

Climate Change Adaptation: Department of the Interior

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The Department of the Interior (DOI) and many agencies within it, including the Bureau of Land Management (BLM), Bureau of Reclamation (Reclamation), National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and U.S. Geological Survey (USGS), are responsible for the administration of most public U.S. lands and waters and the U.S. federal mineral estate, among other responsibilities. DOI agencies administer and manage these resources—which include more than 400 million acres of public lands, parks, refuges, wilderness areas, and more—on behalf of all U.S. citizens. DOI agencies also conduct scientific research that informs the management and care of these lands, waters, and other natural resources. Because DOI has such broad land and resource responsibilities, its operations may be particularly sensitive to changing climate conditions; the effects of climate change may impact many of the resources and activities that DOI administers. As a result, DOI has issued department-wide and agency-specific policies and guidance and undertaken numerous actions (collectively, *activities*) to address climate change and its effects.

At the department level, DOI's efforts to implement activities aimed at adapting to the effects of climate change have taken numerous forms, including implementing executive orders and issuing secretarial orders and department-wide policies and guidance. Department-wide initiatives also have directed agencies to establish or operate adaptation-related activities, such as the USGS-administered Climate Adaptation Science Centers and the FWS-administered Landscape Conservation Cooperatives. These and other adaptation activities are often in flux, as some orders and policies issued in prior Administrations may be withdrawn or amended in subsequent Administrations.

At the agency level—in addition to implementing directives from the department and executive levels—the various agencies and bureaus have issued policies and guidance to inform how programs and staff should or may incorporate climate change adaptation considerations into agency programs, among other activities. For example, certain agencies have published guidance documents and reports that outline how adaptation should be interwoven into on-the-ground administration of agency resources (e.g., the National Park System and the National Wildlife Refuge System) and programs (e.g., hydroelectric energy production and the conservation of species listed as threatened or endangered under the Endangered Species Act [16 U.S.C. §§1531 et seq.]).

Climate-specific administrative actions, including those at the executive, department, and agency levels, may be revoked, modified, or superseded. Some of DOI's adaptation-related activities have been altered or suspended, and it is not always clear to what extent DOI's or an individual agency's day-to-day activities conform with existing adaptation directives.

Some Members of Congress may be interested in how DOI and DOI agencies are addressing and instituting activities related to climate change adaptation. Specifically, such interests may include oversight, legislative, and appropriations actions. Congress may introduce legislation directing the department or agencies to explicitly consider or not consider climate change adaptation, provide information, and/or publish reports about department and agency activities. Congress also may direct funding to carry out certain activities as part of the annual appropriations process.

This report provides an overview of selected activities that DOI and five agencies within DOI—the BLM, Reclamation, NPS, FWS, and USGS—have undertaken to adapt to the effects of climate change. It focuses on activities related to adapting to the effects of climate change rather than activities focused on mitigating climate change (although attributing activities to adaptation versus mitigation can be difficult at times). For the purposes of this report, *adaptation* includes activities undertaken to adjust to the experienced or projected effects of climate change, and *mitigation* includes activities directed at reducing the magnitude of climate change. This report is, in part, an update to a previous CRS report published in February 2015, CRS Report R43915, *Climate Change Adaptation by Federal Agencies: An Analysis of Plans and Issues for Congress*, and presents information on the state of activities as of the end of 2020. It previews Biden Administration activities only nominally.

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Introduction

Climate change—changes in the average or variability of weather conditions that persist over long time scales (e.g., multiple decades or longer)¹—and related global changes can threaten human health; the economy; the built environment; and the natural world, including wildlife, plants, and the ecosystems upon which they rely.² Many scientists, governments, and organizations have researched climate change, documented its experienced effects, projected potential effects, and undertaken activities to respond to it.³ Scientists have demonstrated the effects of climate change already realized around the world, and they project that climate changes will intensify in future decades.⁴

Climate change has been observed directly (e.g., in long-term temperature and extreme weather records).⁵ The changes can affect plant growth rates, water availability, energy demand, and many other aspects of human and natural systems; these changes can be beneficial or adverse, can change over time and across regions, and can influence other stressors, such as poverty, famine, and water stress.⁶ Effects of climate change are spatially variable, with some regions more affected than others. For some degrees of climate change, certain regions may see benefits (e.g., longer growing seasons) in addition to stressors.⁷ Projections for climate change and its effects over the coming decades span a wide range and depend on many factors (e.g., current and future greenhouse gas emissions). Ultimately, the magnitude of the effects of climate change over time will depend on actions taken to adapt to and mitigate climate change (see text box “Adaptation Versus Mitigation”).⁸

¹ For example, see definitions of *climate* and *climate change* at U.S. Global Change Research Program (USGCRP), “Glossary,” at <https://www.globalchange.gov/climate-change/glossary>, and Intergovernmental Panel on Climate Change (IPCC), “Definition of Terms Used Within the Data Distribution Centre: Glossary,” at https://www.ipcc-data.org/guidelines/pages/glossary/glossary_c.html. This report does not address the causes of multidecadal climate change. For a discussion of climate change science, see CRS Report R43229, *Climate Change Science: Key Points*, by Jane A. Leggett. For additional background on climate change, see CRS In Focus IF11446, *Weather and Climate Change: What’s the Difference?*, by Jane A. Leggett.

² Alexa Jay et al., “Overview,” in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*, vol. II, eds. David Reidmiller et al. (Washington, DC: U.S. USGCRP, 2018), pp. 33-71 (hereinafter, assessment cited as Reidmiller et al., *Impacts, Risks, and Adaptation*).

³ For example, the USGCRP is a federal program mandated by Congress through P.L. 101-606 with the stated purpose of developing and coordinating “a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.” For more information, see USGCRP, “About USGCRP,” at <https://www.globalchange.gov/about>. The IPCC “is the United Nations body for assessing the science related to climate change” (IPCC, “About the IPCC,” at <https://www.ipcc.ch/about/>).

⁴ For example, see IPCC, “Summary for Policy Makers,” in *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Core Writing Team, Rajendra K. Pachauri, and Leo Meyer (Geneva, Switzerland: IPCC, 2014), pp. 2 and 10 (hereinafter, report cited as IPCC, *Climate Change 2014*).

⁵ National Centers for Environmental Information, “Climate Monitoring,” at <https://www.ncdc.noaa.gov/climate-monitoring/index.php>. See also Donald J. Wuebbles et al., “Our Globally Changing Climate,” in *Climate Science Special Report: Fourth National Climate Assessment*, vol. I, eds. Donald J. Wuebbles et al., USGCRP, 2017, at <https://science2017.globalchange.gov/chapter/1/>.

⁶ For example, see IPCC, “Observed Changes and Their Causes,” in IPCC, *Climate Change 2014*, pp. 39-54.

⁷ For example, see “Regional Summary” breakdowns included in the various chapters of the *Fourth National Climate Assessment* (e.g., see pp. 149, 178, 238, 279, 444, 485).

⁸ For example, see Robert Lempert et al., “Reducing Risks Through Adaptation Actions,” in Reidmiller et al., *Impacts, Risks, and Adaptation*, pp. 1309-1345. Also see Jeremy Martinich et al., “Reducing Risks Through Emissions

This report does not analyze climate change science, the causes of multidecadal climate change, or the experienced or projected effects of climate change.⁹ Rather, this report describes activities related to climate change adaptation within the Department of the Interior (DOI). The information in this report reflects the state of climate change adaptation activities within DOI and its agencies as of the end of 2020 and does not address activities undertaken under the Biden Administration (see text box on “Changes in Department of the Interior Climate-Adaptation Activities Under the Biden Administration”). Climate change adaptation activities described herein have been implemented both through administrative actions (e.g., executive and secretarial orders and actions taken within agencies’ discretion under existing statutory authorities) and pursuant to statutory requirements.

Changes in Department of the Interior Climate Adaptation Activities Under the Biden Administration

As noted, this report describes Department of the Interior (DOI) climate change adaptation activities through the Trump Administration. The Biden Administration, as well as future Administrations, may pursue actions through administrative mechanisms or pursuant to existing and future statutory requirements that could revoke, modify, or supersede some of the adaptation-related policies and guidance reflected in this report. President Biden implemented several executive actions that have the potential to affect DOI’s climate adaptation activities in the first days of his Administration. For example, on January 20, 2021, President Biden issued Executive Order (E.O.) 13990, “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.” Among its provisions, the order revoked E.O. 13783, “Promoting Energy Independence and Economic Growth,” and directed nearly all executive departments and agencies—including DOI—to review regulations and other agency actions introduced during the Trump Administration. E.O. 13990 also established an interagency working group, which includes the Secretary of the Interior, tasked with establishing a “social cost of carbon” (SCC), a “social cost of nitrous oxide” (SCN), and a “social cost of methane” (SCM) for agencies to use when monetizing the value of changes in greenhouse gas emissions resulting from regulations and other relevant agency actions. According to the E.O., the SCC, SCN, and SCM “are estimates of the monetized damages associated with incremental increases in greenhouse gas emissions.” Further, on January 27, 2021, President Biden issued E.O. 14008, “Tackling the Climate Crisis at Home and Abroad,” which states that it is the Administration’s policy “that climate considerations shall be an essential element of United States foreign policy and national security” and “to organize and deploy the full capacity of its agencies to combat the climate crisis to implement a Government-wide approach.”

Sources: E.O. 13783, “Promoting Energy Independence and Economic Growth,” May 28, 2017, 82 *Federal Register* 16093.

E.O. 13990, “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis,” January 20, 2021, 86 *Federal Register* 7037.

Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad,” 86 *Federal Register* 7619, January 27, 2021.

This report provides an overview of selected DOI departmental and agency policies, programs, and actions (herein collectively referred to as *activities*) aimed at adapting to experienced and projected effects of climate change. This report focuses on activities related to *adaptation* to climate change rather than activities related to the *mitigation* of climate change. For the purposes of this report, *adaptation* includes activities undertaken to adjust to and prepare for, including through research, the experienced or projected effects of climate change; *mitigation* includes activities directed at reducing the magnitude of climate change (see text box on “Adaptation Versus Mitigation”).¹⁰ However, it is often difficult to differentiate and categorize activities as

Mitigation,” in Reidmiller et al., *Impacts, Risks, and Adaptation*, pp. 1346-1386.

⁹ For an overview of climate change, see CRS Report R43229, *Climate Change Science: Key Points*, by Jane A. Leggett.

¹⁰ *Adaptation* and *mitigation* are defined differently by various entities and depend on the context in which the terms

either explicitly adaptation or mitigation, due to potential overlap or differing approaches to defining the two concepts.

The report provides updated information on selected climate change adaptation activities undertaken by DOI and the five DOI agencies considered in the earlier CRS report (CRS Report R43915, *Climate Change Adaptation by Federal Agencies: An Analysis of Plans and Issues for Congress*):¹¹ Bureau of Land Management (BLM), Bureau of Reclamation (Reclamation), National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and U.S. Geological Survey (USGS).¹² It is broken into six sections—one section covers DOI and DOI-wide activities; the remaining sections cover the five listed DOI agencies. Each section contains a brief background of the department or agency and an overview of climate change adaptation activities for that department or agency. A brief conclusion is provided at the end that raises selected issues that may be of interest to some Members of Congress. This report is not intended to be a comprehensive review of DOI's climate change adaptation activities—for example, other agencies within DOI have undertaken climate change adaptation activities—and the information provided should be considered illustrative rather than exhaustive.

Congress may find information in this report pertinent with regard to its oversight and legislative activities related to climate change adaptation as it applies to DOI and DOI agencies, the resources they administer, and the programs they undertake.¹³

Adaptation Versus Mitigation

Federal attempts to address climate change and its effects include activities related to *adaptation* and/or *mitigation*. The two concepts have been defined and interpreted differently across agencies and circumstances, and inconsistent usage can make the terms confusing. In this report, the terms *adaptation* and *mitigation* reflect the commonly accepted definitions of the climate change science community. For example, although specific phrasing may vary between sources, the following U.S. Global Change Research Program (USGCRP) definitions of these terms reflect the broader usage in the climate change science community and how these terms are used in this report:

Adaptation: “Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.”

Mitigation: “Measures to reduce the amount and speed of future climate change by reducing emissions of heat-trapping gases or removing carbon dioxide from the atmosphere.”

Federal agencies may employ these terms as they are defined above or in different ways. For example, the following definitions are examples of how the Department of the Interior (DOI) has defined these terms in selected published reports.

