MINORITY QUESTIONS

Questions for the Record Submitted by Hon. Maria Cantwell to Hon. Neil Jacobs

COVID-19. The COVID-19 pandemic has resulted in consequences for geoduck exports to China and for commercial sales of fresh seafood products in domestic markets. Pacific Northwest shellfish companies are suffering, yet they don't qualify for assistance under the NOAA fishery disaster program.

Question 1. Will you work with Congress to come up with solution to help the commercial and Tribal shellfish industries as they experience impacts from COVID-19 related economic impacts?

Answer.
Section 12005 of the CARES Act authorizes the Secretary of Commerce to provide $300 million in appropriated funds to assist fishery participants affected by the novel coronavirus (COVID–19). NOAA Fisheries understands the urgent need for these funds, and our overarching goal is to distribute the assistance as quickly as possible. To that end, we are working daily with the Department and our Federal partners to finalize a process to expedite the distribution of Sec. 12005 funds, consistent with the direction provided by Congress. We will post details about the process for stakeholders and partners here.

Other provisions in the CARES Act will help NOAA maintain continuity of operations and support the continued success of our nation's fisheries. The $20 million identified for NOAA is essential for continued provision of life-saving services and for keeping our workforce safe.

Hiring Backlog.

Question 2. Is there a hiring backlog at NOAA?

Answer.
Yes. Approximately 1 in 10 positions are vacant based on FY20 Spend Plans.

Question 3. If so, how will you fix it, and what will happen if it is not fixed?

Answer.
For the last 5 years, NOAA has outsourced hiring with mixed success as no single vendor has been able to address our hiring needs. Our hiring needs include 1,200-1,300 actions per year to address attrition and internal promotions, as well as another 1,200 actions to address the current gap in onboard strength based on our FY 2020 spend plan.

For FY 2020, we have worked closely with our contracted vendor to improve their capacity. Conservatively and assuming no losses in capacity due to Coronavirus, we project filling close to 1,500 hires this year. This will be the most hires in a single year for NOAA in over a decade,

and it will address approximately 15% of the gap in onboard strength in our FY 2020 spend plan.

Additionally, NOAA's Office of Human Capital Services is doing two additional things to increase hiring capacity this year. First, we will forgo increasing staff resources in other areas of HR and increase the staff available to focus on building our hiring capacity. Secondly, we are working with line and staff organizations to pilot alternative approaches and implement existing hiring flexibilities given to us by OPM and Congress (i.e., Direct Hire for STEM and Conservation Corps Act hiring and the GS 5-12 promotion plan) to speed up the hiring process. These changes will allow us to target 1800+ hires in FY21 and beyond. Reaching 1,800 hires will allow us to reduce the gap between our onboard strength and the projected resources we have to spend on employee salaries in our FY 2021 spending plan.

NOAA Budget.

Question 4. What is your perspective on NOAA's overall funding and do you support cutting programs like Sea Grant, Coastal Zone Management grants, and the Pacific Coastal Salmon Recovery Fund as proposed in the fiscal year 2021 budget request?

Answer.
In the FY21 Budget, as in every budget submission, NOAA works closely with the Administration to identify those NOAA specific initiatives that maximize both NOAA goals and broader Administration priorities in national security, trade, and the economy, acknowledging fiscal constraints. NOAA supports these broader priorities by reducing the impacts of extreme weather and water events to save lives and protect property by implementing the Weather Research and Forecasting Innovation Act, maximizing the economic contributions of ocean and coastal resources by expanding the American Blue Economy, and through space innovation. I look forward to working with you in the future on the funding levels of NOAA programs.

Conservation.

Question 5. Do you support, and commit to carrying out, the full suite of conservation laws that apply to NOAA, including the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Coastal Zone Management Act, and the National Marine Sanctuaries Act?

Answer.
Yes, I fully support carrying out NOAA's missions as authorized and guided by these statutes and all others that apply to NOAA.

