NATIONAL *fish, wildlife & plants* CLIMATE ADAPTATION STRATEGY

next steps:

a report on implementation

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www.wildlifeadaptationstrategy.gov

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Executive Summary

The *National, Fish, Wildlife, and Plants Climate Adaptation Strategy* (NFWPCAS or *Strategy*) outlines goals and strategies for the coordination and implementation of climate adaptation and resilience efforts related to fish, wildlife and plants. The *Strategy* was published in 2013 and federal, state and tribal agencies have made progress in implementing actions called for in the *Strategy.* Review of progress is overseen and coordinated by the Joint Implementation Working Group (JIWG), a coordinating body of federal, state, and tribal agencies that provides a forum to help communicate and coordinate climate adaptation. More information on the *Strategy* and its implementation is available at http://www.wildlifeadaptationstrategy.gov/.

This *Next* Steps report provides a sampling of the many ways in which federal, state, and tribal agencies are undertaking climate adaptation and resilience efforts in FY 2015 and 2016 to implement the recommendations of the *Strategy*.

Although not an exhaustive inventory of effort, the report reveals certain features of reported implementation activities.

- There is a large body of work to implement the *Strategy* in action or planned for FY 2015 and 2016 by a broad spectrum of federal, state, and tribal agencies (15 agencies reported a total of 232 projects).
- Although some of this work is collaborative (36 of 232 projects), most actions are driven by a single agency (196 of 232 projects).
- Work is ongoing or planned in each of the *Strategy's* seven major goal areas, with the most extensive work in the areas of identifying and protecting conservation areas (Goal 1, 45 projects); enhancing management capacity to deal with climate change (Goal 3, 46 projects); and developing and utilizing new tools to enable adaptive management (Goal 4, 46 projects).
- Fewer projects, but still a significant number, were reported in the areas of increasing knowledge and information on climate change impacts on, and responses of fish, wildlife, and plants (Goal 5, 35 projects); reducing the impacts of current stressors (Goal 7, 30 projects): and updating current management plans and programs to address climate change (Goal 2, 29 projects).
- The fewest reported projects are in the area of increasing awareness and motivating action (Goal 6, 21 projects).
- Most planned climate adaptation projects for FY 2015 and 2016 represent climate-smart approaches to doing natural-resource conservation. Fewer projects represent wholly new approaches to climate adaptive conservation.

The overall impression gained from reviewing this work is that many agencies are beginning to respond to the challenge of climate change, but largely independent of

other agencies. Many agencies are working on the initial stages of climate adaptation that include planning (Goal 1), capacity building (Goal 3), and monitoring (Goal 4). In most cases, the work being reported helps implement the *Strategy* and supports its recommendations, but was not initiated in response to that *Strategy.*

Finally, there is much room for expanded efforts in the areas of active management (Goal 2) and public outreach/education (Goal 6) and for much closer coordination and collaboration among federal, state, and tribal agencies. The JIWG will continue to foster that coordination/collaboration. Some recommended next step are:

- The JIWG should develop annual reports describing progress in implementation of the *Strategy* to the National Council on Climate Change Preparedness and Resilience.

- Agencies should, in cooperation with the JIWG, consider expanding their portfolio of adaptation efforts to address the strategic actions called for in the *Strategy* that need increased attention.

- The JIWG should actively engage JIWG member agencies and other stakeholders in subgroups that focus on advancing key programmatic or policy matters in support of *Strategy* implementation.

Introduction

The *National Strategy* is a framework for coordinated action by multiple partners over the next 5-10 years to reduce risks and impacts of climate change on America's fish, wildlife, and plant resources and the people that depend upon those resources. The *National Strategy* was developed at the request of Congress by a unique partnership of federal, state, and tribal wildlife agencies. The *National Strategy* was released in 2013 and a Joint Implementation Working Group (JIWG) was formed to promote its implementation, report on progress, and update the *National Strategy* as new information and developments warrant.

In 2014, the JIWG released a report, the *National Fish, Wildlife, and Plants Climate Adaptation Strategy: Taking Action: A Progress Report* (*Taking Action*), that provided case studies of agency climate change adaptation efforts that were already underway when the *National Strategy* was being developed and released. *Taking Action* showed that the types of actions recommended by the *National Strategy* are feasible and already underway. This *Next Steps* report is more forward looking and emphasizes a broader picture of the climate adaptation and resilience work currently underway or planned in the near future.

Next Steps provides a brief summary of some of the top actions that federal, state, and tribal wildlife resource agencies are taking in FY 2015 and/or 2016 that help implement the goals of the *National Strategy.* This report should be viewed as a sampling of implementation efforts, not a comprehensive survey. It is meant to identify and highlight leading examples of where agencies are engaging, within existing resources, on climate change adaptation and resilience enhancing efforts. It is intended to help illustrate how these issues are being incorporated into agency programs and activities, identify points of contact for further information, and to inform participating agencies and partners of opportunities for coordination and collaboration.

JIWG member agencies were asked to identify the top three actions, activities, or projects (hereafter, projects) underway or planned in FY 2015 and/or 2016 that contributed in some way to implementing one or more of the seven goals of the *National Strategy* (Box 1). Fifteen of 21 JIWG member agencies reported one or more projects that contribute to implementation of the *National Strategy.* The total number of projects principally or directly related to climate change adaptation or natural resource resilience reported was 232. Summary information on all projects is presented in Appendix 1.

The *National Strategy* established seven overarching goals and then outlined major strategies and actions for achieving each goal. The following sections sort the projects reported by goal and list each under the more specific "strategy" to which they contribute most directly.

Note that the work described in the *National Strategy* is multi-faceted, broad in scope, often complex, and, in many cases, will take significant time to complete. Just because a strategy in the following sections has a project or two listed does not mean that strategy has been fully implemented. This information does, however, serve to highlight major areas where work is underway and those areas that currently lack attention.

Finally, after reviewing the implementation projects underway across agencies to support each goal, the JIWG identified actions recommended by the *National Strategy* that need greater attention from the agencies. These projects are listed at the end of each goal section of this report.

BOX 1 The Strategy identifies seven goals to help fish, wildlife, plants and ecosystems cope with the impacts of climate change. These goals were developed collectively by diverse teams of federal, state, and tribal technical experts, based on existing research and understanding regarding the needs of these valuable resources.

Goal 1
Conserve habitat to support healthy fish, wildlife and plant populations and ecosystem functions in a changing climate.

Goal 2
Manage species and habitats to protect ecosystem functions and provide sustainable cultural, subsistence, recreational, and commercial use in a changing climate.

Goal 3
Enhance capacity for effective management in a changing climate.


John Maxwell, USFWS Climate Change

Goal 4
Support adaptive management in a changing climate through integrated observation and monitoring and improved decision support tools.

Goal 5
Increase knowledge and information on impacts and responses of fish, wildlife and plants to a changing climate.

Goal 6
Increase awareness and motivate action to safeguard fish, wildlife and plants in a changing climate.

Goal 7
Reduce non-climate stressors to help fish, wildlife, plants, and ecosystems adapt to a changing climate.

Goal 1. Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.

An important first step toward adapting to climate change is to identify and begin protecting the best candidates for conservation areas that help safeguard species in a changing climate. The *National Strategy* envisions innovative opportunities to conserve additional habitat areas or to forge new connections between existing habitat areas.

Strategy 1.1: Identify areas for an ecologically-connected network of terrestrial, freshwater, coastal, and marine conservation areas that are likely to be resilient to climate change and to support a broad range fish, wildlife, and plants under changed conditions.

