

**SPENDING PRIORITIES AND MIS-  
SIONS OF THE U.S. GEOLOGICAL  
SURVEY AND THE PRESIDENT'S  
FY 2012 BUDGET PROPOSAL**

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**OVERSIGHT HEARING**

BEFORE THE

SUBCOMMITTEE ON ENERGY AND  
MINERAL RESOURCES

OF THE

COMMITTEE ON NATURAL RESOURCES  
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

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**OVERSIGHT HEARING TO “EXAMINE THE  
SPENDING PRIORITIES AND THE MISSIONS  
OF THE U.S. GEOLOGICAL SURVEY AND THE  
PRESIDENT’S FY 2012 BUDGET PROPOSAL.”**

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**Wednesday, March 9, 2011  
U.S. House of Representatives  
Subcommittee on Energy and Mineral Resources  
Committee on Natural Resources  
Washington, D.C.**

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The Subcommittee met, pursuant to call, at 2:43 p.m. in Room 1324, Longworth House Office Building, Hon. Doug Lamborn [Chairman of the Subcommittee] presiding.

Present: Representatives Lamborn, Fleming, Coffman, Rivera, Gosar, Landry, Fleischmann, Holt, and Sarbanes.

**STATEMENT OF HON. DOUG LAMBORN, A REPRESENTATIVE IN  
CONGRESS FROM THE STATE OF COLORADO**

Mr. LAMBORN. The Subcommittee will come to order. The Chairman notes the presence of a quorum, which under Committee Rule 3[e] is two Members. The Subcommittee on Energy and Mineral Resources is meeting today to hear testimony on the mission, priorities, and proposed Fiscal Year 2012 budget for the United States Geological Survey.

Under Committee Rule 4[f], opening statements are limited to the Chairman and Ranking Member of the Subcommittee so that we can hear from our witnesses more quickly. However, I ask unanimous consent to include any other Member’s opening statements in the hearing record if submitted to the clerk by close of business today. Hearing no objection, so ordered.

We are here today to consider the President’s proposed Fiscal Year 2012 budget and missions for the U.S. Geological Survey. The Survey was founded on March 3rd, 1879, for the purpose of classifying public lands and to examine geologic structures, mineral resources, and products within and outside the national domain.

Today, the USGS mission reads a little bit like the Book of Genesis, although not quite in the order of the earth’s creation. It includes the land and waters. It gives us an understanding of the minerals and energy resources of our world, helps to track the subsurface movements of the earth in order to mitigate the adverse impacts of earthquakes, volcanic eruptions, tsunamis, and other geologic hazards.

During the nineties, that mission was expanded even further to include the National Biological Service to study the plants that cover the earth and the birds and animals that roam the earth. Over the last few years, the mission of USGS has expanded further to include work on climate change, and the budget before us today continues this expansion by finalizing a move to include more responsibility for operations in space and ecosystem restoration here on earth.

Considering the USGS now has the responsibility for the entire world, the rocks, waters, animals, air and space, I must say, Madame Director, it sounds like an incredibly daunting job. It is also, however, concerning, if not troubling, for those of us who care about the traditional missions of the Survey to see its missions and budgetary requirements redirected to programs other than the important economic activities built on the USGS Organic Act and the various mineral policy laws that Congress has passed over the years.

We will be reminded today that the important mission of the Survey to combat and address geologic hazards is slated for a reduction in funding. As we were reminded just over a year ago in Haiti, earthquakes can and do kill hundreds of thousands of people—in the case of Haiti, a magnitude 7 earthquake that killed over 230,000 people. We were also reminded of the importance of mitigation as an equally devastating magnitude 8 earthquake in Chile recently killed approximately 500 people.

Now, many folks are deeply concerned that the Administration's proposal to reduce funding for the geologic hazards program will hinder the nation's ability to prepare and mitigate for potential natural disasters. More troubling is the proposed budget that includes significant spending increases for well-intended but questionable scientific endeavors with no measurable benefit to society.

In addition, as the Survey is stretched thinner, the traditional core responsibilities, such as mapping, geologic mapping, and ensuring adequate, stable, and economical materials and supplies essential to national security, economic well-being, and industrial production—that is a quote from the original Act, I believe—are displaced with fashionable programs with limited, if any, measurable benefit to society.

As we see the Survey gaining greater responsibility for the Landsat satellites that help us understand our earth, we also see the Survey failing to help keep duplication of mapping efforts from wasting our precious tax dollars. This is an area I am particularly concerned about. In 2009, this Subcommittee heard testimony identifying billions of dollars wasted in the Stimulus Bill on duplicative mapping efforts.

I expect today we will hear that such duplication and waste continue in our Federal agencies. It is the mission of this Subcommittee to find opportunities to root out waste, duplication, and to streamline government. You can be assured this committee will be examining this issue in more depth in the future.

Finally, I am wondering where the geology is at with the United States Geological Survey. It has been completely swallowed up by all the, quote, "new missions and reorganization," unquote, at USGS. If I were to guess the name of your agency by looking at your budget, it would be called the United States Ecosystem Restoration and Climate Monitoring Service, not the United States Geological Survey. It is time that the Survey get back to its roots, providing the foundational knowledge of the nation's geology, energy, and mineral resources, geologic structures and hazards, and a functional map base for the United States.

This is knowledge that allows States, local governments, tribal nations, territories, and the private sector to make informed

decisions regarding economic development, private sector investment, conservation, and job creation. Baseline geologic information allows the United States to make informed decisions on how best to reduce our dependence on foreign sources of fuel and nonfuel mineral resources that will improve our economic and national security.

I look forward to hearing from our witnesses today, and I would now like to recognize for five minutes the gentleman from New Jersey, our Ranking Member, for his opening statement.

[The prepared statement of Chairman Lamborn follows:]

**Statement of The Honorable Doug Lamborn, Chairman,  
Subcommittee on Energy and Mineral Resources**

We are here today to consider the President's proposed fiscal year 2012 budget and missions for the U.S. Geological Survey.

The Survey was founded on March 3, 1879 for the purpose of classifying public lands and to examine geologic structures, mineral resources, and products within and outside the national domain.

Today the USGS mission reads a little like The Book of Genesis but not quite in the order of the earth's creation. It includes the land and waters; it gives us an understanding of the minerals and energy resources of our world. Helps us track the subsurface movements of the earth in order to mitigate the adverse impacts of earth quakes, volcanic eruptions, tsunamis and other geologic hazards.

During the 90's that mission was further expanded to include the national biological service to study the plants that cover the earth and the birds and animals that roam the earth. Over the last few years, the mission of USGS has expanded further to include work on climate change and the budget before us today continues this expansion by finalizing a move to include more responsibility for operations in space and ecosystem restoration here on earth.

Considering the USGS now has responsibility for the entire world: the rocks, waters, animals, air, and space I must say madam Director, it sounds like an incredibly daunting job.

It is also deeply troubling for those of us who care about the traditional missions of the Survey to see its missions and budgetary requirements redirected to programs that other than the important economic activities built on the USGS Organic act and the various mineral policy laws that Congress has passed over the years.

We will be reminded today that the important mission of the Survey to combat and address geologic hazards is slated for a reduction in funding. As we were reminded just over a year ago in Haiti, earthquakes can and do kill hundreds of thousands of people, in the case of Haiti a magnitude 7 earthquake killed over 230,000 people. We were also reminded of the importance of mitigation as an equally devastating magnitude 8 earthquake in Chile killed approximately 500 people. Many folks are deeply concerned that the Administration's proposal to reduce funding for the geologic hazards program will hinder the Nation's ability to prepare and mitigate for potential natural disasters. More troubling is the proposed budget includes significant spending increases for well-intended but questionable scientific endeavors with no measurable benefit to society.

In addition, as the Survey is stretched thinner, the traditional core responsibilities such as mapping, geologic mapping and ensuring "adequate, stable, and economical materials supplies essential to national security, economic well-being, and industrial production;" are displaced with fashionable programs with limited if any measurable benefit to society.

As we see the Survey gaining greater responsibility for the Landsat satellites that help us understand our earth, we also see the Survey failing to help keep duplication of mapping efforts from wasting our precious tax dollars. This is an area that I am particularly concerned about; in 2009 this Subcommittee heard testimony identifying billions of dollars wasted in the stimulus bill on duplicative mapping efforts. I expect today we will hear that such duplication and waste continue in our federal agencies. It is the mission of this Subcommittee to find opportunities to root out waste, duplication and streamline government. You can be assured this committee will be examining this issue in more depth in the future.

Finally, I'm wondering where the "geology" is at the United States Geological Survey. It's been completely swallowed up by all the 'new missions and reorganization' at USGS. If I was to guess the name of your agency by looking at your budget it

would be called the United States Ecosystem Restoration and Climate Monitoring Service not the United States Geological Survey.

It's time that the Survey get back to its roots providing the foundational knowledge of the nation's geology, energy and mineral resources, geologic structure and hazards, and a functional map base for the United States; knowledge that allows states, local governments, tribal nations, territories and the private sector to make informed decisions regarding economic development, private sector investment, conservation and job creation.

Baseline geologic information allows the United States to make informed decisions on how to best reduce our dependence on foreign sources of fuel and non-fuel mineral resources improving our economic and national security.

I look forward to hearing from our witnesses today.

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**STATEMENT OF HON. RUSH HOLT, A REPRESENTATIVE IN  
CONGRESS FROM THE STATE OF NEW JERSEY**

Mr. HOLT. Thank you, Mr. Chairman. And since this is the first hearing of this Subcommittee in this Congress, I would like to welcome our colleagues to the Subcommittee and say I look forward to working with you, Mr. Chairman. Thank you.

The USGS dates back to the fine work of such American heroes as John Wesley Powell and many other experts. And I would have to say, too few Americans know how much they depend on the work of the USGS, work that benefits all Americans in so many areas, including traditional geology and far beyond.

I have some questions on specific line items in the budget request. I would like to focus just quickly on a couple of items, though, that I hope we will be able to discuss. First, with the increasing use of hydraulic fracturing, there has been an increase in public concern about the effects that this technique has on our environment. And last week, notably, The New York Times published the results of a rather extensive investigation that suggests that millions of gallons of drilling wastewater that are contaminated with radioactive materials have been dumped into rivers and other waterways. Oh, and The Times also reported, interestingly, that much of the sludge has been spread on roads to control ice in the winter and dust in the summer.

Other news reports have raised concerns about this same drilling wastewater when injected deep underground. We have had reports recently of earthquakes in Arkansas and in Texas and other areas, and so questions remain about the exact effects of hydraulic fracturing. It is an issue of great importance to residents of my state, New Jersey, because so many of us live in the Delaware River basin and depend on that water.

USGS has an important role to play in providing robust data and scientific understanding that is needed to ensure that any hydrofracking is done in an environmentally responsible manner.

Rare earth elements are another area that I think deserve our attention, minerals that are useful in military and civilian applications of all sorts. Our scientists at USGS, I think, have an important role in helping us understand the nature and quantity of available rare earth resources, and I look forward to hearing more about that.

I also wanted to express concern about something that is of interest to many of the States and their geological programs, and that is the elimination of the National Geological and Geophysical Data



Preservation Program, as well as proposed cuts to the Cooperative Geologic Mapping Program.

As Dr. Phillips will testify today, these programs are very important to many of the States, and I know of particular importance to New Jersey. My State has one of the oldest geological agencies in the nation, predating the USGS. In fact, it goes back to 1835. And I am very proud of our State Geologist, Karl Muessig. Geology, I should point out, is so important in New Jersey that although we don't have a State song, we do have a State soil. And for you trivia aficionados, it is Downer soil.

So I look forward to discussing these cuts and how they would affect the States if they were to go forward. And finally, as we approach the one-year anniversary of the BP oil spill, we should remind ourselves that Congress still has not yet enacted the reforms to improve the safety of offshore drilling. And the independent Commission on the BP Deepwater Horizon Oil Spill recommended that Congress establish permanent technical expertise on, among other things, flow rate. And the legislation I have introduced with Ranking Member Markey to implement the Commission's reforms would create a permanent flow rate technical group, headed by USGS. And this Subcommittee, I think, should take action on that and related recommendations.

So I thank you, Mr. Chairman, and I look forward to the testimony of our witnesses.

[The prepared statement of Mr. Holt follows:]

**Statement of The Honorable Rush D. Holt, Ranking Member,  
Subcommittee on Energy and Mineral Resources**

As this is the first hearing of the Energy and Mineral Resources Subcommittee in the 112th Congress let me begin by welcoming my colleagues to the Subcommittee and saying that I look forward to working with you, Mr. Chairman.

Few Americans know of the work of the USGS—dating back to the fine work of such American heroes as John Wesley Powell and many other experts—that all Americans depend on and benefit from in so many areas including traditional geology and beyond. While I have questions on specific line items in the Administration's budget request for the U.S. Geological Survey for FY2012 I want to begin by focusing on a few general issues.

First, with increasing use of hydraulic fracturing there has also been an increase in public concern about the effects this technique has on our environment. Last week the New York Times released results of an investigation that suggests that millions of gallons of drilling wastewater contaminated with radioactive radium had been dumped into rivers and other U.S. waterways that feed our drinking water supply. When this wastewater is treated by sewage plants, what is left is a highly concentrated toxic and radioactive sludge, which according to the Times, is spread on roads to control ice in the winter and dust in the summer. Other news reports have raised concerns that this same drilling wastewater, when injected deep underground, may be responsible for triggering earthquakes in Arkansas, Texas and other areas where these drilling operations are abundant. Questions remain as to the exact effects that hydraulic fracturing is having on our environment. This is an issue of utmost importance to my New Jersey constituents who live in the Delaware River Basin, where hydro fracking regulations are currently being considered. USGS has an important role to play in providing the robust data and scientific understanding needed to ensure that hydraulic fracturing is either done in an environmentally responsible manner and if that is not possible that it not be done at all.

Rare earth elements are another area I feel deserves close attention. These minerals are indispensable to a wide range of military, electronic, and industrial applications, as well as a variety of clean energy technologies, such as wind turbines, hybrid vehicles, solar panels and energy efficient light bulbs. The United States was once self-reliant in producing rare earth elements domestically, however, we have become completely reliant on imports over the past 15 years. Today, 97 percent of the world's rare earth element supply comes from China, a scenario unfavorable to

American economic and national security interests. Our scientists at USGS have an important role in helping us more fully understand the nature and quantity of the available rare earth resource base and I look forward to hearing more about that strategy today.

I also have to express my concern about the proposed elimination of the National Geological and Geophysical Data Preservation Program and proposed cuts to the National Cooperative Geologic Mapping Program. As Dr. Phillips will testify today these programs are extremely important to our states, and, I know, of importance to New Jersey. My state runs one of the oldest Geological Agencies in the nation. The New Jersey Department of Environmental protection created the NJ Geological Survey in 1835, and I am proud to have our state Geologist Karl Muessig as a constituent. Geology is so important to New Jersey that while we do not have a state song we do have a state soil, downer soil. I look forward to discussing the reasons that these cuts have been proposed and what can be done to ensure that states get the federal support they need to continue these programs.

Finally, as we approach the one-year anniversary of the BP oil spill, it is a reminder that the Congress still has not yet enacted reforms to improve the safety of offshore drilling. The independent commission on the BP Deepwater Horizon oil spill recommended that Congress establish permanent, technical expertise on flow rate. The legislation that I have introduced with Ranking Member Markey to implement the commission's reforms would create a permanent flow rate technical group headed up by USGS and this Subcommittee must take action to implement these recommendations.

Thank you and I look forward to the testimony from our witnesses.

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Mr. LAMBORN. Thank you. And now we will hear from our witnesses. It is my honor to welcome USGS Director, Dr. Marcia McNutt. Like all of our witnesses, your written testimony will appear in full in the hearing record, so I ask that you keep your oral comments to five minutes, as outlined in the invitation letter. Our microphones are not automatic, so please press the button when you are ready to begin.

I also want to explain the timing lights. When you begin to speak, the clerk will start the timer, and a green light will go on. After four minutes, a yellow light will come on. And then at that time, you should begin to conclude. And at five minutes, the red light comes on.

So we would love to hear from you. Thank you for being here today.

