

Building a Landscape Level Understanding of Our Resources



Today we have an unprecedented opportunity, using science and technology, to create a better understanding of landscapes than ever before, to advance important conservation goals and achieve our development objectives together. It's not an either/or. It can't be. We're already seeing this approach work, as we seek to meet President Obama's goal of approving 20,000 megawatts of renewable energy on public lands by 2020.

*Sally Jewell, Secretary of the Interior
October 31, 2013*

The complexity of natural resource issues and the rates of change to landscapes, both naturally and human induced, are increasing faster than anyone could have predicted just a decade ago. The Department of the Interior recognizes in order to effectively carry out its mission and priorities it must understand and make decisions at the landscape, rather than local scale. Interior provides applied and basic scientific research, monitoring, information, and tools to inform decisionmaking by Departmental bureaus and offices as well as local, tribal, State, national, and international communities.

Interior conducts basic and applied science to inform these decisions. It develops the tools to analyze, visualize, translate, and extrapolate science, and is leading efforts to apply science at multiple scales and across multiple landscapes to inform land and resource planning, policy, mitigation, and management. Interior employs some of the Nation's premier scientists. The U.S. Geological Survey and the scientists of the Department's land and resource management agencies provide baseline information regarding the health of ecosystems and environment, natural hazards, and the impacts of climate change. This expertise is shared and leveraged with other Federal agencies, State and local governments, Tribes, academia, and communities.

As the managing partner for the Geospatial Platform, Interior leverages 21st century geographic information system tools to transform vast amounts of data on landscapes and resources into useful information to inform decisions to help power the future, ensure healthy landscapes, and achieve sustainable supplies of water. Decisions affecting the siting of energy development, water resource allocations, recreation, conservation of habitat, identification

of transmission line rights-of-way, mitigation for development activities, and other land uses are increasingly interconnected on an ever changing, climate-impacted landscape.

The Department's landscape level understanding of the Nation's resources is focused on tools and technologies to gather and deliver data and information, develop a scientifically-robust foundation for landscape understanding, and apply science to support Interior responsibilities.

DEVELOPING AND SHARING THE SCIENTIFIC TOOLS FOR LANDSCAPE LEVEL UNDERSTANDING

The Department's science programs provide an array of tools for analyzing management and resource trade-offs, and understanding the long-term impacts of management decisions. Interior is incorporating the use of tools such as geospatial data, remote sensing, predictive modeling, scenario development, forecasting, and simulation into land management activities.

The 2015 budget includes \$888.7 million for research and development activities throughout the Department, an increase of \$60.4 million from the 2014 enacted level. Activities supported by this funding range from scientific observations of the earth, streams, and wildlife populations, to applied research in the field to better address the impacts of a changing climate on Interior's lands and address species specific problems such as white nose syndrome in bats. Complementing this request are two components of the President's Opportunity, Growth, and Security Initiative. The Initiative proposes an

RESEARCH AND DEVELOPMENT
(dollars in thousands)

| | 2013 | 2014 | 2015 | |
|--|----------------|----------------|----------------|----------------|
| | Actual | Enacted | Request | Change |
| Bureau of Land Management..... | 15,769 | 19,226 | 22,379 | +3,153 |
| Bureau of Ocean Energy Management..... | 38,056 | 47,775 | 50,185 | +2,410 |
| Bureau of Safety and Environmental Enforcement | 25,767 | 27,056 | 27,083 | +27 |
| Office of Surface Mining..... | 0 | 0 | 3,399 | +3,399 |
| Bureau of Reclamation..... | 12,365 | 16,566 | 12,668 | -3,898 |
| U.S. Geological Survey..... | 636,343 | 649,465 | 685,103 | +35,638 |
| Fish and Wildlife Service..... | 32,548 | 30,479 | 49,932 | +19,453 |
| National Park Service..... | 24,705 | 26,817 | 26,992 | +175 |
| Bureau of Indian Affairs..... | 0 | 5,000 | 5,000 | 0 |
| Wildland Fire Management..... | [5,676] | 5,990 | 5,990 | 0 |
| TOTAL, RESEARCH AND DEVELOPMENT..... | 785,553 | 828,374 | 888,731 | +60,357 |

investment of \$140.0 million for Interior research and development as part of a government-wide effort to jump start growth spurred by scientific discovery. The Initiative also proposes investments to address climate resilience. This effort proposes research to better understand and predict the impacts of climate change to help prepare communities and infrastructure, and breakthrough technologies and resilient infrastructure to help the Nation become more prepared in the face of a changing climate.

The following examples are but a few of the many landscape scale data sets, research, and tools supported by Interior.