Adaptation: Citing the Environmental Protection Agency, DOI's 2014 *Department of the Interior Climate Change Adaptation Plan* defined *adaptation*, as it relates to climate change, as “the adjustments that society or ecosystems make to limit negative effects of climate change” (p. 2). DOI further clarified that the departmental approach for adaptation centers on increasing resiliency of DOI and its assets. Citing Executive Order (E.O.) 13653, which was later revoked by E.O. 13783 on March 31, 2017, the adaptation plan defined resilience as “the ability to anticipate,

are being used. As used in this report, the terms reflect common usage by the climate change science community.

¹¹ Updated information on other departmental and agency activities covered in CRS Report R43915, *Climate Change Adaptation by Federal Agencies: An Analysis of Plans and Issues for Congress*, coordinated by Jane A. Leggett, also may be included in other CRS products; for example, see CRS Report R46454, *Climate Change Adaptation: U.S. Department of Agriculture*, coordinated by Genevieve K. Croft.

¹² Information within this report was obtained from publicly available resources and through personal communications between CRS and the Department of the Interior (DOI) and agency congressional affairs offices, when available. Other DOI agencies not considered in this report also may undertake climate change adaptation activities, but these activities are outside the scope of this report.

¹³ For example, see shaded text box on “Selected Congressional Appropriations Actions Related to Climate Change Adaptation.”

prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions” (p. 2).

Mitigation: Also in 2014, the DOI Energy and Climate Change Task Force issued a report titled *A Strategy for Improving the Mitigation Policies and Practices of the Department of the Interior*. The report was issued pursuant to DOI Secretarial Order (S.O.) 3330, which required the task force to develop a DOI-wide mitigation strategy that, among other things, included “a focus on mitigation efforts that improve the resilience of our Nation’s resources in the face of climate change.” (S.O. 3330 was revoked by S.O. 3349 on March 27, 2017.) The report stated that *mitigation* includes “activities to avoid, minimize, and compensate for adverse impacts to particular resources or values” (p. 2).

Sources: DOI, *Department of the Interior Climate Adaptation Plan*, 2014, at https://www.doi.gov/sites/doi.gov/files/migrated/greening/sustainability_plan/upload/2014_DOI_Climate_Change_Adaptation_Plan.pdf.

DOI, S.O. 3330, “Improving Mitigation Policies and Practices of the Department of the Interior,” Secretary of the Interior Sally Jewell, October 31, 2013.

J. P. Clement et al., *A Strategy for Improving the Mitigation Policies and Practices of the Department of the Interior: A Report to the Secretary of the Interior from the Energy and Climate Change Task Force*, April 2014, at https://www.doi.gov/sites/doi.gov/files/migrated/news/upload/Mitigation-Report-to-the-Secretary_FINAL_04_08_14.pdf.

USGCRP, “Glossary,” at <https://www.globalchange.gov/climate-change/glossary>.

IPCC, “Annex II: Glossary,” eds. K. J. Mach, S. Planton, and C. von Stechow, in *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Core Writing Team, R. K. Pachauri, and L. A. Meyer (Geneva, Switzerland: IPCC, 2014), pp. 117-130.

Department of the Interior¹⁴

DOI has a wide range of responsibilities, many of which are related to managing lands and resources throughout the nation.¹⁵ For example, DOI houses three of the four major federal land management agencies.¹⁶ Together, these DOI agencies—BLM, FWS, and NPS—manage roughly 20% of the nation’s lands and related cultural and natural resources.¹⁷ The department also manages 35,000 miles of coastline and 2.5 billion acres of the outer continental shelf, and it has numerous responsibilities for water and power resources.¹⁸ Among the properties managed by DOI are the nation’s national parks, monuments, and recreation areas; national wildlife refuges; other public lands and resources, including certain forested lands and rangelands; lands held in trust for American Indians; and more than 300 dams and reservoirs owned and operated by the

¹⁴ For more information on DOI and department-wide policies, guidance, and activities related to climate change adaptation, contact Mark DeSantis, Analyst in Natural Resources Policy.

¹⁵ For a full overview of the department, see CRS Report R45480, *U.S. Department of the Interior: An Overview*, by Mark K. DeSantis.

¹⁶ The fourth major land management agency is the U.S. Forest Service (FS), within the U.S. Department of Agriculture. For more information on climate change adaptation activities in the FS, see CRS Report R46454, *Climate Change Adaptation: U.S. Department of Agriculture*, coordinated by Genevieve K. Croft.

¹⁷ For data and other information on federal land management, see CRS Report R42346, *Federal Land Ownership: Overview and Data*, by Carol Hardy Vincent and Laura A. Hanson, and CRS Report R43429, *Federal Lands and Related Resources: Overview and Selected Issues for the 117th Congress*, coordinated by Katie Hoover. For a brief summary of the responsibilities of DOI land management agencies, see CRS In Focus IF10585, *The Federal Land Management Agencies*, by Katie Hoover.

¹⁸ The *outer continental shelf* is defined by statute as all submerged lands lying seaward of state coastal waters that are under U.S. jurisdiction (43 U.S.C. §1331). For additional information, see Bureau of Ocean Energy Management, “Outer Continental Shelf,” at <https://www.boem.gov/oil-gas-energy/leasing/outer-continental-shelf>.

Bureau of Reclamation.¹⁹ DOI facilities provide large quantities of water and produce hydroelectric power for communities and farmers in 17 western states.²⁰ The department also is responsible for managing federal energy and mineral resources located belowground and offshore; this responsibility includes leasing lands for oil and gas production, as well as for certain renewable resource development. In addition, DOI provides financial and technical assistance to U.S. territories.

Through its agencies, DOI manages and monitors certain fish and wildlife species and their habitats. The department's agencies are responsible for protecting federal trust species, such as species listed as threatened and endangered under the Endangered Species Act (ESA),²¹ as well as ecosystems.

In addition to its cultural and natural resource stewardship responsibilities, the department plays an important role in cooperating with, providing scientific information to, and supporting other federal agencies, states, local and tribal governments, and other nonfederal entities. For example, USGS and other agencies measure and monitor resources and develop science-based tools for land and water resource managers nationwide. The department also is involved in numerous private-public partnerships involving monitoring, research, and resource management.

Because of DOI's widespread land and resource management responsibilities, its operations and missions are particularly sensitive to changing climate conditions, whether due to naturally occurring climate variability or to the projected intermediate and long-term effects of climate change.²² Climate change effects influence DOI's ongoing operations; these effects likely include changes in soil, air, and water temperatures; precipitation patterns; streamflow and runoff; sea-level rise; habitat conditions; and the frequency and intensity of extreme weather events, such as storms, floods, and droughts. Changing climate conditions can affect the health and habitats of fish and wildlife; they also can expand or restrict access to and development of natural resources and infrastructure upon which many communities and industries depend.

Status of DOI Adaptation-Related Policy and Guidance

DOI has undertaken various activities related to climate change adaptation for more than a decade, and some related activities—such as observations of sea levels, stream flows, and ice and snow—have been in place for even longer.²³ Many of the climate change adaptation activities conducted by DOI over the past decade have been in accordance with government-wide executive orders, presidential memoranda, and presidential proclamations or through DOI-specific secretarial orders. Other such activities are the result of departmental policies or specific programs and guidance issued by the various agencies within DOI. Congress also has used a variety of tools—including authorizing legislation, appropriations legislation, and oversight

¹⁹ Other water resource projects are administered by the U.S. Army Corps of Engineers.

²⁰ The 17 western states are Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

²¹ The Endangered Species Act (ESA), as amended, is codified at 16 U.S.C. §§1531-1544.

²² For explanation of climate variability versus climate change, see CRS In Focus IF11446, *Weather and Climate Change: What's the Difference?*, by Jane A. Leggett.

²³ See, among many examples, Mark A. Ayers and George H. Leavesley, "Assessment of the Potential Effects of Climate Change on Water Resources of the Delaware River Basin: Work Plan for 1988-90," U.S. Geological Survey (USGS), 1988, at <https://doi.org/10.3133/ofr88478>.

activities—to weigh in on and provide guidance to DOI and other executive agencies on whether or how such adaptation activities are conducted.

Climate-specific executive orders and secretarial orders may be revoked, modified, or superseded. As a result of such actions, some adaptation-related activities undertaken by DOI have been altered or suspended in subsequent years.²⁴ For example, DOI issued strategic sustainability performance plans that included adaptation strategies and principles from FY2010 to FY2016, as well as a 2012 department-wide policy on climate adaptation.²⁵ DOI issued these plans in accordance with the goals outlined in Executive Order (E.O.) 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” as well as the revised goals issued in 2015 as part of E.O. 13693, “Planning for Federal Sustainability in the Next Decade.”²⁶ Both orders required federal agencies to develop sustainability plans and to integrate climate change adaptation strategies into agency policies and practices.²⁷

President Donald J. Trump revoked these requirements in May 2018 with the issuance of E.O. 13834, “Efficient Federal Operations.” Among other provisions, E.O. 13834 required federal agencies to meet “statutory requirements related to energy and environmental performance ... in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment.”²⁸ Consistent with revocation of the requirements in E.O. 13693, DOI does not appear to have released an updated strategic sustainability performance plan since FY2016.

In addition to sustainability performance plans, DOI issued a department-wide Climate Adaptation Plan in 2014.²⁹ This plan was issued as part of DOI’s implementation of E.O. 13653, “Preparing the United States for the Impacts of Climate Change.” E.O. 13653 directed federal departments and agencies—including DOI—to take various steps to prepare for climate change impacts and to support state and local resilience efforts.³⁰ However, on March 28, 2017, President Trump rescinded E.O. 13653 with the issuance of E.O. 13783, “Promoting Energy Independence

²⁴ For more information regarding issuing and revoking executive orders, see CRS Report RS20846, *Executive Orders: Issuance, Modification, and Revocation*, by Todd Garvey.

²⁵ DOI, “Department of the Interior Climate Change Adaptation Policy,” 523 DM 1, December 2012, at https://www.doi.gov/sites/doi.gov/files/elips/documents/Chapter%201_%20Climate%20Change%20Policy%20%282%29.pdf. DOI’s department-wide climate adaptation policy outlined the department’s approach to climate change adaptation and provided guidance to for addressing climate change impacts on DOI’s programs and resources.

²⁶ Executive Order (E.O.) 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” October 5, 2009, 74 *Federal Register* 52117; E.O. 13693, “Planning for Federal Sustainability in the Next Decade,” March 19, 2015, 80 *Federal Register* 15869. (E.O. 13693 revoked E.O. 13514). E.O. 13514 also directed DOI and other agencies to participate in the interagency Climate Change Adaptation Task Force, which was tasked with determining how the policies and practices of federal agencies can be made compatible with and reinforce a national climate change adaptation strategy.

²⁷ In addition, Section 5(b) of E.O. 13514 authorized the chair of the Council on Environmental Quality (CEQ) to issue instructions to implement the E.O. In response, CEQ issued “Instructions for Implementing Climate Change Adaptation Planning” to federal agencies on how to integrate climate change adaptation into federal agency planning, operations, policies, and programs (CEQ, “Instructions for Implementing Climate Change Adaptation Planning in Accordance with Executive Order 13514,” 76 *Federal Register* 12945, March 9, 2011).

²⁸ E.O. 13834, “Efficient Federal Operations,” May 17, 2018, 83 *Federal Register* 23771.

²⁹ DOI, Department of the Interior Climate Adaptation Plan, 2014, at https://www.doi.gov/sites/doi.gov/files/migrated/greening/sustainability_plan/upload/2014_DOI_Climate_Change_Adaptation_Plan.pdf.

³⁰ E.O. 13653, “Preparing the United States for the Impacts of Climate Change,” November 1, 2013, 78 *Federal Register* 66817.

and Economic Growth.”³¹ E.O. 13783 generally aimed to establish a policy to promote domestic energy development and use and to ensure affordable and reliable electricity. To accomplish these broad goals, the E.O. directed executive agencies to review their existing regulations and “appropriately suspend, revise, or rescind those that unduly burden” domestic energy production or use, “with particular attention to oil, natural gas, coal, and nuclear energy resources.”³²

DOI adaptation-related activities also are guided by department-wide secretarial orders and by policies and programs implemented pursuant to earlier orders. Secretarial Order (S.O.) 3289, issued in September 2009 and amended in February 2010, provides the primary guidance for DOI agencies. The order established “a Department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages.”³³ Pursuant to S.O. 3289, DOI established the Climate Change Response Council (CCRC), which was, among other things, responsible for overseeing the creation or reorganization of several different department-wide initiatives. Major initiatives included the establishment of the National Climate Change and Wildlife Science Center, the creation and renaming of eight regional Climate Service Centers, and the establishment of Landscape Conservation Cooperatives. As of early 2021, these initiatives—as well as S.O. 3289—remain in place; they are briefly described below in “Selected DOI-Wide Adaptation Activities.”