**STATEMENT OF HON. MARCIA McNUTT, DIRECTOR, U.S.  
GEOLOGICAL SURVEY, U.S. DEPARTMENT OF THE INTERIOR**

Dr. McNUTT. Well, good afternoon, Mr. Chairman and Members of the Subcommittee. Thank you for the opportunity to appear before you today and to discuss the Administration's 2012 budget request for the USGS. I will be pleased to answer your questions and to hopefully clear up any misperceptions about our request.

The 2012 budget does formally realign the USGS budget with our new mission areas. And although it may appear to you that we are diverging from our roots, it really is in order to better meet the needs of the changes in our nation and what the American public really needs to see from the USGS in terms of our natural resources: water, energy, minerals, natural hazards. And those are exactly our new mission areas.

So while much has changed at the USGS, really things have not. Natural resource managers, natural hazard responders, industry, and the public continue to rely on our science, our data, and our information. So here are some examples.

The USGS recently released the first detailed inventory of rare earth elements, describing known deposits for the entire nation. The assessment will be important both to policy makers, but particularly to industry. It reinforces the value of our efforts to maintain accurate, independent information on our nation's resources.

Estimated economic loss and casualty information are now being included in U.S. earthquake alerts following significant earthquakes around the world. These earthquake alerts are widely used by emergency responders, are FEMA's favorite product right now, and aid officials in the public to understand the scope of potential disasters and to develop the appropriate level of first response.

The USGS long-term monitoring and robust ecosystem studies continue to pay dividends as our nation seeks to discover whether investments in ecosystem restoration are working. For example, a recent study determined that the Potomac River in Washington is showing multiple benefits from restoration efforts.

The 2012 budget request for the USGS is 1.1 billion, about one-half of 1 percent more than we received two years ago. The budget request includes establishment of a separate account for Landsat missions, along with an increase of 48 million to begin developing an operational Landsat program, starting with Landsats 9 and 10.

Landsat has become vital to the nation's agricultural, water management, disaster response, and scientific communities. Establishment of this account and the increase in funding will provide the stable budgetary foundation needed for a continuous capability.

The budget request also proposes an additional 12 million for the restoration of some of the nation's most iconic ecosystems, including Chesapeake Bay, Columbia River, Upper Mississippi, Puget Sound, and the Great Lakes. The USGS is working in collaboration with other Interior bureaus, the Federal agencies, on these restoration efforts.

Funding to complete the work of Interior climate science centers is also included at 11 million above the 2010 enacted level. The centers focus on understanding landscape stressors related to climate change and designing adaptation strategies at a regional level. In 2010, centers were established in the Northwest, Southeast, and Alaska regions, in collaboration with universities in your home states. The remaining centers will be established in the Northeast, South Central, North Central, Southwest, and the Pacific Island regions.

To support Interior's substantial coastal and ocean resource management responsibilities, the budget request includes an additional 4.5 million for coastal and marine spatial planning. The USGS will continue leading the development of a national information management system for coastal, ocean, and Great Lakes resources.

Our budget also makes vital investments in resource and development in ecosystem restoration, while proposing reductions within a number of programs, and also making management efficiencies.

The U.S. 2010 budget reflects our ability to address a broad array of natural resource and natural science issues facing the nation. It also reflects tough choices and difficult decisions. We aim to ensure our multi-disciplinary science expertise is applied effectively, efficiently, and strategically to meet the nation's most pressing needs today.

To conclude my statement, Mr. Chairman, I would be happy to answer your questions and that of any other Members. I appreciate this opportunity to testify before you.

[The prepared statement of Dr. McNutt follows:]

**Statement of Marcia McNutt, Director, U.S. Geological Survey,  
U.S. Department of the Interior**

Good morning, Mr. Chairman and Members of the Subcommittee. Thank you for the opportunity to appear before you today to discuss the Administration's 2012 budget request for the U.S. Geological Survey (USGS).

Much about the USGS has changed in the year since we last sat together in this room to discuss funding for the important work the USGS does for the Nation. The USGS has realigned its management structure, moving from an organizational structure of single and separated disciplines to form interdisciplinary mission areas as outlined in the USGS Science Strategy: *"Facing Tomorrow's Challenges—U.S. Geological Survey Science in the Decade 2007–2017"* (U.S. Geological Survey, 2007). I appreciate the Subcommittee's support for the realignment. The 2012 USGS budget request formally aligns the USGS budget structure with the new mission area management structure. We are already seeing evidence that bringing expertise from several Earth science disciplines together through these mission areas to address issues of concern allows the USGS to better respond to customer and partner needs to provide the best value to the taxpayers.

While much has changed at USGS, some things have not. Natural resources managers, natural hazards responders, industry, and the public continue to rely on the important science, data, and information the USGS produces as part of its core mission to provide the scientific basis that contributes to the wise management of the Nation's natural resources and that promotes the health, safety, and well-being of people. Given the rapid pace required for management and policy decisions in comparison to the more deliberative time scale for authoritative, peer reviewed science, the USGS must always anticipate the Nation's needs and maintain a broad portfolio of research and researchers across the country. The last year has provided numerous examples of how USGS science is providing relevant and timely scientific results to address some of the most pressing natural resources challenges of our time.

In the last year, USGS science has been at the forefront in responding to many natural resource challenges. The USGS recently released the first ever detailed inventory of rare earth elements describing known deposits for the entire Nation. These elements are essential components for many current and emerging alternative energy technologies, such as electric vehicles, photo-voltaic cells, energy-efficient lighting, and wind power. The assessment will be very important both to policy-makers and to industry, and it reinforces the value of our efforts to maintain accurate, independent information on our Nation's natural resources as only the USGS can do.

USGS hazards science made great strides as well. In the aftermath of the January 2010 Haiti earthquake, USGS scientists used geological field observations and interpretations of satellite imagery, aerial photography, and light detection and ranging (LiDAR) to discover the main strand of the Enriquillo-Plantain Garden Fault thought to be responsible for the January quake had not ruptured and the hazard associated with the fault still remains high. Information of this nature is critical as Haiti continues its struggle to recover from the impacts of the devastating earthquake and make important decisions on rebuilding its capital city.

The USGS continues its efforts to put science, data, and information into the hands of those who need it for decision making. In recent months, the USGS announced that estimated economic loss and casualty information will now be included in USGS earthquake alerts following significant earthquakes around the world. These earthquake alerts are widely recognized and used by emergency responders, government and aid officials, and the public to understand the scope of the potential disaster and to develop the best response. The USGS automated system, PAGER (Prompt Assessment of Global Earthquakes for Response), within minutes provides preliminary estimates of earthquake impacts, including the range of possible fatalities and economic losses, by assessing the shaking distribution, the number of people and settlements exposed to severe shaking and other factors. This information is critical in determining the human and economic toll so that emergency responders can act promptly and effectively.

The USGS recently made available instant, customized updates about water conditions through its "WaterAlert" system. This system allows users to receive updates about river flows, groundwater levels, water temperatures, rainfall and water qual-

ity at more than 9,500 sites where the USGS collects real-time water information. This information is crucial for managing water resources, including during floods, droughts and chemical spills. Real-time water data are essential to those making daily decisions about water-related activities, whether for resource management, business operations, flood response or recreation. WaterAlert furthers USGS efforts to make data immediately available and relevant to every user.

USGS long-term monitoring and robust ecosystem studies continue to pay dividends as our Nation seeks to discover whether investments in ecosystem restoration are working. One example is a recent study that determined the Potomac River in Washington, D.C., is showing multiple benefits from restoration efforts. According to direct measurements taken during the 18-year field study, reduced nutrients and improved water clarity have increased the abundance and diversity of submerged aquatic vegetation in the Potomac. The public deserves to know whether its investments are having tangible results. This study and others like it provide that information.

It is the hard-working scientific and professional staff at the USGS, powered by this Subcommittee's long-term investment in and commitment to science, that makes these advancements possible. The success of USGS efforts, such as those highlighted here, makes it all the more challenging to make tough decisions regarding the allocation of scarce fiscal resources.

To address the President's priority on fiscal responsibility, the USGS 2012 budget makes vital investments in research and development and ecosystem restoration, while also proposing reductions within programs such as regional assessments of groundwater quantity and quality; toxic substances research; mineral resource assessments; research and grants that address the Nation's resilience to natural hazards; the Water Resources Research Act program; the National Biological Information Infrastructure; the National Water Quality Assessment Program; the National Geological and Geophysical Data Preservation program; the National Cooperative Geological Mapping program; research to establish the limits of the extended Outer Continental Shelf; and the climate effects network. These changes reflect tough choices. We are repositioning core responsibilities to better address complex multidisciplinary issues within a reduced funding level.

The 2012 budget request for the USGS is \$1.1 billion, an increase of \$6.1 million from the 2010 enacted level. In 2012, the USGS is proposing to establish a new appropriations account, National Land Imaging (NLI), which comprises a base transfer from the Surveys, Investigations and Research (SIR) account of \$53.5 million coupled with an increase of \$48.0 million to begin work on Landsats 9 and 10. Excluding the NLI account, the SIR account is \$53.6 million below the 2010 enacted level. Decreases are proposed in scientific programs as well as for Interior-wide management efficiencies and administrative savings in travel, contracts, supplies, and information technology.

### **Major Changes**

The USGS 2012 budget request includes establishment of a separate account for Landsat missions along with an increase of \$48.0 million to begin developing an operational Landsat program, starting with Landsats 9 and 10. Landsat furthers Interior's important role in land remote sensing under the President's National Space Policy and provides invaluable data for land use and climate change research. The new account will include funding for current satellites (Landsats 5 and 7), the Landsat Data Continuity Mission (Landsat 8), which is scheduled to launch in December 2012, and the development of Landsats 9 and 10, through a continuous Landsat program that will ensure data continuity in the future. Landsat has become vital to the Nation's agricultural, water management, disaster response, and scientific communities. Establishment of this account and the increase in funding will provide the stable budgetary foundation needed for a continuous capability. A permanent budgetary and managerial structure will ensure the continued collection and maintenance of the important data the Landsat satellite series provides.

The budget request also proposes an additional \$12.0 million for the restoration of some of the Nation's most iconic ecosystems. These efforts support America's Great Outdoors, the President's signature conservation initiative to protect and restore the health, heritage, natural resources and social and economic value of some of the Nation's most significant ecosystems. The USGS plays a vital role in the development and implementation of the America's Great Outdoors initiative, working in collaboration with other Interior bureaus and Federal agencies. Particular focus is given to important and iconic ecosystems, with targeted increases for Chesapeake Bay (+\$4.6 million), Columbia River (+\$1.4 million), Upper Mississippi River (+\$1.0 million) and Puget Sound (+\$1.5 million). The budget includes \$3.5 million for the

Great Lakes, including support for USGS' role in the Asian Carp Control Framework, to detect and understand this invasive fish and develop chemical control tools.

The 2012 budget provides \$10.9 million for USGS activities in the WaterSMART initiative, \$9.0 million above the 2010 Enacted/2011 CR level, to implement the WaterSMART Availability and Use Assessment. The USGS will conduct comprehensive water supply and demand inventories to provide the baseline information needed by public and private water managers to work toward sustainable water supplies. This effort will include estimating freshwater resources, how those supplies are distributed, and how they are changing over time; evaluating factors affecting water availability including energy development, changes in agricultural practices, increasing population, and competing priorities for limited water resources; and assessing water use and distribution for human, environmental, and wildlife needs.

Funding to complete the network of Interior Climate Science Centers, as called for in Secretarial Order 3289, is also included at \$11.0 million above the 2010 enacted level. The planned network of eight Interior Climate Science Centers will provide fundamental research and tools to the network of landscape conservation cooperatives and to natural and cultural resource managers. The Centers focus on understanding landscape stressors related to climate change and designing adaptation strategies at a regional level. In 2010, CSCs were established in the Northwest, Southeast and Alaska Regions. At the proposed funding level, the remaining CSCs will be established in the Northeast, South Central, North Central, Southwest and Pacific Islands regions.

To continue investment in science to support Interior's substantial coastal and ocean resource management responsibilities and its critical role in implementing the Administration's National Ocean Policy, the budget request includes an additional \$4.5 million for coastal and marine spatial planning. The USGS will continue leading the development of a national information management system for coastal, ocean and Great Lakes resources. This involves conducting a number of efforts important in managing resources with other Federal, State, tribal, and regional partners. Efforts include constructing a prototype Coastal and Marine Spatial Planning Internet portal for the Gulf of Mexico; developing modeling tools to forecast coastal vulnerability to projected sea level rise and predicted coastal storms; and establishing data standards and undertaking gap analysis to target future priority data collection activities.

#### **Budget Summary by Budget Activity**

The 2012 budget includes a total of \$166.4 million for the Ecosystems mission area. The request includes increases to the Terrestrial, Freshwater, and Marine Environments and Invasive species programs to support the President's signature conservation initiative, America's Great Outdoors.

The Climate and Land Use Change budget activity request totals \$106.4 million and includes new funding for completion of the Interior Climate Science Centers and funding for new efforts associated with carbon sequestration in the California Bay-Delta.

The 2012 total request for Energy, Minerals, and Environmental Health is \$88.5 million, which reflects a \$13.0 million reduction from the 2010 enacted level.

The total requested funding level for Natural Hazards in 2012 is \$133.9 million or \$5.1 million below the 2010 enacted level.

In 2012, the request level for Water Resources totals \$199.6 million. This represents a reduction of \$21.6 million from the 2010 enacted level.

The 2012 total budget request for Core Science Systems is \$105.9 million, a reduction of \$19.0 million below the 2010 enacted level.

The total funding level for Administration and Enterprise Information is requested at \$116.5 million and reflects a net program increase of \$1.4 million.

The 2012 total budget request for Facilities is \$100.8 million; a reduction of \$5.6 million below the 2010 enacted level.

#### **Conclusion**

The USGS 2012 budget request addresses issues long important to the Administration and Interior, and aligns the USGS budget structure with its management structure. This budget reflects our ability to address a broad array of natural-resource and natural-science issues facing the Nation. It also reflects tough choices and difficult decisions. The challenges ahead are great, but the USGS is committed to placing our science, data, and information into the hands of decision makers across the landscape when they need it and in formats they can readily use. The 2012 budget request aims to ensure our multidisciplinary science expertise is applied effectively, efficiently, and strategically to meet the Nation's most pressing needs today and to preserve our wealth of biologic, geologic, geographic, and hydro-

logic monitoring capabilities to meet the needs of tomorrow. The USGS will continue its legacy of providing the data, long-term scientific understanding, and scientific tools needed to sustain and improve the economic and environmental health and prosperity of people and communities across the Nation and around the world.

This concludes my statement, Mr. Chairman. I will be happy to answer the questions you and other Members have. I appreciate this opportunity to testify before you and this Subcommittee and look forward to our continued collaboration.

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Mr. LAMBORN. Well, thank you for your testimony. And at this point, we will begin questions for our witnesses. To allow all of our Members to participate and to ensure we can hear from all of our witnesses, we will limit questions to five minutes. However, if Members have additional questions, the Chair might consider more than one round of questioning. And I now recognize myself for five minutes for the first set of questions.

This morning, the price of oil was at \$114.52 per barrel, and the average price per gallon of gasoline in the U.S. is \$3.52. With the ongoing instability in Northern Africa and the Middle East, prices will probably continue to climb, adversely impacting the nation's economy as a whole and each and every U.S. citizen. The working poor and jobless will be harmed the most.

So we import 60 percent of the oil that our country needs, and we are 100 percent dependent on 17 different nonfuel mineral commodities. How can the Geological Survey in its budget continue to support cuts in the energy and minerals programs while at the same time increasing significantly the budgets for ecosystem restoration and climate change, Director McNutt?

Dr. McNUTT. Well, there are of course tough choices that had to be made in this budget. The USGS energy program does periodically reassess the places in the country where we have already done initial assessments, and when we do these reassessments, of course, not as resource intensive as when we did the initial assessments. Do I wish we could be growing all of our programs? Absolutely. But these were tough choices that had to be made.

The same in our minerals program. We wish we could grow these programs, but unfortunately that is not the case. Some of the money that goes to our ecosystems programs can be used to help with domestic development of helping to decide right places to do alternative energy programs as well. For example, deciding where might be the appropriate places for solar and wind energy.

So it is not as though we draw sharp lines between the ecosystems programs and the energy programs. We recognize that all of these programs are interrelated.