The Geospatial Platform – The Geospatial Platform facilitates landscape level planning by integrating data from Federal agencies and partners such as universities, private organizations, and tribal, State, and local governments. This data integration increases the applicability and value to identify potential land use conflicts up front, saving time, resources, and litigation expenses, while allowing Interior to make better and more timely management decisions.

Landsat Data and Science Inform Resource Management and Climate Change Response – The USGS has 41 years of high resolution Landsat data that are used to document over time natural phenomena, such as drought and wildfire, and human activities, such as agriculture and urban development. The USGS uses Landsat data to examine land use and land cover change with significant benefits to resource managers. In 2014 and 2015, USGS will release important new products providing scientific data coverage of the United States.

Examples of these products include: an assessment and visualization tool that can be used to help guide the national biological carbon sequestration assessment; Landsat datasets to illustrate wildfire burned areas, surface water, and snow covered areas for monitoring current and predicting future drought and fire conditions; and the National Land Cover Database to provide modelers and researchers the ability to estimate potential impacts of land management decisions.

SPARROW–Informing Landscape Nutrient Management Decisions – The USGS SPARROW decision support system allows modelers and water resource managers to experiment with hypothetical scenarios and develop science-based estimates of the effects specific contaminant sources or changes may have on water quality across landscapes. This tool will be available over the Internet in a user friendly interface. The SPARROW model of the Mississippi River basin will be used to inform decisions related to hypoxia in the Gulf of Mexico. Over the next three years, USGS will initiate watershed studies to better understand nutrient transport and transformation and conduct regional stream water quality studies to better inform models.

Three Dimensional Geologic Framework and Seismic Velocity Model – The Sacramento-San Joaquin River Delta is a critical locus of water resources and endangered and threatened species. The ecosystem and the water resources are strongly affected by an extensive set of levees enclosing artificial islands created for agricultural use. Over the next three years, a landscape scale 3-D geologic map and 3-D seismic velocity model will be completed for the

entire Sacramento-San Joaquin River Delta. This information will enable a broad range of stakeholders to make landscape decisions with better information about possible impacts to water quality and quantity, earthquake hazards, the protection of lives and property, and the overall economic vitality of the region.

Department of the Interior Climate Science Centers – The CSCs provide science and technical expertise to help improve understanding of climate impacts on fish, wildlife, and landscapes. The CSCs provide meaningful linkages between research and specific decisions that Tribes, Federal, State, and local agencies make at a landscape scale. The Northeast and Southeast CSCs have begun research to evaluate coastal flooding impacts to migratory water birds along the eastern seaboard while considering the complex needs of local landowners, jurisdictions, and resource managers. In 2015, the North Central and the South Central CSCs will work with stakeholders to develop regional drought impact scenarios, create a common understanding of likely forecasts in the region, and coordinate adaptation actions.

PRIORITY GOAL
CLIMATE CHANGE

GOAL: Understand, communicate, and respond to the diversity of impacts associated with climate change across the various landscapes of the United States.

METRIC: By September 30, 2015, the Department of the Interior will demonstrate maturing implementation of climate change adaptation as scored when implementing strategies in its Strategic Sustainability Performance Plan.

APPLYING SCIENCE AND ANALYSIS
AT THE LANDSCAPE LEVEL

A landscape level approach allows Interior bureaus and offices to work more efficiently and effectively together and with other resource managers. Sharing information at this scale promotes collaboration to evaluate resource conditions and trends, identify potential opportunities and conflicts associated with conservation and resource development goals, and use this information to better inform and guide policy and management decisions.

Secretarial Order on Mitigation – Secretarial Order No. 3330 establishes a Department-wide mitigation strategy that focuses on mitigation opportunities at the landscape level. The Order is part of a larger effort required by President Obama’s May 17, 2013, memorandum for all Federal agencies to reduce by half the aggregate timelines for major infrastructure projects by modernizing Federal infrastructure review and permitting policies, promoting interagency coordination and planning, and enhancing both efficiency and predictability for project applicants.

Order No. 3330 is intended to encourage early integration of mitigation measures in project design and planning, a landscape scale approach to conservation, transparency, and consistency of mitigation measures, and recognition of the effects of climate change on the environment. The Order is aimed at increasing permit efficiencies and financial predictability for developers while improving State and Federal regulatory agencies’ ability to plan for long-term and large scale conservation investments. The Order’s emphasis on landscape scale mitigation is intended to allow agencies to more efficiently target mitigation resources to support critical, existing conservation goals at the landscape scale, rather than identify and fund smaller mitigation projects on a piecemeal basis as has been done in the past.