Other climate-related secretarial orders and policies issued in prior Administrations have been revoked by subsequent orders. For example, in March 2017, then-DOI Secretary Ryan Zinke issued S.O. 3349, “American Energy Independence.” This S.O. implemented President Trump’s E.O. 13783 by, among other provisions, rescinding a 2013 secretarial order on climate mitigation (S.O. 3330, “Improving Mitigation Policies and Practices of the Department of the Interior”) and ordering a review of department and agency mitigation and climate change policies issued pursuant to that order.³⁴ This was followed by S.O. 3360, “Rescinding Authorities Inconsistent with Secretary’s Order 3349, ‘American Energy Independence,’” which was signed by then-DOI Deputy Secretary David Bernhardt on December 22, 2017. S.O. 3360 revoked several directives and policy manual components addressing climate adaptation activities, including *Departmental Manual* Part 600, Chapter 6 (600 DM 6), “Landscape-Scale Mitigation Policy” and DOI’s 2012 department-wide climate adaptation policy (523 DM 1), “Climate Change Policy.”³⁵

Selected DOI-Wide Adaptation Activities

DOI and its agencies have undertaken multiple climate change adaptation initiatives. The following are examples.

Federal Interagency Councils. DOI and its agencies have participated in several federal advisory panels and councils related to climate change and adaptation. Although some of these

³¹ E.O. 13783, “Promoting Energy Independence and Economic Growth, May 28, 2017, 82 *Federal Register* 16093. More specific to DOI, E.O. 13783 also required the review of November 2016 regulations for the Bureau of Land Management (BLM) on methane emissions from new and existing oil and gas operations.

³² For more information on E.O. 13783, see CRS Legal Sidebar WSLG1789, *New Executive Order Directs Agencies to Revise or Rescind Climate Change Rules and Policies*, by Linda Tsang.

³³ DOI, Secretarial Order (S.O.) 3289, “Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources,” Secretary of the Interior Ken Salazar, September 14, 2009.

³⁴ DOI, S.O. 3349, “American Energy Independence,” Secretary of the Interior Ryan Zinke, March 28, 2017.

³⁵ DOI, S.O. 3360, “Rescinding Authorities Inconsistent with Secretary’s Order 3349, ‘American Energy Independence,’” Deputy Secretary of the Interior David Bernhardt, December 22, 2017.

entities have been dismantled or discontinued—such as the Interagency Land Management Adaptation Group and DOI’s CCRC—others continue to operate. For example, DOI is, by statute, 1 of 13 participating federal entities in the U.S. Global Change Research Program (USGCRP).³⁶ Congress mandated the USGCRP in the Global Change Research Act of 1990 to improve understanding of climate science, including the cumulative effects of human activities and natural processes on the environment; to develop science-based resources to support policymaking and resource management; and to communicate findings broadly among scientific and stakeholder communities.³⁷ The development and administration of the National and Regional Climate Adaptation Science Centers (CASCs) and Landscape Conservation Cooperatives (LCCs) programs—as well as the ongoing research conducted by USGS—constitute DOI’s formal participation in the USGCRP.³⁸

National and Regional Climate Adaptation Science Centers (CASCs).³⁹ Formerly named the National Climate Change and Wildlife Science Center and the Climate Science Centers, CASCs support research, assessment, and synthesis of global change data for use at regional levels, including undertaking research relevant to on-the-ground resource managers. Congress authorized the National CASC (then referred to as the National Global Warming and Wildlife Science Center) in 2008 to be housed at the USGS headquarters in Reston, VA.⁴⁰ Following the establishment of the National CASC, DOI developed eight regional CASCs across the country.⁴¹ With the issuance of S.O. 3289, DOI and the CCRC broadened the missions of the CASCs, which were primarily focused on providing climate change impact and analysis data to fish and wildlife managers, to encompass other climate change-related impacts on DOI resources, such as tribal and cultural heritage resources.⁴² The explanatory statement accompanying the Further Consolidated Appropriations Act, 2020,⁴³ stated that enacted FY2020 appropriations for USGS included funding to support “the development of the Midwest Climate Adaptation Science Center.”⁴⁴ The Midwest CASC is to “focus on and address the threats to natural and human communities in Midwest states and develop a more tailored strategic science agenda.”⁴⁵ This ninth CASC would encompass some of the 21 states currently under the purview of the existing Northeast CASC.

³⁶ Global Change Research Act of 1990, P.L. 101-606.

³⁷ P.L. 101-606.

³⁸ USGCRP, “Agencies—Department of the Interior,” at <https://www.globalchange.gov/agency/department-interior>.

³⁹ For more information on Climate Adaptation Science Centers (CASCs), see “Selected USGS Adaptation-Related Activities.”

⁴⁰ P.L. 110-161, Division F. See U.S. Congress, House Committee on Appropriations, *Consolidated Appropriations Act, 2008*, committee print, 110th Cong., 1st sess., January 1, 2008, 39-564 (Washington: GPO, 2008), p. 1242.

⁴¹ The eight regional centers cover regions named as follows: Alaska, Northeast, Southeast, Southwest, Northwest, North Central, South Central, and the Pacific Islands. The National CASC acts as the managing entity for the eight regional centers.

⁴² S.O. 3289, signed on September 14, 2009, directed the renaming of CASCs, previously known as *regional hubs* of the National Climate Adaptation Science Center, to *Regional Climate Change Response Centers*. However, when S.O. 3289 was amended on February 22, 2010 (S.O. 3289A1), the *regional hubs* were renamed again and directed to be called *DOI Climate Science Centers*. In the FY2018 budget, the *Climate Science Centers* were renamed the *Climate Adaptation Science Centers*.

⁴³ Further Consolidated Appropriations Act, 2020, P.L. 116-94.

⁴⁴ Joint Explanatory Statement of the Committee of Conference on H.R. 1865, *Congressional Record*, December 17, 2019, p. H11288.

⁴⁵ H.Rept. 116-100, p. 45.

Landscape Conservation Cooperatives (LCCs). As part of S.O. 3289, DOI and the CCRC also were charged with the development a Landscape Conservation Cooperatives (LCCs) network to provide science capacity and technical expertise to meet shared natural and cultural resource priorities.⁴⁶ At the time of their creation, the 22 LCCs that made up the national network were collaborative entities comprising research institutions, federal resource managers and scientists, tribes, nonprofit organizations, and other stakeholders. LCCs address a wide range of land-use pressures and landscape-scale issues—including climate change—and help coordinate regional adaptation efforts through partnerships and collaboration. FWS has indicated the agency “no longer provides dedicated staff, administrative functions, and funding” for the initiative.⁴⁷ Rather than providing direct financial support, FWS has shifted to providing technical and collaborative support for landscape conservation science and coordinating directly with state fish and wildlife agencies and tribes on shared conservation priorities.⁴⁸ The status of all 22 LCCs is not clear, although there are some indications that a portion of these LCCs are on hiatus or have been dissolved.⁴⁹ Congress provided funding for LCCs in the FY2020 and FY2021 appropriations acts, with instructions for DOI to report on the current status of LCCs and on the department’s plans for future engagement.⁵⁰

Selected Congressional Appropriations Actions Related to Climate Change Adaptation

Congress has addressed DOI-based climate change adaptation efforts through various actions, including appropriations. Congress has directed agencies within DOI to undertake and report on various activities related to climate change adaptation. For example, in the explanatory statements accompanying the FY2020 Department of the Interior, Environment, and Related Agencies appropriations (Further Consolidated Appropriations Act, 2020; P.L. 116-94, Division D) and the FY2021 Department of the Interior, Environment, and Related Agencies (Consolidated Appropriations Act, 2021; P.L. 116-260, Division G), Congress directed the U.S. Fish and Wildlife Service (FWS) and the U.S. Geological Survey (USGS) to undertake specified activities related to the Landscape Conservation Cooperatives (LCCs) and the National and Regional Climate Adaptation Science Centers (CASCs). Enacted appropriations for the LCCs and CASCs differed from the Administration’s requests for programmatic funding in FWS and USGS budget justifications for FY2020 and FY2021.

With regard to the LCC funding in FY2020, in the explanatory statement accompanying P.L. 116-94, Congress included

\$12,500,000 for Landscape Conservation Cooperatives (LCCs). Within 60 days of enactment of this Act, the Service shall provide a report to the Committees outlining how this program deviates from that which was presented to Congress in the annual budget justifications. This report must include how the Service will engage previous stakeholders and how conservation

⁴⁶ Landscape Conservation Cooperative Network, “Landscape Conservation Cooperatives,” at <https://lccnetwork.org/cooperatives>. Also see National Academies of Sciences, Engineering, and Medicine, *A Review of the Landscape Conservation Cooperatives* (Washington, DC: The National Academies Press, 2016).

⁴⁷ Personal correspondence between U.S. Fish and Wildlife Service (FWS) Congressional and Legislative Affairs Office and CRS on January 7, 2020.

⁴⁸ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on August 27, 2020.

⁴⁹ Prepared Statement of Dr. Lara J. Hansen, Chief Scientist and Executive Director, EcoAdapt, in U.S. Congress, House Committee on Natural Resources, Subcommittee on National Parks, Forests, and Public Lands, *Climate Change and Public Lands: Examining Impacts and Considering Adaptation Opportunities*, 116th Cong., 1st sess., February 13, 2019, 116-5 (Washington: GPO, 2019): “Today, most ... [Landscape Conservation Cooperatives] are in limbo without dedicated funding and some have been redesigned and renamed (i.e., Landscape Conservation Partnerships) in instances where there were non-Federal partners that could provide interim support.” See also Mallory Pickett, “Trump Administration Sabotages Major Conservation Effort, Defying Congress,” *Guardian*, April 8, 2019.

⁵⁰ H.Rept. 116-100; S.Rept. 116-123; Joint Explanatory Statement of the Committee of Conference on H.R. 1865. See also H.Rept. 116-448; Joint Explanatory Statement of the Committee of Conference on P.L. 116-260. According to FWS, Office of Legislative Affairs, as of August 2020, the report was in development and under review. Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on August 27, 2020.

efforts are aligned with partners, especially what will be done to ensure there is collaborative conservation efforts on a landscape scale in fiscal year 2020. In addition, the report should include how the Service will engage in areas where LCCs have been diminished or dismantled. This report must also include the detailed information outlined in House Report 116–100 and Senate Report 116–123. Until this report is received by the Committees, \$1,000,000 of the funding provided for General Operations, Central Office Operations, is not available for obligation.

For FY2021, in the explanatory statement accompanying P.L. 116–260, Congress provided that “the agreement includes \$12,500,000 for Landscape Conservation Cooperatives (LCCs). The Service is directed to promptly submit the required report outlining how this program deviates from that which was presented to Congress in the annual budget justifications.”

In its FY2020 and FY2021 budget justifications, FWS did “not request funding for the Landscape Conservation Cooperatives program.” However, the justifications stated, FWS “programs will continue to coordinate with State resource management agencies and other partners.”

Congress also addressed the CASCs in the FY2020 DOI appropriations for USGS. Specifically, in the explanatory statement accompanying P.L. 116–94, Congress provided “\$38,335,000 for National and Regional Climate Adaptation Science Centers for the purposes outlined in House Report 116–100. This funding level supports the development of the Midwest Climate Adaptation Science Center, which was first requested in the fiscal year 2017 Congressional budget justification.” In the explanatory statement accompanying P.L. 116–260, which provided appropriations for FY2021, Congress stipulated that “the recommendation provides \$60,488,000 of which \$41,335,000 is for the National and Regional Climate Adaptation Science Centers for the purposes outlined in House Report 116–448. This funding level provides no less than \$4,000,000 for the development and operation of the Midwest Climate Adaptation Science Center as provided for in Public Law 116–94.”