Mr. LAMBORN. OK. Thank you. Now, there are serious workforce issues in the energy and mineral sector, and we are in jeopardy of losing accreditation in some of the energy and mineral engineering programs around the country. Yet, you zero out funding for graduate programs in these fields, while adding funding for environmental programs, where from all that I am aware of is an abundance of programs at universities around the country. Why that apparent disconnect?

Dr. McNUTT. I wasn't aware that we had funding for graduate—OK. OK, right. We are maintaining opportunities for students in other ways through our minerals program, although those particular grant programs did have to be zeroed out because of again

tough choices in terms of meeting the fiscal restraints of the budget. But there will be other opportunities to support students.

And, Mr. Chairman, I have to agree with you that I agree completely that the workforce issues are something that we are facing. And I will be speaking at Colorado School of Mines as their commencement speaker this year, and that will be one of my messages, is indeed the workforce issues in mines, the number of schools of mines that have closed around the country, and the difficulty that we will be facing in terms of replacing the many retirements we have in the minerals workforce. It is something that we as a nation do need to worry about.

Mr. LAMBORN. Well, thank you, and I am glad you are coming out to Colorado. That is an excellent, world-renowned school. It is an excellent institution of higher learning, so we appreciate your taking the time to encourage them and be there for that event. I just wish that the budget that we just talked about, that the line items in particular were more reflective of a stronger priority on the core mission of USGS, at least the original core mission up until recent years maybe, the focus that I should like to see on energy and minerals.

OK. Thank you for your answers, and now I will recognize the Ranking Member for any questions he might have.

Mr. HOLT. Thank you, Mr. Chairman. As New Jersey is experiencing floods even right now, with more to come, I note the proposed reduction in funding for national stream flow information and the loss of perhaps hundreds of stream gauges. Can you tell us what would be the effect of such reductions? Is there remote sensing that somehow replaces this, or we doing without the information?

I have to tell you, that sort of information is critically important for the livelihood and lives of people in my district.

Dr. McNUTT. I have to agree with you, Congressman Holt, that it is hard to look around the USGS and not find a program—especially if you look over the past few years—that has not had budget cuts and been impacted by cuts to its budget that has impacted its mission. And the stream gauge program is one that was initially viewed as one that should be a 50/50 match between co-operators and the USGS.

It is so far from a 50/50 match today, and for awhile we were able to get by with our cooperators paying more than their 50 percent share. And then, of course, what happened was States similarly felt the economic issues that the Federal Government was facing, and states found that they no longer could pick up more than 50 percent, and so stream gauges started getting shut down. And this is definitely putting into jeopardy—we have the Secure Water Act, which has in it provisions to create a backbone of water gauges, which would help provide at least a national network, which would help provide some consistency, but yet the funding for that Act has never been completely materialized.

Mr. HOLT. Am I correct that the effect now will be the loss of hundreds of gauges in the coming year?

Dr. McNUTT. Well, right now we are looking at it as a million dollars, and we are going to try to absorb that in mainly travel,



training, administrative stuff, to the maximum that we can, hoping to not absorb that in the stream gauges themselves.

Mr. HOLT. Let me ask you to please keep the Subcommittee informed as—

Dr. McNUTT. We will do that.

Mr. HOLT.—that goes forward. And perhaps you would like to answer in more detail later the rationale behind the reductions in the cooperative mapping program and the data preservation program. One thing I would like you to address in the minute or so that remains, is the recovery, the ARR Act, which provided 150-ish, \$140 million in funds, can you say that those were spent wisely, without duplication or redundancy?

Dr. McNUTT. OK. First of all, I will say that the decisions on how to spend them were made before I arrived. I looked into how they were spent when I arrived, and I was extremely pleased with how those decisions were made from the standpoint that—just to give you an example, our stream gauge program with the new technology that was put into play, it allowed us to bring those gauges up to a standard in terms of the new satellite network that they were able to communicate with. It allowed us to connect those new gauges with a new protocol for the satellite communications that otherwise would have rendered so many of those gauges obsolete and unable to communicate back to the network that it saved us so much in future budgets to be able to bring those up to standards.

It took the advanced seismic network and took it 10 years into the future in terms of that funding. So very wise decisions, and ones that made sense for the USGS because we did not have construction authorities. So it was right sized for the USGS, right decisions.

Dr. McNUTT. I am pleased you could put that in the record. Thank you. Thank you, Mr. Chairman.

Mr. LAMBORN. And thank you. I would like to now recognize the gentleman from Idaho, Mr. Labrador.

Mr. RIVERA. Excuse me.

Mr. LAMBORN. OK. Idaho, Florida, it doesn't matter, either way. Mr. Rivera from Florida.

Mr. RIVERA. How are you doing?

Mr. LAMBORN. Please accept my apology.

Mr. RIVERA. That is OK. The weather is a little bit different, but other than that, it is pretty much the same. We love potatoes in Miami.

As the representative from South Florida, I am very concerned about news reports regarding exploration of resources off the coast of Cuba. And I am wondering if the USGS has conducted any recent research in coordination with the Cuban dictatorship regarding these resources, and if so, what has been the extent of those efforts?

Dr. McNUTT. USGS does have estimates of—you are talking about oil resources?

Mr. RIVERA. Oil and natural gas.

Dr. McNUTT. Yes.

Mr. RIVERA. Any type of resources that—

Dr. McNUTT. Oil and natural gas.

Mr. RIVERA. Any research that may have been conducted in conjunction with the Castro regime.

Dr. McNUTT. Yeah. I am not sure to what extent that they are in conjunction with the Castro regime. I know that the most recent USGS estimate of undiscovered oil and natural gas is about 5 billion barrels of oil and about—I think it is about 10 trillion—

Mr. RIVERA. How long ago was that estimate?

Dr. McNUTT.—cubic—what is the—well, we will get back to you for on the record for that. But I don't think that the numbers have changed. But we can get back to you on the record for that.

Mr. RIVERA. So recently, and I would say—because my understanding is the last time there were any estimates was about a decade ago. And I am wondering if there are any recent efforts to do any research, and if so, if any of that has been in coordination with the Cuban government?

Dr. McNUTT. Yeah. I doubt that anything has been done in conjunction with the government. That would not be—no.

Mr. RIVERA. So how would it be done?

Dr. McNUTT. The typical way that we do that is using geophysical data and using geological assessments of depositional environments and—

Mr. RIVERA. I have no idea what that means.

Dr. McNUTT. Ah, OK.

Mr. RIVERA. Depositional environments.

Dr. McNUTT. OK. In other words, we understand based on knowing the kinds of environment that is around Cuba, knowing remote sensing data from gravity data and other data like that what the likely crustal structure is around Cuba. And knowing analogies in similar environments, we know the age of the sediments there. We know how they likely were formed. And there was industry seismic data that was from 2004 that was done.

Mr. RIVERA. In 2004?

Dr. McNUTT. Yeah.

Mr. RIVERA. OK. So to your knowledge right now, just here at this hearing, you are not familiar with anything recently that has been conducted, particularly not in coordination with the Cuban dictatorship?

Dr. McNUTT. No.

Mr. RIVERA. OK. Thank you very much. I yield back the remainder of my time.

Mr. LAMBORN. OK. Thank you, Mr. Rivera. I would now like to recognize the gentleman from Maryland, Mr. Sarbanes.

Mr. SARBANES. Thank you, Mr. Chairman. Thank you for being here. Now I have moved out of your line of sight. Sorry about that.

Dr. McNUTT. I can move.

Mr. SARBANES. I first off wanted to echo Ranking Member Holt's observation that the hydraulic fracturing issue is certainly going to be one that we give close attention to going forward. The industry is presenting it as holding great promise as a kind of bridge from traditional conventional sources of energy to, you know, renewable energy sources, and it is going to be that natural gas bridge arguably, and they are also clearly in a position to make huge profits from this as well. And my view is if the promise of this technology is all that it is being presented as, then the industry certainly is

in a position to make sure they do it right. And if that means kind of slowing things down and getting off of what appears to be a kind of pell-mell schedule operating with respect to the Marcellus Shale, then I think that is something that ought to be given real consideration, and I expect we are going to have a number of different opportunities to bring that issue to the Administration and to others.

I did want to ask you—and you won't be surprised probably by this question, as you attended the ribbon cutting at the Patuxent Wildlife Refuge Center when we were celebrating the American Recovery and Reinvestment Act funds that went to really address some very dilapidated structures there, and begin to renovate this incredible facility, which is operated by the USGS. As you know, it is the nation's only national wildlife refuge which was established originally to support wildlife research. It was very instrumental in providing data on the effects of DDT, leading to the ultimate ban in 1972. Patuxent is celebrating its 75 anniversary this year, and I could go on and on about why it is a critical resource. I think you know those facts.

But I guess I am aware from the line items of the budget that there are not the resources being put into kind of finishing out the project arguably that was begun by the ARRA funds. And I wanted to ask you to speak to that because the research that is being done there, the science that is conducted there, is so critical to the Nation that to not finish out this process, complete this project, I think is a real mistake. And I would be curious as to the thought process that went into that.

Dr. McNUTT. Yeah. The ARRA funds for the replacement of the infrastructure and the funding, basically it is done. We have the funding in place.

Mr. SARBANES. Well, most of the ARRA funds, as I understand it, were going to some of the demolition, some of the design with respect to the new structures that need to be put there. And now it is a question of whether that piece of it is going to be finished out, which is going to rely on some non-ARRA resources.

Dr. McNUTT. Yeah. We worked out a partnership with Fish and Wildlife Service.

Mr. SARBANES. Which will do what?

Dr. McNUTT. To put together the final funding for it.

Mr. SARBANES. OK. So you do expect that to happen then.

Dr. McNUTT. Yes.

Mr. SARBANES. OK. I appreciate that. Thank you very much. I yield back my time.

Mr. LAMBORN. Thank you. And I would like to now recognize the gentleman from Tennessee, Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman, and welcome, Director McNutt. I represent the Third District of Tennessee. I just have one question today, ma'am. The USGS budget provides for 133.9 million for natural hazards, which is \$5.1 million below the 2010 enacted 2011 CR. As you all are cutting your budget for monitoring hazardous activity that could reduce fatalities in the immediate future, it appears that you all are increasing funds for programs and research that promote climate change prevention and doesn't save lives in the near future.

Can you kindly provide an explanation of why you made these cuts?

Dr. McNUTT. Right. The climate change program actually has been cut substantially. I think there are a total of \$9 million of cuts in the climate change program. So it actually sustained a much larger cut than the hazards program. And basically, quite a few programs had to take cuts.

Our hazards program has been a program that we have been very loathe to cut over the years because it is something that is quite uniquely done by the USGS. And so it has been one that over the years has been perhaps taken fewer cuts than some of the other programs within the USGS. And just because of how tight the fiscal climate was for this coming year, it did have to take some hit, though perhaps less than some of the other programs.

And the part of the hazards program which is being cut is the NetQuakes program in the Pacific Northwest, which was going to put out some low-cost accelerometers, which would help do some fine-scale understanding of how buildings and other infrastructure might respond to an earthquake in the Pacific Northwest. And also, it would impact some multi-hazards work and some work in Alaska as well. And those are the parts of the program which will be delayed.

Mr. FLEISCHMANN. Thank you, ma'am. Mr. Chairman, I yield back.

Mr. LAMBORN. Thank you. And I would like to now recognize the gentleman from Louisiana, Mr. Landry.

Mr. LANDRY. Thank you. Ms. McNutt, do you know how long we have been using the fracking process in this country?

Dr. McNUTT. Oh, well, if you include generic fracking in terms of enhanced oil recovery, for probably decades.

Mr. LANDRY. And it seems like after we use a system for decades, we would have a lot of data involved in the safety aspects and any risk that it may pose. Wouldn't you agree with that?

Dr. McNUTT. I would suppose.

Mr. LANDRY. I mean, 50 years, that is a long time. Well, it is maybe 60 years. I am trying to understand, you know, why people keep dealing with these fracking issues when, you know, if we were using natural gas to fuel our vehicles, we would be paying about 75 cents a gallon. That is a little better at the pump right now, wouldn't you think?

Dr. McNUTT. Some people do use natural gas to fuel their vehicles.

Mr. LANDRY. That is right. I think we should use more of them. I guess the point I am trying to make is that, you know, we continue to pour resources sometimes in this government looking for an answer that we hope to find rather than one that is already in front of our face. I just wanted to make sure that me and you were on the same wavelength when it comes to how long we have been fracking for oil and gas in this country.

My question to you is how will the changes in your budget affect your all ability to properly do the geological work necessary for lease sales in the Gulf of Mexico?

Dr. McNUTT. We don't do geological work for lease sales.

Mr. LANDRY. But you all provide the data, though, correct?

Dr. McNUTT. We don't—that is not actually our responsibility for doing—we don't do any regulatory work.

Mr. LANDRY. No, no, no. I know. But you all provide the data that is used to build—you all do geological surveys in the Gulf of Mexico, correct?

Dr. McNUTT. Well, it has been probably quite some time since we have done marine surveys in the Gulf of Mexico. I can't remember the last time that we have done a marine survey in the Gulf of Mexico. It has been——

Mr. LANDRY. It has been a long time?

Dr. McNUTT. Yeah.

Mr. LANDRY. OK. I yield back.

Mr. LAMBORN. OK. Thank you. Now, with the Director's indulgence, we would like to have a second round of questions. We are only down to four of us, so that should be a little faster. And let me ask about two particular line items that are in the budget, just to better understand what these programs are about. Your agency has requested \$166 million for ecosystems mission area support for America's Great Outdoors program. Can you explain what that money is going for?

Dr. McNUTT. The President and the Secretary have a new initiative, America's Great Outdoors, where the purpose is to help restore some of the iconic landscapes, the Chesapeake, the Great Lakes, the Upper Mississippi, Puget Sound, some of the places where Americans live, work, and play. It is a very broad-based initiative in terms of helping people to get outdoors, to hunt, to fish, to recreate in these beautiful places, and also to make them more productive in terms of places where people farm and——

Mr. LAMBORN. OK. That is exactly what I was understanding, and I am concerned about that. It sounds wonderful, but to me it does not sound like a core function of the U.S. Geological Survey. I mean, I just have to call in question the need for this department to be spending \$166 million on sort of a nebulous program that is not related to the core mission of the Geological Survey.

Dr. McNUTT. Yeah. You know, we support America's Great Outdoors, but we actually have no direct funds. I think the \$166 million sounds like—that doesn't sound like—166 million doesn't sound like——

Mr. LAMBORN. Well, I think this is accurate because it is from your testimony, your written testimony.

Dr. McNUTT. OK. In ecosystem restoration, we have a total of 9-1/2 million of funding, but that money goes to water programs. It goes to mapping programs. It goes to toxics and human health. So it actually goes to very core things that the USGS does in support of America's Great Outdoors.

Mr. LAMBORN. OK. Well, maybe the testimony was a little ambiguous.

Dr. McNUTT. OK.

Mr. LAMBORN. The written testimony.

Dr. McNUTT. Yeah.

Mr. LAMBORN. The written portion of your testimony.

Dr. McNUTT. Because we will be doing the GIS, so the maps. We will be doing stream gauges, water—so it will go help to support our water programs. It will support our mapping programs. It will

support our toxics programs, our water quality programs. It will be supporting basic USGS programs that are therefore linked to America's Great Outdoors.

Mr. LAMBORN. OK. That explains it better. That huge amount for a nebulous program really concerned me. I understand a little better. I still have some concerns, but I do understand better the role of the Survey.

Dr. McNUTT. Right.

Mr. LAMBORN. But second, there is the \$106.4 million for climate and land use change activity, including completion of the Interior climate science centers.

Dr. McNUTT. Yes.

Mr. LAMBORN. And funding for new efforts associated with carbon sequestration in the California Bay Delta. Could you please explain that line item?

Dr. McNUTT. OK. The climate science centers are completing a series of science centers that are at universities, actually a consortia of universities that were put out by an RFP, in which in each section of the country we put out a call for proposals, and consortia of universities put in absolutely stellar proposals that were chosen then by peer review panels to bid on these. And these climate science centers actually work very closely then with groups, on-the-ground groups, of stakeholders that include state agencies, farming cooperatives, emergency managers, different groups, to say what kind of information do you want to know about what is coming in the next decade that will help you to decide what kind of water projects you need to do, what kind of communities you need to build, what kind of hazards you need to worry about, so that they can help them provide the science that will help them in their planning.

