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Chairman Grijalva, Ranking Member Bishop, and members of the Committee, thank you for inviting me to testify today before the House Natural Resources Committee on the Commonwealth's approach to the very real challenge of climate change. Thank you for addressing this issue in a bipartisan manner and for looking to the states who, along with cities and towns, are directly taking on this challenge by setting bold targets, developing practical and cost effective solutions, and working collaboratively across the country.

Challenges and Opportunities in Massachusetts

In Massachusetts climate change is not a partisan issue – while there may sometimes be disagreement on specific policies, we understand the science and we know the impacts are real. We know through experience that mitigation to clean up our energy supply and transportation system, paired with adaptation strategies to reduce risk and build resilience can foster strong communities, protect residents and natural resources, and contribute to strong economic growth and innovation throughout the state.

We have seen first-hand the impacts of a changing climate in Massachusetts. Shortly after taking office in January of 2015, the snow started falling, hard, and it didn't end until well into April. What was different about those storms was the sheer volume of snowfall, with record-breaking amounts in Worcester and Boston. Although it seems counterintuitive, climate change is indeed producing higher volume precipitation events. As the air and oceans have warmed, higher concentrations of water vapor in the atmosphere lead to more intense rain and snowfall, and what we are seeing in Massachusetts is part of this pattern. In fact, the percentage of rain and snow falling in the heaviest one percent of storms in the Northeast has increased by over 70 percent since 1958.[1] The increasing frequency and intensity of storms is something of great concern to us in Massachusetts. Last winter we saw four major Nor'easters, setting record flood levels in Boston and other coastal communities, and causing significant damage to natural resources and infrastructure as well as devastating property loss. We have also seen an increase in intense rainfall events, with flash flooding and damage to ageing infrastructure in cities like Worcester and Lynn.

While last fall was the wettest ever recorded in Massachusetts, in the summer of 2016, we experienced one of the worst droughts on record. These droughts greatly strained public and

[1] Horton, R., G. Yohe, W. Easterling, R. Kates, M. Ruth, E. Sussman, A. Whelchel, D. Wolfe, and F. Lipschultz, 2014: Ch. 16: Northeast. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 16-1-nn.

private water supplies in many communities and led to significant losses in agricultural production, including cranberries, apples, peaches and Christmas trees whose growers reported up to 80 percent loss of seedlings. In September of 2016, the United States Department of Agriculture designated all 14 counties in Massachusetts as primary or contiguous natural disaster areas due to losses caused by the drought, making them eligible for federal disaster assistance.

Temperatures have also been rising. On the heels of the warmest three years on record, last August was the warmest month ever recorded in Massachusetts. This overall warming trend is leading to more frequent heat waves that threaten vulnerable population groups, warmer winters that impact weather dependent industries like maple syrup and skiing, and increases in Lyme disease and other tick and mosquito-borne illnesses. Climate change is also warming our coastal waters and threatening some of the nation's most important commercial fisheries off the coast of New England. Stretching from Cape Cod to Cape Sable Island in Nova Scotia, the Gulf of Maine is warming faster than 99 percent of the world's oceans. Warming waters have already led to 80 percent reduction of Atlantic cod habitat over the last decade. Further warming is projected to shift lobster populations 200 miles north into Canada and enhance the ongoing invasion of green crabs that threaten the soft-shell clam industry.

By talking with our farmers and fisherman and touring the damage after weather events, one theme has become clear to me - while many of these challenges are not new, they are not like they used to be. They are occurring more frequently and they are more damaging than they ever were in the past. The science and economic data bear this out and we know that these changes are happening all across the globe. I am all too aware of the unique challenges other governors are facing, from the deadly wildfires in California and Montana, to permafrost and glacial melt in Alaska, to severe heat waves last summer across the Southwest.