In the annual budget justifications, USGS requested \$23.901 million in FY2020 and \$20.866 million in FY2021 to fund the Climate Adaptation Center program.

Sources: P.L. 116–94, Further Consolidated Appropriations Act, 2020; Explanatory Statement Accompanying H.R. 1865, *Congressional Record*, vol. 165, part 204, Book III (December 17, 2009), pp. H11284 and H11288; P.L. 116–260, Consolidated Appropriations Act, 2021; Explanatory Statement Accompanying H.R. 133, *Congressional Record*, vol. 166, part 218, Book IV (December 21, 2020), pp. H8530 and H8533; FWS, Budget Justifications and Performance Information, FY2020; FWS, Budget Justifications and Performance Information, FY2021; USGS, Budget Justifications and Performance Information, FY2020; USGS, Budget Justifications and Performance Information, FY2021.

Bureau of Land Management⁵¹

BLM administers more onshore federal lands than any other agency, with BLM lands heavily concentrated in 12 western states.⁵² BLM lands, officially designated the National System of Public Lands, include grasslands, forests, high mountains, Arctic tundra, and deserts. BLM lands often are intermingled with other federal or private lands, and the agency has authority to acquire, dispose of, and exchange lands under various authorities.⁵³

Under law, BLM generally manages its lands under principles including sustained yield and multiple use. Land uses and resources include recreation, grazing, energy and mineral development, timber, watershed, wildlife and fish habitat, and conservation.⁵⁴ Some lands have

⁵¹ For more information on BLM, contact Carol Hardy-Vincent, Specialist in Natural Resources Policy.

⁵² The 12 western states are Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

⁵³ See, for example, 43 U.S.C. §§1713, 1715, 1716. See also CRS Report RL34273, *Federal Land Ownership: Acquisition and Disposal Authorities*, coordinated by Carol Hardy Vincent.

⁵⁴ BLM responsibilities are defined in the Federal Land Policy and Management Act of 1976, 43 U.S.C. §§1701 et seq. “Multiple use” is defined at 43 U.S.C. §1702(c) and “sustained yield” is defined at 43 U.S.C. §1702(h).

been withdrawn (restricted) from one or more uses or managed for a predominant use. The agency inventories its lands and resources, and it develops land use plans for its land units. The public uses BLM lands for their diverse attributes and opportunities.

DOI and other sources have cited climate change as a contributing factor to changes in western lands and resources and to challenges in their management.⁵⁵ The magnitude and effects of climate change on BLM lands—as well as the lands’ vulnerability to such effects—likely vary considerably among locations.⁵⁶ Possible effects of climate change on public lands are currently being observed and are projected to occur in the future.⁵⁷ For example, effects may include the desertification of some public lands and changes in the availability and quality of water and forage. These effects may result in part from increased temperatures and/or changes to the quantity and timing of precipitation.⁵⁸ Changing climate also may increase the vulnerability of BLM forested lands to damage from insects and disease, due directly to climate stressors (e.g., temperatures near the threshold that species can tolerate) as well as indirectly to changes in ranges or lifecycles of pests (e.g., when longer warm seasons allow two birth cycles of insects rather than one).⁵⁹ As temperatures and precipitation patterns change, some locations may experience an increase in the size and frequency of wildfires and an expansion of noxious weeds and invasive species.⁶⁰ Melting of glaciers and permafrost in Alaska has increased as well, contributing to erosion and a loss of soil stability in some locations.⁶¹ Another challenge pertains to management of freshwater ecosystems, as climate change could alter water quality and the ranges of both cold-water and warm-water fish.⁶²

Selected BLM Adaptation-Related Activities

Under government- or DOI-wide policies, BLM has considered the effects of climate change through various actions. For instance, BLM has considered impacts of climate change in environmental assessments related to proposed uses of its lands, such as certain energy

⁵⁵ DOI and other sources have addressed the issues in this paragraph. See, for example, testimony of USGS Senior Advisor for Global Change Programs Thomas R. Armstrong, in U.S. Congress, House Committee on Natural Resources, Subcommittee on National Parks, Forests, and Public Lands, *Combating Climate Change*, hearings, 111th Cong., 1st sess., March 3, 2009; and BLM, “Fisheries and Aquatics,” at <https://www.blm.gov/programs/fish-and-wildlife/fisheries-and-aquatics/about-the-program>. See also Elaine M. Brice et al., “Impacts of Climate Change on Multiple Use Management of Bureau of Land Management Land in the Intermountain West, USA,” *Ecosphere*, vol. 11, no. 11 (November 2020), at <https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/ecs2.3286> (hereinafter, Brice et al., “Impacts of Climate Change”).

⁵⁶ See for example, Colorado Natural Heritage Program, *Climate Change Vulnerability Assessment for Colorado Bureau of Land Management*, eds. Karin Decker et al. (Fort Collins, CO: Colorado Natural Heritage Program, Colorado State University, 2015).

⁵⁷ Brice et al., “Impacts of Climate Change.”

⁵⁸ See, for example, Alisher J. Mirzabaev et al., “Desertification,” in *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*, eds. Priyadarshi R. Shukla et al. (IPCC, 2019), pp. 249-343. See also Brice et al., “Impacts of Climate Change,” pp. 14-15, and citations therein.

⁵⁹ Brice et al., “Impacts of Climate Change,” p. 14, and citations therein.

⁶⁰ See, for example, Tania Schoennagel et al., “Adapt to More Wildfire in Western North American Forests as Climate Changes,” *Proceedings of the National Academy of Sciences*, vol. 18 (2017), pp. 4582-5690, at <https://www.pnas.org/content/114/18/4582>, and Stephen P. Boyte, Bruce K. Wylie, and Donald J. Major, “Cheatgrass Percent Cover Change: Comparing Recent Estimates to Climate Change-Driven Predictions in the Northern Great Basin,” *Rangeland Ecology and Management*, vol. 69, no. 4 (2016), pp. 265-279, at <http://dx.doi.org/10.1016/j.rama.2016.03.002>.

⁶¹ Carl J. Markon et al., “Alaska,” in Reidmiller et al., *Impacts, Risks, and Adaptation*, pp. 1185-1241.

⁶² Brice et al., “Impacts of Climate Change,” p. 15, and citations therein.

development activities.⁶³ The agency also has considered climate change in developing and amending land use plans.⁶⁴ Further, BLM might undertake actions that in part address the effects of climate change without explicitly referencing such change—for instance, by addressing desertification and other range health issues that affect livestock grazing and other land uses.⁶⁵

The current extent and types of climate change adaptation activities at BLM are unclear. BLM does not appear to have broad, agency-specific guidance focused on climate change adaptation.⁶⁶ In the last few years, some former guidance on this topic was rescinded directly by executive or secretarial orders or based on directives in those orders.⁶⁷

In the early in the 2010s, BLM began to focus on two efforts in part to adapt to climate change: a landscape approach to managing lands and rapid ecoregional assessments (REAs). Though these efforts have continued, the extent to which they currently are used to inform climate change adaptation is uncertain. The activities' goal is to help BLM managers understand land conditions and trends, as well as influences and opportunities for land use, from a broader perspective that may not be apparent when focusing on smaller areas. The landscape approach looks at large, connected geographic areas defined by their similar ecological characteristics, such as the Sonoran Desert or Colorado Plateau. In conducting REAs, BLM uses a landscape classification known as *ecoregions*, which span land ownerships, including both federal and nonfederal land. REAs collectively cover about 800 million acres and are prepared in cooperation with other federal and state land management agencies.⁶⁸ Part of the intent is to synthesize scientific information about natural resource conditions and trends; highlight and map areas of high ecological value; and help BLM to identify and coordinate resource conservation, rehabilitation, and development priorities over the long term. BLM has used REAs to inform resource

⁶³ See, for example, the following environmental assessments: BLM, Bakersfield Field Office, *Oil and Gas Lease Sale: Environmental Assessment*, DOI-BLM-CA-C060-2020-0120, December 2020, at https://eplanning.blm.gov/public_projects/2000634/200384596/20024911/250031115/DOI-BLM-CA-C060-2020-0120-EA%202020.08.26.pdf; BLM, *Camino Solar Project: Environmental Assessment*, DOI-BLM-CA-D050-2020-0011-EA, February 2020, at https://eplanning.blm.gov/public_projects/nepa/1503669/20012915/250017709/Camino_Solar_Project_EA_508.pdf; BLM, *June 2019 Competitive Oil and Gas Lease Sale, Salt Lake Field Office Area Parcels: Environmental Assessment*, DOI-BLM-UT-0000-2019-0002-EA-SLFO, February 2019, at [https://eplanning.blm.gov/public_projects/nepa/119572/166661/203017/SLFO_OG_DOI-BLM-UT-0000-2019-0002-EA_\(Box_Elder\)_2-14-2019.pdf](https://eplanning.blm.gov/public_projects/nepa/119572/166661/203017/SLFO_OG_DOI-BLM-UT-0000-2019-0002-EA_(Box_Elder)_2-14-2019.pdf); and BLM, *Miles City Field Office: Draft Supplemental Environmental Impact Statement and Resource Management Plan Amendment*, May 2019, at [https://eplanning.blm.gov/public_projects/lup/116998/172730/209874/MCFO_DEIS_RMPA_201905\(508\).pdf](https://eplanning.blm.gov/public_projects/lup/116998/172730/209874/MCFO_DEIS_RMPA_201905(508).pdf).

⁶⁴ See, for example, BLM, *Miles City Field Office, Draft Supplemental Environmental Impact Statement and Resource Management Plan Amendment*, May 2019, at [https://eplanning.blm.gov/public_projects/lup/116998/172730/209874/MCFO_DEIS_RMPA_201905\(508\).pdf](https://eplanning.blm.gov/public_projects/lup/116998/172730/209874/MCFO_DEIS_RMPA_201905(508).pdf).

⁶⁵ BLM also has modified activities to comply with court orders in legal actions alleging the agency improperly accounted for the effects of climate change. See, for example, *WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F. Supp. 3d 880, 891-895 (D. Mont. 2020).

⁶⁶ In February 2020 communications between CRS and the BLM Legislative Affairs Division, BLM indicated the agency did not have broad, agency-specific guidance on climate change adaptation.

⁶⁷ See, for example, BLM, “Rescinding the Washington Office Permanent Instruction Memorandum No. 2017-003, The Council on Environmental Quality Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews,” Instruction Memorandum IM 2018-002, October 24, 2017. See also DOI, SO. 3360, “Rescinding Authorities Inconsistent with Secretary’s Order 3349, ‘American Energy Independence,’” Deputy Secretary of the Interior David Bernhardt, December 22, 2017. This secretarial order rescinded *BLM Manual* Section 1794 -Mitigation and BLM’s Mitigation Handbook H-1791-1, both of which were issued on December 22, 2016, and contained provisions related to addressing climate change.

⁶⁸ BLM issued its first rapid ecoregional assessment (REA), for the Colorado Plateau, on February 26, 2013. The documents released to date for the various REAs are on the BLM website at <https://landscape.blm.gov/geoportal/catalog/REAs/REAs.page>.

management planning and to integrate landscape-scale analyses into BLM programmatic activity, among other uses.⁶⁹ Moving forward, it is unclear as to whether and to what extent BLM might use a landscape approach and REAs for climate change adaptation.

Bureau of Reclamation⁷⁰

DOI's Bureau of Reclamation manages water resource projects primarily in 17 western states.⁷¹ Reclamation's mission is to "manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public."⁷²

Reclamation built and manages most of the large federal dams in the West, in addition to hundreds of other dams and diversion projects; it now operates more than 300 storage reservoirs and 53 hydropower plants serving approximately 30 million people.

Temperature, precipitation, and runoff conditions in the western United States already have changed in some areas and are expected to change further if the projected effects of global climate change are realized. Such changes may affect Reclamation's ability to reliably deliver water to project users in the future. Changes to soil and air temperature, precipitation, seasonal runoff, long-term streamflow, and extreme events are of particular concern.⁷³ As most of the surface water "stored" in the West is stored in snowpack, changes that reduce snowpack or that accelerate or alter the timing of runoff may result in less effective reservoir storage and major changes in reservoir and river operations. Extreme weather events—such as severe drought, heat waves, and mega-storms—pose additional risks. Much of the West, particularly the Southwest, is naturally semiarid and arid, and has experienced periods of naturally occurring decades-long drought in past millennia. Some observers note that if climate change projections prevail, the Southwest may face a synergistic or "double-whammy" impact on water supplies due to recurrent mega-drought as well as consequences from greenhouse gas-induced climate change.⁷⁴ Irrigated agriculture, hydropower production, municipal water deliveries, and aquatic species that rely on the Lower Colorado River and the Rio Grande may be especially at risk.⁷⁵ Planning for potential conditions is difficult, particularly for the Colorado River Basin, which has multiple storage

⁶⁹ BLM communication with CRS on March 24, 2020.