Sage Grouse Landscape Planning Pilot – In support of the work of the Bureau of Land Management and the Fish and Wildlife Service to manage the sagebrush landscape, USGS in collaboration with partners recently completed a sage grouse National Research Strategy defining high priority science needs for landscape scale decisionmaking. Over the next few years, USGS will conduct a pilot project to use geospatial information on a landscape level to aid in the refinement of the interagency sage grouse strategy and will serve to assist FWS in making its upcoming listing decision.

Coastal Vulnerability – Decision makers require tools to forecast the vulnerability of coastal resources and communities to erosion and the increasing impacts of climate change and sea level rise. In 2014, USGS will document topography and bathymetry and analyze shoreline changes due to Hurricane Sandy that will inform future response and recovery actions. The USGS will also begin to model coastal change scenarios in 2014 and work to create a conservation plan in collaboration with FWS to use offshore sand deposits in the Gulf of Mexico as a source for replenishing the south island of the Chandeleur Islands

as a way to decrease storm energy and enhance protection of coastal habitats.

Factors Affecting Water Quality and Wildlife in Priority Ecosystems – Improving knowledge to facilitate planning and effective management of ecosystems is critical to the well-being of the Nation. Coastal and marsh ecosystems like the Everglades and the Chesapeake are nurseries for a diverse number of fisheries and support uses that are a significant contributor to local economies. To understand the dynamics of these ecosystems and better predict the impacts of changes, Interior bureaus are implementing cross-agency strategies to pilot locally managed, public-private projects to restore ecosystem functions.

Global Warming Impacts on Key Natural Resources – Studies to collect data and understand the impacts of global climate change are funded by grants from Interior’s regional CSCs and support President Obama’s Climate Action Plan. The studies focus on how climate change will affect natural resources as well as management actions that may be taken to help mitigate such impacts. The research will help

guide managers of parks, refuges, and other cultural and natural resources to plan ways to better help species and ecosystems adapt to climate change.

Landscape Conservation Cooperatives – The LCCs integrate scientific data and knowledge about the implications of management actions to improve understanding of climate change and other landscape scale management challenges. The 22 LCCs bring together Federal, State, and local governments along with Tribes, non-governmental organizations, universities, and interested public and private organizations to share information and collaboratively identify adaptive landscape scale strategies. For example, the five LCCs in Alaska are working to update Alaska’s National Hydrography Dataset to meet the needs of managers and guide infrastructure development and protect fish and wildlife populations.

The FWS employs its Science Investment and Accountability Schedule, comprised of eight interrelated Conservation Activity Areas and associated benchmarks, to guide its support for individual LCCs. Using a strategic habitat conservation framework, SIAS facilitates an iterative process of adaptive management, including biological planning, conservation design, delivery of conservation actions, decision-based monitoring, and assumption-driven research.

National Park Service Inventory and Monitoring Program – The I&M Program provides NPS managers with a broad-based understanding of the status and trends of natural resources under their purview. The NPS inventories natural resources under its stewardship and integrates the results into planning and resource management decisions. Over the next three years, NPS will complete vegetation mapping inventories across the United States. This will assist park managers in the control of invasive species, restoration of natural habitats, and efforts needed to sustain wildlife populations.

The Desert Renewable Energy Conservation Plan – Federal, State, and local land managers are developing the Desert Renewable Energy Conservation Plan, a major component of California’s renewable energy plan, to provide for renewable energy development and conservation of desert ecosystems. This planning effort incorporates information about the potential distribution of habitat of selected endangered species to guide conservation efforts and site solar energy development. For example, a new desert tortoise habitat model is targeted for

LANDSCAPE LEVEL COLLABORATION IN THE CHESAPEAKE BAY

Interior has a key role in implementing the President’s Chesapeake Bay Executive Order. The FWS and USGS are using landscape level science to investigate the relationships between habitats, water quality conditions, and fish and wildlife in the Bay ecosystem in order to improve management regimes for habitat that is essential to sustain natural systems and local communities. The NPS and USGS are working with partners to expand a watershed-wide system approach for landscape and local level collaboration on resource conservation. In 2014, USGS will identify factors affecting the health of fisheries in the Bay watershed; analyze groundwater response to water quality conditions and management practices; and investigate the natural processes affecting nutrients and implications for water quality improvements. In 2015, USGS will implement and test a duck habitat model and the effects of toxic contaminants on fish-eating birds. The USGS also will analyze the combined effects of land and climate change on streamflow in the Bay watershed.

publication in May 2014 and is expected to help forecast desert tortoise habitat as it might exist in 30 and 80 years. The model will produce information to guide adaptive management based on the Desert Renewable Energy Conservation Plan and will inform BLM and FWS decisions.