These impacts come with a growing cost. Federal data from the National Oceanic and Atmospheric Administration (NOAA) shows that 2017 was the costliest year for weather and climate disasters with over $300 billion in total spending.[2] In New England, the string of Nor'easters we saw last March cost the region $2.2 billion and we lost 9 lives. Since 2015, Massachusetts has also seen at least $200 million in disaster damages to our towns and public agencies, which is only a fraction of the costs our communities face. The 2015 February blizzards alone were devastating- lives were lost, and the storms cost our state and local governments $35 million, with total losses exceeding an estimated $1 billion.

In Massachusetts our rural economy and natural resource based industries are increasingly threatened by changing seasons, shorter winters, and less snow. Warmer temperatures are hitting the ski industry particularly hard. Just one mild winter in 2009/2010 cost

[2] NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2018). https://www.ncdc.noaa.gov/billions/

the Northeast ski industry 1,700 jobs and $108 million in economic value.[3] But our ski resorts are responding to this pressure with entrepreneurship to diversify their business model and expand into recreation and tourism activities outside of the traditional winter season.

On the eastern slopes of the Berkshires, Jon Schaefer's family business Berkshire East has become the first ski mountain in the world to be 100% powered by renewables. Concerned about the unpredictable cost of energy and the impact of climate change, Mr. Schaefer invested in wind and solar, using state and federal incentive programs. The cost savings from installing clean energy allowed him to invest in more efficient snow-making equipment while also diversifying his business to include off-season activities like zip-lining and white water rafting to bring in additional revenue. He reports that 60% of the mountain's revenue now comes from non-winter business, resulting in an operation that is much more resilient to the changing weather patterns ahead.

There are stories like this across the country-stories of family businesses, farms, large industry and cities and small towns threatened by the changes they are already seeing, but harnessing innovation and ingenuity to take on these challenges. But they can't do it alone. The magnitude of the impacts from climate change requires all of us to put politics aside and act together, quickly and decisively. We still have the opportunity to check the severity of future impacts by aggressively reducing greenhouse gas emissions and adapting to the changes that are ongoing. That is the path we have taken in Massachusetts.

A History of Bold Leadership on Climate Change and Breakthrough Mitigation Policies

The effort to reduce emissions to a level that avoids the most catastrophic changes to our climate clearly requires state, national, and international leadership. At the same time, there are aspects of Massachusetts's own experience in successfully establishing achievable goals, working regionally, and fostering innovative breakthroughs that could offer lessons for other states, regions, and the federal government.

With the unanimous, bipartisan passage of the Global Warming Solutions Act in 2008, Massachusetts became one of the first states in the nation to establish both a long-term requirement to reduce carbon emissions by at least 80 percent below 1990 levels by 2050, while also setting interim targets every decade. The Act requires us to report our emissions annually, track policy effectiveness and develop plans for the future. By mid-century this course will yield significant GHG reductions, overhaul our energy structure, and lead to significant economic and societal change, while the interim targets will guide the implementation of cost-effective policies that reflect current technology. Clearly, this is an enormous undertaking but developing

[3] Burkowski, E., and M. Magnussen. 2012. Climate Impacts on the Winter Tourism Economy in the United States. Natural Resources Defense Council. https://www.nrdc.org/sites/default/files/climate-impacts-winter-tourism-report.pdf

ambitious, yet realistic goals is working. Our 2020 goal of a 25 percent reduction under that baseline was set ambitiously in 2010 and as of 2016 we have reached a 21.4 percent emissions reduction and are well on our way to reach the 25 percent limit. Moreover, far from being an economic burden, we have seen close to a 70% increase over 1990 levels in our gross state domestic product and clean energy has been one of the strongest job growth sectors in our economy in the last decade.