- Under Department of the Interior (DOI) leadership, federal land management agencies selected six flagship geographic regions in which inter-agency efforts will demonstrate a landscape level approach to developing place-based resilience strategies. The regions chosen include California's Headwaters, California's North-Central Coast and Russian River Watershed, Crown of the Continent, southwest Florida, Hawaii, Puget Sound Washington and the Great Lakes region. This is one of the first actions specified in the *Priority Agenda: Enhancing the Climate Resilience of America's Natural Resources* (see Appendix 1: 13-14)[1].
- In response to climate change concerns and other ecological stressors, the Bureau of Land Management (BLM) has launched 14 Rapid Ecological Assessments (REAs) since 2010 to improve understanding of the existing condition of these landscapes, and how conditions may be altered by ongoing environmental changes and land use demands. REAs look across all lands in an ecoregion to identify regionally important habitats for fish, wildlife, and species of concern. REAs then gauge the potential of these habitats to be affected by four overarching environmental change agents: climate change, wildfires, invasive species, and development (both energy development and urban growth). In FY 2015 and 2016 REAs will be completed for the Wyoming Basin, Yukon Kuskokwim, North Slope, Madrean Archipelago, Chihuahuan Desert, Southern Great Plains, and Central Yukon (1).
- The U.S. Fish and Wildlife Service's (USFWS) Migratory Bird Program is examining long-term data sets from hunting records across 49 states to assess potential range shifts in certain waterfowl species (22). This work will help determine if these bird

[1] Numbers in parentheses refer to the Project with that number in the list presented in Appendix 1.

species will have sufficient conservation areas in newly emerging ranges resulting from climate change.

Strategy 1.2: Secure appropriate conservation status on areas identified in Action 1.1.1 to complete an ecologically-connected network of public and private conservation areas that will be resilient to climate change and support a broad range of species under changed conditions.

- The National Park Service (NPS) is providing guidance to parks to assess unique ecological systems based on geological, soil, and vegetation surveys, to, in-part, capture unique geophysical settings. By FY 2016 NPS will assemble a portfolio of priority conservation sites based on the results (27).
- The National Fish Habitat Action Plan (NFHAP) is providing project funding for climate adaptation projects (8) and the Florida Fish and Wildlife conservation Commission (FWC) is using its Florida Private Lands Partnerships to target property tax incentives for land dedicated to conservation (25). This effort will lead to a more connected habitat landscape to allow for species migration.

Strategy 1.3: Restore habitat features where necessary and practicable to maintain ecosystem function and resiliency to climate change.

- Many efforts are underway across the country by a variety of agencies to restore important degraded habitats to enhance the resilience of fish, wildlife, or plant resources and/or to enhance carbon sequestration services. Most are focused on riparian and wetland systems: some coastal (5, 7, 9, 20, 34); others inland (30, 33, 36), or both (10, 19). For example, The California Department of Fish and Wildlife (CDFW) is restoring 950 acres of fresh and brackish water emergent wetlands that will be accomplished by reconnecting diked lands of Hill Slough in Suisan Marsh (5).

Strategy 1.4: Conserve, restore, and as appropriate and practicable, establish new ecological connections among conservation areas to facilitate fish, wildlife, and plant migration, range shifts, and other transitions caused by climate change.

- A number of efforts are underway to better identify and protect ecological connectivity. This includes a number of projects supported by the Landscape Conservation Cooperatives (LCCs, 11). NPS efforts to identify restoration opportunities that include corridor goals and objectives (21) and migration barriers, both internal and external to park boundaries (37), and the FWC's Conservation Blueprint (24). In addition, a collaborative interagency (CDFW, BLM, USFWS, and the California Energy Commission) effort on Desert Tortoise management is seeking to assemble and manage a Desert Tortoise Conservation Area and Linkage Reserve System (4).

Key Actions in Strategy Needing Future Attention

- 1.1.4: Establish inter-jurisdictional inventory of current conservation area and candidate high priority conservation areas.
- 1.2.4: Work with partners at landscape scales to strengthen and maximize use of existing conservation programs, particularly the conservation title of the Farm Bill, conservation easement tax incentives, the private lands programs focused on endangered species, and other federal and state private lands incentive programs to conserve private lands of high conservation value, to enhance habitat values and maintain working landscapes under climate change.
- 1.3.1: Develop and implement restoration protocols and techniques that promote ecosystem resilience and facilitate adaptation under a range of possible future conditions.
- 1.4.2: Assess and prioritize critical connectivity gaps and needs across current conservation areas, including areas likely to serve as refugia in a changing climate.

Goal 2. Manage species and habitats to protect ecosystem functions and provide sustainable cultural, subsistence, recreational, and commercial use in a changing climate.

In order for climate change considerations to become mainstreamed within agency's operations, climate change impacts and adaptation strategies must be incorporated into existing and new management and conservation plans for species and habitats. New management approaches are being developed as needed to ensure that healthy, robust populations of fish, wildlife, and plants will be maintained into the future.

Strategy 2.1: Update current or develop new species, habitat, and land and water management plans, programs and practices to consider climate change and support adaptation.

- Many efforts are underway across the country by a variety of agencies to incorporate climate change into general and species-specific management or conservation plans and objectives for fish, wildlife, and the habitats on which they depend (38, 39, 40, 41, 49, 50, 56). For example, conservation of habitat for Mohave Ground Squirrel may be undertaken outside its historic range if such areas have been shown to be suitable for occupancy in response to climate change induced shifts in the species' range and/or distribution (38).
- Agencies are also beginning to utilize the principles of ecosystem based management and green infrastructure together to support climate adaptation (57, 58). The U.S. Army Corps of Engineers (USACE), the National Oceanic and Atmospheric Administration (NOAA), Coastal States Organization, and The Nature Conservancy have partnered to develop the Systems Approach to Geomorphic Engineering (SAGE). SAGE is an initiative that brings together experts and practitioners from the federal, academic, non-profit and private sectors to pursue and advance a comprehensive view of shoreline change to slow, prevent, mitigate, and/or adapt to impacts to coastal communities from the consequences of climate change, linking 'soft' ecosystem-based approaches with 'hard' infrastructure approaches (58).

Strategy 2.2: Develop and apply species-specific management approaches to address critical climate change impacts where necessary.

- Efforts are currently underway to develop species-specific management approaches to help maintain healthy fish populations in the future and to avoid negative impacts of climate change. USFWS/Fisheries and Aquatic Conservation along with the Department of Commerce (DOC), the National Institute of Standards & Technology

(NIST), and Montana State University are working together to develop dietary interventions to mitigate climate-induced alterations of rainbow trout gut microbial populations and protein metabolism in hatchery-raised fish (44).
- The CDFW is working with several organizations in California's Central Valley to develop a reintroduction plan for winter-run Chinook Salmon that will create a more resilient population in the face of climate change (45).
- Several agencies and organizations are utilizing risk assessments to design appropriate management actions and inform decision-making frameworks related to various species and habitats (60, 61, 62).

Strategy 2.3: Conserve genetic diversity by protecting diverse populations and genetic material across the full range of species occurrences.

- Multiple large-scale efforts are underway to protect genetic material and diverse plant populations. NPS is currently working to implement the Plant Conservation Alliance 2015 Action Plan (46).
- An interagency collaboration, led by BLM, is developing a National Seed Strategy which will ensure the availability of appropriate seed to provide healthy and productive plant communities in a changing climate (47).