Fisheries Management.

Question 6. Do you agree that overfishing should not be allowed and that depleted fisheries should be rebuilt? Should fisheries management decisions be based on the best available science? Will you oppose actions that undermine these conservation tenets?

Answer.

Requirements to prevent overfishing, rebuild overfished stocks, and base conservation and management decisions on the best scientific information available are core tenets of the Magnuson-Stevens Act and fundamental to our successful fisheries management construct. At the end of 2019, 93 percent of our stocks are not subject to overfishing and 81 percent are not overfished. In addition, we have rebuilt 47 stocks since 2000. By preventing overfishing and rebuilding stocks, we are strengthening the value of fisheries to the economy and communities that depend on them, and also ensuring a sustainable supply of seafood for the Nation in the future.

Climate Change.

Question 7. Do you concur with the conclusion reached by NOAA scientists that climate change is occurring and that human-caused greenhouse gas emissions are largely responsible?

Answer.
Yes, I concur with the conclusion by NOAA scientists that climate change is occurring. Accumulation of greenhouse gases is one of many factors that influence this trend, which also includes removal of carbon sinks. Drivers of climate change are a complex mix of natural and anthropogenic forces.

Question 8. Is climate change a pressing problem for the ocean, fisheries, and coastal communities?

Answer.
Yes. For example, fish migration, acidification, and coastal storm impacts could become a growing challenge. However, increasing risk exposure, particularly along developed coastlines, can exacerbate these challenges regardless of impacts from a changing climate.

Arctic.

Question 9. Describe your plan for continuing and expanding weather, sea, and ice observing and monitoring capabilities in the Arctic.

Answer.
NOAA has a long history of Arctic science, service, and stewardship, including weather and climate services, nautical charting and other navigation services, natural resource management, and spill preparedness and response. Observations are key to performing these important missions in the Arctic region. NOAA envisions an Arctic where decisions and actions related to conservation and management are based on sound science. Innovation and partnerships are critical to meeting this goal. NOAA operates baseline atmospheric observatories and conducts research on important issues that improve our understanding of Arctic atmospheric phenomena, on various timescales, including the study of connections between Arctic weather and lower latitudes.

Questions for the Record Submitted by Hon. Amy Klobuchar to Hon. Neil Jacobs

Great Lakes. Fishing contributes an estimated $2.4 billion to Minnesota's economy annually and supports nearly 35,000 jobs. Reports have highlighted that climate change is causing temperatures in the Great Lakes to rise, causing fish populations in the Great Lakes region to migrate to different areas—which could negatively impact a key part of our economy.

Question 1. If confirmed, how will you ensure that NOAA continues to support the resiliency and stability of fish populations and the fishing industry in the Great Lakes region?

Answer.
While NOAA does not have regulatory oversight over fish in the Great Lakes, the Agency supports projects that restore degraded or altered Great Lakes coastal habitat to promote the recovery and sustainability of native fish species, recognizing that such projects yield multiple benefits for local communities and wildlife. Since 2010, NOAA has supported more than 70 habitat and species restoration projects through the Great Lakes Restoration Initiative. These projects have restored nearly 4,500 acres of habitat and opened almost 500 stream miles for fish passage. These projects will provide multiple benefits to the environment and communities: supporting valuable fisheries and coastal resources, improving the quality of our water by restoring coastal wetlands, providing recreational opportunities for the public's use and enjoyment.

Question 2. If confirmed, will you commit to work to produce accurate climate science and provide the public with timely information about climate change?

Answer.
Yes.

Questions for the Record Submitted by Hon. Ed Markey to Hon. Neil Jacobs

Right Whales. Fishermen in the United States have been working hard to conserve right whales over the past 30 years, most recently closing more than 3000 square miles of lobster fishery in Massachusetts over a three month period to ensure a zero-percent chance of interaction with right whales. Canada just published their updated regulations on this subject, proposing changes to fishing regulations and vessel traffic.