Mr. LAMBORN. OK. Thank you. And now I would like to recognize the Ranking Member, Mr. Holt.

Mr. HOLT. Thank you. Let me clarify a point from that last discussion and make sure I understand. The figure of 166 million applies to the entire ecosystems mission area, does it not?

Dr. McNUTT. Right.

Mr. HOLT. OK. And so it is not just in support of—

Dr. McNUTT. America's Great Outdoors.

Mr. HOLT. OK.

Dr. McNUTT. Right.

Mr. HOLT. And even what is in support of America's Great Outdoors, it sounds to me like it is relevant to work that you would be doing anyway.

Dr. McNUTT. Right.

Mr. HOLT. Stream gauges, et cetera.

Dr. McNUTT. Right.

Mr. HOLT. OK. Thank you. The cut in the minerals line, can you assure us that this does not reduce any of your efforts in domestic rare earth geology?

Dr. McNUTT. The cut in the minerals area—and, you know, as I say, we are sorry to have to take a cut anywhere. It is kind of like which finger do you want to cut off. But the cut we are taking there is in our international—

Mr. HOLT. International.

Dr. McNUTT.—minerals program, and it is to focus actually on our domestic minerals program because that is where we figure we really are vulnerable. We need to do something about that.

Mr. HOLT. So you are assuring us that you are proposing no reduction in the domestic geology.

Dr. McNUTT. Right.

Mr. HOLT. OK. Thank you. I spoke in my opening remarks about our call for the review of—for an expert, a standing, permanent expert body, to look at such things as oil flow from offshore drilling. And I just would like to have your word of whether or not you think USGS has the expertise to head that up, to provide the guidance, as we have proposed in the legislation.

Dr. McNUTT. Yes, we do.

Mr. HOLT. OK. Thank you. And would you support congressional action to do—I am not sure whether you are familiar with our legislation. But would you support some kind of congressional action to have such permanent expert panel?

Dr. McNUTT. You know, I don't think I can comment on pending legislation.

Mr. HOLT. OK, fine.

Dr. McNUTT. But what I can say is that doing science during an ongoing emergency is never the right way to do it. And I think it is a good idea to vest within a science agency the authority to keep their eye on the ball and to be thinking in a strategic way about the next emergency, and constantly being nimble to have the answers ahead of time.

Mr. HOLT. OK. In the time remaining, could you say a few words about Landsat 8? The USGS role, how the system will enhance the nation's ability to collect information, and the extent to which that information contributes to national economic interests.

Dr. McNUTT. Yes. Well, Landsat 8 is scheduled to be launched in December of 2012. As you may know, we are sort of flying with a wing and a prayer with Landsats 5 and 7. They have both performed well beyond their design lives. And in fact, there has been a major failure of the land scanner on 7, which has compromised its ability to provide—

Mr. HOLT. If I may ask you to speed up a little bit. We have less than a minute remaining.

Dr. McNUTT. Oh, OK, sorry.

Mr. HOLT. And I do want you to address the question of the economic value of—

Dr. McNUTT. Yeah. The economic value of Landsat is many times its cost to the taxpayers, for farmers, for water use, for companies in terms of just the—for city planners in terms of looking at land use. We have this report that we would be happy to give you, which documents the dollars and cents and the value for planners, for developers, for agricultural communities, for government agencies. It gives all the dollars and cents in a recent survey.

Mr. HOLT. If you would care to provide a page or two summary of that for the record—

Dr. McNUTT. We can do that, yes.

Mr. HOLT.—that would be good. And we will make sure that Members of the Subcommittee have access to the full report. Thank you.

Mr. LANDRY [presiding]. Mr. Fleischmann?

Mr. FLEISCHMANN. Mr. Chairman, I have no further questions. I yield back. Thank you.

Mr. LANDRY. The witness is dismissed.

Mr. HOLT. And if I may add, my thanks to the Director for her good testimony.

Mr. LANDRY. Yes. I am sorry. Thank you for your testimony. At this point, we will begin questioning the witnesses. To allow Members to participate, and to ensure that we can hear from all of our witnesses today, we will limit them to five minutes. Let us see.

[Pause]

Mr. LAMBORN [presiding]. OK. We are now ready for our next panel of witnesses. I want to welcome Dr. Richard Aster, President of the Seismological Society of America and the New Mexico Institute of Mining and Technology; Mr. John Palatiello, Executive Director of MAPPS; Dr. Jonathan Price, State Geologist of Nevada, representing the American Association of State Geologists, and the Director of Nevada Bureau of Mines and Geology at the University of Nevada, Reno; and Dr. Craig Schiffries, Director for Geoscience Policy with the Geological Society of America.

All of the witnesses are reminded again that their complete written testimony will appear in the record, and you have five minutes to summarize it. Thank you for being here. And, Dr. Aster, you may begin.

**STATEMENT OF DR. RICHARD ASTER, PRESIDENT, SEISMOLOGICAL SOCIETY OF AMERICA, EES DEPARTMENT, NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY**

Dr. ASTER. Chairman Lamborn, Ranking Member Holt, Members of the Subcommittee, thank you for inviting me to testify at this hearing on the mission of the U.S. Geological Survey and the President's 2012 budget proposal.

I speak today on behalf of the Seismological Society of America, an international scientific society devoted to the advancement of seismology and its applications in understanding and mitigating earthquake hazards.

Some of the most important work of the USGS, as has already been acknowledged, is accomplished with a new natural hazards mission area, which includes earthquakes and volcanoes and other hazardous natural phenomenon. My testimony is on the USGS earthquake programs, and specifically reflects concerns about reductions in the President's request for the Earthquake Hazards Program and the Global Seismographic Network.

We ask this committee to reconsider these cuts and press for restoration of funding needed for the USGS to continue these science and public safety programs. Earthquakes pose significant risks to 75 million Americans in 39 states, as well as Puerto Rico, the U.S. Virgin Islands, and a number of Pacific Territories. Under the Disaster Relief Act of 1974, the USGS is the only Federal agency with responsibility for recording and continuously evaluating domestic and global earthquake activity. The USGS sets the world's standard for providing the most accurate and timely information available from any source, including where and how strongly the ground



shook, immediate estimates on fatalities, and economic impact, and the likelihood of future significant shaking.

Earthquakes also generate destructive tsunamis that threaten tremendous loss of life and property. The same USGS seismographic monitoring system used for earthquake monitoring also provides vital data to tsunami warning systems operated by NOAA. Seismic monitoring and seismological science are critical elements of the USGS volcano hazards program that provides vital warnings to protect populations and aviation.

Seismic monitoring systems supported by the USGS and its partners include the USGS Advanced National Seismic System, or ANSS, and the Global Seismographic Network, GSN. These systems provide indispensable baseline information on the interior of the earth and its dynamic natural processes that drive scientific understanding and advance the societal benefits.

At the forefront of this monitoring and science capability is the National Earthquake Information Center located in Golden, Colorado, on the campus of the Colorado School of Mines. NEIC rapidly determines the location and size of all significant earthquakes on earth and disseminates this information immediately to concerned national and international agencies, scientists, critical facilities, and the general public.

NEIC also collects and provides to scientists and the public an extensive seismic database that provides the foundation for scientific research. A sobering issue facing the U.S., as well as many other nations, is the increasing exposure to strong earthquake ground motion as the world economy and population grows. The results of poor building practices in seismically active regions can be catastrophic. Can I have the second slide, please?

A recent example that has already been mentioned is the 2010 magnitude 7 Haiti earthquake, which claimed over 230,000 lives. Events of this size occur roughly 20 times per year somewhere on earth. However, the Haiti earthquake struck a woefully underprepared nation and city with no seismic building codes.

A stunning counter-example—next slide, thank you—is the Chile earthquake of 2010, which struck a nation with building codes that compare comparably with high-risk regions of the United States. The Chile earthquake released 500 times as much as seismic energy, shook a much larger area, and affected a larger population than the Haiti earthquake, but resulted in approximately 500 fatalities. That is .2 percent of the number of fatalities in Haiti.

However, our database's strong ground motion recordings and scientific studies of damaged cities is highly incomplete. Next slide, please. Keep going. Next one. Thank you. This is tragically demonstrated by recent events in New Zealand, which like Chile had similar building codes to those of high-risk regions of the U.S. A shallow earthquake about the same size of the Haiti earthquake struck near Christ's Church on September 3, 2010, and resulted in not one fatality.

However, on February 21st of this year, a much smaller magnitude 6 aftershock, which occurred much closer to the city, produced acceleration substantially exceeding that of gravity, or 1G. The result was widespread destruction. The number of fatalities is expected to exceed 250. There is no scientific reason to expect that

shallow, high-acceleration earthquakes similar to this event cannot occur beneath cities in a number of seismically active regions of the United States. Regions at risk include Alaska, California, the Pacific Northwest, the Inner Mountain West, parts of the Central U.S., Puerto Rico, and the U.S. Virgin Islands.

In addition to activities performed by USGS staff, expertise in earthquake studies that exist outside of the Federal Government is applied through a substantial program of grants, cooperative agreements, and/or contracts with universities, State and local government agencies. The President's 2012 budget calls for a \$2 million cut to the external research component of the earthquake hazards program. This is fully one-third of the funding provided for these competitive external research grants and cooperative agreements.

The students lost, the relationships severed, the data not obtained due to these cuts cannot easily be reclaimed in the future.

Mr. Chairman, this concludes my remarks. I will be pleased to answer any questions you or the Subcommittee may have at this time.

[The prepared statement of Dr. Aster follows:]

**Statement of Dr. Richard C. Aster, President of the Seismological Society of America, and Professor of Geophysics, New Mexico Institute of Mining and Technology**

Chairman Lamborn, Ranking Member Holt, Members of the Subcommittee, thank you for inviting me to testify at this hearing on the mission of the U.S. Geological Survey (USGS) and the President's FY2012 budget proposal. I speak today on behalf of the Seismological Society of America (SSA), an international scientific society, founded in 1906, devoted to the advancement of seismology and its applications in understanding and mitigating earthquake hazards. SSA was founded to promote research in seismology, the scientific investigation of earthquakes and related phenomena, to promote public safety by all practical means, and to enlist the support of the people and the government in the attainment of these ends. SSA is the largest and most respected society of earthquake seismologists in the world and is aligned with numerous other scientific and engineering organizations to promote earthquake risk reduction worldwide.

The USGS is a science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information. Some of the most important work of the Survey is accomplished within the new Natural Hazards Mission Area, which includes earthquakes, volcanoes, landslides and coastal and marine geology, amongst others. My focus in this testimony is on the USGS programs regarding earthquakes, and reflects concern about the reductions in the President's request for the Earthquake Hazards Program and the Global Seismographic Network.

While it might seem that earthquakes are confined to a small segment of the nation, the fact is earthquakes pose significant risk to 75 million Americans in 39 States. The USGS is the only Federal agency with responsibility for recording and continuously reporting earthquake activity nationwide and globally. The USGS, through its Earthquake Hazard Program, provides citizens, emergency responders, and engineers with the most accurate and timely information available from any source on where an earthquake occurred, how much the ground shook in different locations, immediate estimates on fatalities and economic, and on the likelihood of future significant ground shaking. Because the seismic waves generated by earthquakes easily travel through the entire body of the earth, US Geological Survey rapid evaluations of earthquake size, damage, and other attributes, are the widely acknowledged worldwide standard for such information.

Earthquakes can generate destructive tsunamis that span international boundaries the same USGS seismographic monitoring system used for earthquake monitoring also provides vital information on tsunami generation, and is critical to informing tsunami warning systems operated by NOAA. Seismic monitoring and seismological science also provide key measurements of unrest on volcanoes, and are

critical elements of the USGS Volcano Hazards Program that provides vital warnings to protect nearby populations and aviation.

The USGS is a world leader in earthquake science, data collection and dissemination. The global seismic monitoring systems supported by the USGS and its partners include two critical elements, the U.S.-based Advanced National Seismic System (ANSS; which has many components operated in association with U.S. universities) and the Global Seismographic Network. Additionally, USGS has the assigned Federal responsibility for monitoring and notification of seismic activity in the United States. The USGS fulfills this requirement via the ANSS. These seismic monitoring systems provide the fundamental and scientifically indispensable baseline information on the interior of the earth, and on its dynamic natural processes that drives scientific understanding and advance societal benefits. These networks are very efficient and cost effective data collection and processing systems; as was noted in the 2008–2009 USGS Director’s Scientific Earthquake Studies Advisory Committee (SESAC), ANSS is the highest scoring major information technology capital investment made by the Department of the Interior. In the report, the top recommendation for the USGS to be able to continue to carry out its mission and continue to provide essential data products to dramatically lower earthquake effects, calls for the full funding of ANSS, (<http://earthquake.usgs.gov/aboutus/sesac-reports.php>).

At the forefront of the USGS’ earthquake science capability is the National Earthquake Information Center (NEIC), located on the campus of the Colorado School of Mines in Golden, Colorado. The NEIC determines, as rapidly and as accurately as possible, the location and size of all significant earthquakes that occur worldwide. The NEIC disseminates this information immediately to concerned national and international agencies, scientists, critical facilities, and the general public. NEIC also collects and provides to scientists and to the public an extensive seismic database that serves as a solid foundation for scientific research, principally through the operation of modern digital national and global seismograph networks and through cooperative international agreements. The NEIC is the U.S. national data center and archive for earthquake information. As a research facility, the NEIC pursues an active program to improve its ability to locate earthquakes and to understand earthquake physics, geology, and effects.

To not only survive a strong earthquake, but to be able to thrive afterwards, is a function of the size of the earthquake, its proximity to densely populated areas, and the construction of the buildings affected by the quake. To this end, science directs the essential operation of networks of sensitive seismographs that provide the core data for the detection and rapid assessment of earthquakes, and the more detailed analyses that follow. Additionally, science directs research into the nature of the geological processes involved and impacts on people and infrastructure. Science is employed to inform every recommendation to building codes to create more earthquake resilient buildings. Earthquake science and engineering saves lives, and the USGS is a cornerstone of US world leadership in this area.

A sobering issue facing the U.S. (as well as many other nations) is the increasing exposure to strong earthquake ground motion from earthquakes as the world economy and population grows, and the necessity of mitigating this hazard. USGS National Seismic Hazard Maps form the baseline probabilistic estimates for mitigation in the U.S.

In a poorly designed and built environment, the results of poor building practices can be catastrophic. A recent example of a too common situation worldwide is the January 12, 2010 Haiti earthquake, which claimed over 230,000 lives. The earthquake was magnitude 7, and events of this size occur roughly 20 times per year somewhere on earth. However, the Haiti earthquake struck a woefully unprepared nation and city with no seismic building codes, and the result has been tremendous loss of life, civic devastation, and severe societal disruption. A stunning counterexample to the devastation of the Haiti earthquake was the magnitude 8.8 Chile earthquake of February 27, 2010. This earthquake shook a much larger area than the Haiti earthquake (and released approximately 500 times more seismic energy), but resulted in approximately 500 fatalities, which is 0.2% of the number of fatalities in Haiti. Chile has building codes that compare favorably with high-risk regions of the U.S.

However, our record of strong ground motion recordings and scientific studies of damaged cities is highly incomplete, and we are far from fully understanding or acting on the threats posed to society by earthquakes. This is tragically demonstrated by recent events in New Zealand, which has similar building codes to those of high-risk regions of the U.S. A shallow earthquake of approximately the same size as the Haiti earthquake struck near New Zealand’s second largest city, Christchurch, on September 3, 2010, and resulted in not one fatality. On February 21st of this year,

as the city was still recovering from the 2010 event, a moderate-sized (magnitude 6.3) earthquake again struck Christchurch. This event was much closer to the city center than the 2010 magnitude 7 event, and produced unexpectedly (near record) accelerations exceeding 1.8 times that of gravity. The result was widespread destruction within the city, and the number of fatalities is expected to exceed 250. The shaking was so extreme during this earthquake that it is likely that a third or more of the major business district buildings will be total losses. The experience of this February's Christchurch earthquake tragically informs us that there is still much to learn through further research and forensic engineering about the potential for extreme ground motions and about their effects on the built environment. It is noteworthy that there is no scientific reason not to expect that shallow, high-acceleration earthquakes similar to the most recent Christchurch event cannot occur beneath cities in a number of seismically active regions of the United States, including Alaska, California, the Pacific Northwest, the intermountain west, and the Central US.