Key Actions in Strategy Needing Future Attention

- 2.1.3: Identify species and habitats particularly vulnerable to transition under climate change (e.g., wetlands, cool-water to warm-water fisheries, or cool season to warm season grasslands) and develop management strategies and approaches for adaptation.
- 2.1.5: Review and revise as necessary existing species and habitat impact avoidance, minimization, mitigation, and compensation standards and develop new standards as necessary to address impacts in a manner that incorporates climate change considerations.
- 2.2.2: Develop criteria and guidelines that foster the appropriate use, and discourage inappropriate use of translocation, assisted relocation, and captive breeding as climate adaptation strategies.
- 2.3.3: Develop protocols for use of propagation techniques to rebuild abundance and genetic diversity for particularly at-risk plant and animal species.

Goal 3. Enhance capacity for effective management in a changing climate.

The *National Strategy* recognizes that it is critical to enhance natural resource managers' capacity for understanding information about climate change so that it can be utilized in developing effective management plans. This may involve, among other things, developing new management tools, professional training, and new ways of assessing information.

Strategy 3.1: Increase the climate change awareness and capacity of natural resource managers and other decision makers and enhance their professional abilities to design, implement, and evaluate fish, wildlife, and plant adaptation programs.

- There has been extensive progress among the federal, state, and tribal agencies in developing new climate change training classes focused on both existing and emerging tools. The aim is to help managers and decision makers learn and apply climate knowledge in their activities. This training is open to all federal agency personnel and partners and includes various topics. For example, USFWS's National Conservation Training Center offers a climate change curriculum that includes courses on Climate Change Vulnerability Assessment (83), the National Climate Academy (65, 87), Decision Analysis in a Changing Climate (83), Scenario Planning toward Climate Change Adaptation (83), Climate-Smart Conservation training (86), Communicating Climate Change (67) and Tribal Climate Adaptation Planning (89). As another example, the Bureau of Reclamation has been collaborating with the Climate Change and Water Working Group and University Corporation for Atmospheric Research (UCAR) COMET program to develop and pilot climate change training tools for federal and non-federal water agency staff and explore sustained delivery approaches (88).
- Existing training classes are also being updated to include a climate change component. The USACE has taken this approach with their Ecosystem Restoration Planning courses and the NPS is incorporating climate change considerations into their plant conservation and restoration efforts (74).
- BIA has added a geospatial analysis position to its workforce to increase its data analysis capacity in support of adaptation planning and to help identify best practices/planning scenarios for tribes (90).
- There are efforts underway to provide data that increases the capacity of managers to implement climate adaptation programs. For example:
    - Various LCC projects are designed to provide information to land managers such as sea level rise modeling, including site-specific data and modeling results (72).
    - NOAA is connecting with stakeholders, customers and users through regional, state, and local extension capabilities and activities to translate

climate information. For example, their Regional Integrated Sciences & Assessments (RISA) program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change (70).

- Tribes are working towards increasing information available on the web. For example, there will be a "tribal landing page" added to the Climate Resilience Toolkit[2] which will aid in the sharing of management and planning level information (91).

Strategy 3.2: Facilitate a coordinated response to climate change at landscape, regional, national, and international scales across state, federal, and tribal natural resource agencies and private conservation organizations.

- The Wisconsin Initiative on Climate Change Impacts (WICCI) is a network of individuals and organizations, each working on reducing vulnerability to climate change in their areas. The WICCI network covers a host of topics, including heat stress, waterborne disease, agriculture, wildlife, natural communities, stormwater management, community planning, and more (78).
- NOAA has coastal monitoring and data collection tools, sanctuaries, estuarine reserves, marine protected areas, and other assets located in coastal areas around the Nation. Their Sentinel Site Program is currently looking at the impacts of climate change, focusing on sea level change and coastal inundation. This effort is about more than simply gathering data and directly engages local, state, and federal managers as part of the Cooperative team. By doing so, managers help ensure the types of science conducted, information gathered, and products developed are immediately used for better management (68).
- The Bureau of Reclamation (BOR) was part of a binational team that worked toward supporting a binational agreement (Minute 319) which supplements the 1944 Water Treaty with Mexico. This agreement will help increase resilience to climate change by preserving reservoir elevations in the Colorado River, providing environmental flows in the Colorado River Delta in Mexico, and facilitating investments to improve water infrastructure in Mexico (97).
- The challenges of working across multiple jurisdictions and across great geographic distances make highly migratory species a special case in terms of correctly assessing their vulnerability to climate change impacts. The USFWS is partnering with foreign countries in the development and prioritization of national guidelines/actions needed to assist migratory species to adapt to climate change (100).

[2] Note on, and link to Climate Resilience Toolkit.

Strategy 3.3: Review existing federal, state and tribal legal, regulatory and policy frameworks that provide the jurisdictional framework for conservation of fish, wildlife, and plants to identify opportunities to improve, where appropriate, their usefulness to address climate change impacts.

- CDFW is establishing a program that will use cap and trade funds to establish a program titled Wetland Restoration for GHG Reduction. The new program and additional staff will enhance CDFW's capacity to support climate adaptation and mitigation activities (79).
- The NPS is reviewing and revising their guidance on ecological restoration to add more detail on addressing targets and strategies to incorporate adaptation opportunities. They are also developing and utilizing guidance on how to address impacts associated with climate change, including those on low income, minority and Tribal communities, and in environmental compliance documents (104).
- The Animal and Plant Health Inspection Service (APHIS) is examining their cooperative agreement process to ensure that they are responsive to increased demand for collaboration and partnerships with others on climate change issues (65).

Strategy 3.4: Optimize use of existing fish, wildlife, and plant conservation funding sources to design, deliver, and evaluate climate adaptation programs.

- BOR is currently prioritizing funding for land and water protection programs in FY 2015-16 that incorporate climate change considerations. For example, WaterSMART Grants provide cost-shared financial assistance to carry out water and energy efficiency improvements, including projects that save water, increase energy efficiency and the use of renewable energy in water management, address endangered species and other environmental issues, and facilitate transfers to new uses (105).
- USFWS is developing policy in FY 2015-16 that will incorporate climate change considerations and best management practices for applying resilience criteria to land acquisition and financial assistance programs (106).

Key Actions in Strategy Needing Future Attention

- 3.1.4: Develop a web-based clearinghouse of training opportunities and materials addressing climate change impacts on natural resource management.
- 3.2.4: Collaborate with tribal governments and native peoples to integrate traditional ecological knowledge and principles into climate adaptation plans and decision-making.
- 3.3.2: Review existing legal, regulatory and policy frameworks and identify opportunities to develop or enhance, where appropriate, market-based incentives

to support restoration of habitats and ecosystem services impacted by climate change. Identify opportunities to eliminate disincentives to conservation and adaptation.

- 3.4.1: Prioritize funding for land and water protection programs that incorporate climate change considerations.

Goal 4. Support adaptive management in a changing climate through integrated observation and monitoring and use of decision support tools.

Adaptive management for a changing climate requires inventory, monitoring, and observation to understand climate impacts on fish, wildlife, and plants. It also requires understanding what vulnerable, identifying possible future scenarios is, and developing management strategies for effective adaptation. There is significant activity underway in FY 2015 and 2016 to address this Goal.

Strategy 4.1: Support, coordinate, and where necessary develop distributed but integrated inventory, monitoring, observation, and information systems at multiple scales to detect and describe climate impacts on fish, wildlife, plants, and ecosystems.