The Commonwealth's aggressive 2020 goal puts the state on track to meet emissions reductions of 26 to 28% below 2005 levels by 2025 – the nationally determined U.S. contribution through the Paris Agreement of the United Nations Framework Convention on Climate Change. Shortly after the announcement of the intent to withdraw the U.S. from the Paris Agreement, Massachusetts joined with a bipartisan coalition of states committed to fulfilling the tenets of the Paris Agreement by implementing policies to reduce emissions, tracking and reporting progress on emissions reductions and accelerating new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level. The coalition is now 20 governors strong.

This 2020 goal has not only provided a focus within Massachusetts, but it has also compelled us to develop instrumental regional partnerships with New England states, the Canadian provinces and the federal government. Specifically, we have found that utilizing the comparative strengths of different regions —whether it is hydropower from Quebec or offshore wind in federal waters —allows us to obtain cost-competitive pricing. Every region of our country should have the flexibility to develop a unique plan that leverages existing resources and economies, but we must seize the opportunity to responsibly reduce emissions now.

The predictability of the regional clean energy market and promotion of clean energy development and trade have also been essential to the Commonwealth's success. The Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade program encompassing electric generators larger than 25 Megawatts across nine states, provides a stable policy to reduce emissions and allows states to invest auction proceeds in cost-effective energy efficiency programs, including nearly $400 million in Massachusetts since its inception. While the program marginally increases wholesale electricity pricing, the reinvestment in highly cost-effective energy efficiency measures has resulted in $3-$4 in benefits for every $1 of incremental cost. In Massachusetts, businesses across sectors are seizing the opportunity to take advantage of energy efficiency programs through our MassSave Program—from optimizing efficient cooling technology at the largest data center in New England run by the Markley Group, to installing advanced lighting at Hannaford, one of the largest supermarket chains in the state, to removing redundant motors at Cedar's Mediterranean Foods operations, saving over $100,000 annually in energy costs. Our major sports facilities, including Fenway Park, have undergone LED lighting upgrades that have reduced the park's electricity use by 12 percent. Bottom line, we have saved billions in avoided electrical costs for all ratepayers by keeping electric load basically flat while our economy has grown. The results on New England sports fields have been pretty decent as well.

In total, the region's greenhouse gas emissions from this sector have fallen 50 percent since 2005 and the regional investments from the proceeds are estimated to have saved ratepayers across the RGGI states a cumulative $8.6 billion. Regulated generators see the value in the clarity and the predictability of the program, while businesses support the energy efficiency investments that have earned Massachusetts the title of the #1 state for energy efficiency in the nation for eight consecutive years.

While we have leveraged cost-effective efficiency investments, including the installation of over 24.1 million LED light bulbs, energy innovation opportunities are accelerating. From further advancements in lighting, electrical heating and cooling, and advanced insulation improvements that make zero energy consumption for new building construction a reality, we now have commercially available efficient technology and materials that are transforming our economy.

There is no single solution to the challenges we face and we need to take a flexible approach that supports the innovations of tomorrow while acknowledging the role existing resources like natural gas and nuclear power, have played in our success to date. Clean energy innovation, guided by targeted research and development and pure entrepreneurial initiative, continues to deliver declining energy costs and new disruptive technologies. While deploying the cost-effective technology of today we should invest in clean energy research and development. These investments will likely produce key components of our energy future. For example, the ARPA-E program has partnered with MIT to move forward with advanced nuclear research to increase reactor performance. Harvard University is researching a flow battery that utilizes organic molecules to store electricity beyond increasingly competitive—but still expensive—electric batteries.

Storage completely alters the value proposition for renewable energy, presents unique advantages to reconfigure our electric distribution system, and can target reductions in the peak electricity consumption through timely dispatch. Our Department of Energy Resources determined that in Massachusetts, 40 percent of the electrical cost for ratepayers occurs during the top 10 percent of the usage hours of year. Storage technology can therefore provide both ratepayer and greenhouse gas reduction benefits. Massachusetts electric utilities are looking to avoid costly upgrades to distribution lines through targeted storage deployment, diesel generation on our islands are being replaced with storage units, and manufacturers are lowering bills through avoided demand charges by curtailing demand with storage during peak demand periods.