The USGS plays a critical role in earthquake preparedness and planning by working with communities to develop earthquake scenarios and exercises. Earthquake scenarios provide a means to visualize community impacts from earthquakes without actually having the event occur. Scenarios provide a basis for communities to define their own level of acceptable level of risk and develop risk-reduction policies. Scenarios help answer questions like "Have we done enough?" and enable communities to identify appropriate actions to reduce their level of risk.

With the success of the Great Southern California ShakeOut in California in 2008, a scenario which simulated a 7.8 magnitude earthquake in Southern California and had a record 5 million participants statewide (repeated in 2009 and 2010 with 7 million and 8 million participants, respectively), other communities have taken the opportunity to increase awareness for earthquake hazards and implement their own "ShakeOut" operations. The Great Central US ShakeOut, scheduled for 10:15 a.m. on April 28, capitalizes on the bicentennial of the large New Madrid, Missouri, earthquakes of 1811–1812 to raise public awareness of earthquake hazards in the heartland and increase preparedness. The Central US ShakeOut encompasses 11 states (IL, IN, MO, KY, TN, OK, AR, MS, AL, GA, and SC) and already has 850,000 registered participants. Exercises of this scale aim to incorporate all levels of the community, from schools, to businesses to government, and highlight the appropriate steps to take to prepare for an earthquake and remain safe if an earthquake strikes.

In addition to activities performed by USGS staff, expertise in earthquake studies that exist outside the federal government is applied through a substantial program of grants, cooperative agreements and/or contracts with universities, state, regional and local government agencies, and private industry. Targeted research funding through the earthquake grants program has been key to the development of the USGS Seismic hazards maps, urban seismic hazards maps and the National Earthquake Information Center's rapid response products used by emergency personnel and key decision makers to allocate emergency resources in the event of an earthquake. The President's FY2012 budget calls for a \$2 million cut to the External Research component of the Earthquake Hazards Program. This proposed cut eliminates 1/3 of the funding provided by Earthquake Hazards Program for competitive, peer-reviewed, external earthquake research grants and cooperative agreements with State governments, the academic community, and the private sector.

Proposed cuts to external grants and other programs would directly impact:

- The continued development of national and urban seismic maps that inform planners, builders, governments, and citizens.
- The operation of the Global Seismographic Network
- Cooperative agreements between the USGS and University and State partners in support of a prototype Earthquake Early Warning System in California that can provide up to tens of seconds of warning to areas of high vulnerability *before* strong ground motion begins.
- State geological survey mapping in support of earthquake loss reduction in the New Madrid Seismic Zone, a highly vulnerable region of the nation's mid-section that has experienced strong earthquakes.
- The use of LiDAR in the Pacific Northwest to identify faults under heavily forested landscapes, an activity that will greatly expand our understanding of the shallow earthquake hazard of that region.
- The Southern San Andreas Fault Evaluation project at the Southern California Earthquake Center, a 40-institution research consortium that the USGS funds in partnership with the National Science Foundation to better understand the timing and slip, and the attendant seismic hazard, of the San Andreas fault system.

- Critical funding for graduate students, postdoctoral researchers, and other young scientists necessary to maintain U.S. preeminence in this field, and to advance mitigation of earthquakes hazards in the U.S.

## CONCLUSION

The USGS is a U.S. and world-leading science and science-driven agency dedicated to the furtherance of the understanding of our planet, its resources and how to best live and thrive on it. The USGS is an essential agency in ensuring that basic science results in applications that save lives.

In these difficult economic times, when budget decisions aren't between what to fund and what not to fund, but are instead centered on what to cut and what not to cut, we can't lose sight of the incredible progress that science has made to the nation and do all we can to ensure we continue to invest in science. The budget cuts proposed in the President's FY2012 budget hamstringing core science programs within the Hazards Programs at the USGS, and undercut investment in future scientists that we hope will continue to both advance our scientific understanding and protect society from earthquakes. The students lost, the relationships severed, the data not obtained due to these cuts, cannot easily be reclaimed in the future. We ask this Committee to reconsider these cuts and press for restoration of the funding needed for the USGS to continue these valuable science and public safety programs.

Mister Chairman, this concludes my remarks. I will be pleased to answer any questions you or the subcommittee may have at this time.

Mr. LAMBORN. Thank you for your testimony. Mr. Palatiello. And I believe your agency is the Management Association of Private—help me here, please.

Mr. PALATIELLO. Photogrammetric.

Mr. LAMBORN. Photogrammetric—

Mr. PALATIELLO. Surveyors.

Mr. LAMBORN. Surveyors. OK. Thank you for being here, and please present your testimony.

## STATEMENT OF MR. JOHN M. PALATIELLO, EXECUTIVE DIRECTOR, MAPPS

Mr. PALATIELLO. Thank you, Mr. Chairman. Thank you for the opportunity to present our views, to you, Mr. Chairman and Mr. Holt.

MAPPS is the national association of private geospatial firms. Photogrammetry is photography. Grammetry is measurement, so it is measurement or the making of maps from aerial photographs. Geospatial, that was the origin of our organization. Geospatial is much broader than that now, and so our membership includes the full spectrum of private firms in the broad geospatial field.

In our view, there is a critical need to refocus the mission and the priorities of the USGS. As you mentioned in your opening statement, Mr. Chairman, the USGS operates primarily under authorization provided by the Act of March 3rd, 1879. It has been decades since Congress has enacted major surveying and mapping legislating affecting the USGS.

The underpinning for where we believe the USGS priority today should be is in the national spatial data infrastructure. The NSDI was established by President Clinton by executive order and reaffirmed by President Bush, and it provides a framework for the geographic information needs that our nation has today.

However, that priority is not reflected in the USGS budget. The national map is the key component of USGS in the NSDI. But we are deeply disappointed that partnerships to facilitate this activity is proposed to be cut in the President's Fiscal Year 2012 budget.

I would like to call to your attention a very candid comment in the USGS budget justification, quote, “The reduction would result in reduced work for America’s geospatial industry, which benefits by fulfilling contracts for projects that result from agreements the national geospatial program makes with its cooperators,” unquote.

Mr. Chairman, this is the last place we should be cutting the USGS budget. A reduction in partnerships will result in more duplication, less coordination, and less leveraging of scarce resources. As I have shown, I believe, in the first slide that I have—this is a USGS slide. By their own analysis, for every dollar invested in partnerships for geospatial data of appropriated funds to GS, more than eleven dollars in partnership dollars is leveraged. For things like imagery, it is 20 to 1. So when you reduce partnerships, you reduce that leveraging of resources.

We are also opposed to the decrease in the funding for the Federal Geographic Data Committee. FGDC is a USGS office that is responsible for Federal coordination. As you mentioned before, Mr. Chairman, the need for better coordination was also identified by this Subcommittee in a 2009 hearing on a bipartisan basis, as well as in a recent U.S. GAO report.

Perhaps most troubling as far as USGS trends are concerned has been its retrenchment from the utilization of the private sector. The data that we have shows that USGS is not even coming close to meeting the instructions of Congress that was established in the Fiscal Year 1996 Appropriations Act for using the private sector.

On the bright side, we are pleased that the budget includes the request of 48 million to support current and future Landsat. Landsat does not compete with the private sector and is an appropriate government investment. As you can see from the slides that I have, we have shown both in your district, Mr. Lamborn, and in your district, Mr. Holt, how Landsat is a useful tool in doing change detection analysis, where you can see where growth, development, change to impervious surface can be monitored over time so that appropriate planning and smart, intelligent land use and development can occur.

Geospatial data contributes to national priorities and economic development, resource management, environmental protection, infrastructure, construction and maintenance, homeland security, and a variety of other needs and applications.

USGS was once the world leader in this field. We don’t believe that is the case any longer. We look forward to working with the Subcommittee to reform USGS’s mapping and geospatial activities so we can once again be that national and international leader. Thank you again for the opportunity.

[The prepared statement of Mr. Palatiello follows:]

**Statement of John M. Palatiello, Executive Director, MAPPS**

Mr. Chairman, members of the Subcommittee, thank you for the opportunity to present our views on the priorities, mission and budget proposal for the U.S. Geological Survey. MAPPS ([www.mapps.org](http://www.mapps.org)) is a national association of private sector geospatial firms. Our 180+ member firms span the entire spectrum of the geospatial community, including satellite and airborne remote sensing, surveying, photogrammetry, aerial photography, LIDAR, hydrography, bathymetry, charting, aerial and satellite image processing, GPS, and GIS data collection and conversion services and companies that provide hardware, software, products and services to the geospatial profession in the United States and other firms from around the world.

A significant number of our member firms are prime contractors or subcontractors to USGS and other federal agencies, and to the state and local governments that receive grant monies from USGS.

MAPPS believes there is a critical need to refocus the mission and priorities of the USGS, and to align its budget with this new direction. The USGS operates primarily under authorization provided by the Act of March 3, 1879 (codified in 43 U.S.C. 31 et seq.). It has been decades since Congress last enacted major legislation affecting one of the original and core missions of the USGS—the surveying and mapping of the United States. As a result, surveying and mapping has proliferated among more than 40 federal agencies, resulting in duplication, a lack of coordination, gaps in coverage and the absence of a strategic approach to providing the basic geographic information needed in the 21st century for scientific research, as well as practical applications that contribute to the economic health, quality of life and safety and security of our Nation. The need for better coordination of Federal surveying and mapping activities has been well documented by previous Congressional hearings, including one by this Subcommittee in 2009, GAO reports, National Academy of Sciences studies, and investigations by the National Academy of Public Administration, OMB and other entities.

The National Spatial Data Infrastructure (NSDI), established by President Clinton in Executive Order 12906 on April 11, 1994, and amended and reaffirmed by President Bush in Executive Order 13286 on March 5, 2003, provides a framework for the geographic information America needs today. However, this priority is not reflected in the USGS budget.

The National Map is the key USGS component of the NSDI. We are surprised and deeply disappointed that funding for this activity, and the partnerships to facilitate this activity, is proposed to be cut in the President's FY 2012 budget. I call to your attention the extraordinarily candid comment on page E-15 of the USGS "Green Book" FY 2012 Budget Justification:

The National Map Partnerships (-\$3,500,000/-4 FTE)

The USGS proposes to reduce the funding for the Partnership Implementation component of the National Map by \$3.5 million which is currently funded at \$13.9 million. The proposed reduction eliminates all funds used to specifically leverage with Federal, State and local agencies to acquire new data.

The proposed decrease would eliminate liaison positions responsible for partnerships in 13 States. These positions organize the agreements through which the USGS leverages its resources with those of State and local co-operators. They routinely provide coordination among Federal geospatial resources and those of State and local governments. Beyond these immediate outcomes, the reduction would result in reduced work for America's geospatial industry, which benefits by fulfilling contracts for projects that result from agreements the NGP makes with its cooperators.

Mr. Chairman, this is the last place we should be cutting the USGS budget. A reduction in partnerships will result in more duplication, less coordination, less leveraging of scarce resources, and increased unemployment in the private sector. It goes exactly in the opposite direction of what this Subcommittee, on a bipartisan basis, concluded was necessary in its 2009 hearing and the recommendations of numerous studies, including the National Research Council/National Academy of Sciences report *National Spatial Data Infrastructure Partnership Programs* (2001). According to the USGS's own analysis, for every \$1 in funds appropriated to USGS for NSDI framework data, more than \$11 in partnership dollars is leveraged. That is a return on investment that will be lost as partnerships are reduced. This is a penny wise and pound foolish reduction.

Moreover, the FY 2012 budget request decreases funding for the Federal Geographic Data Committee (FGDC) by \$200,000. Last week, the GAO issued a report, *Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue*. While this report did not discuss duplication in Federal geospatial activities, previous studies have done so. GAO qualified its report by noting it did not provide an exhaustive or comprehensive list of Federal activities prone to duplication, but if it had, geospatial would be near the top of such a list. This point was also identified by this Subcommittee in its 2009 hearing, as well as in hearings in 2003 and 2004 by a Subcommittee of the House Committee on Oversight and Government Reform and the 2004 GAO report, *Geospatial Information: Better Coordination Needed to Identify and Reduce Duplicative Investments*.

Mr. Chairman, I regret to report that since the Subcommittee held its hearing in July of 2009, the Steering Committee of the Federal Geographic Data Committee (FGDC) has not met. In fact, the FGDC Steering Committee, chaired by Secretary Salazar, has not met since the Obama Administration took office in January of

2009. The last meeting of the designated senior career or political officials of the government was in the final days of the Bush Administration. It is an unfortunate neglect of leadership and responsibility. We urge the Subcommittee to reinforce the need for coordination, partnerships, and a clear definition of roles and responsibilities so that tax dollars are not wasted, effort is not duplicated, and our economy is not stifled.

Perhaps the most troubling trend in USGS has been its retrenchment from utilization of the private sector. In FY10, the appropriated amount from Congress for USGS National Geospatial Program was \$70 million. However, only \$5 million of the \$70 million went to contract via the Geospatial Products and Services Contracts (GPSC). That is only 7% going to contract for data and related services. This is a reversal of a direction from Congress that USGS had previously implemented. In House Report 104-173, to accompany H.R. 1977 Department of the Interior and Related Agencies Appropriations Act, 1996, the Appropriations Committee instructed:

“The Committee expects the Survey to continue to increase its contracting of map and digital data production, with the goal of no less than 50 percent contracting by the end of fiscal year 1997 and no less than 60 percent contracting by the end of fiscal year 1999. The survey should not be competing with the private sector for map production contracts. When services of equal quality and cost are available from the private sector, the Survey should use the private sector.”

Another USGS activity that has long upset MAPPS members is the Civil Applications Committee (CAC) (p I-36). The CAC is an interagency committee, chaired by USGS, and housed in a secure facility at the USGS headquarters in Reston, VA, that facilitates civil agency use of classified imagery and other data, officially known as National Technical Means (NTM) for “resource management, environmental, climate, natural disaster, and remote sensing applications.” This secret activity often duplicates and competes with the private sector. While the policy prescribes that NTM data is only to be used when commercially provided data does not exist, we have seen examples where the policy has not been followed, and the private sector has not been utilized. Also, there is no transparency to this activity and the private sector is often unaware of the CAC’s facilitation of the use of NTM when commercial solutions were indeed available. It should be noted that a number of MAPPS member firms work in GEOINT, or geospatial intelligence and have the cleared personnel and secure facilities to support classified data. We urge the Subcommittee’s oversight of the CAC, a reduction in its funding, and stronger enforcement of policies and procedures to prevent government competition with and duplication of the private sector.

On the bright side, we are pleased the budget request includes an increase, or reallocation, of \$48 million to support the current and future mission of the National Land Imaging Program, principally through LANDSAT. The National Land Imaging Program includes funding for current satellites (LANDSAT 5 and 7), the LANDSAT Data Continuity Mission (LANDSAT 8), scheduled to launch in December 2012, and the development of LANDSAT 9 and 10, through a continuous program to ensure data continuity in the future. The moderate resolution data provided by LANDSAT does not compete with the private sector and is an appropriate government investment. It provides for data that is primarily used in research and scientific applications, much of it funded by the government, which complements higher resolution satellite and airborne capabilities available from the private sector. This funding by the Obama Administration continues implementation of the “Future of Land Imaging” program initiated in the Bush Administration. We support this bipartisan program.

Mr. Chairman, geospatial data, products, technology and services enhance and contribute to national priorities in economic development, resource management, environmental protection, infrastructure, construction and maintenance, homeland security and a variety of other national needs and applications. The USGS was once the envy of the world for its leadership in this field. I have pleaded with previous USGS leaders to “lead, follow or get out of the way”. In the Committee’s Oversight Plan for the 112th Congress, this Subcommittee reported:

**Federal Mapping Programs**—The federal government spends billions each year on new geospatial data—spending which is frequently duplicative and uncoordinated. During hearings last year, witnesses made clear that multiple Administrations have exerted little control, central oversight or effective management. The Subcommittee intends to examine this issue and may consider legislation to consolidate and streamline the geospatial programs to reduce waste and duplication. In addition, the Subcommittee intends to conduct oversight of federal agencies and how they track and monitor their land management responsibilities and purposes.