- A number of efforts are underway to monitor changing conditions on marine and riverine aquatic ecosystems. Such efforts include measuring responses to human impacts and management activities in Wisconsin on Cisco (107). California (CDFW) will continue to monitor changing water temperature in the Sacramento River and its effects on aquatic habitat (108). FWC will continue to implement ongoing Seagrass Integrated Mapping and Monitoring and Coastal Habitats Independent Mapping and Monitoring Programs that coordinate statewide efforts to map and monitor critical coastal habitats in Florida (111).
- Various LCC projects will provide managers with the monitoring tools they need to evaluate climate change effects. For example, the University of California Riverside's Center for Conservation Biology will create a sustainable resource monitoring framework that will provide empirical data identifying if and how climate change is changing the composition and vitality of Joshua Tree National Park (134).
- NPS will collaborate with the National Phenology Network (NPN) to build a system for monitoring phenology in National Parks (137).
- The North Slope Science Initiative is an intergovernmental effort, administered by BLM, to increase collaboration at the local, state, and federal levels to address the research, inventory, and monitoring needs to support decision-making about development and climate change on the North Slope of Alaska (110).
- NOAA partners will continue to track, assess and report on current conditions and impacts of climate and other stressors on the Nation's marine ecosystems (National Marine Fisheries Service ecosystem status reports) and estuaries (National Estuarine Research Reserves System System-Wide Monitoring Program--112).
- The National Marine Fisheries Service (NMFS) and partners will develop a Northeast climate and marine ecosystem dashboard to provide fisheries and other

marine resource managers with improved information on past, current and future climate and marine ecosystem conditions including early warnings (119).

- USFWS and partners will evaluate long-term waterfowl breeding population data to develop an estimation framework to develop models linking waterfowl population dynamics to climate change impacts on important weather and habitat variables (129).

Strategy 4.2: Identify, develop, and employ decision support tools for managing under uncertainty (e.g., vulnerability and risk assessments, scenario planning, strategic habitat conservation approaches, forecasting, and adaptive management evaluation systems) via dialogue with scientists, managers (of natural resources and other sectors), economists, and stakeholders

- NOAA Fisheries have several efforts underway to assess and pilot methodology to ascertain vulnerability of marine protected species (e.g., marine mammals, sea turtles--114) and commercial and recreational fisheries (119).
- Florida's State Wildlife Action Plan (SWAP) Objective 3 states that, by 2017, Florida will integrate adaptation planning into a broader suite of habitats and species, using previous vulnerability assessments as a template for identifying threats. Plans include expanding scenario planning and/or vulnerability assessments, developing and funding on-the-ground pilot adaptation projects, and funding research projects that will provide the information needed to better manage habitats and/or species in response to climate change (123).
- In association with SWAP revision, CDFW is partnering with UC Davis to conduct a vulnerability assessment of vegetative communities across the entire state of California in 2015. The study will increase our knowledge of which communities in California are most vulnerable to climate change and why. (141).
- By 2016, USFWS and partners will provide an adaptive harvest management framework to Atlantic States for horseshoe crab harvest decisions and a modeling and estimation framework to evaluate changes in migration phenology and match-mismatch of migratory shorebirds and their food resources in Delaware Bay (127).
- Over the next year, NOAA will deploy new or expanded resilience tools including an expanded Coastal Flood Exposure Mapper for coastal states on the East Coast and Gulf of Mexico; a Climate Change Vulnerability Assessment tool for Coastal Habitats; and a new performance support tool for GIS professionals working with agencies and organizations on natural infrastructure planning for coastal resilience. These resources and tools will be incorporated into the Climate Resilience Toolkit[3] (120)(Wisconsin DNR is incorporating climate adaptation into Master Planning for

[3] https://toolkit.climate.gov/

the Driftless Area, a unique potential climate refugia located in the western and southwestern portion of the state. The Driftless Area planning team used two of the newest science-based stream models to help evaluate the suitability of current and future habitat conditions for brook trout, brown trout, and smallmouth bass (124).

- USFWS and partners will develop a survey sampling framework to estimate population size and distribution of breeding shorebirds, compare results to prior survey efforts, and provide robust information for future analysis of climate change in Arctic and boreal habitats in areas of high breeding densities (125).
- Over the next two years, NPS will hold scenario workshops on conservation in a changing climate in several national parks including Yellowstone National Park, Acadia National Park, and Cape Lookout National Seashore (142).
- NOAA's National Ocean Service (NOS) will explore management options for adapting to or mitigating climate change impacts on natural resources, protected species, and coastal and ocean habitats by developing climate change scenarios in ecosystem-based, forecast models, e.g. Scenario forecast models developed by The National Centers for Coastal Ocean Science Ecological Effects of Sea Level Rise Program and implemented through NOS Sentinel Site program (131).

Key Actions in Strategy Needing Future Attention

- 4.1.5: Develop consensus standards and protocols that enable multi-partner use and data discovery, as well as interoperability of databases and analysis tools related to fish, wildlife, and plant observation, inventory, and monitoring.
- 4.2.4: Define national standards and criteria to identify fish, wildlife, plants, and ecosystems most vulnerable to climate change impacts.

Goal 5. Increase knowledge and information on impacts and responses of fish, wildlife, and plants to a changing climate.

The design and delivery of fish, wildlife, and plant climate change adaptation programs will depend upon expanded and improved knowledge about the specific impacts of climate change on these resources and their capacity to respond and adapt.

Strategy 5.1: Identify knowledge gaps and define research priorities via a collaborative process among federal, state, tribal, private conservation organizations, and academic resource managers and research scientists.

- Federal agencies are working with partners to develop research plans and establish priorities for their areas of expertise and management responsibility. For example, NMFS is developing both a national Climate Science Strategy and Regional Action Plans to support management of marine and coastal resources (170).
- DOI's Climate Science Centers (CSCs) work with regional stakeholders both on medium-term (5 year) priorities and annual investment decisions (183) and the Bureau of Indian Affairs (BIA) is adding five tribal liaison positions at CSCs to strengthen the capacity for dialogue with tribes (182)
- BOR's Basin Studies and Climate Risk Analyses use stakeholder activities to identify adaptation strategies that help balance water supplies and demands given impacts from climate change (171).

Strategy 5.2: Conduct research into ecological aspects of climate change, including likely impacts and the adaptive capacity of species, communities and ecosystems, and their associated ecosystem services, working through existing partnerships or new collaborations as needed (e.g., U.S. Global Change Research Program, National Climate Assessment CSCs, RISAs, and others).

- Understanding how carbon storage can be integrated into management so as to achieve both adaptation and mitigation is a key goal. NOAA is working to define the role of coastal and ocean habitats in carbon storage (143), and the USGS and USFWS have pilot projects to explore carbon storage as a component of restoration and protection of coastal habitats, including mangrove systems (215).
- Wisconsin DNR has research underway to explore the effects of climate change on common loons, snowshoe hare, and the timing of songbird migration. The songbird work takes advantage of citizen science to expand the data available (153, 159, 160).
- A White House Task Force – Coastal Green Infrastructure and Ecosystem Services, co-chaired by NOAA and USGS, will identify knowledge gaps and research priorities

for better understanding the ecosystem services and values provided by coastal green infrastructure (169). In addition, EPA is developing a National Ecosystem Services Classification System that will identify how these services provide direct benefit to humans (168).

- NOAA is launching a new research effort to understand the effects of climate change on fish stocks and fisheries in the U.S. Northeast Shelf and the Bering Sea to provide fisheries managers and industries with more robust climate-ready management strategies (157, 158).
- The USGS National Climate Change and Wildlife Science Center (NCCWSC) and several CSCs have begun work on a toolkit for managers to support them as they anticipate and adapt to drought, with a focus on ecological impacts (154).

Strategy 5.3: Advance understanding of climate change impacts and species and ecosystem responses through modeling.