Question 1. Are the new Canadian regulations commensurate with US regulations? How do they differ?

Answer.
Canada recently announced additional measures to reduce the risk of entanglement that will be implemented in 2020 and 2021. We are still analyzing the measures to see if they address the concerns that we have communicated to Canada. As we continue to revise our U.S. regulatory program, Canada is also implementing the previously announced revised measures. We will continue to work with Canada to consider any additional measures that may provide North Atlantic Right Whales with immediate relief.

Question 2. To minimize the entanglement risk of right whales in fishing gear, NOAA has developed a decision support tool to determine the risk reduction of different types of fishing gear. While the quantitative right whale habitat and vertical line variables underpinning this tool are tailored to US fisheries, how much risk would you qualitatively estimate the new Canadian regulations reduce? Please provide your response to this question in terms of percent risk reduction, as is standard when using the decision support tool that has calculated a 60 to 70 percent risk reduction in Massachusetts.

Answer.
For waters outside of the U.S., we will be applying a variety of approaches, many of which are qualitatively similar, as we analyze the effect of the Canadian measures in our upcoming biological opinion and rulemaking. For the purpose of the MMPA Import Provisions, we will use the same methods that we use to evaluate all nations' fisheries for all Canadian fisheries. Regarding vessel strike conservation measures, which are a component of Canada's conservation measures, the Decision Support Tool is not yet capable of measuring risk reductions associated with vessel collisions in that region. However, for both vessel strikes and fisheries interactions, NMFS will continue to coordinate with Canada on the means and methods to assess risk reduction. I look forward to working with you and your staff as more data become available, and analysis begins to produce both qualitative and quantitative results.

Oil Spills. The coastal United States has suffered through several major oil spills, from Exxon Valdez to the BP Oil Spill and the 14-year long Taylor Energy spill in the Gulf of Mexico. However, the United States still lacks critical capacity for oil spill response, especially as the Unites States moves to ramp up oil production in the Arctic Sea. At a Senate Commerce Subcommittee hearing on the Arctic on December 12, 2019, I was disappointed to hear the Commandant of the Coast Guard Admiral Schultz state that the United States still does not know or have the ability to clean up oil spills in and around ice.

Question 3. Is NOAA doing research on how to clean up oil spills in the Arctic, in and around ice? If not, why not?

Answer.
Yes, NOAA has a number of projects and partnerships with other agencies, other countries, industry, academia and institutions such as the Oil Spill Recovery Institute in Cordova, Alaska, and the Coastal Response Research Center (CRRC) at the University of New Hampshire. The Office of Response and Restoration (ORR) is currently collaborating with the Coast Guard Research Development Center (RDC), along with others including the Bureau of Safety and Environmental Enforcement (BSEE), Environmental Protection Agency (EPA), and Prince Williams Sound Science Center, to advance detection capabilities for oil spills in ice environments. This multi-year project involves testing various sensor platforms (such as unmanned aircraft systems and remotely operated vehicles) and environmental samplers that have been developed and calibrated specifically for oil.

NOAA is also researching the biological effects of oil. ORR, Alaska Fisheries Science Center (AFSC) and Northwest Fisheries Science Center (NWFSC) have a multi-year, collaborative research initiative on the effects of oil on Arctic cod, a keystone species in Arctic ecosystems. The work includes toxicity testing to determine acute and latent effects of oil exposure on survival, fitness, and bioenergetics; identification of diagnostic biomarkers of oil exposure and injury; and development of models for oil exposure and effects.