In 2019, we must jettison preconceived assumptions about the costs of clean energy and look at the facts. Just seven years ago, Massachusetts considered moving forward with an offshore wind project at a cost of roughly 20 cents per-kilowatt and projecting billions in above-market costs for ratepayers. In 2016, acting after passage of the bipartisan legislation, we issued a competitive Request for Proposals and Massachusetts selected an offshore wind project on one

of three federal lease areas proposed by Vineyard Wind that represents a cost reduction of more than 65 percent below the previous proposal and is projected to save ratepayers money. The factors that led to these disruptive prices include technology that will increase turbine sizes by nearly 3 times, economies of scale delivered by a larger project, and a competitive solicitation that challenged bidders to deliver the best price. These industry advancements would not have been possible without our critical partnership with the federal government. I applaud Congress for providing a predictable investment tax credit for this industry and also the Trump Administration's Bureau of Ocean Energy Management for working with us to expeditiously review the project and build a new industry in the United States. The Administration has recognized the potential economic opportunity of modern offshore wind turbines and last December moved forward with lease sales for three additional parcels in federal waters south of Massachusetts. Not only did the auction collectively deliver $405 million for the federal government, but it attracted traditional companies like BP, Shell, and the Norwegian state energy company, Equinor. This is a partnership that can reduce emissions, save ratepayers money, and provide critical revenue to the federal government.

We can seize this economic opportunity while simultaneously realizing the emission reductions afforded by the best available science and technology. Congress has come together in the past to successfully enact meaningful bipartisan energy and climate change legislation that resulted in emission reductions and predictability for our business community. Just over four years ago, Republicans and Democrats came together and developed a compromise that included the extension of the renewable investment tax credit allowing Vineyard Wind to move forward with an 800Megawatt project. This credit was imperative to the results: emission reductions by over 1.6 million metric tons annually, the equivalent of taking 325,000 cars off the road and it is estimated that the project will provide over 3,600 local full-time equivalent jobs over the life of the project.

While we have made significant progress to reduce power sector emissions, our next challenge will be transportation. In Massachusetts transportation emissions represent close to 40% of total emissions and continue to climb, while most other sectors are declining. In that spirit of regional partnership, this past December, we joined eight states and the District of Columbia through the Transportation Climate Initiative to work together over the next year to develop the framework for a regional program to address greenhouse gas emissions in the transportation sector, building on the strong foundation provided by RGGI. The announcement follows the recent release of the report of the Commission on the Future of Transportation, which I appointed to help Massachusetts navigate a disruptive transportation future. The report called for the de-carbonization of transportation, including collaborating with regional partners to develop a carbon pricing mechanism to cap emissions and invest revenue back within the state.

Building a Resilient Commonwealth

In Massachusetts we have focused first on reducing our contributions to climate change and building our clean energy economy, but our experience with severe weather and natural hazards has made clear the importance of preparing for the ongoing impacts of climate change. In 2016, I signed an Executive Order to, for the first time, pursue an aggressive, integrated effort using sound science to prepare state government and partner with our local communities to build resiliency for the challenges ahead.

One of the first things we did was to partner with the federally funded Northeast Climate Adaptation Science Center at the University of Massachusetts to understand the climate changes we are seeing now and the kinds of changes we will see in the future. Our secretaries of Energy and Environmental Affairs and Public Safety and Security led a two year, government-wide effort to complete a State Hazard Mitigation and Climate Adaptation Plan. The plan, which leveraged Federal Emergency Management Agency (FEMA) money and engaged over 500 stakeholders, is the first in the nation to fully integrate federal hazard mitigation planning requirements, with a proactive, forward looking approach to addressing the impacts from climate change. Throughout the development of the plan, every state agency completed a vulnerability assessment of their assets and functions and identified initial strategies to increase resiliency.