National Park Service Call to Action – The NPS will manage its natural and cultural resources to increase resilience in the face of climate change and other stressors and collaborate with other land managers and partners to create, restore, and maintain landscape scale connectivity. These efforts are guided by A Call to Action, the NPS vision for its second century. One goal of this strategy is to expand the NPS Migration Conservation Initiative to create a service-wide structure for conserving migratory species. Landscape scale conservation of migratory wildlife requires the collaboration of national and international agencies and organizations to develop new and innovative technologies to identify key migration routes and to design and implement scientifically valid monitoring and research projects to conserve migratory species habitat.

Implementing the Western Solar Energy Plan – Landscape level planning that guides siting and permitting decisions increases certainty for project developers, their investors, and utilities. At the same time, planning on a landscape scale improves efforts to avoid, reduce, and mitigate resource risks and thereby serves as a better process to ensure conservation success. These efforts allow Interior and its bureaus to avoid litigation and streamline permitting.

The Solar Environmental Impact Statement Record of Decision signed in October 2012, which identifies solar energy zones to facilitate future utility scale solar energy development while reducing other resource conflicts, reflects the principle of pursuing



Mitigation associated with solar development will help BLM restore native vegetation at Gold Butte.

WILDLAND FIRE AND LANDSCAPE RESILIENCY

The 2015 budget includes funding in the Department’s Wildland Fire Management account to enhance the program’s capability to prepare for, respond to, and recover from wildfire. The 2015 budget makes pro-active investments in fuels management and landscape resiliency to better address the growing impact of wildland fire on communities and the public lands.

The request includes a \$30.0 million increase to establish a new “Resilient Landscapes” activity to improve the integrity and resilience of forests and rangelands by restoring natural vegetation landscapes to specific conditions and maintain fire resiliency. Treatments will be strategically placed within landscapes where ecosystem structure and function is at a high risk from wildfire and other disturbances.

Examples of treatments that will be conducted include thinning of overstocked stands in areas with critical wildlife habitat and removing trees encroaching on meadows or wetlands with significant resource value. Importantly, the Resilient Landscapes activity will be coordinated with and supported by the resource management programs of the four Interior bureaus that participate in the Wildland Fire program. Bureaus will leverage funds to restore and maintain fire resilient landscapes.

resource conservation and mitigation at the landscape level. This document required the development of mitigation plans for each solar energy zone.

The Mitigation Strategy for the Dry Lake SEZ is the first mitigation plan that will be completed by BLM under the solar EIS. In developing the mitigation plan, the BLM is working with conservation and sportsmen’s groups, the solar industry, and Las Vegas-area officials to implement measures that will offer more certainty for developers while yielding better conservation results.

Transmission Planning – The BLM is using landscape scale approaches to ensure transmission corridors and projects are carefully sited. Use of geospatial data at the landscape level will improve analysis and planning and decisions about specific development projects.

INTERIOR'S RESPONSE TO HURRICANE SANDY

What we witnessed during Hurricane Sandy was that our public lands and other natural areas are often the best defense against Mother Nature. By stabilizing marshes and beaches, restoring wetlands, and improving the resiliency of coastal areas, we not only create opportunities for people to connect with nature and support jobs through increased outdoor recreation, but we can also provide an effective buffer that protects local communities from powerful storm surges and devastating floods when a storm like Sandy hits.

*Sally Jewell, Secretary of the Interior
October 24, 2013*

In October 2013, Secretary Jewell announced the release of \$162.0 million for competitively-selected restoration and research projects to protect Atlantic coastal communities from future powerful storms, including restoring marshes, wetlands and beaches, rebuilding shorelines, and researching the impacts and modeling mitigation of storm surge impacts. The investments are consistent with the Obama Administration's commitment laid out in the Climate Action Plan to build resilience and ensure communities are better protected from future storms.

Funds released in October support 25 on-the-ground projects to restore and enhance coastal marshes, wetlands, and shorelines, create habitat connectivity, improve flood resilience, and undertake other efforts to protect nearby communities from future storms. Assessments, modeling, coastal barrier mapping, and other projects will provide Federal, State, and local land managers and decision makers the information and tools they need to improve resiliency and prepare for future storms.

In August 2013, the Department announced the National Fish and Wildlife Foundation would assist in administering the Hurricane Sandy Coastal Resiliency Competitive Grant Program, which will support projects that reduce communities' vulnerability to the growing risks from coastal storms, sea level rise, flooding, erosion, and associated threats through strengthening natural ecosystems that also benefit fish and wildlife. The program will award more than \$100 million in grants throughout the region affected by Hurricane Sandy from Virginia to New Hampshire and west to Ohio. By the proposal deadline of January 31, 2014, NFWF had received 375 proposals requesting over \$563 million in funding. Proposals are currently under review and NFWF anticipates announcing grant awards in May 2014.