ORR and NOAA Fisheries scientists have also participated in a project studying oil & dispersed Oil Effect on Whale Baleen Function with North Slope Borough/Department of Wildlife Management, Barrow, AK, Woods Hole Oceanographic Institute (WHOI) and others. Projects we are championing (providing comments, suggestions, etc.) for the Arctic Domain Awareness Center (ADAC) include

- Mitigating the Damage to Arctic Copepods from Surface Oil Spills: When to Apply Dispersants. Led by Bigelow Laboratory for Ocean Sciences.
- Photo-enhanced toxicity of dispersed and burned crude oil to Arctic mussels. Led by University of Alaska Anchorage College of Arts and Sciences, Alaska Sea Life Center and University of New Orleans.
- Oil Spill Modeling for Improved Response to Arctic Maritime Spills: The Path Forward. Led by University of New Hampshire, Coastal Response Research Center, Center for Spills in the Environment.
- Dynamics of oil spreading under various ice and sea conditions: laboratory observations and modeling. Texas A&M University

Question 4. Do you agree with Commandant Schultz that the United States is unable to currently clean up Arctic Oil spills? If not, why not?

Answer.
Oil spill response in the Arctic faces significant technical, operational and logistical challenges. The extent of these challenges varies significantly with location. Oil spill clean-up on land and at

nearshore facilities is a routine practice in Prudhoe Bay, where industry funded Oil Spill Response Organizations (OSROs) such as Alaska Clean Seas have significant expertise and state-of-the-art equipment, infrastructure, and logistical support. This is not the case for most of the other places in the U.S. Arctic, and especially for large offshore spills; access, weather, oceanographic conditions, equipment staging, communications, etc., are challenging in these remote areas.

Question 5. NOAA's recent Science Report includes an outline of new technology on how to clean up oil spills. What other research is NOAA doing on oil spills?

Answer.
NOAA (ORR, AFSC, and NWFSC) has a multi-year, collaborative research initiative on the effects of oil on Arctic cod, a keystone species in Arctic ecosystems. The research includes toxicity testing to determine acute and latent effects of oil exposure on survival, fitness, and bioenergetics; identification of diagnostic biomarkers of oil exposure and injury; and development of models for oil exposure and effects.

NOAA's Shoreline Cleanup and Assessment Team validates shoreline oiling interactions and assesses effects of Aggressive Monitoring and Cleaning Techniques on Shorelines. Its goal is to develop marsh/shoreline cleanup guidelines by evaluating datasets and associated publications. This includes reviewing the utility and application of sediment chemistry and microbial ecology data as potential indicators of cleanup efficacy.

Climate Change. From fish species shifting northward to the impacts of ocean acidification on shellfish, fishing industries are facing many new challenges as a result of climate change.

Question 6. Will you continue to support climate change research as the NOAA Administrator?

Answer.
Yes.

Fish Stock Assessments. At the nomination hearing you briefly mentioned NOAA's role in managing fish stocks.

Question 7. Can you explain how NOAA will work to adapt their stock assessment process to include climate impacts?

Answer.
NOAA Fisheries recognizes that fish stocks are routinely impacted by their environment, and that this is increasingly important to account for as environmental and climate conditions change. One of the reasons for updating a stock's assessment in a prioritized approach is to take into account unexpected changes due to climate influences. NOAA Fisheries has developed several guidance documents such as the NOAA Fisheries Climate Science Strategy, the Next Generation Stock Assessment Improvement Plan (SAIP), and a recent NMFS Technical Memorandum that provides suggestions on how to address shifting distributions and changing productivity in the fisheries management process. For example, the SAIP recommends that Terms of Reference for

stock assessments call for consideration and review of the degree to which climate, ecosystem, and socioeconomic drivers affect fish stocks. The SAIP also provides several decision trees that help guide considerations of climate and ecosystem effects, and how to include these effects in the stock assessment process. NOAA Fisheries is actively working to implement the collective suite of recommendations from these documents across all regions.