The plan will be used to inform policy, management and spending decisions including development of climate change resiliency criteria in our capital planning process to ensure that the investments we are making today are designed for changing conditions and do not increase our exposure to climate risk. While we know we need increased funding to deal with these challenges, the first step in this process is making sure existing spending is climate-smart and cost-effective.

As I mentioned, our local communities are already experiencing climate change impacts and are taking leadership themselves on this issue – our administration strongly values our municipal partners and has sought to work closely together on this challenge. Our Municipal Vulnerability Preparedness program (MVP), launched in 2017, builds on this partnership by providing grants and technical assistance to municipalities so they can assess their vulnerabilities, and plan for and implement priority climate change adaptation projects to build resiliency and reduce risk. My administration worked with partners across the state to develop this community-based program, including the Nature Conservancy and the Massachusetts Audubon Society and has trained over 300 technical service providers from consulting firms, regional planning authorities, engineering companies, small businesses and non-profits to lead municipal planning efforts. In its first two years, the MVP program enrolled 44% of Massachusetts municipalities, and awarded over $8 million in grants.

These grants are advancing local resilience innovation—like the development of the City of Boston's first ever resilient building code, restoration of an urban floodplain in Arlington, and a town-wide road stream crossing resiliency strategy in Belchertown. High participation from Massachusetts communities underscores the real need and enthusiasm for a program that

maintains and enhances quality of life, helps to repair and replace aging infrastructure with climate-smart solutions, and promotes strong local economies while reducing risks and future costs. Importantly the program allows communities the flexibility to design solutions that work for their unique circumstances, are grounded in science and funded by the Commonwealth.

These programs cost money, and in fact over the first four years of my administration we have invested over $600 million on climate change mitigation and adaptation actions through our environmental agencies alone without raising taxes or fees. Building on this investment, we recently worked together with the Legislature to craft an environmental bond bill focused on climate change adaptation, environmental protection, and recreation that authorizes $2.4 billion of investments over five years.

Now that we have a better understanding of the scope of the challenges ahead through our state and local planning efforts, I also filed legislation in January calling for a modest increase in the excise on property transfers to fund a substantial and sustained investment in climate change adaptation to protect property. The proposal is estimated to generate $1.3 billion over 10 years that would go directly back to cities and towns to invest in climate-smart infrastructure and nature-based solutions that protect public health, safety, and property across the Commonwealth. Climate-smart infrastructure is resilient to damage caused by climate change and extreme weather because it is designed to accommodate the climate conditions it will experience over its lifetime, rather than historic conditions which set the standards for the infrastructure we have today. Examples include:

- right-sizing culverts to accommodate increased streamflow from more intense storms;
- removing underutilized dams and restoring floodplains along rivers and streams to prevent flooding;
- installing resilient energy technologies such as microgrids that pair on-site renewables like wind and solar with battery storage to allow a critical facility like a hospital or campus to remain online during severe weather;
- employing nature-based solutions such as wetland restoration in urban areas to absorb increased runoff during storms;
- installing artificial oyster reefs and restoring natural coastal habitats to buffer against increased storm surge and sea level rise;
- upgrading combined sewer overflows to separate wastewater from stormwater to ensure cleaner water and fewer flooding events involving untreated sewage; and
- ensuring materials used in roads, bridges, train tracks and other heat sensitive infrastructure can withstand increasing temperatures over their useful lifespan.

Recommendations and Conclusions: Commonwealth Perspective

I would like to share some themes I believe will help make progress on reducing greenhouse gas emissions and building resiliency across the country based on our experience in Massachusetts.

Support Local Communities and States

Communities need support in the form of incentives, like our MVP grant program, to address resiliency issues before the next disaster. Many of the current federal incentives directed through FEMA are only available after a disaster occurs, yet for every dollar spent proactively on resiliency measures, taxpayers save $6.[4] One example of this type of funding comes from FEMA's new resilient infrastructure grants which provide large scale funding support to projects that will reduce risks, loss of life, and damages from future disasters. Our public and private sector partners are ready to make resilient investments in projects that protect our communities, and these matched funds ensure that construction can get started. Expanding programs like this and increasing funding available to states would accelerate existing efforts and galvanize new ones.