- The Swinomish Indian Tribal Community is modeling future conditions on the west side of the Reservation to estimate the impacts from sea level rise and storm surge on the near-shore environment (151).
- Wisconsin DNR is developing watershed-scale models to predict the occurrence of fish species in Wisconsin streams under current climate conditions and to project possible changes in fish species occurrence in response to global climate change (164)
- LCC projects will use modeling to identify potential impacts of climate change on key habitats so that those impacts can be considered in the management of resources. For example, several projects are ongoing to model sea-level rise along the Pacific Coast including at several National Wildlife Refuges (167).

Key Actions in Strategy Needing Future Attention

- 5.1.5: Based on priority conservation needs identified by resource managers, develop national, and as appropriate, regional research agendas identifying key high level questions for which more fundamental research is needed to enable development of management applications or decision support tools; and facilitate consultation among major science funding agencies to maximize incorporation of these needs into funding opportunities and work plans.
- 5.2.6: Identify pollutants likely to be affected by climate change and accelerate research on their effects on fish, wildlife, and their habitats, including contaminant effects that will likely increase vulnerability to climate change.
- 5.3.5: Provide access to current climate data and ensure alignment with data management and decision support tools at agency and departmental levels.

Goal 6. Increase awareness and motivate action to safeguard fish, wildlife, and plants in a changing climate.

Many government and non-governmental entities are already working to increase awareness about the effects of a changing climate on natural resources. As these efforts go forward, it is important to remember that different approaches are needed with different audiences. Outreach needs to be varied, comprehensive, and persistent.

Strategy 6.1: Increase public awareness and understanding of climate impacts to natural resources and ecosystem services and the principles of climate adaptation at regionally- and culturally-appropriate scales.

- The BIA, in partnership with USFWS, USFS, USGS, and the NPS are providing an Intertribal Climate Youth Leadership Congress for training and engagement to 100 tribal youth June 28-July 3, 2015 (189).
- Subject to appropriations, EPA will expand activities in each of its 10 regional offices to assist small and disadvantaged communities in addressing environmental risks, building resilience and addressing the impacts of climate change (192).
- CDFW staff will identify opportunities to increase awareness of the various stresses to California ecosystems (including climate change) and to communicate the importance of addressing these stressors. Outreach objectives and associated actions will be outlined in the revised SWAP, which will be completed in 2015 (185).

Strategy 6.2: Engage the public through targeted education and outreach efforts and stewardship opportunities.

- The Wisconsin DNR and the University of Wisconsin (Madison) are exploring the use of citizen science programs for studying spring migration phenology of songbirds throughout the Upper Midwest. So far, they have found that milder climate conditions on overwintering grounds promotes early arrival to breeding grounds, which may lead to phenological mismatches between the birds and their normal food sources (e.g., insects, etc.; 197).
- Among other creative education initiatives, the NPS is working with the Garden Club of America to disseminate climate-related information and messages (200).
- The BIA is initiating a climate-impact photo contest for K -12 students (190).

Strategy 6.3: Coordinate climate change communication efforts across jurisdictions.

- NOAA has developed interagency websites, such as Climate.gov (http://climate.gov) and Digital Coast (http://coast.noaa.gov/digitalcoast) that communicate climate data and information to the general public as well as decision makers (191).

Key Actions in Strategy Needing Future Attention

- 6.1.3: Identify and partner with key stakeholder groups (e.g., conservation and environmental organizations, hunting and angling groups, trade associations, outdoor manufacturers and retailers) to help develop and distribute key climate change and adaptation messages tailored for their interest groups as well as the broader public.
- 6.2.5: Develop educational materials and teacher trainings for K-12 classrooms linked to state education standards on impacts and responses to climate change.
- 6.2.8: Develop strategy to assess effectiveness of communication efforts and modify as appropriate.
- 6.3.2: Engage employees from multiple agencies in key climate change issues by expanding existing forums for information sharing and idea exchange, and create new forums and channels as needed.

Goal 7. Reduce non-climate stressors to help fish, wildlife, plants, and ecosystems adapt to a changing climate.

Reducing existing threats such as habitat degradation and fragmentation, invasive species, pollution, and over-use can help fish, wildlife, plants, and ecosystems better cope with the additional stresses caused by a changing climate.

Strategy 7.1: Slow and reverse habitat loss and fragmentation.

- The BLM, working jointly with the USFS, has developed a series of Environmental Impact Statements (EISs) to incorporate Greater Sage-Grouse conservation measures on the lands they manage. These Draft EISs were released to the public in 2013. The goal is to release the final EISs in the early summer of 2015, with final plans released before the end of FY 2015 (205).
- The US Coral Reef Task Force member agencies will implement Watershed Management and Conservation Action Planning and Implementation in priority watersheds in Puerto Rico, American Samoa, and Hawaii in collaboration with multiple federal, state and local entities (206).

Strategy 7.2: Slow, mitigate, and reverse where feasible ecosystem degradation from anthropogenic sources through land/ocean- use planning, water resource planning, pollution abatement, and the implementation of best management practices.

- In 2014, EPA joined with federal agencies, non-governmental organizations, and private-sector entities to form the Green Infrastructure Collaborative, a network to help communities more easily implement green infrastructure. The Collaborative will build capacity for green infrastructure implementation by providing a platform for national stakeholders to:
    - Leverage joint efforts to promote the multiple community benefits of green infrastructure;
    - Build and share knowledge around emerging green infrastructure technologies and policy issues; and
    - Facilitate shared inquiry into the best ways to encourage adoption of green infrastructure technologies at the local level.
    - Seven federal agencies support the Collaborative and these agencies have committed to specific actions to promote green infrastructure. Over the coming year, Collaborative members will work closely together to align public and private knowledge and resources to promote green infrastructure.

- Pollution Control Programs: EPA is continuing to implement a range of water pollution abatement programs in cooperation with States, including permits for control of pollution discharges, grants to states for reducing nonpoint sources of pollution, and grants to support financing of drinking water and wastewater facilities.

Strategy 7.3: Use, evaluate, and, as necessary, improve existing programs to prevent, control, and eradicate invasive species and manage pathogens.

- The Federal Aquatic Nuisance Species Task Force and National Invasive Species Council produced a report, "Bioinvasions in a Changing World: A Resource on Invasive Species-Climate Change Interactions for Conservation and Natural Resource Management" in FY 2015. An interagency workgroup will define information gaps and provide recommendations on the intersection between climate change and invasive species and will provide ongoing updates to the report (232).
- USFWS will work with industry and other partners to promote and encourage environmentally responsible consumer behavior in selecting and owning pets. For example, reinvigorating the Habitattitude campaign will lead to fewer releases, whether accidental or intentional, of pets that pose a threat to native resources that are already stressed by climate change (211).
- USFWS will continue to develop peer-reviewed tools such as the Risk Assessment Mapping Program that maps and scores invasive species climate niches using projections of changing climate conditions. Data generated by those improved risk assessment models will allow the USFWS and partners to better identify high-priority threats and take more effective action for the benefit of trust resources. This information, which incorporates climate data, will continue to be shared with industry, the public, and state partners to promote and encourage environmentally responsible actions in the trade of harmful species and take voluntary and regulatory risk management actions (208).
- Invasive, non-native plants and animals degrade and diminish Florida's conservation lands and waterways. The State devotes significant resources to monitoring and managing these species. Efforts include Exotic Pet Amnesty Days, and the Python Challenge which seek to raise awareness and reduce numbers of exotic animals, and extensive ongoing programs to remove Hydrilla and water hyacinth from rivers (210).
- The Chesapeake Bay Nutria Eradication Project (CBNEP) aims to eradicate the invasive and highly damaging nutria from the Delmarva Peninsula, thereby preventing further erosion of the remaining coastal wetlands to preserve and protect the ecological and economic benefits they provide the Chesapeake Bay Region (231).

