Statement of
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before the
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regarding
Oversight of the U.S. Geological Survey

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Chairman Murkowski and Ranking Member Cantwell, members of the committee, thank you very much for inviting me to testify today. I am excited for this opportunity to share some of my views on the state of the USGS and its mission. I would like to start this conversation with some history.

In 1879, Congress passed legislation that merged several Federal scientific and mapping surveys. We call this statute our Organic Act[1] because it inaugurated the U.S. Geological Survey (USGS). From the beginning, the mission of this combined endeavor was not only to map the West and locate resources, but also to push the boundaries of science. USGS scientists, for almost 140 years now, have pursued that mission with an uncommon dedication. I am honored to be their 16th Director and cognizant of the responsibility that the President, the Congress, and this committee have entrusted to me.

Not only is the USGS older than 12 of the States, it is also the forbearer of several important government agencies, including the Bureau of Ocean Energy Management and the Bureau of Reclamation. In the time since we were established, technology and Earth science have evolved and we have evolved along with it, to meet the scientific needs of the Nation. For example, with the increase in global demand for critical mineral commodities, USGS has focused on conducting research to understand geologic processes that have concentrated known mineral resources at specific localities in the Earth's crust and to estimate or assess quantities, qualities and areas of undiscovered mineral resources, or potential future supply. We have increased resources toward the National Geospatial program, earthquake early warning, volcano monitoring and the national streamgage network. USGS has also focused our activities on fulfilling statutory authorities, most recently by addressing national water availability and use through the SECURE Water Act.

[1] 43 USC 31 et seq.

Our evolution is evident, as you noted two years ago, Madame Chairman, in a resolution recognizing the anniversary of the massive earthquake that occurred in the Prince William Sound region of Alaska on March 27, 1964 (the Good Friday Earthquake). USGS science in response to that event helped confirm the theory of plate tectonics, fundamentally changing earthquake science. Shortly thereafter, in 1966, Bill Pecora, our 8th Director, advocated for the use of satellites to study natural resources. This innovation led to Landsat and opened the age of Earth observation from space.

In 1995, Congress merged biologists from the National Biological Survey with the USGS, helping us to become an integrated Earth science agency. As scientific and technological advances have revealed the complexity of the issues we face, the value of bringing Earth science disciplines together has become ever more apparent. Today's challenges demand the innovation made possible by integrating the full breadth of USGS capabilities.

One example that illustrates the value of USGS's diverse scientific capabilities is our leadership in understanding methylation processes of mercury. Mercury is a toxin that can build up in the food chain, becoming deadly to humans. It is most dangerous after undergoing a specific chemical change, methylation. Our geological expertise allows us to understand how and where methylation occurs, and our biological expertise allows us to understand how it affects plants, animals, and humans. Combining the talents, tools, and methods from these two disciplines is necessary to correctly assess methylmercury and its potential impacts.

I want to stress that we rely on numerous partnerships to pursue our scientific mission. The state geological surveys, universities, municipal governments, other Federal agencies, and foreign governments all count as critical partners of the USGS. As you may know, our budget is leveraged resulting in, approximately, an additional half a billion dollars contributed by our partners, especially State governments and other Federal agencies. We see this as an indication of their confidence in and support for our work. Such partnerships also have made it possible, for example, to create and publish a whole-lifecycle mining report, that offers industry and regulators guidance on how to site, develop, and close a mine with resource and environmental implications taken into account. In the future, we plan to do similar work for energy resources.

The USGS works closely with other Interior bureaus such as the Fish and Wildlife Service, the National Park Service, and the Bureau of Land Management, as well as other Federal agencies such as the Environmental Protection Agency, the National Aeronautics and Space Administration, the U.S. Army Corps of Engineers, and the National Oceanic and Atmospheric Administration. Rather than duplicate those agencies' missions, the USGS complements their research activities and contributes sound science for their decisionmaking. We are pleased to know that Congress looks to us, too, because researchers from the USGS are here hundreds of times a year meeting with you and your offices.

While I am proud of our integrated approach to problem solving, drawing on geological and biological science, remote sensing, epidemiology, ecology, or any of the myriad disciplines that constitute Earth science, innovation is the characteristic I most hope to nurture during my tenure in this office. While the Bureau has often been at the forefront of innovative research and science, we must take advantage of technological change and respond to emerging scientific directions to meet our full potential.

Today USGS labs are spearheading novel technologies. For example we are using eDNA to monitor the spread of Asian carp. We also work on other invasive species such as zebra mussels, brown tree snakes, and cheatgrass. Through our groundbreaking work on white-nosed syndrome, avian influenza and other wildlife diseases, the Bureau has become known as "the CDC of wildlife," and is on the front lines of possible future epidemics.

One of our ongoing pursuits is 21st century mapping. In Alaska, we are harnessing our partnerships with the State and the University of Alaska, along with the technology of interferometric synthetic aperture radar, or ifsar, to produce modern geospatial information for the State. Back in the lower 48, high resolution elevation data are being collected using lidar technology by a coalition of Federal, State and private industry partners, to inform decisionmaking and enable newfound abilities like mapping and even forecasting landslides. The landslide tragedy at Oso, Washington, in 2014, not unlike the Good Friday Earthquake, pushes us to look farther, aim higher, and complete a scientific achievement worthy of the investment and trust placed in us by the American people.

Speaking of hazards, the USGS has long led Federal research into various geologic hazards and we are pressing forward on innovative approaches in this area, too. Along the West Coast, we are establishing, in cooperation with states, universities, and philanthropic partners, a state-of-the-art earthquake early warning system. This system could readily be expanded to Alaska and other high-risk regions of the country. We are also applying advanced telemetry and remote sensing technologies, making a volcano early warning system a reality. For many of your constituents, these are hazards they live with every day and they are also threats to the Nation as a whole.

The unknown unknowns of Earth science motivate us to advance our understanding of the natural world. As we look toward the future I see challenges where we are positioned to lead, all of which I have touched on: water security and availability, tools for protection from and response to natural hazards, assessment of critical minerals, forecasting and preventing biological threats, and creating the next generation of mapping tools and technology.

I have every confidence that the USGS will continue to meet these challenges, and I am heartened by a recent survey of marine and coastal scientists and managers which found the

USGS to be the most credible Federal science agency.[2] This is not a reason to boast, but a calling to meet such high expectations.

The mission of the USGS in the 21st century will not only be to locate natural resources for the benefit of the Nation, but to find ways of exploiting those resources sustainably so that our prosperity is not fleeting or fragile. For example, we are researching microbial production of natural gas, which may someday make it possible harness the energy of coal resources while avoiding many of the environmental costs traditionally associated with it. It is the job of the USGS, working with our partners, to help bring that future to fruition.

On behalf of the approximately 8,000 employees of the USGS, thank you again for inviting me here today. I would be happy to answer any questions you have.

[2] March 2016 issue of *Ocean & Coastal Management*. Survey of scientists, interest groups, and industry associated with marine and coastal policy issues.