and Committee members in general, for making sure that this becomes a part of a comprehensive response to climate change, along with land and initiatives that are also part of another piece of legislation.

Dr. Lubchenco, one of the points that we are going to hear over and over about is that we really can't talk about climate change regarding the ocean. It is about job loss, it is about the destruction of energy independence. It is about hurting American families with rising energy costs. And it is having to play with bad actors like Russia. And this is just a bad actor in other instances, to the Administration, not so bad.

And, then, I think the other point that kind of wrapped up that was let's talk about real science-based discussions and formulation of legislation going forward, because the legislation before us is based on emotion, and not science. I mean, those are the messages we are going to hear as this legislation goes forward.

And it is going forward. I think it is incumbent on us in the House of Representatives, at least, to lay a template out about how we need to respond to climate change. And this is one of them.

So, Dr. Lubchenco, emotion not science. I appreciated your discussion on integrity that you had with Mr. Tonko. That was excellent, as well. But if we are going to put science and empirical information, in fact, at the head of the table, does this make this legislation that we are talking about today an emotional, feel-good response?

Dr. LUBCHENCO. Mr. Chairman, we continue to be saddled with a very unfortunate framing that many people have bought into, that we have to choose between the economy and the environment. And I think that is absolutely false.

This bill really provides a pathway for both protecting and restoring ocean ecosystems in ways that generate economic benefit, and that also reduce the impacts of climate change that are so economically devastating and so devastating to people who have fewer options, be they poor people or BIPOC communities. And the current impact of climate change is devastating to the economy, to our health, to economic opportunities, as well as to life on Earth.

So, it is imperative that we tackle this urgent problem of climate change. This bill has many key provisions for doing exactly that. But not only can we tackle climate change using ocean-based solutions, but doing so brings multiple other benefits and huge opportunities.

The CHAIRMAN. Thank you. But let me just state that I really think having science as the crucible by which we forward legislation, I am absolutely in favor of that, totally. And the more that we have fact-driven and science-driven decisions that are around issues of the environment and climate change, the better off the American people are going to be, in terms of some progress.

But I don't want to spend time going through the whole debate about the validity of some science versus the lack of validity of other science. I think we are way past that question. And I don't plan to really re-litigate that whole point over again, period.

But I do think that, going forward, as we plan to introduce this legislation in the next session, based on your comments and the continued feedback that we are getting, we hope to make the bill, the legislation, even better, and incorporating some of the points that were made today.

I think we need to deal with it. To ignore it, to put it off, and to go from denial to avoidance on climate change is not progress. And we have much to catch up on. Nothing has happened for 4 years. In fact, on the contrary, much has happened to make the situation even worse. So, we have to repair, and this is a repair legislation. And I hope that, as we go forward, we continue to welcome your input.

To my colleagues and Members, thank you. To the panel, I appreciate very, very much your information. And we will be forwarding individual questions to you.

Again, thank you, and there are no other comments?

The meeting is adjourned. Thank you.

[Whereupon, at 2:21 p.m., the Committee was adjourned.]

[ADDITIONAL MATERIALS SUBMITTED FOR THE RECORD]

PREPARED STATEMENT OF THE HON. KATHY CASTOR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Today I would like to commend Chair Grijalva for his continued leadership on climate action and to express my support for the Ocean-Based Climate Solutions Act. This bill will unleash the incredible power of the ocean to capture and store carbon, helping us move closer to our climate goals. As Chair of the Select Committee on the Climate Crisis, I'm proud that it incorporates many of the recommendations from our Climate Crisis Action Plan. And as a Floridian, I have seen firsthand the impacts of climate change, such as rising sea levels and increasingly extreme storms and weather. I am encouraged by the important progress made by the Natural Resources Committee in laying out a comprehensive framework for ocean climate action.

In particular, the Ocean-Based Climate Solutions Act recognizes the potential of "blue carbon" to mitigate climate change. This bill would take meaningful steps to protect and restore the ocean and wetland ecosystems that are so vital in capturing and storing carbon. Importantly, this legislation will protect at least 30% of our ocean by 2030. This is an ambitious goal, but an achievable one that will help mitigate both the climate and biodiversity crises that we face.

Protecting and restoring ocean and wetland ecosystems doesn't just increase their capacity to sequester carbon; it also makes coastal communities more resilient to the impacts of climate change. The Ocean-Based Climate Solutions Act improves coastal resiliency by promoting living shorelines, enhancing the Coastal Barrier Resource Act, and expanding natural infrastructure.

One of the most critical aspects of the Ocean-Based Climate Solutions Act is that it incorporates ocean-based energy production as part of the climate solution. It prohibits new oil and gas leasing in all areas of the Outer Continental Shelf, while promoting responsibly sited offshore wind energy and other marine energy development.

We know the ocean is a crucial ally in the climate fight. We also know we need to protect it, as ocean ecosystems are already being harmed by climate change. The Ocean-Based Climate Solutions Act will keep oceans healthy in the face of warming temperatures—by enhancing and improving research, forecasting, and mitigation of ocean acidification and harmful algal blooms. It also promotes climate-ready fisheries and provides investments in climate and fisheries management research.

These are just a few of the many climate solutions we can advance by passing the Ocean-Based Climate Solutions Act. This legislation will allow our ocean and coasts to mitigate climate change, while also protecting frontline communities and ensuring healthy, biodiverse marine ecosystems. I look forward to continuing to work with Chair Grijalva, as we advance meaningful, nature-based policies to fight the climate crisis.

[LIST OF DOCUMENTS SUBMITTED FOR THE RECORD RETAINED IN THE COMMITTEE'S OFFICIAL FILES]

Submissions for the Record by Rep. Haaland

—A letter by 180 organizations and businesses to members of the House of Representatives and to Senators, dated February 7, 2020 urging them to co-sponsor a House Resolution by Representative Haaland and a Senate Resolution by Senators Tom Udall (D-NM) and Michael Bennet (D-CO) to strongly protect at least 30% of lands and 30% of ocean areas by 2030.

—A 2019 scientific paper by E. Dinerstein et al. entitled, "A Global Deal for Nature: Guiding principles, milestones, and targets," from the Journal *Science Advances*.

—A 2020 study by Cabral et al. entitled, "A global network of marine protected areas for food," from the *Proceedings of the National Academy of Sciences*.

—A 2019 paper by Murray & Hee entitled, "A rising tide: California's ongoing commitment to monitoring, managing and enforcing its marine protected areas," in *Ocean and Coastal Management*, Volume 182.

Submissions for the Record by Rep. Huffman

—A letter from the Pacific Coast Federation of Fishermen's Associations dated November 17, 2020, RE: Statement for the record: Full Committee hearing entitled 'Ocean Climate Action: Solutions to the Climate Crisis'.

Submissions for the Record by Rep. Lowenthal

—Testimony submitted by the World Shipping Council, dated November 17, 2020.

Submissions for the Record by Rep. Bishop

—A letter of opposition to Title II from a coalition of commercial fishermen, dated November 16, 2020.

—Testimony submitted by Dan Keppen, P.E., Executive Director, Family Farm Alliance dated November 17, 2020.

—A letter of concern from Stronger America Through Seafood dated November 12, 2020.

Submissions for the Record by Rep. Graves

—House Concurrent Resolution No. 38 of the Louisiana State Legislature.

—A graph entitled, "Crude Oil Supply Sources to California Refineries".

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