Additionally, the Office of Oceanic and Atmospheric Research (OAR) and the National Marine Fisheries Service (NMFS) are collaborating on the NOAA Climate and Fisheries Initiative to increase the availability of climate information needed to successfully manage fish stocks and protected species. This information includes short-term forecasts and long-term projections of changing climate and ocean conditions at spatial scales important for stock assessments, and will increase our understanding of how changing conditions could impact marine and coastal species. Finally, NMFS is actively working on the development of new stock assessment models and tools that will facilitate better uptake of climate and ecosystem data into stock assessment models.

Question 8. What opportunities do you see to integrate both novel technologies as well as collaborative approaches that include data collected with the industry in stock assessments?

Answer.
NOAA Fisheries has been making many advances to integrate novel technologies and collaborative approaches into stock assessments, where appropriate. For example, NOAA has been increasing its use of autonomous vehicles in coordination with fishery-independent research cruises to improve stock assessments. Similarly, many NOAA Fisheries stock assessments already incorporate data collected with industry, such as fisherman's logbook data, observer data, and data from cooperative research projects. Additionally, NOAA Fisheries is continuing to work with fishermen, Fishery Management Councils, and other partners to improve the timeliness, quality, cost effectiveness, and accessibility of fishery-dependent data, such as through the expansion of electronic monitoring and reporting programs in all regions, (but not necessarily all fisheries). Further, several of our major stock assessment research cruises are conducted in collaboration with industry by chartering fishing vessels. Expanding and streamlining data collection from fisheries will help deliver information more efficiently into use for stock assessments and help U.S. fishermen make timely decisions for their fishing operations and businesses. Looking forward, as NOAA Fisheries seeks to maintain and expand its data collection infrastructure, the agency will continue to expand these programs, as well as explore programs that leverage partnerships to collect more data in cost-efficient ways.

Question 9. How do you aim to integrate feedback from fishery councils as well as cooperative research done with fishermen into any changes to stock assessment methods?

Answer.
The Fishery Management Councils, with their Scientific and Statistical Committees (SSCs) are the primary management partners for the agency, and regional stock assessment processes ensure that their input is incorporated into the stock assessments. The Council's SSCs have a major role in developing stock assessment Terms of Reference and conducting reviews of stock assessments performed by agency scientists for use in the management process.

NMFS supports the incorporation of any scientifically valid data set into stock assessments. This includes various external sources, such as academic projects, as well as partnerships, including cooperative research or state programs. Many of these data sources are already incorporated into stock assessments, and the agency supports increasing the use of these sources. All such data are subject to the same stock assessment review process as data collected by NMFS; thus their use in stock assessments depends on the outcome of the regional review processes managed by the Councils.

Politicization of Science. "The "Sharpiegate" scandal represented an alarming politicization of weather science.

Question 10. If confirmed as NOAA administrator, how will you protect scientists and continue to publish accurate science, without political interference?

Answer.
I am committed to promoting scientific integrity within NOAA. NOAA already has a rigorous Scientific Integrity Policy (NOAA Administrative Order NAO 202-735D) that provides best practices to promote a continuing culture of scientific excellence and integrity. We are currently in the process of evaluating our scientific integrity policy to make it even more robust. I have valued, promoted and benefited from scientific integrity throughout my career, in academia, industry and at NOAA and will continue to champion it going forward.

Questions for the Record Submitted by Hon. Brian Schatz to Hon. Neil Jacobs

NOAA Budget. For NOAA to be healthy, it needs to have a budget that supports all of its activities. However, the FY21 NOAA budget zeroes out important conservation and management programs like the National Estuarine Research Reserve System (NERRS) and Coastal Zone Management grants. It also slashes the NOAA Habitat program run out of the fisheries office by a third.

Question 1. How will your confirmation make a difference for these programs in the next budget cycle?

Answer.
As in every budget submission, NOAA works closely with the Administration to identify those NOAA specific initiatives that maximize both NOAA goals and broader Administration priorities in national security, trade, and the economy, acknowledging fiscal constraints.