We look forward to working with the Subcommittee on this important and long-overdue review and reform of USGS's mapping and geospatial activities. It is time to bring USGS into the 21st Century and align its programs and budget priorities to America's contemporary and future needs to provide the spatial data infrastructure necessary for economic growth, sound resource management, solid science, and proper environmental stewardship.

USGS should be focused on coordination; assisting with applying geospatial data to our Nation's challenges; encouraging economic development, private sector job creation and export promotion; driving a research agenda that is responsive to the private sector's needs; working to assure a geospatial workforce that will meet the demands of the nation; and contracting with the private sector and partnering with other government entities to build and then maintain the NSDI. We believe this is where USGS's budget priorities should be placed and we are committed to working with you and the Administration to build a stronger USGS that once again leads the Federal government's geographic information activities.

Mr. LAMBORN. Thank you for your testimony. Dr. Price, you may begin.

**STATEMENT OF DR. JONATHAN G. PRICE, STATE GEOLOGIST  
AND DIRECTOR, NEVADA BUREAU OF MINES AND GEOLOGY,  
UNIVERSITY OF NEVADA, RENO, TESTIFYING ON BEHALF OF  
THE ASSOCIATION OF AMERICAN STATE GEOLOGISTS**

Dr. PRICE. Thank you for this opportunity to comment on the value of USGS programs. The President's budget would devastate many of the most successful and effective programs run by the USGS. These are programs that stimulate economic development, save lives and property from natural disasters, and protect the environment and public health. Cutting these programs would cost the government money through loss of general revenue that is created from the economic stimulation that these programs provide.

These are also Federal programs that directly benefit from collaboration with experts outside the Federal Government. Through competitive grants, which would be eliminated or reduced in the President's budget, the USGS is engaging the nation's best and brightest scientists and local area experts in their mission-oriented work.

The foremost of concern to our Association of American State Geologists is the national cooperative geologic mapping program. The President's budget proposes cutting this by 10 percent, but disproportionately cuts the cooperative components with states and universities, which bring non-Federal matching dollars to the projects. We believe that this program should not be cut at all. Large parts of the United States do not have modern detailed geologic maps.

Geologic mapping at the scale and overall coverage done by the USGS and the State Geological Surveys is clearly a role for government because the public benefits in many ways, and the private sector must limit its work to small areas of immediate interest to their businesses. Geologic mapping generally engages the use of private sector base mapping efforts, but must rely on the knowledge of geologists at government agencies and universities to build the geological history and four-dimensional framework of an area.

A cost-benefit analysis calculated the value of geologic maps to be 25 to 39 times the cost of the mapping. Therefore, a program of 28 million has a potential to generate \$700 million to \$1.2 billion in value.

The Colorado State geologist, Dr. Vince Matthews, has documented some recent successes in economic development and increased State and Federal revenue through geologic mapping. Mapping in the San Juan Basin provided industry and regulators with sound science on how to most efficiently and safely develop cold-bed methane, which currently accounts for approximately 40 percent of Colorado's natural gas production.

The New Jersey State geologist, Dr. Karl Muessig, noted that geologic mapping guided the drill testing for a new underground explosive testing facility at the Picatinny Arsenal. It resulted in drilling into competent crystal and rocks, compared to the initial fractured rock target, saving the Army the cost of extra exploration and drilling, and millions of dollars for a possible failed facility.

The President's budget proposes elimination of the national geological and geophysical data preservation program. These data and samples are used in exploration for domestic mineral and energy resources, including geothermal and wind, groundwater protection, and investigation of the potential for carbon sequestration in geological formations. The program should grow, not suffer elimination.

In making the case for support of the energy and minerals program of the USGS, please refer to the four graphs at the end of my written testimony. These graphs use critical data collected and reported by the USGS. Only the USGS compiles the vast amount of mineral resource data used by our decision makers.

The USGS has a vital role in documenting domestic production and reserves, and in assessing the likelihood of future discoveries. Recent external reports by the National Academy of Sciences and by the American Physical Society have documented the importance of continuing to collect and analyze mineral resource data for both the economic health and national security of America.

We believe neither the minerals program nor the energy program should be cut. There are several other USGS programs that we believe are vital to the Nation and should not be reduced. We strongly support increased funding of the USGS hazards programs, including earthquakes, volcanos, and landslides. Geologic mapping is a key to reducing risk from these hazards, which brings me back to our key concern, funding for the geologic mapping program.

It and the comparably important data preservation program provide the basis for other USGS activities. They are integral to economic development, reducing risk from natural hazards, and stewardship of the environment. Thank you.

[The prepared statement of Dr. Price follows:]

**Statement of Jonathan G. Price, State Geologist and Director, Nevada Bureau of Mines and Geology, Association of American State Geologists**

My name is Jonathan G. Price. I am the Nevada State Geologist and Director of the Nevada Bureau of Mines and Geology, which is the state geological survey and a research and public service unit of the Nevada System of Higher Education at the University of Nevada, Reno. As past president of the Association of American State Geologists, I am testifying today on behalf of that organization, which represents the geological surveys in the 50 states and Puerto Rico.

Thank you for this opportunity to comment on the budget of the U.S. Geological Survey (USGS) and the value of their programs.

The President's budget would devastate many of the most successful and effective programs run by the USGS. These are programs that stimulate economic develop-

ment, save lives and property from natural disasters, and protect the environment and public health. Cutting these programs would cost the government money through loss of general revenue that is created from the economic stimulation that these programs provide.

These are also federal programs that directly benefit from collaboration with experts outside the federal government. Through competitive grants, which would be eliminated or reduced in the President's budget, the USGS is engaging some of the Nation's best and brightest scientists and local-area experts in their mission-oriented work.

Foremost of concern to the Association of American State Geologists is the National Cooperative Geologic Mapping Program (NCGMP), a subactivity within the Core Science Systems Activity, funded at \$28.2 million in FY 2010. The President's budget proposes cutting this by 10% in FY 2012, but disproportionately cuts the cooperative components with states and universities, which bring non-federal matching dollars to the projects, by 14%, while cutting the federal component by 8%. We believe that this program should not be cut at all in FY 2012. Given its proven record in stimulating economic development and generation of tax revenues for federal, state, and local governments, the program should grow to its fully authorized level of \$64 million per year in the upcoming years. Large parts of the United States do not have modern, detailed geologic maps. The program locates, characterizes, and assembles the vital information upon which economic decisions involving land and water are made. Virtually all mineral, energy, water, industrial construction, public works, and urban development projects require a geologic map.

Geologic mapping at the scale and overall coverage done by the USGS and the state geological surveys is clearly a role for government, because the public benefits in many ways, and the private sector must limit its work to small areas of immediate interest to their businesses. Geologic mapping generally engages the use of private-sector base-mapping efforts (such as aerial photography and topographic mapping, nowadays using light detection and ranging, LiDAR) but must rely on the knowledge of geologists at government agencies and universities to build the geological history and four-dimensional framework of an area.

Cost-benefit studies show that the existence of a modern geologic map saves developers and engineers about \$50,000 for every project occurring within a standard mapping area of 56 square miles. Typically, many projects utilize a single map, multiplying these cost savings many times over. The maps, and data collected to make them, are of great value because society can use them in perpetuity. A cost-benefit analysis done on a state fortunate to have completed modern geologic map coverage calculated the value of the geologic maps to be 25 to 39 times the cost of the mapping. Therefore a FY 2012 program of \$28 million has the potential to generate \$700 million to \$1.1 billion in value. Also, through this program, 850 students at 140 universities have been trained in the essential skills of geologic mapping, skills that are much in demand in the United States.

The Colorado State Geologist, Dr. Vince Matthews, has documented some recent successes in economic development (and increased state and federal revenue) through geologic mapping. Geologic mapping in Archuleta and La Plata Counties along the northern outcrop of the San Juan Basin provided industry and regulators with sound science on how to most efficiently and safely develop coalbed methane, which currently accounts for approximately 40% of Colorado's natural gas production. Geologic mapping by the Colorado Geological Survey is a key component of an \$11 million research project on carbon capture and storage centered in northwestern Colorado. Partners include the Colorado Geological Survey, Tri State Generation and Transmission, Shell Production Company, Schlumberger Carbon Services, and other state geological surveys and universities.

The New Jersey State Geologist, Dr. Karl Muessig, provided the following example of how geologic mapping saves the federal government money. Mapping data gathered under the NCGMP guided the drill testing at the Picatinny Arsenal for a new underground explosives testing facility. It resulted in drilling into competent crystalline rocks (compared to the initial fractured rock target), saving the Army the cost of extra exploration drilling and millions of dollars for a possible failed facility or for additional grouting.

Geologic maps and related reports on applied research are excellent incentives for economic development. As another example, geologic mapping and related interpretation of the regional geological structures were an integral part of the discovery of the Carlin gold deposit in 1961. The geologic mapping was done by USGS geologists in a cooperative program with the Nevada Bureau of Mines and Geology, but the discovery was made through the additional investment by the private sector for drilling and assaying. In the last 35 years, mining companies in Nevada have produced tens of billions of dollars' worth of gold and silver from deposits of this type

and have directly and indirectly provided tens of thousands high-paying jobs. There is still much mineral wealth to be found in the United States. In 1988, I estimated that the undiscovered mineral resources in Nevada were likely to have a value in the range of \$120 billion to \$1.2 trillion, and those figures still provide a reasonable estimate of the untapped mineral wealth of that one state. Nevada's gold production of over 167 million troy ounces since the Carlin deposit began operation in 1965 would have a value of over \$230 billion at current prices.

Another reason why the STATEMAP and EDMAP components of the National Cooperative Geological Mapping Program should be increased, rather than cut, is the fact that these components require that non-federal dollars be added to the federal investments, thereby at least doubling the overall effort. In addition, each state engages stakeholders (including federal land managers, resource and urban development industries, local governments, water districts, other state agencies, and conservation groups) in setting priorities for new geologic maps, thereby assuring that the highest priority areas are covered as soon as possible.

The President's budget proposes elimination of the National Geological and Geophysical Data Preservation Program (NGGDPP), also a subactivity within the Core Science Systems Activity, funded at \$1.0 million in FY 2010. This is another cooperative program with states, which double the federal investment. The 2002 National Academy of Sciences report on *Geoscience Data and Collections—National Resources in Peril* made the case for preserving these irreplaceable data and physical samples and led to Congressional authorization of this program at \$30 million per year within the Energy Policy Act of 2005. We have seen uses for these data and samples in exploration for domestic mineral and energy resources (including renewable geothermal energy sources), groundwater protection, and investigation of the potential for carbon storage in geological formations. The program should grow, not suffer elimination.

An example of how both data preservation and geologic mapping create jobs in the private sector and revenues for the federal government comes from New Jersey. Coastal mapping supported by NCGMP and offshore mapping by the Department of Interior, along with drilling data preserved through the NGGDPP, have provided baseline data for siting proposed offshore wind energy facilities. This is generating jobs in the alternative energy industry and future federal leasing revenues.

Many states have considerable amounts of public land managed by the federal government. In contrast to Canada and Australia, which help stimulate exploration for natural resources and eliminate unnecessary environmental degradation that can occur from duplication of efforts on the ground, the United States has no significant program to preserve information gathered from leases or mining claims on public lands, other than the National Geological and Geophysical Data Preservation Program. We have experienced many cycles of exploration, when commodity prices rise and fall. Preserving data from past exploration clearly stimulates private investment and economic development when commodities are in high demand.

In making the case for support of the Energy and Minerals Programs of the USGS, please refer to four graphs at the end of this testimony. The continuing historical rise in demand for copper, an example of a mineral commodity needed for modern society, is documented in Figure 1. To meet global demand, the world needs to mine the equivalent of one huge copper deposit each year and find a new one to replace the depleted reserves. Although conservation and recycling can lessen the demand for newly mined copper, the increases in both global population and average standard of living require more mining. Domestic resources for most mineral commodities occur in the United States, where they are mined using the world's best practices for environmental stewardship and health and safety for workers and the public. The USGS has a vital role in documenting domestic production and reserves and in assessing the likelihood of future discoveries that will add to the mineral and energy resources of our country.

Global iron-ore production and, by that measure, the rise of China as a major economic power, is shown in Figure 2. The dominance of China as a producer of mineral and energy commodities today is illustrated in Figures 3 and 4. These graphs use critical data collected and reported by the USGS. No other agency, foreign government, or private company does this. Although foreign governments, domestic state governments, and private companies collaborate with the USGS in the data collection, only the USGS compiles the vast amount of mineral-resource data used by our decision makers. China's dominance in the minerals arena, as documented by the USGS data, presents challenges, threats, and opportunities for the United States.

Within the USGS's Energy, Minerals, and Environmental Health Activity, the Mineral Resources Subactivity would be cut 18% below the FY 2010 level, from \$53.8 million to \$44.2 million in FY 2012. The Mineral Resources External Research

Program (only \$250,000 in FY 2010) would be eliminated, thereby losing collaboration with subject experts that can fill gaps in expertise within the USGS. The Minerals Information Function, considered to be an essential government function in two 2008 National Academy of Sciences reports (titled *Minerals, Critical Minerals, and the U.S. Economy*, and *Managing Materials for a Twenty-first Century Military*) and in a 2011 report by the American Physical Society (titled *Energy Critical Elements: Securing Materials for Emerging Technologies*), would suffer a 17% cut. These recent external reports have documented the importance of continuing to collect and analyze these data for both the economic health and national security of America. We believe these are programs and functions that should not be cut.

The President's budget for the USGS's Energy Resources Subactivity would be approximately the same as last year (increasing from \$27.2 million in FY 2010 to \$27.4 million in FY 2012), but funding for the State Coop to maintain and improve the National Coal Resources Data System would be eliminated. Coal continues to be a major supplier of inexpensive electricity for America. Research on new technologies for reducing carbon dioxide emissions, storing carbon dioxide underground, and adapting to climate changes is needed, because coal and other carbon-based energy fuels (including unconventional sources of oil and natural gas) are likely to dominate the global energy supplies for many years. Whereas the Energy Information Administration in the Department of Energy does a good job of collecting statistics on domestic energy production, the USGS's role in long-term forecasting of energy supplies (including fossil fuels, nuclear fuels, and geothermal resources) is unique and necessary for long-term planning. Much of this work is done in collaboration with states, and the Association of American State Geologists supports this working relationship.

There are several other USGS programs that we believe are vital to the nation and should not be reduced. The President's budget for the Earthquake Hazards Program (within the Natural Hazards Activity) calls for an 8% overall decrease and a much larger percentage cut to the external Earthquake Grants program, which has successfully engaged leading scientists and engineers through a peer-reviewed grant process. The President's budget would also put on hold progress to build a prototype earthquake early warning system. This system would warn people within seconds after a major earthquake starts to shake the ground, in time for many people to take cover, protect their children, and automatically implement electronic safety measures (such as opening firehouse doors, slowing trains, and backing up computers). Japan already has a functional system in place, but the President's budget calls for the United States to stall its efforts. The system that we need would surely save lives and facilitate a rapid recovery after the inevitable earthquakes that will strike not only California, Alaska, Nevada, Hawaii, Oregon, Utah, and Washington, but many other states, including ones in the eastern and central parts of the country. The Earthquake Hazards Program also needs funding to take advantage of new technologies (such as better seismic instrumentation, more geodetic measurements, and more use of LiDAR in mapping faults) that are improving our abilities to reduce risks from earthquakes.

The National Science Foundation's EarthScope-US Array experiment, which has been deploying seismic instruments across the country, but for only 18 months at a given site, has demonstrated how useful a robust national seismic network could be. For example, the US Array instruments helped to detect a magnitude 3.7 earthquake in the same area as, but approximately one year before, the magnitude 6.0 earthquake that damaged the town of Wells, Nevada on February 21, 2008. Unfortunately, the US Array instruments in most western United States have been moved eastward in NSF's experiment, and the USGS-supported seismic network can no longer detect the small events that might help us eventually predict earthquakes or that might be critical for an early warning system for many urban areas throughout the country. That is, USGS support of a national seismic and geodetic network, with collaboration from state and university-based regional networks, is vital.