⁷⁰ For more information on the Bureau of Reclamation, contact Charles V. Stern, Specialist in Natural Resources Policy.

⁷¹ Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. For more information on the Bureau of Reclamation (Reclamation), see CRS Report R46303, *Bureau of Reclamation: History, Authorities, and Issues for Congress*, by Charles V. Stern and Anna E. Normand.

⁷² See Reclamation, "Bureau of Reclamation: About Us," at <http://www.usbr.gov/main/about/mission.html>.

⁷³ Temperature, precipitation, and runoff conditions in the western United States already have changed in some areas and are expected to change further if the projected effects of global climate change are realized. Such changes may affect Reclamation's ability to reliably deliver water to project users. They also may affect hydropower production, species habitat, and recreation in areas projected to receive less precipitation and runoff or experience severe weather events. For discussion of one illustrative example, see Connie A. Woodhouse et al., "Increasing Influence of Air Temperature on Upper Colorado River Streamflow," *Geophysical Research Letters*, vol. 43 (March 9, 2016), pp. 2174-2181.

⁷⁴ Reed D. Benson, "Federal Water Law and the 'Double Whammy': How the Bureau of Reclamation Can Help the West Adapt to Drought and Climate Change," *Ecology Law Quarterly*, vol. 39, no. 4 (2012), p. 1050, quoting testimony of University of Arizona climate scientist Dr. Jonathan Overpeck, in U.S. Congress, Senate Committee on Energy and Natural Resources, *Drought and Climate Change on Water Resources*, field hearing, 112th Cong., 1st sess., April 27, 2011, S.Hrg. 112-16 (Washington, DC: GPO, 2011). (Hereinafter cited as Benson, "Federal Water Law.")

⁷⁵ Benson, "Federal Water Law."

reservoirs across a wide geographic area—some parts of which may see less precipitation and other parts of which may see the same or more precipitation, according to different climate models.⁷⁶

Reclamation facility operations are closely intertwined with numerous stakeholders, including other federal agencies, states, Indian tribes, local water and irrigation districts, and other nongovernmental organizations. Although Reclamation built, owns, and operates much of its infrastructure, local sponsors play a large role in system operations and maintenance; these local sponsors also are obligated to reimburse the federal government for a portion of construction costs. Thus, many stakeholders are likely to play a role in ensuring that Reclamation facilities continue to provide water, power, and ecosystem services into the future under varying climatic conditions.

Selected Reclamation Adaptation-Related Activities

In response to E.O. 13514, Reclamation published its *Climate Change Adaptation Strategy* in 2014.⁷⁷ The document built on existing work by the bureau to extend climate change adaptation efforts across Reclamation’s mission responsibilities. The strategy was divided into four goals:

1. Increase water management flexibility
2. Enhance climate adaptation planning
3. Improve infrastructure resiliency
4. Expand information sharing

Reclamation last reported on progress under its climate change adaptation strategy in 2016, with the publication of its *Climate Change Adaptation Strategy: 2016 Progress Report*.⁷⁸ The report highlighted several individual Reclamation programs’ progress toward each of the aforementioned goals. For example, several Reclamation programs support the first goal of the 2014 strategy (*increased water management flexibility*), including the bureau’s WaterSMART Grants program,⁷⁹ Title XVI Water Reuse/Recycling Program, and Reservoir Operations Pilot Initiative.⁸⁰ Similarly, Reclamation’s Basin Studies Program, in which the bureau collaborates with partners to assess and respond to water supply and demand imbalances, contributes to the second goal (*enhance climate adaptation planning*).

After Reclamation’s climate change adaptation strategy was last updated in 2016, the Trump Administration continued to solicit and award funding for new projects under the programs noted

⁷⁶ One Reclamation study noted there appears to be “climate model consensus agreement” on temperature increases; however, there is less model agreement on precipitation changes. Additionally, such changes vary geographically, which makes predictions for large river basins with multiple storage reservoirs, such as the Colorado and Missouri, especially difficult. See Reclamation, *SECURE Water Act Section 9503(c)—Reclamation Climate Change and Water 2011*, pp. vii–viii, at <https://www.usbr.gov/climate/secure/docs/SECUREWaterReport.pdf>.

⁷⁷ Reclamation, *Climate Change Adaptation Strategy*, November 2014, at <https://www.usbr.gov/climate/docs/ClimateChangeAdaptationStrategy.pdf>.

⁷⁸ Reclamation, *Climate Change Adaptation Strategy: 2016 Progress Report*, November 2016, at <https://www.usbr.gov/climate/docs/2016ClimateStrategy.pdf>. (Hereinafter cited as Reclamation, *2016 Progress Report*.)

⁷⁹ Some of Reclamation’s primary climate change adaptation-related activities have been carried out pursuant to authority in the 2009 SECURE Water Act (P.L. 111-11, Subtitle F, §§9501-9510), which is implemented through the bureau’s WaterSMART program. For more information, see Reclamation, “WaterSMART,” at <https://www.usbr.gov/watersmart/>.

⁸⁰ Reclamation, *2016 Progress Report*, p. 9.

above contributing to the first and second goals.⁸¹ In some cases, funding for these programs has increased since 2016. Other programs and initiatives emphasized by Reclamation's 2016 *Progress Report* were not proposed for funding in Trump Administration budget requests, and Congress has not added funding for these programs. For example, West Wide Climate Risk Assessments were noted contributors to the strategy's second goal (*enhance climate adaptation planning*) but have not been funded since FY2016. Similarly, the Western Watershed Enhancement Program, which contributed to the strategy's third goal (*improved infrastructure resiliency*) was last funded in FY2016.

National Park Service⁸²

NPS administers the 423 units of the National Park System, which face a diverse array of impacts from climate change. Warming temperatures, precipitation changes, streamflow changes, sea-level rise, wildfire, invasive species, and wildlife migration, among others, all have the potential to alter park resources (depending on their location and vulnerability) and to affect tourism and recreation in the parks.⁸³ Some researchers have suggested the units of the National Park System are experiencing a higher magnitude of climate change than other parts of the country because they are disproportionately located in strongly impacted areas such as the Arctic, the high mountains, and the arid Southwest.⁸⁴ For example, mean annual temperatures in the park system increased at double the national rate and precipitation decreased in a higher proportion of park system areas than for the nation generally for the period between 1895 and 2010.⁸⁵ Some natural resource changes have attracted popular attention, such as ongoing glacial retreat in Glacier National Park (Montana), threats from rising temperatures to the Joshua trees (*Yucca brevifolia*) at Joshua Tree National Park (California), and sea-level rise that could damage or submerge parts of Everglades National Park (Florida).⁸⁶ Attention also has focused on potential impacts of climate-

⁸¹ For more information on these grant announcements, see Reclamation, "WaterSMART," at <https://www.usbr.gov/watersmart/>.

⁸² For more on the National Park Service, contact Laura Comay, Specialist in Natural Resources Policy.

⁸³ For studies documenting climate change impacts in the National Park System, see, for example, Patrick Gonzalez et al., "Disproportionate Magnitude of Climate Change in United States National Parks," *Environmental Research Letters*, vol. 13 (September 2018), at <https://iopscience.iop.org/article/10.1088/1748-9326/aade09/pdf> (hereinafter cited as Gonzalez et al., "Disproportionate Magnitude"); Patrick Gonzalez, "Climate Change Trends, Impacts, and Vulnerabilities in U.S. National Parks," in eds., Steven R. Bessinger et al., *Science, Conservation, and National Parks* (University of Chicago Press, 2017), pp. 102-140; Maria A. Caffrey, Rebecca L. Beavers, and Cat Hawkins Hoffman, *Sea Level Rise and Storm Surge Projections for the National Park Service*, National Park Service (NPS) Natural Resource Report Series NPS/NRSS/NRR—2018/1648, May 2018, at <https://www.nps.gov/subjects/climatechange/upload/2018-NPS-Sea-Level-Change-Storm-Surge-Report-508Compliant.pdf>; Joanna X. Wu et al., "Projected Avifaunal Responses to Climate Change Across the U.S. National Park System," *PLoS One*, vol. 13, no. 3 (March 2018), at <https://doi.org/10.1371/journal.pone.0190557>; and William B. Monahan and Nicholas A. Fisichelli, "Climate Exposure of U.S. National Parks in a New Era of Change," *PLoS ONE*, vol. 9, no. 7 (July 2014), at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0101302> (hereinafter cited as Monahan and Fisichelli, "Climate Exposure"). Also see studies of specific effects to individual parks or geographic regions at NPS, "Climate Change: Effects in Parks," at <https://www.nps.gov/subjects/climatechange/effectsinparks.htm>.

⁸⁴ Gonzalez et al., "Disproportionate Magnitude"; also see testimony of Patrick Gonzalez, University of California, Berkeley, in U.S. Congress, House Committee on Natural Resources, Subcommittee on National Parks, Forests, and Public Lands, *Climate Change and Public Lands: Examining Impacts and Considering Adaptation Opportunities*, hearing, February 13, 2019, at <https://naturalresources.house.gov/imo/media/doc/Gonzalez,%20Patrick%20-%20Written%20Testimony%202019-02-13.pdf>.

⁸⁵ Gonzalez et al., "Disproportionate Magnitude."

⁸⁶ See USGS, Northern Rocky Mountain Science Center, "Retreat of Glaciers in Glacier National Park," at [https://www.usgs.gov/centers/norrock/science/retreat-glaciers-glacier-national-park?qt-science_center_objects=0#qt-](https://www.usgs.gov/centers/norrock/science/retreat-glaciers-glacier-national-park?qt-science_center_objects=0#qt-science_center_objects)

related events to the iconic cultural resources administered by NPS, such as the Statue of Liberty National Monument (New York), an NPS unit that experienced significant damage in Superstorm Sandy of 2012.⁸⁷

NPS has addressed climate change and associated effects through research, education, and adaptive management, as well as through efforts to reduce its own carbon footprint. Some have suggested managing the parks for adaptation would require a fundamental rethinking of NPS mission, from one that historically has focused on preserving lands in an unimpaired state to one that would “steward NPS resources for continuous change that is not yet fully understood.”⁸⁸

science_center_objects; NPS, “Glacier National Park: Climate Change,” at <https://www.nps.gov/glac/learn/nature/climate-change.htm>; NPS, “Climate Change in Joshua Tree,” at <https://www.nps.gov/articles/climate-change-in-joshua-tree.htm>; and NPS, “Everglades National Park: Climate Change,” at <https://www.nps.gov/ever/learn/nature/climatechange.htm>.

⁸⁷ See NPS, “Statue of Liberty: Hurricane Sandy Recovery,” at <https://www.nps.gov/stli/after-hurricane-sandy.htm>. On climate change and NPS cultural resources generally, see resources available at Advisory Council on Historic Preservation, “Climate Adaptation and Resilience,” at <https://www.achp.gov/initiatives/sustainability-climate-resilience/climate-adaptation-resilience>.

⁸⁸ National Park System Advisory Board (NPSAB), *Revisiting Leopold: Resource Stewardship in the National Parks*, August 25, 2012, p. 11, at http://www.nps.gov/calltoaction/PDF/LeopoldReport_2012.pdf (hereinafter cited as NPSAB, *Revisiting Leopold*). Also see box on “Gray Wolves at Isle Royale National Park.”

Gray Wolves at Isle Royale National Park: Rethinking National Park Service Intervention in an Era of Climate Change

Foundational to the NPS mission is the mandate to preserve the resources of the National Park System “unimpaired” for future generations (54 U.S.C. §100101). Traditionally, NPS has aimed to fulfill this mission by allowing natural processes to unfold in parks, where possible, without human intervention. Some stakeholders have asked whether this policy should apply if the natural processes are partly shaped by human-induced climate change. NPS scientists and managers are confronting this question at Isle Royale National Park in Michigan. This park also is a congressionally designated wilderness area, where “the earth and its community of life” are to remain “untrammelled by man” (16 U.S.C. §1131).