Being confirmed in this position, as opposed to acting, will provide me with an increased opportunity to forge relationships and advocate for agency priorities at a higher level. An agency head in the official capacity will instill confidence and stability. Not only is this critical with the upcoming hurricane season, but also during our navigation, management, and gradual return to normal operations in the wake of the coronavirus pandemic.

I look forward to working with you and your staff on the funding levels of NOAA programs, including various high priority areas such as reducing the impacts of extreme weather and water events by implementing the Weather Research and Forecasting Innovation Act and maximizing the economic contributions of ocean and coastal resources by expanding the American Blue Economy.

Hurricane Dorian Investigations. At present, there is both a NOAA scientific integrity investigation on the Hurricane Dorian incident, and a Commerce Inspector General investigation.

Question 2. Do I have your commitment to cooperate with both and allow both to proceed freely and without interference?

Answer.
Yes.

STEM Education. The FY21 NOAA Budget zeroes out the NOAA Office of Education and the NOAA Sea Grant program. I am concerned about this Administration's lack of support for STEM education.

Question 3. Please explain your position on NOAA education programs, and whether you will commit to being a strong advocate for NOAA education in this Administration?

Answer.
Yes. STEM is incredibly important, not just for the future of NOAA, but also the U.S. The

Office of Education works with the Office of Human Capital Services, the Research Council, and NOAA leadership to diversify NOAA's workforce and identify actionable strategies for hiring and retaining diverse and highly qualified individuals. I am proud of what the Office of Education has accomplished, but there is far more that can be done. I will most certainly be a strong advocate for NOAA education.

National Monuments. The NOAA budget has terminated programs supporting research grants that specifically encourage the necessary scientific exploration and research programs needed to guide sustained management of US Marine National Monuments. In addition, the President has repeatedly questioned the validity of National Monuments established by previous Administrations.

Question 4. Explain your commitment to defending existing Marine National Monuments, and to ensuring adequate funding for the vital research grants managers rely on to make science-based decisions for coastal and marine stewardship?

Answer.
NOAA has no current plans to alter the boundaries or scope of Marine National Monuments under our management. Under the proposal, NOAA would continue to support mission-vital research requirements in the proposed base budgets.

Research. NOAA Research (OAR) saw a decrease of almost $250 million in funding under the President's FY21 budget. In furthering NOAA's long-term priorities, not only is more research needed to manage climate adaptation and mitigation, healthy oceans, and building resilient coastal communities but also sustained support of current research programs.

Question 5. Will you commit to being a strong advocate for support for all of NOAA's current and future research programs?

Answer.
Yes.

Questions for the Record Submitted by Hon. Richard Blumenthal to Hon. Neil Jacobs

Leadership. I want to thank you for meeting with me earlier this month to discuss your nomination. As you know, I have some concerns about your role as acting chief of NOAA during the Hurricane Dorian controversy involving President Trump, commonly referred to as "SharpieGate". Specifically, I want to ask you about your conversations with senior officials at the Department of Commerce and the White House and the events that led to an unsigned statement from NOAA that contradicted its own scientists. Reports from *The New York Times* indicated that Secretary Wilbur Ross and Mick Mulvaney pressed you to take action to support the President's ultimately inaccurate claims that the State of Alabama was at risk of serious threat. According to reports, Secretary Ross and Mr. Mulvaney threatened to fire members of NOAA's leadership and cut funding for programs at the agency if it did not support the President's position.

Question 1. Do you agree that weather forecasts provide a vital function that should be free from political interference?

Answer.
Yes.

Question 2. To what extend were you involved in the development of the unsigned statement?

Answer.
I was involved, along with several other NOAA and DOC employees, in the development of the statement.

Question 3. As acting administrator to an agency responsible for conveying scientifically accurate, timely, and clear information for public safety—especially in the midst of extreme weather events like Hurricane Dorian—do you think your agency's efforts and government resources were best spent correcting the record for President Trump?