Strategy 7.4: Reduce destructive capture practices (e.g., fisheries bycatch, destructive fishing gear), over-harvesting and illegal trade to help increase fish, wildlife, and plant adaptation.

- The State of Hawai‘i designated the Kahekili Herbivore Fisheries Management Area in order to control the overabundance of marine algae on coral reefs and restore the marine ecosystem back to a healthy balance. In 2009, the State prohibited the killing, injuring, or harming of sea urchins and certain herbivorous fishes, including sea chubs, parrotfish, and surgeonfish in order to increase the local abundance of these beneficial fishes and sea urchins in the area. Feeding of these fishes is also prohibited in order to promote grazing. The State is continuing to monitor the impacts of this effort (214).

Key Actions in *National Strategy* Needing Future Attention

- 7.1.9: Identify options for redesign and removal of existing structures or barriers where there is the greatest potential to restore natural processes.
- 7.2.2: Work with farmers and ranchers to develop and implement livestock management practices to reduce and reverse habitat degradation and to protect regeneration of vegetation.
- 7.3.3: Develop national standards for collecting and reporting invasive species data to facilitate information sharing and management response.

Summary and Recommendations

Conclusions

Although not an exhaustive inventory of effort, this report reveals certain features of reported implementation activities.

- There is a large body of work consistent with the recommendations of the *Strategy* in action or planned for FY 2015 and 2016 by a broad spectrum of federal, state, and tribal agencies (15 agencies reported a total of 232 projects).
- Although some of this work is collaborative (36 of 232 projects), most actions are driven by a single agency (196 of 232 projects).
- Work is ongoing or planned in each of the *Strategy's* seven major goal areas, with the most extensive work in the areas of identifying and protecting conservation areas (Goal 1, 45 projects); enhancing management capacity to deal with climate change (Goal 3, 46 projects); and developing and utilizing new tools to enable adaptive management (Goal 4, 46 projects).
- Fewer projects, but still a significant number, were reported in the areas of increasing knowledge and information on climate change impacts on, and responses of fish, wildlife, and plants (Goal 5, 35 projects); reducing the impacts of current stressors (Goal 7, 30 projects): and updating current management plans and programs to address climate change (Goal 2, 29 projects).
- The fewest reported projects are in the area of increasing awareness and motivating action (Goal 6, 21 projects).
- Most planned climate adaptation projects for FY 2015 and 2016 represent climate-smart approaches to doing natural-resource conservation. Fewer projects represent wholly new approaches to climate adaptive conservation.

The overall impression gained from reviewing this work is that many agencies are beginning to respond to the challenge of climate change, but largely independent of other agencies. Most work is in the areas of land and water conservation or building the human and intellectual capacity for adaptation. In most cases, the work being reported helps implement the goals and recommendations of the *National Strategy*, but was not initiated in response to that *Strategy*. There is much room for both expanded efforts and for much closer coordination and collaboration between agencies and with partners. The *National Strategy's* Joint Implementation Working Group can and should play a role in overseeing and promoting implementation efforts and fostering coordination/collaboration.

Recommendations

Based on a review of the information presented here, key next steps include:

- The Joint Implementation Working Group should develop annual reports describing progress in implementation of the *National Strategy* to the National Council on Climate Change Preparedness and Resilience. These reports should also identify pressing policy matters and critical investments needed to support effective implementation of the *National Strategy* in the future.

- Agencies should, in cooperation with the JIWG, consider expanding their portfolio of adaptation efforts to address the strategic actions called for in the *National Strategy* that need increased attention. Some of these actions are identified at the end of each goal section of this report. Where necessary, agencies should include funding for such actions in future budget requests.

- The JIWG should actively engage JIWG members and other stakeholders in subcommittees that focus on advancing key program or policy matters in support of the *National Strategy.*

- The JIWG should name a lead federal agency on an annual basis. The lead federal agency should, in cooperation with State partners in the JIWG, be responsible for co-chairing meetings, managing JIWG activities and reports, representing the JIWP to outside parties, and providing operational staff support to complement the staff support now provided by other JWIG partners (i.e.; Association of State Fish and Wildlife Agencies).

Appendix 1. Projects Reported by Federal and State Agencies that Contribute to Implementation of the *National Fish, Wildlife, and Plants Climate Adaptation Strategy*

#	Strategy Goal	Strategy or Action	Title	Brief Project Description	Year (15 or 16)	Agency	Contact
1	1	1.1	Rapid Ecological Assessments	In response to climate change concerns, the BLM has launched fourteen Rapid Ecoregional Assessments (REAs) since 2010 to improve the understanding of the existing condition of these landscapes, and how conditions may be altered by ongoing environmental changes and land use demands. REAs look across all lands in an ecoregion to identify regionally important habitats for fish, wildlife, and species of concern. REAs then gauge the potential of these habitats to be affected by four overarching environmental change agents: climate change, wildfires, invasive species, and development (both energy development and urban growth). In FY 2015 and 2016 REAs should be completed for the Wyoming Basin, Yukon Kuskokwim, North Slope, Madrean Archipelago, Chihuahuan Desert, Southern Great Plains, and Central Yukon		BLM	ktripp@blm.gov
2	1	1.1	Wildlife Management Area Planning in Florida	Sea level rise potential inundation being included in new management plans for coastal wildlife management areas, such as Chassahowitzka WMA. The results of Sea Level Affecting Marsh Model (SLAMM) for CWMA show habitats that may be impacted. The low-lying coastal habitats, such as salt marsh and hardwood swamp, are projected to face the most direct and dramatic impacts, which may result in the loss of species using that habitat including migrating and nesting birds.	15, 16, 17	Florida Fish and Wildlife Conservation Commission	Whitney.Gray@MyFWC.com
3	1	1.2	Designation of climate adaptive sites in the National Estuarine Research Reserve System	National Estuarine Research Reserve System site designation - continue NERR site designation process for Hawaii on landscapes likely to be climate resilient		NOAA-OCM	Roger.B.Griffis@noaa.gov
4	1	1.3	Desert Tortoise Management	Assemble and manage a Tortoise Conservation Area and linkage reserve system to provide for desert tortoise population and range change on the landscape in response to biophysical changes as a result of climate change, shifting vegetation communities, and desert tortoise populations. Actions will be taken in accordance with the Desert Renewable Energy Conservation Plan (DRECP), which will be completed in 2015.	15/16	CDFW, BLM, USFWS, CA Energy Commission	Whitney.Albright@wildlife.ca.gov