The Landslide Hazards Subactivity and the Volcano Hazards Subactivity of the USGS's Natural Hazards Activity are slated for 4% reductions in the President's budget. As indicated in recent USGS and National Academy of Sciences studies, landslides (and related land-surface movements such as debris flows, shrink-swell soils, sinkholes, and subsidence) cause billions of dollars of damage per year, yet not enough has been done to map and understand the hazards, a key step to risk reduction. The Association of American State Geologists strongly supports increased funding of USGS hazards programs, including earthquakes, volcanoes, and landslides. Geologic mapping is a key to reducing risks from these hazards, which brings me back to our key concern—funding for the National Cooperative Geologic Mapping Program. It and the comparably important National Geological and Geophysical Data Preservation Program, are housed in the USGS's Core Science Systems Activ-

ity. They both provide the basis for other USGS activities. They are integral to economic development through work that stimulates the responsible development of energy, mineral, and water resources; reduces risks from natural hazards; and guides our stewardship of the environment.

Thank you, again, for this opportunity to comment on the value of USGS programs.

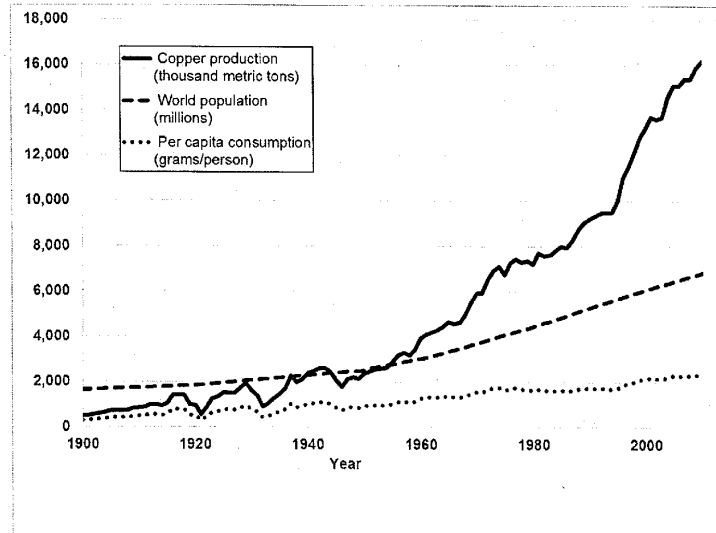


Figure 1. Global production of copper compared with world population and per capita consumption (production divided by population), a measure of average standard of living, from 1900 to 2010 (mineral production data from USGS). Demand for nearly every mineral and energy commodity is high, in part because of increasing world population and in part because of increasing standards of living in many parts of the world. While world population increased four-fold from 1900 to 2010, per capita copper consumption increased eight-fold, such that annual copper production in 2010 was 33 times more than in 1900. Global copper production in 2010 was a record high, at 16.2 million metric tons, approximately the same as the cumulative historical production, since 1906, from the Bingham Canyon copper mine in Utah. Copper is used primarily to conduct electricity.

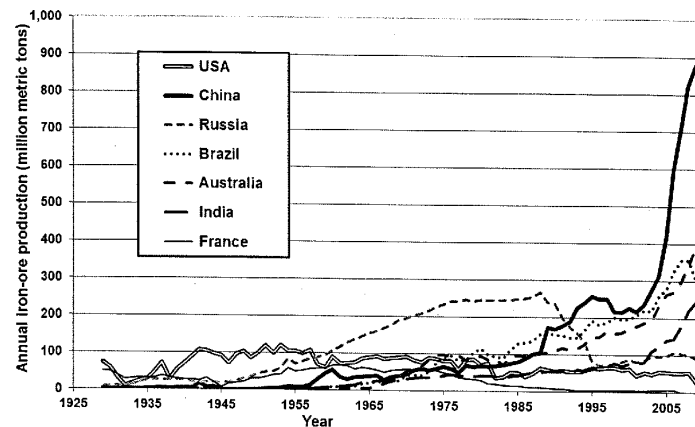


Figure 2. Iron-ore production by country (in millions of metric tons) from 1929 to 2010 (data from USGS). Global annual iron-ore production also reached an all-time

high in 2010. Iron is used primarily in steel. Most of the iron-ore production from Australia and Brazil has fed the steel industry in China.

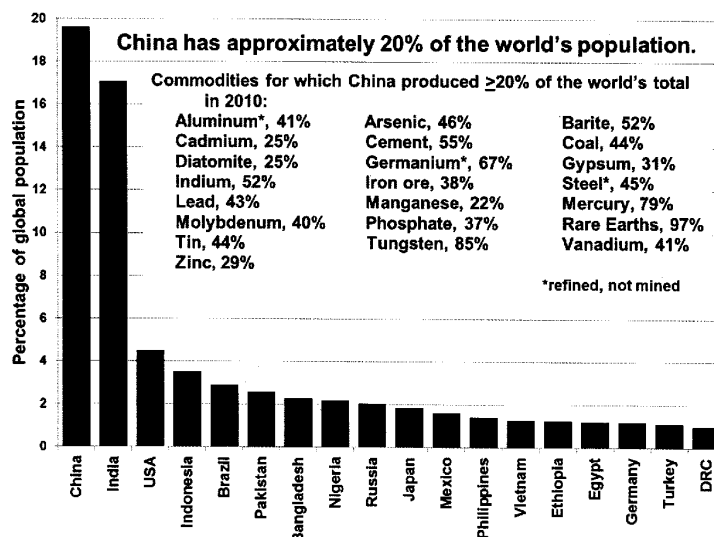


Figure 3. Percentage of global population by country. With approximately 20% of the world's population, China produces well over 20% of the world's supply of many mineral and energy commodities, some of which are highlighted on this graph (population data from CIA, coal production data from EIA, other mineral commodity data from USGS; DRC = Democratic Republic of Congo).

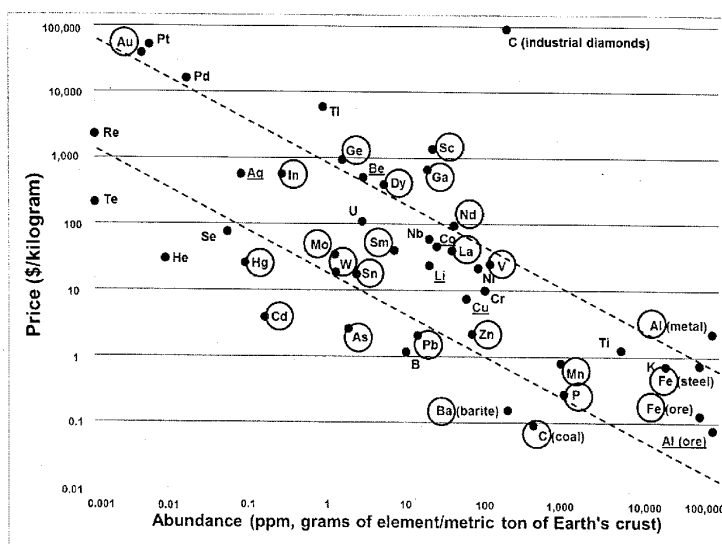


Figure 4. Average price in 2010 versus abundance of various chemical elements (data are mostly from USGS Mineral Commodity Summaries 2011 for prices and from the 85th edition of the CRC Handbook of Chemistry and Physics for abundances). The dashed lines illustrate the general trend of increasing price for rarer elements. In 2010, China was the leading producer of 25 (circled) of the 46 mineral commodities plotted and among the top three producers of another five (underlined).

These include silver (Ag), aluminum (Al) metal and ore, arsenic (As), gold (Au), barium (Ba), beryllium (Be), cadmium (Cd), carbon (C, as coal), cobalt (Co), copper (Cu), iron (Fe) as both ore and steel, gallium (Ga), germanium (Ge), mercury (Hg), indium (In), lithium (Li), manganese (Mn), molybdenum (Mo), phosphorus (P), lead (Pb), scandium (Sc), tin (Sn), vanadium (V), tungsten (W), zinc (Zn), and the rare earth elements, with dysprosium (Dy), lanthanum (La), neodymium (Nd), and samarium (Sm) shown on this graph. The United States was the top producer of two, beryllium (Be) and helium (He), and among the top three producing countries for 13 commodities. Russia was the top producer of three, industrial diamonds (another form of carbon, C), nickel (Ni), and palladium (Pd), and among the top three for 12. Australia was the top producer of two, aluminum (Al) ore and titanium (Ti), and among the top three for 10 mineral commodities. Other global leaders include Chile for copper (Cu), lithium (Li), and rhenium (Re); South Africa for chromium (Cr) and platinum (Pt); Democratic Republic of Congo for cobalt (Co); Mexico for silver (Ag); Turkey for boron (B); Brazil for niobium (Nb); Canada for potassium (K); Kazakhstan for uranium (U); and Japan, from its smelting of imported copper ores, for selenium (Se) and Tellurium (Te). Thallium (Tl) is a byproduct of copper, zinc, and lead processing.

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Mr. LAMBORN. Thank you for your testimony. Dr. Schiffries.

**STATEMENT OF DR. CRAIG M. SCHIFFRIES, DIRECTOR FOR  
GEOSCIENCE POLICY, GEOLOGICAL SOCIETY OF AMERICA**

Dr. SCHIFFRIES. Mr. Chairman, Mr. Holt, and Members of the Committee, thank you very much for the opportunity to testify today about the U.S. Geological Survey. My name is Craig Schiffries, and I serve as Director for Geoscience Policy at the Geological Society of America.

Quite simply, the USGS is one of the nation's premiere science agencies. It addresses many of society's greatest challenges, including mineral and energy resources, natural hazards, and water resources. The USGS benefits every American every day, or at least those of us who use water, energy, minerals, or maps.

The devastating earthquake in Haiti on January 12th, 2010, that killed more than 200,000 people, and the small volcanic eruptions in Iceland that disrupted global air travel in April 2010 emphatically demonstrate the value of robust natural hazards monitoring and warning systems, and symbolize the need for increased Federal funding for the USGS.

Nevertheless, funding for the USGS has stagnated in real dollars for more than a decade, as shown on this figure. The USGS budget would be even weaker if Congress had not repeatedly restored proposed budget cuts during this time. We urge Congress to again restore proposed budget cuts for the USGS.

The broad rationale is that science and technology are the engines of economic prosperity and national security. Federal investments pay substantial dividends. According to the National Academies' report, "Rising Above the Gathering Storm," economic studies have shown that as much as 85 percent of the measured growth in U.S. income per capita was due to technological change. And, of course, technological change is driven by science and technology.

In 2010, the National Academies issued an updated report, which says, quote, "It would be impossible not to recognize the great difficulty of carrying out the gathering storm recommendations, such as doubling the research budgets, in today's fiscal environments. However, it is emphasized that actions such as doubling the research budget are investments that need to be made if the Nation



is to maintain the economic growth to provide for its citizens healthcare, Social Security, national security, and more.”

One seemingly relevant analogy is that a non-solution to making overweight aircraft flight worthy is to remove an engine. Likewise, the National Commission on Fiscal Responsibility and Reform, headed by Erskine Bowles and Alan Simpson said, “Cut and invest to promote economic growth and keep America competitive. We should cut red tape in unproductive government spending that hinders job creation and growth. But at the same time, we must invest in education, infrastructure, and high value research and development to help our economy grow, keep us globally competitive, and make it easier for businesses to create jobs.”

Earth science is a critical component of the overall science and technology enterprise, and growing support for earth science in general and the U.S. Geological Survey in particular is required to stimulate investments that fuel the economy, provide security, and enhance the quality of life.

I would like to call your attention to the combination of two recent developments that have advanced both science and scientific integrity at the Department of the Interior. Secretary Salazar issued a new five-year strategic plan that for the first time elevates science to one of five mission areas for the entire department.

The Interior Department also adopted a comprehensive scientific integrity policy that sets clear expectations for all employees, including political appointees, public affairs officers, and scientists.

GSA is pleased that science has been elevated to a mission area in the Interior Department’s strategic plan, and hopes that this development will guide investments and the allocation of resources that are reflected in the budget for the U.S. Geological Survey. It is critically important for Congress to restore proposed cuts in the USGS budget request. I would like to focus on just two examples.

Natural hazards such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, wild fires, and hurricanes remain a major cause of fatalities and economic losses worldwide. An improved scientific understanding of geologic hazards will reduce future losses through better forecast of their occurrence and magnitude.

The recent volcanic eruption in Iceland and the earthquake in Haiti emphatically demonstrate the value of robust natural hazards monitoring and the need to provide funds to the USGS to modernize, expand, and maintain these networks. Mineral and energy resources are critical to the functioning of society and to national security, and have positive impacts on local, national, and international economies and the quality of life.

But energy and minerals are critically linked in important ways. For example, widespread deployment of clean energy technologies can reduce dependence on foreign oil, reduce greenhouse gas emissions, and mitigate climate change. But many emerging technologies, such as wind turbines, solar cells, and electric vehicles depend on rare earth elements and other scarce elements that currently lack diversified sources of supply. A renewed Federal commitment to funding innovative research, information, and education on minerals is needed to address these issues.

In conclusion, the Geological Society of America urges Congress to restore the proposed cuts in the USGS budget. Thank you very much, Mr. Chairman.

[The prepared statement of Dr. Schiffries follows:]

**Statement of Dr. Craig M. Schiffries, Director for Geoscience Policy,  
Geological Society of America**

**Summary**

The U.S. Geological Survey (USGS) is one of the nation's premier science agencies. It addresses many of society's greatest challenges, including mineral and energy resources, natural hazards, climate change, and water resources. The USGS benefits every American every day. The devastating earthquake in Haiti on January 12, 2010 that killed more than 200,000 people and the small volcanic eruptions in Iceland that disrupted global air travel in April 2010 emphatically demonstrate the value of robust natural hazards monitoring and warning systems and the need for increased federal funding for the USGS. Nevertheless, funding for the USGS has stagnated in real dollars for more than a decade (Figure 1). The USGS budget would be even weaker if Congress had not repeatedly restored proposed budget cuts during that time.

The Geological Society of America (GSA) supports strong and growing budgets for the U.S. Geological Survey. Increased federal funding for Earth science is needed to stimulate innovations that fuel the economy, provide national security, and enhance the quality of life. The USGS has a unique combination of assets that enables it to address interdisciplinary research challenges that are beyond the capabilities of most other organizations. GSA urges Congress to restore proposed cuts in USGS programs in the President's budget request for fiscal year 2012.

The Geological Society of America, founded in 1888, is a scientific society with over 24,000 members from academia, government, and industry in all 50 states and more than 90 countries. Through its meetings, publications, and programs, GSA enhances the professional growth of its members and promotes the geosciences in the service of humankind. GSA encourages cooperative research among earth, life, planetary, and social scientists, fosters public dialogue on geoscience issues, and supports all levels of earth science education.

**Rationale**

Science and technology are engines of economic prosperity, environmental quality, and national security. Federal investments in research pay substantial dividends. According to the National Academies' report *Rising Above the Gathering Storm* (2007), "Economic studies conducted even before the information-technology revolution have shown that as much as 85% of measured growth in US income per capita was due to technological change." In 2010, the National Academies issued an updated report, *Above the Gathering Storm, Revisited*, which says:

It would be impossible not to recognize the great difficulty of carrying out the *Gathering Storm* recommendations, such as doubling the research budget, in today's fiscal environment . . . with worthy demand after worthy demand confronting budgetary realities. However, it is emphasized that actions such as doubling the research budget are investments that will need to be made if the nation is to maintain the economic strength to provide for its citizens healthcare, social security, national security, and more. One seemingly relevant analogy is that a non-solution to making an over-weight aircraft flight-worthy is to remove an engine.

Likewise, the National Commission on Fiscal Responsibility and Reform, headed by Erskine Bowles and Alan Simpson, said:

Cut and invest to promote economic growth and keep America competitive. We should cut red tape and unproductive government spending that hinders job creation and growth. At the same time, we must invest in education, infrastructure, and high-value research and development to help our economy grow, keep us globally competitive, and make it easier for businesses to create jobs.

Earth science is a critical component of the overall science and technology enterprise. Growing support for Earth science in general and the U.S. Geological Survey in particular is required to stimulate innovations that fuel the economy, provide security, and enhance the quality of life. Earth Science provides knowledge and data essential for developing policies, legislation, and regulations regarding land, mineral, energy, and water resources at all levels of government.