Answer.
Our Weather Forecast Offices, including Birmingham and the National Hurricane Center, did their utmost to produce accurate and timely weather forecasts to inform the general public and ensure public safety. Hurricane Dorian was a persistent, challenging, and historic storm, and the forecast products produced reflect the tireless effort and countless hours spent by the hardworking forecasters around the country, who are tasked with the challenge of communicating risk to emergency managers and the general public.

Question 4. For the record, did your conversations with Secretary Ross or Mr. Mulvaney have any influence over NOAA's official response to this controversy?

Answer.
I did not speak directly with either Secretary Ross or Mr. Mulvaney regarding the controversy over the statement.

Office of Inspector General report. As you know, the Department of Commerce Office of Inspector General (OIG) launched an investigation into the "SharpieGate" incident. We are still awaiting the final report, but expect the release of that report at some point in the next month or so. Soon after the controversy, there was a preservation notice issued to keep all records related to this incident. As you may know, failure to adhere to this sort of notice may violate the Federal Records Act.

Question 6. Your nomination hearing comes before the release of the OIG report. I would like to give you the opportunity to confirm for the record that nothing in the forthcoming report will reflect poorly on you, or the agency. Are you aware of anything in the forthcoming OIG report that members of this committee should be aware of or concerned about?

Answer.
I've been completely open and forthright with the IG during the investigation process, and I await the results of the report.

Question 7. Can you confirm that all documents related to the Hurricane Dorian controversy were preserved in a manner that does not violate the law?

Answer.
I have complied with the guidance from the Office of the General Counsel to preserve all documents related to the IG investigation.

NOAA's unsigned statement. The controversy surrounding "SharpieGate" resulted in serious concerns regarding the accuracy, transparency, and clarity in knowledge sharing as well as the censorship of agency scientists. During your meeting with me earlier this month, you expressed that NOAA's unsigned statement was in reaction to a "fake" map produced on the internet – not the President's inaccurate claims. You also explained that there was a "technical 10-30 percent chance" that Hurricane Dorian could have hit Alabama.

Question 8. With weather forecasting, is there ever a zero percent chance of a Hurricane making landfall?

Answer.
It is impossible to predict the future outcome of any open system with absolute certainty.

Question 9. Do we generally know which areas will be at high risk and which will be at lower risk?

Answer.
Weather prediction has long struggled with the theoretical limits of predictability. Ensemble forecast guidance gives us a probabilistic range of likely outcomes. Ideally, if the distribution of predicted solutions was Gaussian, the statistical mean would be the most likely outcome. Risk can be quantified in a variety of ways. For example, low-lying flood-prone coastal communities with large populations and extensive development may have more risk exposure. We also know,

in general, from decades of historical observations, which regions are more likely to experience severe weather events, such as hurricanes, tornadoes, and blizzards.

Question 10. For preparedness, safety, and understanding, how do you plan to balance the data received from probabilistic models with the publicly issued warnings based on actual risk?

Answer.
I foresee this being one of the greatest challenges for the future of weather prediction. Unless you have an advanced degree in statistics or game theory, probability is not an intuitive concept, and trying to convey uncertainty to the general public in a way that is scientifically correct, yet elicits a preferred response, is a complex problem. On the physical science side, educating the public on how probabilistic forecasts are made, what the limitations are, and how to interpret them will be essential. On the social science side, we need to focus on developing better methods to convey probabilities in an understandable way. Risk tolerance varies greatly from corporations and communities down to a personal level. While we can't define risk tolerance levels, we can improve ways we convey the probability and severity of a potential outcome. Likewise, our ongoing effort to improve forecast accuracy will reduce the levels of uncertainty in the future, thereby making that balance easier to achieve.

Question 11. You referred to the existence and circulation of an alternate, falsified NOAA Hurricane Dorian map – besides the one displayed in the Oval Office. Will you commit to providing evidence of that map to the committee?

Answer.
I would welcome the opportunity to work with the committee on this issue.