5	1	1.3	Hill Slough Restoration	Restoration of 950 acres of fresh and brackish water tidal emergent wetlands that will be accomplished by reconnecting diked lands of Hill Slough (in Suisun Marsh).	15/16	CDFW	Greg.Martinelli@wildlife.ca.gov
6	1	1.3	Improve Best Management Practices for Culverts and Road Stream Crossings	Provide on the ground training for state and local officials in designing and developing best management practices for culverts and road crossings to promote habitat connectivity for aquatic organisms and provide resiliency in the face of increasing rainfall.	15/16	FWS/FAC	dolores_savignano@fws.gov
7	1	1.3	Lindsey Slough Restoration	Restoration of 150 acres of fresh and brackish water tidal emergent wetlands and 69 acres of alkali wetlands that will be accomplished by reconnecting diked lands in Lindsey Slough (in the Cache Slough area).	15/16	CDFW	Greg.Martinelli@wildlife.ca.gov
8	1	1.3	National Fish Habitat Action Plan Project Funding	Provide funding to National Fish Habitat Partnerships for climate adaptation projects.	15/16	FWS/FAC	dolores_savignano@fws.gov
9	1	1.3	Restore coastal, marine and Great Lakes habitats	Restore coastal, marine and Great Lakes habitats to promote climate resilience through efforts such as Coastal Zone Management Area (CZMA) funded projects		NOAA-OCM	Roger.B.Griffis@noaa.gov
10	1	1.3	Wetlands Restoration for Greenhouse Gas Reduction (grant program)	Projects will result in the restoration of coastal/Delta wetlands and mountain meadows for the primary purpose of GHG emissions reduction, but with many ecological co-benefits such as improved ecosystem function and resilience. Project selection and implementation will begin in 2015.	15/16	CDFW	Helen.Birss@wildlife.ca.gov
11	1	1.4	Identify and map priority areas for wildlife connectivity.	Some LCC projects will evaluate wildlife connections that may be important as climate change transitions occur. (For example, one LCC project will provide a quantitative and predictive analysis of landscape connectivity for 20 wildlife species over the Sonoran Desert ecoregion in the United States based on climate change and water type.)	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
12	1	1.1.1	BLM Healthy Lands Initiative Focal Areas	The BLM will use a landscape approach to identify and prioritize focal areas for treatments that are intended to maintain, improve, or restore range, aquatic, or forest health; connectivity; or resilience to climate change, fire, and other change agents.	15/16/17+	BLM	kprentic@blm.gov ktripp@blm.gov
13	1	1.1.1	Identify and map high priority areas	Within 6 months, Federal agencies working to address ecosystem management issues through LCCs and other multi-stakeholder bodies will work with partners to select flagship geographic regions for which they will identify priority areas for	15	LCC lead agencies (FWS, NPS,	

			for conservation.	conservation, restoration, or other investments to build resilience in vulnerable regions, enhance carbon storage capacity, and support management needs. Within 24 months, these agencies and their partners will have identified and mapped the initial list of priority areas within each of the selected geographic landscapes or regions.		BOR, BLM,FS)	
14	1	1.1.1	Identify and map high priority areas for conservation.	Identify and map priority areas for conservation in flagship geographic regions. (Several efforts are already ongoing, including the Southeast Conservation Adaptation Strategy (SECAS), a collaboration to define the 2060 conservation landscape needed to support fish, wildlife and other natural and cultural resources in the Southeastern US and Caribbean.)	15/16/17	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
15	1	1.1.1	National Landscape Conservation System	These lands are managed as an integral part of the larger landscape, in collaboration with the neighboring landowners and surrounding communities. The management objectives are to maintain biodiversity and promote ecological connectivity and resilience in the face of climate change.		BLM	sbutts@blm.gov/ ktripp@blm.gov
16	1	1.1.1	SWD District Reservoir Master Plan Updates.	Master Plan Updates will include climate adaptation and are scheduled for Tenkiller, Fort Gibson, John Redmond, Keystone, Pat Mayes, Robert S. Kerr, Texoma, Whitney, Sam Rayburn, Lavon, Canyon, Addicks & Barker, Wallisville, Beaver, Table Rock, and Bull Shoals Reservoirs.	15/16	USACE	David.K.White@usace.army.mil
17	1	1.1.1, 1.2.1	Joint venture activities	Work with various joint ventures on climate adaptation related activities for waterbird habitats.	15/16	Joint Ventures	guthrie_zimmerman@fws.gov
18	1	1.1.1, 1.2.1,1.3.1	Neotropical Migratory Bird Conservation Act (NMBCA)	Grant and matching funds support projects aimed at promoting the conservation of migratory birds and will include climate adaptation.		Division of Bird Habitat Conservation	Leakhena_Au@fws.gov
19	1	1.1.1, 1.2.2, 1.3.1, 1.4.1	North American Wetlands Conservation Act Grants (NAWCA)	Grant and matching funds support projects aimed at protecting, restoring, and enhancing wetland and associated upland migratory bird habitat and will include climate adaptation	15/16	Division of Bird Habitat Conservation	Leakhena_Au@fws.gov
20	1	1.1.2	Climate Ready Estuaries Program; part of the National Estuaries Program	The EPA Climate Ready Estuaries Program is providing grant assistance to support protection and restoration programs in 28 critical estuaries around the country, including climate adaptation projects and revision of existing Comprehensive Conservation and Management Plans for the estuaries to include climate adaptation elements.	15/16	EPA National Estuaries Program Estuaries	Craghan.Michael@epa.gov
21	1	1.1.3	Restoration opportunities	Identify significant degraded sites for restoration actions that implement corridor development goals and objectives	15/16	NPS / NIFC	cat_hawkins_hoffman@nps.gov for

			for corridor enhancement on NPS lands				Eckert, Schwab
22	1	1.1.3	Assessing species range Shifts	Examine long term data sets from hunting records across 49 states to assess potential range shifts in certain waterfowl species as a result of climate change	15/16	Division of Migratory Bird Management	Khristi_Wilkins@fws.gov; Eleanora_babij@fws.gov
23	1	1.1?	Revise Forest Plans: Implement 2012 Planning Rule	Revisions to include climate adaptation	Ongoing until all LMP's are revised	Forest Service	
24	1	1.2.1	Florida's Cooperative Conservation Blueprint	A multi-partner strategic conservation process continuing since 2006. The goal is to conserve wildlife, identify important interconnected wildlife habitats, and maintain a sustainable economy and a wide range of agriculture and nature-based opportunities. Components include private landowner incentives programs, and the development of a payment for ecosystem services program specifically for conservation of gopher tortoise habitat on private lands.		Florida Fish and Wildlife Conservation Commission	Brian.Branciforte@myfwc.com
25	1	1.2.1	Florida Private Lands Partnerships	The Landowner Assistance Program works cooperatively with private landowners and managers to conserve wildlife and habitat while keeping land productive for agriculture and recreation. The program offers habitat management workshops, and technical assistance. Property tax incentives have been developed for land that is dedicated wholly or in part, in perpetuity, to conservation. This program is being used to protect important corridors.		Florida Fish and Wildlife Conservation Commission	Scott.Sanders@myfwc.com
26	1	1.2.2	Establish Healthy Watersheds Grant Consortium	EPA will establish a Healthy Watersheds Consortium to accelerate and expand the strategic protection of healthy freshwater ecosystems and their watersheds across the country. EPA expects to issue a cooperative agreement to fund a single grantee to manage the Healthy Watersheds Consortium grant program and issue subawards on a competitive basis.	15	EPA Heathy Watersheds Program	Gabanski.Laura@epa.gov
27	1	1.2.2	Identify unique geophysical settings within NPS units	Provide guidance to parks to assess unique "patch" ecological systems based on geological, soil, and vegetation surveys (or systematic review of surveys done from CO). Assemble a portfolio of priority conservation sites based on the results.	16	NPS	cat_hawkins_hoffman@nps.gov for Brown, Eckert, Heise
28	1	1.2.5	Extend NPS Natural Resource Adaptation support to NPS	Work with the NPS Rivers, Trails, and Conservation Assistance Program to identify priority adaptation opportunities and practices.	15/16	NPS-NRSS	cat_hawkins_hoffman@nps.gov for Eckert, Drees