Isle Royale, an island in Lake Superior, has supported a population of gray wolves since the 1940s. NPS has stated that the wolves play a “critical role” as predators on the island, managing the moose population and, by extension, island vegetation. The wolves crossed from the mainland to the island via a natural ice bridge that historically formed in most winters. In recent decades, however, owing to warmer temperatures, the ice bridge has formed less often. For this and other reasons, the wolf population on the island became increasingly inbred and eventually shrank to two wolves.

In 2018, NPS released a record of decision authorizing the introduction of 20-30 new wolves to the island. The decision could be seen as a departure from the traditional NPS policy of nonintervention. In its final environmental impact statement (EIS) on the proposal, NPS wrote: “The National Park Service must determine how to fulfill the mandate of the park in the context of rapid and continuous climate change that will likely result in different environmental conditions than have existed in the past.” NPS stated that the agency could “find novel approaches to lessen the impacts, slow down change so that species and populations can adapt, and assist species movements where it is deemed appropriate.”

There is disagreement about whether the animals’ decline, and the role of climate change in this decline, justifies this step. Many factors over the years have caused the island populations of wolves and moose to fluctuate, and scientists’ role previously had been to monitor the changes. In comments on the EIS, some questioned whether the present decline was so singular as to warrant more aggressive action and wondered if the intervention could have unforeseen consequences. Some expressed concerns about where future lines would be drawn once human manipulation of the ecosystem began.

Others contended an intervention was justified to prevent an extinction that could have severe impacts for the island’s species and vegetation. They commented that the action was necessary and appropriate in light of effects to the island’s ecosystem from human-induced climate change. Some have viewed the Isle Royale project as potentially illustrating a “new meaning of wilderness,” as a “place where concern for ecosystem health is paramount, even if human action is required to maintain it.”

Sources: NPS, *Final Environmental Impact Statement to Address the Presence of Wolves at Isle Royale National Park*, March 2018, at <https://parkplanning.nps.gov/document.cfm?parkID=140&projectID=59316&documentID=86353>. Unless otherwise noted, comments referenced above are from Appendix C of the final EIS.

NPS, *Record of Decision: Final Environmental Impact Statement to Address the Presence of Wolves at Isle Royale National Park*, June 2018, at <https://parkplanning.nps.gov/document.cfm?parkID=140&projectID=59316&documentID=88676>.

J. A. Vucetich et al., “Predator and Prey, a Delicate Dance,” *New York Times*, May 8, 2013, at http://www.nytimes.com/2013/05/09/opinion/save-the-wolves-of-isle-royale-national-park.html?_r=0. Also see J. A. Vucetich, M. P. Nelson, and R. O. Peterson, “Should Isle Royale Wolves Be Reintroduced? A Case Study on Wilderness Management in a Changing World,” *The George Wright Forum*, vol. 29, no. 1 (2012), pp. 126-147, at http://isleroyalewolf.org/sites/default/files/tech_pubs_files/Vucetich%20et%20al%202012%20GW%20Forum.pdf.

Selected NPS Adaptation-Related Activities

NPS has long engaged in efforts to assess climate change impacts and consider adaptation in the parks.⁸⁹ During the Obama Administration, NPS published multiple policy and planning

⁸⁹ For example, the agency undertook such efforts as part of its participation in the multi-agency Cooperative Ecosystem Studies Units Network, established in 1999 pursuant to the National Parks Omnibus Act of 1998 (P.L. 105-391, §203). See, for example, testimony of NPS Regional Director for the Pacific West Region Jonathan B. Jarvis, in U.S. Congress, House Committee on Natural Resources, *The Impacts of Climate Change on America’s National Parks*,

documents addressing climate change adaptation. The agency released a *Climate Change Response Strategy* in September 2010, focusing on four types of actions: science, adaptation, mitigation, and communication.⁹⁰ It followed this with a *Climate Change Action Plan* in November 2012, emphasizing the same four response areas and detailing over 50 immediate actions to incorporate climate change considerations into NPS operations.⁹¹ The actions, some of which have been implemented since 2012 (or were implemented in earlier years), included training park personnel on climate change issues, assessing park management plans and project plans for climate considerations, partnering with universities to research park-specific climate trends, developing a “risk screening tool” to assess the vulnerability of park facilities to erosion and sea-level rise, creating interpretive exhibits on climate effects for park visitors, and initiating youth outreach programs, among others.⁹²

The planning documents also focused on NPS’s unique role as an “extraordinary educational institution where millions of people learn about the environment.”⁹³ Thus, they included as a key component of NPS strategy the goal of raising public awareness of climate change and potential responses.⁹⁴ Other documents released by the agency included a *Scenario Planning Handbook* (2013), detailing how park managers can use climate change scenario planning to inform actions and strategies, and a *Green Parks Plan*, published in 2012 and updated in 2016, which explored ways to make parks more sustainable by reducing energy and water consumption, limiting waste, and making other management changes.⁹⁵ Also in 2016, NPS released a *Cultural Resources Climate Change Strategy* and a *National Climate Change Interpretation and Education*

oversight field hearing, 111th Congress, 1st sess., April 7, 2009, at <https://www.govinfo.gov/content/pkg/CHRG-111hhrg48662/html/CHRG-111hhrg48662.htm>.

⁹⁰ NPS, *Climate Change Response Strategy*, September 2010, at https://www.nps.gov/subjects/climatechange/upload/NPS_CCRS-508compliant.pdf. Development of the strategy accorded with authorities including Executive Order 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” October 5, 2009; and DOI Secretarial Order 3289, “Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources,” September 14, 2009.

⁹¹ NPS, *Climate Change Action Plan 2012-2014*, November 2012, at <https://www.nps.gov/subjects/climatechange/upload/CCActionPlan-508compliant.pdf>. For further discussion of NPS climate change adaptation activities through 2012, see U.S. Government Accountability Office (GAO), *Climate Change: Various Adaptation Efforts Are Under Way at Key Natural Resource Management Agencies*, GAO-13-253, May 2013, at <http://www.gao.gov/assets/660/654991.pdf>.

⁹² For updates on NPS implementation of climate change response actions, see the quarterly *Climate Change Response Program Newsletters*, available at <http://www.nps.gov/subjects/climatechange/resources.htm>.

⁹³ NPS Director Jonathan B. Jarvis in NPS, *Climate Change Response Strategy*, September 2010, at http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf.

⁹⁴ See, for example, White House Office of Science and Technology Policy, “Lifting America’s Game in Climate Education, Literacy, and Training,” fact sheet, December 3, 2014, at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/climateed-dec-3-2014.pdf>, which describes the Administration’s Climate Education and Literacy Initiative. Among several Administration commitments was to equip NPS employees with climate-relevant resources to support park interpreters “in the creation and delivery of effective climate-change messages in the programs and exhibits across all National Parks” (p. 2).

⁹⁵ NPS, *Using Scenarios to Explore Climate Change: A Handbook for Practitioners*, July 2013, at <https://www.nps.gov/subjects/climatechange/upload/scenarioshandbook-july2013-508compliant-smaller.pdf>; NPS, *Green Parks Plan: Advancing Our Mission Through Sustainable Operations*, April 2012 and Spring 2016, at <https://www.nps.gov/orgs/socc/upload/NPS-Green-Parks-Plan-GPP.pdf> (2012 version) and <https://www.nps.gov/subjects/sustainability/upload/NPS-Green-Parks-Plan-2016.pdf> (2016 version).

Strategy.⁹⁶ Additionally, then-NPS Director Jonathan Jarvis issued Director's Order 100, "Resource Stewardship for the 21st Century," which was rescinded in 2017.⁹⁷

NPS's Climate Change Response Program (CCRP), established in 2007, continues to operate as a resource for park system adaptation planning under the guidance provided by these planning documents (other than the rescinded Director's Order 100). The CCRP provides training, technical expertise, educational products, and in some cases funding support for projects in the park system aimed at preserving natural and cultural resources in the context of climate change.⁹⁸ Examples of recent CCRP activities include training courses for park interpretive staff on climate change communication, an internship program for students to work on climate change-related park management issues, a series of regional roundtables for NPS staff on findings from the National Climate Assessment, and assistance to individual NPS units with climate change scenario planning, as well as a January 2020 report on scenario planning.⁹⁹ Other agency programs and activities that are not primarily focused on climate change also may play roles in NPS's adaptation efforts.¹⁰⁰ In addition, broader DOI entities such as the USGS National Climate Adaptation Science Center have provided support for some NPS projects related to climate change adaptation.¹⁰¹

The scope of climate change adaptation activities across individual park units is unclear. A 2012 survey of public land managers in Colorado, Utah, and Wyoming found 78% of surveyed NPS managers and staff reported that either no climate change adaptation planning was taking place at their unit or they did not know whether such planning was occurring.¹⁰² More recently, the NPS

⁹⁶ NPS, *Cultural Resources Climate Change Strategy*, 2016, at https://www.nps.gov/subjects/climatechange/upload/NPS-2016_Cultural-Resoures-Climate-Change-Strategy.pdf; and NPS, *National Climate Change Interpretation and Education Strategy*, at <https://www.nps.gov/subjects/climatechange/upload/FINAL-NCCIES-508-LowRes.pdf>.

⁹⁷ NPS Director's Order 100, "Resource Stewardship for the 21st Century," issued December 20, 2016, rescinded August 16, 2017, at https://www.nps.gov/policy/DOOrders/DO_100.htm. This order aimed to implement the National Park System Advisory Board's recommendation that "the overarching goal of NPS resource management should be to steward NPS resources for continuous change that is not yet fully understood, in order to preserve ecological integrity and cultural and historical authenticity, provide visitors with transformative experiences, and form the core of a national conservation land- and seascape" (NPSAB, *Revisiting Leopold*). Among other provisions, the order directed that park managers adopt a "precautionary principle" whereby, when an activity raised "plausible or probable threats of harm to park resources and/or human health," managers should "take anticipatory action even when there is uncertainty." The order also directed an "adaptive management approach" under which decisions would be adjusted in response to changing outcomes.

⁹⁸ NPS, "Climate Change Response Program," at <https://www.nps.gov/orgs/ccrp/index.htm>; and "Climate Change Response Program: What We Do," at <https://www.nps.gov/orgs/ccrp/whatwedo.htm>. For recent activities, see *Climate Change Response Program Newsletters* at <https://www.nps.gov/subjects/climatechange/resources.htm>.

⁹⁹ NPS, *Climate Change Response Program Newsletters*, available at <https://www.nps.gov/subjects/climatechange/resources.htm>; NPS, "Climate Change Scenario Showcase," at <https://www.nps.gov/subjects/climatechange/scenarioplanning.htm>; A. N. Runyon et al., "Repeatable Approaches to Work with Scientific Uncertainty and Advance Climate Change Adaptation in U.S. National Parks," *Parks Stewardship Forum*, vol. 36, no. 1 (2020), pp. 98-104, at <https://escholarship.org/uc/item/76p7m8rz> (hereinafter cited as Runyon et al., "Repeatable Approaches"); NPS, *Climate Change Response Program Newsletter*, December 2019, at <http://campaign.r20.constantcontact.com/render?preview=true&m=1120693565783&ca=92bd8b62-791c-4d98-9188-97de8cd3cea5&id=preview>.

¹⁰⁰ For example, NPS's Invasive Plant Management Teams work with park units to combat invasive plants, whose spread has been linked to climate change in some cases. For more information, see NPS Biological Resources Division, "Invasive Plant Management Teams," at <https://www.nps.gov/orgs/1103/epmt.htm>.

¹⁰¹ See, for example, NPS, *Climate Change Scenario Planning for Resource Stewardship: Applying a Novel Approach in Devils Tower National Monument*, December 2019, at <https://irma.nps.gov/Datastore/DownloadFile/632857>.

¹⁰² Kelli M. Archie et al., "Climate Change and Western Public Lands: A Survey of U.S. Federal Land Managers on the Status of Adaptation Efforts," *Ecology and Society*, vol. 17, no. 4 (2012), p. 20, at <http://dx.doi.org/10.5751/ES-05187-170420>. Staff cited budget constraints, lack of information at a relevant scale, and uncertainty of available information

CCRP reported some ongoing efforts at the individual park level, including work to incorporate climate scenario planning into each park's Resource Stewardship Strategy.¹⁰³

U.S. Fish and Wildlife Service

The mission of DOI's FWS is "working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."¹⁰⁴ FWS is responsible, among other activities, for

- administering the National Wildlife Refuge System (NWRS) and the National Fish Hatchery System;
- enforcing many of the nation's federal wildlife and conservation laws and international treaties;
- working with federal and nonfederal partners on conservation activities; and
- managing hundreds of millions of dollars in grant funding each year.