Bipartisan cooperation around funding to address the nation's ageing infrastructure also holds tremendous promise to reduce climate change vulnerability, help transition to a clean energy economy, spur economic development, and build community resiliency. Additional federal funding can not only repair and modernize our deteriorating infrastructure but also help make it resilient to changes in weather. Consideration of climate change emissions, vulnerability, environmental justice communities, and design standards that reflect a changing climate must be incorporated into any infrastructure legislation that is filed. Nature-based solutions hold great potential for buffering or replacing existing traditional infrastructure and should be explored here. Our environmental bond bill includes these types of strategies that conserve, restore or mimic the functions of natural ecosystems to replace or enhance traditional infrastructure and provide multiple benefits for communities in the form of added resiliency, carbon sequestration and clean water and air.

These types of combined approaches, utilizing traditional infrastructure but enhancing its resilience with nature-based solutions, are in progress in many places now, including Louisiana, following the widespread devastation during Hurricane Katrina. First the levees were built higher and stronger, but Louisiana has also been incorporating wide-ranging nature-based flooding solutions, including restoring wetlands to absorb water, building up barrier islands to reduce wave energy and storm surge, and creating oyster reefs to protect against flooding as the seas rise.

Governments alone cannot sustain the enormous funding needs to support local and state resiliency initiatives or the transition to clean energy and transportation. Both state and federal

[4] Natural Hazard Mitigation Saves: 2017 Interim Report. The 2017 Interim Report (January 2018).

government need to develop public-private partnerships that bring more dollars back to our communities while also leveraging the wealth of knowledge and strategic thinking the private sector can bring to this challenge.

Federal Leadership

I am proud of our record of climate leadership in Massachusetts, and there is much to learn from how states and regions have approached this issue; but states cannot solve this problem alone. We need strong federal leadership and a bold bipartisan vision on climate change that seeks compromise and prioritizes practical market-based solutions, while affording states the flexibility to design strategies that work for their unique challenges while continuing to grow their economies.

In Massachusetts setting an aggressive target for reducing greenhouse gas emissions provides the foundation for our clean energy policy, sends a clear signal to industry, and enables us to complete long-range planning. We believe it is essential to establish federal emission reduction targets that can vary by state or region with policy flexibility for states to design solutions that work for their unique circumstances. Such targets would level the playing field and send a clear signal to business and industry as we transition to a clean energy economy.

Our transportation sector targets are particularly important now. While predictability and compromise have made cost-competitive renewable energy projects possible, recent proposals to roll back the current federal fuel economy standards are creating uncertainty for the automobile industry and will undermine national and state emission progress. Achieving Massachusetts's 2020 emissions limit assumes a strong foundation of federal fuel economy standards based on harmonization with California's Clean Car Program standards which 13 states including Massachusetts currently follow; states cannot succeed in reducing transportation sector emission without these strong standards.

Federal research, science and innovation

Strong federal leadership should also include making impactful investments in research to develop technologies that can reduce emissions and to design strategies and tools for adapting to the ongoing impacts of climate change. The congressional bipartisan effort to prioritize clean energy research is paying dividends across this country and must be measured in years. The research at the Department of Energy and our national laboratories around the country continues, and is the key mechanism to release disruptive innovation. It is inspiring to consider what this country could accomplish through a sustained commitment to clean energy research, while implementing a stable and simple commitment to emission reductions.