### Advancing Science and Scientific Integrity at the Department of the Interior

Science and scientific integrity advanced through the combination of two recent developments at the U.S. Department of the Interior (DOI). Secretary of the Interior Ken Salazar issued a new five-year strategic plan that for the first time elevates science to one of five mission areas for the entire department. The Interior Department also adopted a comprehensive scientific integrity policy that sets clear expectations for all employees, including political appointees, public affairs officers, and scientists.

“These developments are cause for optimism because they emphasize the critical importance of science and demand the utmost integrity in its conduct and application,” said Geological Society of America President Joaquin Ruiz. “GSA is pleased with the inclusiveness of the [scientific integrity] policy, which covers virtually everyone using scientific and scholarly information in relation to the Department of the Interior,” said Ruiz. “In addition, the policy clarifies and documents the ability of federal scientists to serve their professional societies on boards and advisory committees. This is extremely important, both to the societies who benefit from their expertise, and also for the career advancement of scientists working in the federal government.”

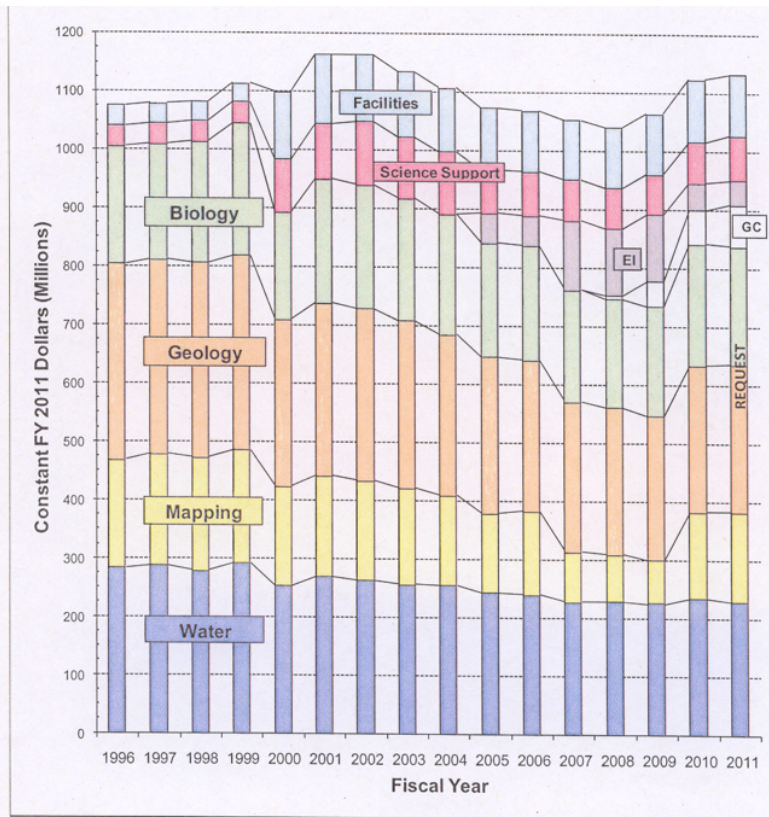


Figure 1. USGS funding in constant 2011 dollars, FY 1996 – FY 2011. EI is Enterprise Information and GC is Global Change. Data from USGS Budget Office.

Science was not included as a mission area in the draft DOI strategic plan that was released for public comment in 2009. However, science was elevated to a mission area in the final version of the DOI strategic Plan. When he announced the final version of the strategic plan on 26 January 2011 Secretary Salazar said, “This

new strategic plan ensures science has its rightful place as a primary source for the Interior Department's decision making process."

GSA is pleased that science has been elevated to a mission area in the Interior Department strategic plan and hopes that this development will guide investments and the allocation of resources that are reflected in the budget for the U.S. Geological Survey.

#### **Broader Impacts of the Earth Sciences**

It is critically important for Congress to restore proposed cuts in the USGS budget request in order to meet challenges posed by human interactions with Earth's natural systems and to help sustain these natural systems and the economy. Additional investments in the USGS are necessary to address such issues as natural hazards, mineral and energy resources, water resources, and climate change.

- Natural hazards, such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, wildfires, and hurricanes, remain a major cause of fatalities and economic losses world-wide. An improved scientific understanding of geologic hazards will reduce future losses through better forecasts of their occurrence and magnitude. The devastating earthquake in Haiti on January 12, 2010 that killed more than 200,000 people, the damaging earthquake in New Zealand on February 21, 2011, and the small eruptions of Eyjafjallajökull volcano in Iceland that disrupted global air travel in April 2010 emphatically demonstrate the value of robust natural hazards monitoring and warning systems and the need for increased federal investments in the USGS.
- Energy and mineral resources are critical to the functioning of society and to national security and have positive impacts on local, national, and international economies and quality of life. These resources are often costly and difficult to find, and new generations of geoscientists need the tools and expertise to discover them. In addition, management of their extraction, use, and residue disposal requires a scientific approach that will maximize the derived benefits and minimize the negative effects. Improved scientific understanding of these resources will allow for their better management and utilization, while at the same time considering economic and environmental issues. This is particularly significant because shifting resource demands often reframe our knowledge as new research-enabling technologies become available. For example, widespread deployment of clean energy technologies can reduce greenhouse gas emissions, mitigate climate change, and reduce dependence on foreign oil. Many emerging technologies—such as wind turbines, solar cells, and electric vehicles—depend on rare earth elements and other scarce elements that currently lack diversified sources of supply. China accounts for 95 percent of world production of rare earth elements although it has only 36 percent of identified world reserves (USGS, 2010). A renewed federal commitment to innovative research, information, and education on minerals is needed to address these issues.
- The availability and quality of surface water and groundwater are vital to the well being of both society and ecosystems. Greater scientific understanding of these critical resources—and communication of new insights by geoscientists in formats useful to decision makers—is necessary to ensure adequate and safe water resources for the future.
- Forecasting the outcomes of human interactions with Earth's natural systems, including climate change, is limited by an incomplete understanding of geologic and environmental processes. Improved understanding of these processes in Earth's history can increase confidence in the ability to predict future states and enhance the prospects for mitigating or reversing adverse impacts to the planet and its inhabitants.
- Research in earth science is also fundamental to training and educating the next generation of earth science professionals.

The U.S. Geological Survey should be a component of broader initiatives to increase overall public investments in science and technology. For example, earth science research should be included in a recommendation by the National Academies to "increase the federal investment in long-term basic research by 10% each year over the next 7 years . . ." (*Rising Above the Gathering Storm*, 2007). Likewise, when Congress reauthorizes the America COMPETES Act, it should broaden the act to include a new title that puts the USGS budget on the same doubling track as other key science agencies.

#### **Budget Shortfalls**

President Obama's FY 2012 budget request for the U.S. Geological Survey is \$1.118 billion, a decrease of \$15 million or 1.3 percent below the USGS budget re-

quest for FY 2011, and an increase of \$6 million or 0.5% above the FY 2010 enacted level.

Although there is a \$6 million increase in the total USGS budget request for FY 2012 compared to the FY 2010 enacted level, the FY 2012 budget request contains significant cuts in many programs that are offset by increases in other areas, including a \$59.6 million increase in a new account for National Land Imaging. The USGS budget request for FY 2012 includes \$89.1 million in program reductions in long-standing programs. The proposed budget cuts would have significant impacts on USGS programs. Proposed budget cuts in the FY 2012 USGS budget request include -\$9.8 million for Biological Information Management and Delivery, -\$9.6 million for Mineral Resources, -\$8.9 million for National Water Quality Assessment, -\$6.5 million for Cooperative Water Program, and -\$4.7 million for Earthquake Hazards.

The USGS budget has been reorganized to reflect the agency's new structure. The FY 2012 budget is now organized along the six crosscutting themes from the USGS science strategy, *Facing Tomorrow's Challenges—U.S. Geological Survey Science in the Decade 2007–2017* (USGS, 2007), rather than the traditional disciplines. The budget request also includes a new National Land Imaging account that focuses on the Interior Department's role in Landsat. Underfunding of uncontrollable cost increases over many years has compromised the scientific capacity of the USGS.

The USGS budget has been nearly stagnant in real dollars since 1996 (Figure 1). The USGS budget for FY 2010 was below the USGS budget for FY 2001 in real dollars. The decline in funding for the USGS during this time period would have been greater if Congress had not repeatedly restored proposed budget cuts. Federal funding for non-defense R&D has increased significantly while funding for the USGS stagnated for more than a decade.

We urge Congress to restore proposed cuts in the USGS budget request, to provide full funding for uncontrollable cost increases, and to provide new funds to enable the agency to address a growing backlog of needs for USGS science and information, accelerate the timetable for deployment of critical projects, and undertake new initiatives that address new challenges.

The Geological Society of America is grateful to Congress for its leadership in restoring proposed cuts in the USGS budget in increasing the budget for the U.S. Geological Survey. We remain grateful to the subcommittee for its leadership in providing \$143 million in stimulus funds for the USGS under the American Recovery and Reinvestment Act of 2009. Thank you for your thoughtful consideration of our request. For additional information or to learn more about the Geological Society of America—including GSA Position Statements on water resources, mineral and energy resources, natural hazards, and public investment in earth science research—please visit [www.geosociety.org](http://www.geosociety.org) or contact Dr. Craig Schiffries at [cschiffries@geosociety.org](mailto:cschiffries@geosociety.org).

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Mr. LAMBORN. Thank you for your testimony. Thank all of you for being here today. We appreciate your coming and sharing your knowledge with us. Now for a round of questions, and I will begin.

Dr. Price, in your opinion, what value do the energy and mineral programs at the USGS provide to the taxpayer?

Dr. PRICE. It is a tremendous amount of value. The programs are giving us information that is basic for exploration, for new resources. It helps us to figure out how we can most environmentally responsibly develop those resources. And all of that adds to greater economic development within our country.

Mr. LAMBORN. So if someone were to propose reducing those budget amounts in the upcoming budget, you wouldn't be happy with that.

Dr. PRICE. Not at all. I think it is actually quite a stimulus to economic development, and cutting back on that funding would in fact be hurting us more than helping us.

Mr. LAMBORN. OK. Thank you. And, Mr. Palatiello, you mentioned government duplication in the mapping area. Can you be more specific on what can be done to avoid this duplication and the expense that goes along with duplication?

Mr. PALATIELLO. Mr. Chairman, I—

Mr. LAMBORN. And I would like to say, I approve of what—and am happy that President Obama in his State of the Union address addressed duplication. He was talking about salmon, I think, and two different programs. And he used a humorous example, but it is unfortunate that we have to, in this time of huge debts, pay money for duplicative programs. Please continue.

Mr. PALATIELLO. You are exactly right, and the President did say that salmon in the freshwater are the responsibility of the Interior Department, and once it reaches saltwater, it is the Commerce Department. And then he said he hears it gets more complicated once they are smoked.

Well, the same thing can be said about mapping. You want a topographic map? You go to USGS. You want to add a flood plain? You go to FEMA. You want to show the shoreline? You go to NOAA. So the same type of stovepiping and lack of coordination that the President was talking about with regard to salmon is a direct corollary to the same problem we have with regard to mapping.

Now, to the Administration's credit, they have launched something called the geospatial platform, which is an attempt to build a cloud computing environment for sharing of data. And I think that is a very good step in the right direction.

The problem is the structure, though. When you have 40-plus Federal agencies doing a variety of different types of mapping, that is a problem.

Let me add one other point, too, because I don't mean to beat on the Administration. And this is a problem that long precedes the Obama Administration, as you well know, Mr. Chairman. But the problem is right up here on Capitol Hill as well. There are over 40 different committees and subcommittees of Congress that have jurisdiction over different mapping activities.

So some sort of better coordination, perhaps a consolidation, we think, is definitely worth exploring.

Mr. LAMBORN. OK. Thank you. And, Dr. Aster, USGS proposes to cut the national volcano early warning system that would eliminate a national scale system. Is this an advisable proposal?

Dr. ASTER. Thank you, Mr. Chairman. I would say definitely not. I mean, we face a very significant threat from volcanos in this country. And part of that program was not only to address immediate needs, but also to produce a more viable, cost-effective scientific system for making scientific and public hazard advances on volcano studies, which in many ways are more complex and somewhat lag behind our understanding of earthquakes.

So I would be a very strong proponent of finding ways to push for increased and restored funding for the NVEWS program.

Mr. LAMBORN. OK. Thank you. And at this point, I would like to yield to the Ranking Member from New Jersey.

Mr. HOLT. Thanks, Mr. Chairman. Dr. Price, in your opinion, does USGS do a good job mapping? And let me extend that and ask whether USGS has the best technology—has fully up-to-date technology, or whether we need more investment in that.

Dr. PRICE. As far as the scientific capabilities of their geologic mappers, they are pretty much first rate. They have some very good people involved with their part of the program. There cer-

tainly is a huge amount of land that still needs to be adequately mapped. In my State, in Nevada, we estimate it to be about 80 percent of the land hasn't been mapped yet adequately. So there is a very large effort that is necessary.

So as far as quality goes, they are just fine. As far as new technology goes, they indeed have some lacking. One of the newest technologies—

Mr. HOLT. May I interrupt you? Could you put LIDAR in perspective?

Dr. PRICE. I was just about to mention LIDAR. That is one of the newest technologies that is really enhancing our ability to accurately locate faults. It leads into the earthquake hazard arena. It does a much better job of detailed topographic mapping. We can map flood plains a lot more easily with that technology. It has a huge amount of opportunities for new geologic mapping, as well as other kind of mapping. And it is also something that engaged the private sector more fully as well. So it addresses some of the MAPPS concerns as well.

Mr. HOLT. Thank you. Dr. Schiffries, do you think the effects of hydraulic fracturing is something that needs to be examined further?

Dr. SCHIFFRIES. I think that greater research needs to be done in this area, and perhaps greater transparency in what is being used in some of these fluids.

Mr. HOLT. Thank you. And, Dr. Aster, last week the Arkansas Oil and Gas Commission unanimously voted to approve an emergency order to temporarily shut down wastewater injection operations associated with hydraulic fracturing. It came after Arkansas had already imposed a moratorium on permitting any new injection wells.

Should USGS be playing a role in studying the recent earthquake swarm in Arkansas? If not USGS, who? Or do we know all we need to know there?

Dr. ASTER. There is a lot we don't know about induced seismicity, although we have known since the 1960s in fact that people can with surprising ease generate earthquakes with mechanisms like fluid injection that change the pressure and affect the forces on faults deep within the earth. There is a lot we don't know about the susceptibility of various areas to induced seismicity, and to some extent, how large such earthquakes might be. So this is very much an appropriate area to be studied, everywhere from the fundamental physics to using the extensive USGS records of background seismic activity before these activities occur to see if there are statistically significant increase in seismicity due to these sorts of activities.

So, yes, this is a very appropriate area of study.

Mr. HOLT. For USGS. They are the appropriate agency to be looking at this?

Dr. ASTER. Indeed they are, along with their usual partners in academia and through their external grants programs. This is very much—in my opinion, it falls into the purview of the USGS as the principal Federal agency for studying earthquakes and related seismic phenomena.

Mr. HOLT. And is this something that—is there an urgency in studying this? I am trying to put this in perspective with respect to geothermal, to prospecting for gas or oil. How serious is it? How urgent is it that we understand this better?

Dr. ASTER. Indeed, this is a large and urgent issue, both for geothermal and for hydrocarbon extraction. As you are aware, there have been some very significant projects shut down in Europe when damaging earthquakes were generated from hot dry rock type—hard rock geothermal activities, and there was great concern recently in the geysers region of California about induced seismicity from geothermal exploration activities.

So this is a very important area of research in the earthquake community.

Mr. LAMBORN. Thank you. I would like to thank the witnesses for their valuable testimony and their patience and for being here today. This has been a very helpful and informative hearing. I would like to thank Members and staff for their participation and preparation.

Members of the Subcommittee may have additional questions for the witnesses that they would supply to you in writing, and we would ask that you respond to those in writing as well. The hearing record will be kept open for 10 days to receive any such responses from you.

If there is no further business, then without objection the Subcommittee stands adjourned.

[Whereupon, at 4:11 p.m., the Subcommittee was adjourned.]