The effects of climate change have the potential to impact many FWS activities related to fish, wildlife, and habitat and FWS-administered resources. As such, the agency may consider climate change adaptation in many of its activities. Such activities may include, for example, administration of agency resources, such as national wildlife refuges; management of federal trust species, such as those listed under the ESA;¹⁰⁵ and provision of training and information to resource management staff on how to incorporate climate change adaptation into their conservation activities.¹⁰⁶ However, many such activities may not explicitly reference climate change, and it can be difficult to ascertain how adaptation to climate change is incorporated into certain FWS actions.

Selected FWS Adaptation-Related Activities

Over the years, FWS has undertaken several activities, pursuant to multiple authorities, related to climate change adaptation. FWS described adaptation as follows: "adaptation involves planned, science-based management actions, including regulatory and policy changes, that we take to reduce the negative impacts of climate change on fish, wildlife, and their habitats."¹⁰⁷ FWS

as barriers to adaptation planning. For an earlier study that similarly assessed barriers to adaptation at the individual park level, see Lesley C. Jantarasami et al., "Institutional Barriers to Climate Change Adaptation in U.S. National Parks and Forests," *Ecology and Society*, vol. 15, no. 4 (2010), p. 33, at <https://www.ecologyandsociety.org/vol15/iss4/art33/ES-2010-3715.pdf>.

¹⁰³ As of 2020, the Climate Change Response Program was working to "help NPS meet an ambitious goal to produce a new or updated Resource Stewardship Strategy (RSS) for managing natural and cultural resources for over 200 national parks.... For each RSS, we present information on historical (observed) and projected climate trends, park-specific impacts, and climate change adaptation" (Runyon et al., "Repeatable Approaches"). For more information, see NPS, "Climate Change Scenario Showcase," at <https://www.nps.gov/subjects/climatechange/scenarioplanning.htm>, which included eight case studies as of the publication date of this report.

¹⁰⁴ This official mission statement was adopted on June 15, 1999; see FWS, "Mission Statement," National Policy Issuance #99-01, at http://www.fws.gov/policy/npi99_01.html.

¹⁰⁵ The ESA, as amended, is at 16 U.S.C. §§1531-1544.

¹⁰⁶ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

¹⁰⁷ FWS, "Climate Change Adaptation," 056 FW 1, §1.4, July 22, 2013, at <https://www.fws.gov/policy/056fw1.pdf>. For more information on FWS climate change adaptation activities, see FWS, "Conservation in a Changing Climate," last updated January 11, 2017, at <https://www.fws.gov/home/climatechange/index.html>.

“policy and staff responsibilities on climate change adaptation” are outlined in Chapter 056 FW 1 of the agency’s *Service Manual*, which was issued on July 22, 2013, pursuant to E.O. 13514, S.O. 3289, and 523 DM 1.¹⁰⁸ Although E.O. 13514 has been revoked, the remaining two listed directives are active and FWS policy in the *Service Manual* is still in effect.¹⁰⁹ (For FWS’s climate change adaptation policy, see shaded text box.)

In addition to the agency’s climate change adaptation policy as stated in *Service Manual* Chapter 056 FW 1, the service established the FWS Climate Change Adaptation Network in 056 FW 2.¹¹⁰ The network comprises a team of senior-level FWS personnel, and its mission is “to guide the Service to enhance preparedness, adaptation, and resilience in the face of the impacts of climate change and its interaction with non-climate influences on fish, wildlife, plants, ecosystems, cultural resources, and facilities.”¹¹¹

U.S. Fish and Wildlife Service Climate Change Adaptation Policy

Section 1.6 of Chapter 056 FW 1 of the FWS *Service Manual* states that FWS policy is to

effectively and efficiently incorporate and implement climate change adaptation measures into the Service’s mission, programs, and operations. Fully implementing and in accordance with Departmental policy (523 DM 1), [FWS] must:

- A. Use the best available science to increase understanding of climate change impacts among all Service employees, to better inform decisionmakers, and to coordinate an appropriate adaptive response to impacts on: (1) Lands and waters; (2) Fish, wildlife, plants, and their habitats; (3) Cultural and tribal resources; and (4) Other assets under our jurisdiction.
- B. Integrate climate change adaptation strategies into all aspects of [FWS] policies, planning, programs, and operations, from facilities maintenance to public use of lands, and from habitat restoration and refuge management to endangered species recovery plans.
- C. Work with partners to implement: (1) The Service’s climate change strategic plan (Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change); (2) The National Fish, Wildlife, and Plants Climate Adaptation Strategy; and (3) 523 DM 1.
- D. Conduct and support research that will help [FWS] better monitor change and facilitate adaptation.
- E. Work with Landscape Conservation Cooperatives (LCCs) to develop vulnerability assessments, decision support tools, biological plans, landscape conservation designs, and regional and local responses that advance conservation at broad, landscape scales in consideration of climate change and other stressors.
- F. Deliver landscape conservation actions that build resilience or support the ability of fish, wildlife, and plants to adapt to climate change.
- G. Monitor populations and habitats to assess the impacts of our management strategies in the face of climate change.

¹⁰⁸ FWS, 056 FW 1. For more information on E.O. 13514 and S.O. 3289, see section above on “Status of DOI Adaptation-Related Policy and Guidance.” For more information on 523 DM 1, see DOI, “Climate Change Adaptation; Climate Change Policy,” in *Department of the Interior Departmental Manual*, 523 DM 1, December 20, 2012, at https://www.doi.gov/sites/doi.gov/files/elips/documents/Chapter%201_%20Climate%20Change%20Policy%20%282%29.pdf.

¹⁰⁹ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

¹¹⁰ FWS, “The Service Climate Change Adaptation Network,” 056 FW 2, June 20, 2014, at <https://www.fws.gov/policy/056fw2.pdf>. Although the commission is still active, it is unclear when it meets. Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

¹¹¹ FWS, 056 FW 2, §2.2(A).

H. Implement and support carbon sequestration projects that protect and promote healthy fish, wildlife, and plant populations and habitats.

I. Engage Service employees and work with LCCs in collaborative conservation with the following groups to seek solutions to the impacts of climate change and other stressors on fish and wildlife: (1) Our local, State, tribal, national, and international partners in the public and private sectors; (2) Congressional Members and staff, other key constituencies, and stakeholders; and (3) The general public.

Source: FWS, “Climate Change Adaptation,” 056 FW I, §1.6, July 22, 2013, at <https://www.fws.gov/policy/056fwI.pdf>.

FWS has published or partnered in publishing two climate change-related documents:

- the service’s climate change strategic plan, *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change*, 2010 (hereinafter, the *Strategic Plan*);¹¹² and
- *The National Fish, Wildlife, and Plants Climate Adaptation Strategy*, 2012 (hereinafter, the *Climate Adaptation Strategy*).¹¹³

The purposes of the first document, the FWS’s *Strategic Plan*, were to

(1) lay out our vision for accomplishing our mission to “work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people” in the face of accelerating climate change; and (2) provide direction for our own organization and its employees, defining our role within the context of the Department of the Interior and the larger conservation community.¹¹⁴

The second document, the *Climate Adaptation Strategy*—which was published by an intergovernmental working group of federal, state, and tribal representatives, including FWS—included as its purpose “to inspire and enable natural resource administrators, elected officials, and other decision makers to take action to adapt to a changing climate.”¹¹⁵ According to FWS, both the FWS *Strategic Plan* and the *Climate Adaptation Strategy* are active documents; the FWS *Strategic Plan* is available as a “resource for FWS programs,” and efforts are underway to “review and update” the *Climate Adaptation Strategy*.¹¹⁶

According to FWS, service personnel consider climate change adaptation in numerous programmatic activities.¹¹⁷ For example, FWS may consider climate change in ESA listing

¹¹² FWS, *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change*, September 2010, at <https://www.fws.gov/home/climatechange/pdf/CCStrategicPlan.pdf> (hereinafter cited as FWS, *Rising to the Urgent Challenge*).

¹¹³ National Fish, Wildlife, and Plants Climate Adaptation Partnership, *National Fish, Wildlife, and Plants Climate Adaptation Strategy*, 2012, at <https://www.wildlifeadaptationstrategy.gov/> (at the time of publication, the listed website was no longer functional; however, the plan was available at <https://www.st.nmfs.noaa.gov/Assets/ecosystems/documents/NFWPCAS-Final.pdf>). Congress urged the Council on Environmental Quality and the DOI “to develop a national, government-wide strategy to address climate impacts on fish, wildlife, plants, and associated ecological processes” in the Committee Report (H.Rept. 111-316, pp. 76-77) accompanying H.R. 2996, the Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010 (P.L. 111-88).

¹¹⁴ FWS, *Rising to the Urgent Challenge*, p. 3.

¹¹⁵ National Fish, Wildlife, and Plants Climate Adaptation Partnership, *National Fish, Wildlife, and Plants Climate Adaptation Strategy*, 2012, p. ii.

¹¹⁶ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

¹¹⁷ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

decisions.¹¹⁸ In making these decisions, FWS and the National Marine Fisheries Service (NMFS) in the National Oceanic and Atmospheric Administration within the Department of Commerce, the two agencies responsible for administering the ESA, must consider five factors specified in the ESA to determine whether a species should be listed as threatened or endangered. Two of the five factors are “the present or threatened destruction, modification, or curtailment of [species’] habitat or range” and “other natural or manmade factors affecting [species’] continued existence.”¹¹⁹ While evaluating these factors, FWS and NMFS may be required to consider climate change as a potential threat in some cases.¹²⁰ FWS also may consider climate change adaptation activities in the administration of the NWRS, which is administered pursuant to the National Wildlife Refuge System Administration Act (NWRSA), as amended.¹²¹ The NWRSA requires that each refuge in the NWRS is managed to “fulfill the mission of the System, as well as the specific purposes for which that refuge was established.”¹²² For example, FWS may implement actions to address sea-level rise, which can be an effect of climate change, at certain coastal wildlife refuges.¹²³

Climate Change and the Endangered Species Act (ESA)

FWS and the National Marine Fisheries Service in the National Oceanic and Atmospheric Administration within the Department of Commerce (hereinafter referred to as *the Services*) are jointly responsible for administering the ESA. In August 2019, the Services promulgated a final rule (84 *Federal Register* 45020) that amended the regulations for implementing the ESA. As part of the rule, which went into effect on September 26, 2019, the Services defined, for the first time, the scope of the term *foreseeable future* as it relates to how the Services make decisions on the listing of species as either endangered or threatened and the designation of critical habitat:

The term foreseeable future extends only so far into the future as the Services can reasonably determine that both the future threats and the species’ responses to those threats are likely. The Services will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species’ life-history characteristics, threat-projection timeframes, and environmental variability. The Services need not identify the foreseeable future in terms of a specific period of time.

The rule may have implications for how the Services make decisions about species and critical habitat that may be affected by climate change. For example, because the foreseeable future extends, per the rule, only so far as both the threats and the species’ responses to threats are *likely*, the Services may be less able to assess threats, such as climate change, that occur on a longer time scale or with a high degree of variability. However, the Services state that the rule is simply a codification of how they applied the term *foreseeable future* prior to the rule’s promulgation (i.e., the Services will continue to consider *foreseeable future* on a case-by-case basis, as they did prior to the rule). The rule’s implementation will be shaped by both the outcome of any litigation over the rule and how the Services apply the new definition.

¹¹⁸ The Endangered Species Act (ESA) is at 16 U.S.C. §§1531 et seq. For more information on the ESA, see CRS Report R46677, *The Endangered Species Act: Overview and Implementation*, by Pervaze A. Sheikh, Erin H. Ward, and R. Eliot Crafton. For more information on climate change as it affects the ESA, see CRS Report R45926, *The Endangered Species Act and Climate Change: Selected Legal Issues*, by Linda Tsang.

¹¹⁹ 16 U.S.C. §1533(a)(1).

¹²⁰ For a discussion of how and when climate change is considered in listing decisions, see CRS Report R45926, *The Endangered Species Act and Climate Change: Selected Legal Issues*, by Linda Tsang.