States, communities, businesses, agricultural producers, and natural resource managers rely heavily on science, data and management tools developed by federal agencies including NOAA, the U.S. Geologic Survey and the Environmental Protection Agency. For example, the

products provided by the NOAA National Weather Service, including real-time data that predicts climate variation on the scale of weeks to years, is used to inform decisions on national security, crop prices, insurance rates, tourism and recreation, energy, and the transportation sector. The Service provides outreach and education to local users across the country. We need agencies like NOAA to continue to deliver on their service mission by providing the best climate science and data, tracking climate change impacts, and helping states and communities develop and implement strategies for adaptation to climate change.

Use Climate Change Science and Data to Inform Planning, Policy-Making, and Resource Management

In the Commonwealth, we strive to set an example by working to incorporate climate risk and vulnerability into all of our decisions whether it is through our statewide planning, bonding, policy development or grant-making. The federal government should also take this approach by incorporating climate risk and resilience in all future federal spending and planning decisions to ensure taxpayer dollars are used wisely on climate-smart investments. Failing to account for climate change impacts like sea level rise and inland flooding will put significant assets at risk within their serviceable life span and may further expose already vulnerability populations and communities to increased risk. Without intervention to adapt over $1 trillion of coastal property and assets are vulnerable to as little as two feet of sea level rise—a level that may be surpassed before the end of the century.[5]

In 2013, federal agencies released climate adaptation plans to ensure agencies can continue to meet their mission and serve the American public in the face of a changing climate. Like our state plan, these plans outlined strategies to reduce the vulnerability of federal programs, assets, and investments to the impacts of climate change. Many of our federal resources across the country are threatened by climate change. It is critical that Congress provide oversight to ensure that agencies implement these plans and prioritize actions based on a long-term, positive return on investment for the American taxpayer.

This is an issue of particular relevance for this Committee in your role providing oversight of our rich public lands. A recent study by National Parks Service scientists and independent researchers finds that all 417 parks are at risk of significant climate change impacts, including the disappearance of glaciers in Glacier National Park and increasing wildfires in Yellowstone that could transform the forested ecosystem to grassland within the century.[6] Closer to my home, our Boston Harbor Islands, managed through a partnership between state and federal government and a non-profit are already threatened by sea level rise and storm surge.

[5] Dahl, K.A., Spanger-Siegfried, E., Caldas, A. and Udvardy, S., 2017. Effective inundation of continental United States communities with 21st century sea level rise. Elem Sci Anth, 5, p.37. DOI: http://doi.org/10.1525/elementa.234

[6] Patrick Gonzalez et al 2018. Disproportionate magnitude of climate change in United States National Parks. Environ. Res. Lett. 13 104001

These islands have rich historical and ecological value, provide unique recreational opportunities for urban youth, and also offer critical defense for Boston Harbor against increasing storm surge.

Risks are likely to be widespread across many different types of federal holdings, including military installations. A report on climate change impacts from the Department of Defense this January[7] found that at least 79 military installations have significant vulnerabilities from climate change related risk including wildfires, drought, recurrent flooding, thawing permafrost or other threats. These bases have already experienced extreme weather, including wildfires in 2016 and 2017 at the Vandenberg Air Force Base in Southern California, permafrost loss on training grounds at Fort Greeley, Alaska, and recurrent flooding at bases in Virginia due to sea level rise, land subsidence, and changing ocean currents.

Closing

Governors around the country are seeing the effects of climate change in our states and communities, and we know that the decisions we make today will determine our ongoing risk and the well-being of future generations. But we also recognize the significant economic opportunity at hand to build a new clean energy industry, transform transportation, spur research advancements, and better design the resilient communities of tomorrow. This is not a challenge the federal government can solve alone; the severity of the impacts from climate change depends on our collective actions as federal, state and local government, working with the private sector to aggressively reduce our greenhouse gas emissions and adapt to the changes that are already in motion. I thank the committee for the invitation to speak and look forward to working together on this challenge.

[7] Report on the Effects of Climate Change to the Department of Defense, January 2019. https://partner-mco-archive.s3.amazonaws.com/client_files/1547826612.pdf