¹²¹ The National Wildlife Refuge System Administration Act, as amended, is at 16 U.S.C. §§668dd-668ee. Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

¹²² 16 U.S.C. §668dd(a)(3)(A). The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” 16 U.S.C. §668dd(a)(2).

¹²³ Personal correspondence between FWS Congressional and Legislative Affairs Office and CRS on January 7, 2020.

Sources: FWS and National Oceanic and Atmospheric Administration, “Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat,” 84 *Federal Register* 45020-45053, August 27, 2019. For more information, see CRS Report R45926, *The Endangered Species Act and Climate Change: Selected Legal Issues*, by Linda Tsang.

U.S. Geological Survey¹²⁴

The mission of USGS is to deliver integrated scientific understanding and forecast natural systems to improve the nation’s economic well-being, reduce societal risks from hazards, and inform natural resource stewardship.¹²⁵ USGS has eight interdisciplinary program areas: (1) Water Resources, (2) Land Resources, (3) Energy and Minerals and Environmental Health, (4) Natural Hazards, (5) Ecosystems, (6) Core Science Systems, (7) Science Support, and (8) Facilities. Much of the work relevant to climate change adaptation is done through the Land Resources program area, although portions of several other program areas also relate to climate change adaptation.¹²⁶

USGS is primarily a science agency. Unlike some other DOI agencies, USGS does not manage large tracts of lands, construct infrastructure, or modify waterways or habitat. Further, the agency does not have regulatory authority under any laws. Consequently, USGS addresses climate change adaptation by conducting scientific studies; collecting and analyzing data related to climatic variables; modeling and predicting the effects of climate variability on natural resources, natural processes (e.g., natural hazards), wildlife, and ecosystems; and monitoring resources such as water flows, habitat changes, and wildlife. For example, USGS provides data on natural resources and scientific analysis to support adaptive management strategies implemented by DOI land management agencies (as well as by other federal agencies, state and local governments, and others) that address climate change adaptation. DOI agencies rely on USGS for scientific data and interpretations to inform their land management decisions. In a 2020 report, USGS committed to reporting to DOI at least once every five years (or sooner, as needed) on significant new findings in climate science and advances in best practices for incorporating climate information into planning and policymaking activities.¹²⁷ The report also outlined best practices the agency will continue to follow, such as modeling potential future impacts over timescales ranging from the near term to a century or longer, depending on the management decision under consideration. Memoranda of understanding and scientific agreements between USGS and other federal and state agencies allow USGS to provide research results on climate change processes and impacts, as well as data for making decisions related to specific geographic areas.

Selected USGS Adaptation-Related Activities

USGS does not have a formal plan to evaluate or implement adaptation strategies related to the potential effects of climate change on its facilities.¹²⁸ USGS evaluates facility projects through a

¹²⁴ For more information on USGS, contact Anna Normand, Analyst in Natural Resources Policy.

¹²⁵ DOI, *FY2020 Interior Budget in Brief*, 2019, p. BH-51, at https://www.doi.gov/sites/doi.gov/files/uploads/fy2020_bib_bh051.pdf.

¹²⁶ For information on USGS funding trends across mission areas, see CRS In Focus IF11181, *The U.S. Geological Survey (USGS): FY2020 Appropriations Process and Background*, by Anna E. Normand.

¹²⁷ Adam Terando et al., *Using Information from Global Climate Models to Inform Policymaking—The Role of the U.S. Geological Survey*, USGS, Open-File Report 2020-1058, 2020, p. 2, at <https://doi.org/10.3133/ofr20201058>.

¹²⁸ Personal correspondence between USGS Congressional Liaison Office and CRS on December 12, 2019.

capital planning and investment review process. An Investment Review Board analyzes agreements and the costs and benefits of actions related to facilities. When funding is available, USGS invests in “hardening” its observational equipment, which may be vulnerable to natural hazards.¹²⁹ For example, Congress provided supplemental funding in FY2018 and FY2019 for USGS to aid recovery from wildfires, hurricanes, volcanic eruptions, and earthquakes.¹³⁰ With the funding, USGS repaired and replaced equipment and facilities, often to be more resilient, and conducted scientific observations and assessments.¹³¹

Beyond these efforts, USGS conducts several scientific and monitoring activities that directly and indirectly relate to climate change adaptation. The following provides an overview of some of these activities.

Climate Adaptation Science Centers.¹³² As noted above, one of the primary functions of the Land Resources program area under USGS is the implementation and maintenance of the National CASC and its regional entities, the Regional CASCs.¹³³ These centers support research, assessment, and synthesis of global change data to assist in the management of DOI-administered resources, including federal lands, at regional levels. The centers aim to evaluate global climate change models at scales appropriate for research managers of species and habitats, and they facilitate applied science and outreach to collaborators and stakeholders, including federal agencies. As noted, the FY2020 appropriations explanatory statement directed increased funding for Land Resources to develop a Midwest CASC to “focus on and address the threats to natural and human communities in Midwest states and develop a more tailored strategic science agenda.”¹³⁴ This ninth CASC would encompass some of the 21 states currently under the purview of the existing Northeast CASC.

Climate Change Research and Development Program.¹³⁵ The objectives of USGS’s Climate Change Research and Development Program include understanding regional effects of climate change and estimating how climate change might affect future scenarios or processes. Research areas under this program include understanding the effects of sea-level rise on coastal communities and infrastructure, studying the long-term effects of drought, and documenting the retreat of glaciers. Although the program focuses more on basic science than on management, its findings may help to inform adaptation actions.

¹²⁹ USGS may strengthen (or *harden*) its observational equipment, such as one of its 10,300 streamgages, to withstand major natural hazard events. In most cases, hardening a streamgage involves raising the structure to a higher elevation, improving the structural integrity of the instrument shelter, and upgrading the data transmission capabilities. USGS, “Recent Improvements to the U.S. Geological Survey Streamgaging Program,” fact sheet 2007-3080, December 2007, at <https://pubs.usgs.gov/fs/2007/3080/fs2007-3080b.pdf>.

¹³⁰ USGS received \$42.2 million from the Bipartisan Budget Act of 2018 (P.L. 115-123) and \$98.5 million from the Additional Supplemental Appropriations for Disaster Relief Act of 2019 (P.L. 116-20).

¹³¹ USGS, “Supplemental Appropriations for Disaster Recovery Activities,” at <https://www.usgs.gov/natural-hazards/usgs-supplemental-disaster-recovery-activities>.

¹³² CASCs also are discussed in this report in the section on “Selected DOI-Wide Adaptation Activities.”

¹³³ These centers, formerly named the National Climate Change and Wildlife Science Center and DOI Climate Science Centers, were authorized in an appropriations law, DOI, Environment, and Related Agencies Appropriations Act, 2008 (P.L. 110-161). For more information, see USGS, “Climate Adaptation Science Centers,” at <https://www.usgs.gov/ecosystems/climate-adaptation-science-centers>.

¹³⁴ Explanatory statement for the Further Consolidated Appropriations Act, 2020 (P.L. 116-94), available at <https://www.govinfo.gov/content/pkg/CPRT-116HPRT38679/pdf/CPRT-116HPRT38679.pdf>, and H.Rept. 116-100.

¹³⁵ USGS, “Climate Research and Development Program,” at <https://www.usgs.gov/ecosystems/climate-research-and-development-program>.

Biologic Carbon Sequestration. The USGS’s “biologic carbon sequestration assessment program,” known as LandCarbon, “investigates ecosystem carbon cycle problems and develops carbon management science and monitoring methods.”¹³⁶ USGS completed assessments of biologic carbon sequestration for the conterminous United States, Alaska, and Hawaii.¹³⁷ Program activities now include (1) researching carbon processes and management in ecosystems and (2) completing carbon sequestration application studies in support of DOI land management decisionmaking. Information gleaned from this program may be used to help inform future DOI land management practices.

Data Collection and Monitoring. USGS collects data and monitors natural processes that are relevant to climate change adaptation. For example, the USGS Streamgaging Network monitors streamgages, which collect data on streamflow, throughout the country.¹³⁸ These data can be analyzed to determine changes in water flows and water quality over time, and they can be used in projecting future flows under various climate scenarios to inform federal land managers, federal infrastructure investments and preparedness, and nonfederal decisionmaking.

Issues for Congress

DOI and its agencies have undertaken various climate change adaptation activities over the years, many of which were conducted in accordance with government-wide and DOI- or agency-specific authorities. Many of these activities were undertaken pursuant to executive and secretarial orders, and selected climate change adaptation activities continued to operate in some capacity during the Trump Administration. Selected orders from previous Administrations, such as the Obama Administration, that initiated certain adaptation activities were revoked during the Trump Administration, at times resulting in the cessation of certain activities. Other adaptation activities have been undertaken pursuant to statutorily authorized programs or congressional directions or when compatible with statutory purposes. The status of some adaptation activities also is unclear, and activities may have been altered, suspended, or set aside at times. Further, with available information, it can be difficult to identify the full breadth of climate change adaptation activities that DOI and its agencies have undertaken and the current status of such activities.

One concrete measure of how approaches to climate change adaptation have changed throughout the years and across Administrations is the issuing, amending, and/or revoking of executive and secretarial orders related to climate change adaptation. Generally, climate change-related executive and secretarial orders issued during the Trump Administration focused on rescinding climate adaptation orders, including several executive and secretarial orders that required various climate change adaptation activities to be conducted, issued during prior Administrations. Rather, the Trump Administration focused on certain other activities, including energy production. As a result, there apparently was less focus on undertaking new DOI-wide climate adaptation initiatives during the Trump Administration than during some previous Administrations, although

¹³⁶ USGS, “LandCarbon,” at https://www.usgs.gov/ecosystems/land-change-science-program/science/landcarbon?qt-science_center_objects=0#qt-science_center_objects. Section 712 of the Energy Independence and Security Act of 2007 (P.L. 110-140) authorized the Secretary of the Interior to complete a national assessment of the quantity of carbon stored in and released from national ecosystems and the annual flux greenhouse gases in and out of ecosystems.

¹³⁷ To access the assessments, see USGS, “LandCarbon,” at <https://www.usgs.gov/apps/landcarbon/>.

¹³⁸ For more information, see CRS Report R45695, *U.S. Geological Survey (USGS) Streamgaging Network: Overview and Issues for Congress*, by Anna E. Normand.

agencies within DOI continued to implement certain policies and programs relevant to climate change adaptation.

The extent to which individual agencies within DOI were pursuing climate change adaptation activities at the end of 2020 varied by agency and activity and, in some cases, is unclear. For example, pursuant to the Further Consolidated Appropriations Act, 2020,¹³⁹ USGS was required to establish a new Midwest CASC and FWS was required to provide a report updating Congress on the status of the LCC network. However, information regarding the status of these activities was not publicly available at the time of this report's publication. As of the end of 2020, the National and Regional CASCs were operational, and FWS reportedly was providing scientific support for the LCC network but was no longer providing direct funding to the individual cooperatives.

In other instances, climate change adaptation activities undertaken by DOI agencies have been more readily identifiable. For example, the USGS's scientific and monitoring activities listed above that directly and indirectly relate to climate change adaptation are documented examples where climate change adaptation activities have continued. In addition, the USGS commitment in 2020 to report to DOI on significant new findings in climate science and advances in best practices for incorporating climate information into planning and policymaking activities reflects ongoing climate change adaptation activities.

In its oversight capacity and to bolster its legislative activities, Congress may be interested in seeking additional information related to the full breadth of climate change adaptation activities within DOI and its agencies that have been undertaken pursuant to both administrative directives and statutory requirements, as well as the current status of such activities. Congress has shown this type of interest in the past; for example, Congress has required DOI or its agencies to produce reports—at times with potential repercussions for an agency's appropriations—to inform Congress on the status of certain activities. For example, in FY2020 Congress required FWS to provide a report on the status of the LCC program prior to receiving certain appropriated funds. In addition to oversight of ongoing programs, some Members of Congress in the 116th Congress expressed interest in pursuing legislation related to climate change adaptation.

A more complete public understanding of DOI's climate change adaptation activities, such as those presented herein, may be useful to inform congressional responsibilities for authorizations, appropriations, and oversight. For example, Members of Congress may be interested in examining legislation related to whether, how, or under what circumstances DOI agencies might incorporate climate change adaptation activities into the pursuit of fulfilling their statutory responsibilities.

¹³⁹ The Further Consolidated Appropriations Act, 2020, P.L. 116-94.

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