			Partnership stewardship				
29	1	1.2.5	Implementation of E.O. 13186	Develop MOU's with Federal agencies such as DOD to promote conservation of migratory birds including managing habitat for climate adaptation.	15/16	Division of Migratory Bird Management	Charisa_Morris@FWS.gov
30	1	1.3.1	River Restoration across the West	Reclamation has numerous river restoration and enhancement efforts ongoing across the West that has resulted in a broad array of benefits to fish and wildlife resources and their habitats. A number of ongoing restoration programs have begun to incorporate climate change modeling results into their restoration planning (e.g., San Juan River Fish Recovery Program and the San Joaquin River Restoration Program).	15/16	BOR	acoykendall@usbr.gov
31	1	1.3.2	Comprehensive Everglades Restoration Plan (CERP)	Restore more natural water flow, depth and duration within the Greater Everglades Ecosystem to maintain water levels in a changing climate.	15/16	USACE, FWS, NPS, SFWMD	Kimberley.A.Taplin@usace.army.mil
32	1	1.3.2	Dike Notching to improve habitat in the Lower Mississippi River.	Notches reduce sedimentation in old chute channels and behind sandbars and maintain flowing water conditions at lower stages in secondary channels. Additionally, low water stages flowing through a notch result in a diversity of current velocities at the notch that increase substrate diversity (both in composition and topography/ bathymetry), thereby increasing aquatic habitat and aquatic species diversity downstream of the	15/16	USACE	gary.l.young@usace.army.mil
33	1	1.3.2	SWD Ecosystem Restoration Project Planning and RESTORE Act proposal submittal	Projects will restore wetlands, riparian forest, native vegetation and ESA critical habitat. Most projects are in feasibility stage and include Arkansas River Corridor (SWT), Crow Creek (SWT), and Brownsville Resacas (SWG). Potential RESTORE Act funding may be obtained for Gulf Intracoastal Waterway (GIWW) Arkansas whooping crane critical habitat protection and development proposal	15/16	USACE	Robert.W.Heinly@usace.army.mil
34	1	1.3.3	Identify and support key restoration projects that can increase	Identify and support key restoration projects that can increase coastal blue carbon sinks.	15/16	FWS Coastal Program and NMFS Office of Habitat	Chris_darnell@fws.gov and roger.b.griffis@noaa.gov

			coastal blue carbon sinks.			Conservation	
35	1	1.3.3	Mississippi Coastal Improvements Program (MsCIP), Comprehensive Barrier Island Restoration	Reduce erosion of Mississippi Sound barrier islands to conserve natural resources on the islands	15/16	USACE, NPS	Susan.I.Rees@usace.army.mil
36	1	1.3.3	Restoring brush habitat along waterways	Brownsville Resacas Ecosystem Restoration Project (SWG) will restore brush habitat along waterways as corridors for endangered jaguarundi and ocelot in south Texas; project in feasibility planning stage.	15/16	USACE	Yvonne.L.Haberer@usace.army.mil
37	1	1.4?	Assessing National Park connectivity barriers	Work with NPS Facilities programs to assess migration barriers internal to and beyond park boundaries	15/16	NPS	cat_hawkins_hoffman@nps.gov for Plumb, Leslie, Hardy
38	2	2.1	Mohave Ground Squirrel Management	Conservation of suitable habitat, within or outside of the historic range of Mohave ground squirrel that has shown to be suitable for occupancy in the event of range and distribution shifts in response to climate change (identified in Desert Renewable Energy Conservation Plan -- DRECP). Actions will be taken in accordance with the DRECP, which is scheduled for completion in 2015.	15/16	CDFW, BLM, USFWS, CA Energy Commission	Whitney.Albright@wildlife.ca.gov
39	2	2.1	Population regulation	Each year help inform harvest regulations for waterfowl in the face of changing climate and	15/16	Division of Migratory Bird Management	
40	2	2.1	Update current or develop new management plans, programs and practices	Incorporate climate change considerations into ongoing National Estuarine Research Reserve System (NERRS) Management Plan updates		NOAA	Roger.B.Griffis@noaa.gov
41	2	2.1	Update current or develop new management plans,	Incorporate climate change considerations into fisheries management assessments and decision-making	15/16	NOAA	Roger.B.Griffis@noaa.gov

			programs and practices				
42	2	2.1	Update current or develop new management plans, programs and practices	Incorporate climate change considerations into Endangered Species Act consultations and decision-making	15/16	NOAA	Roger.B.Griffis@noaa.gov
43	2	2.1	Update current or develop new management plans, programs and practices	Complete coastal vulnerability assessments		NOAA	Roger.B.Griffis@noaa.gov
44	2	2.2	Development of Dietary Interventions to Mitigate Climate-Induced Alterations of Rainbow Trout Gut Microbial Populations and Protein Metabolism	Benefits of determining the shifts in gut microbial communities and global metabolic shifts in response to climate change will allow refinement of dietary formulations that both meet the metabolic demands of rainbow trout and limit their environmental impact from metabolic waste.	15/16/17	FWS/FAC with Dept. of Commerce/ Nat'l Institute of Standards & Technology & Montana State Univ	dolores_savignano@fws.gov
45	2	2.2	Reintroduction of Chinook Salmon	Development of a reintroduction plan for winter-run Chinook salmon is currently underway and will be completed within the next two years. Implementation of the plan will help to maintain a robust population and enhance resiliency in the face of climate change.	15/16	CDFW, several agencies in Central Valley	Kevin.Shaffer@wildlife.ca.gov
46	2	2.3	Implement Plant Conservation Alliance (PCA) 2015 Action Plan	With the renewal of the Federal Partner for Plant Conservation MOU, these items are present in draft action items for the agencies (and several hundred NGO partners). In addition, look at other MOUs to work with organization on such issues as Chestnuts, etc.	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert

47	2	2.3	National Seed Strategy	An interagency collaboration, led by BLM, which will ensure the availability of appropriate seed to provide healthy and productive plant communities in a changing climate through a national network.	15,16,17	BLM	polwell@blm.gov/ ktripp@blm.gov
48	2	2.1 & 1.1	Integration of NFWPCAS Recommended Actions with Environmental Stewardship Program on USACE-Managed Lands	Use the available inventory of the 432 (approx. 12 million acres total) USACE-owned lands (land use, acreage of various habitat types, management actions, etc.) as well activity and management information to analyze how stewardship activities and priority work tasks might align with the recommendations presented in the NFWPCAS.	15	USACE	janet.a.cushing@usace.army.mil; jeff.krause@usace.army.mil
49	2	2.1.1	Adjusting adaptive harvest management decision frameworks in response to climate change	Through the double-loop learning process of adaptive management, formally consider how climate change impacts harvest management objectives, regulatory actions, and system models used to predict waterfowl population responses to harvest regulations and environmental change.	15/16	USFWS/DMBM/PHAB	scott_boomer@fws.gov
50	2	2.1.1	Incorporate climate change considerations into new and future revisions of management plans.	Developing and revising Bird Conservation Plans to include climate change.	15/16	Division of Migratory Bird Management	FWS NCTC
51	2	2.1.1	Support adaptation planning	Direct support for Tribes to develop strategic climate adaptation plans leading to updated management planning.	15/16	BIA	sean.hart@bia.gov
52	2	2.1.1 & 2.1.2	Incorporate carbon sequestration and nutrient cycling information into	Ecosystem services, specifically carbon sequestration and nutrient cycling, will be quantified to show the impacts/benefits for selected St. Johns Bayou/New Madrid Floodway project alternatives.	15/16	USACE	gary.l.young@usace.army.mil

			Mississippi Valley Division feasibility reports.				
53	2	2.1.2	Support Habitat Response	Provide more functional guidance to managers that more clearly defines terms about climate adaptation and climate change.	15/16	BRMD, CCRP	cat_hawkins_hoffman@nps.gov for Eckert, OEO,Fisichelli, Schuurman
54	2	2.1.2 and 2.1.7	Develop best practices for applying resilience criteria to program management practices, training, investments, etc.	Adopt Climate Smart principles for program management, investments, etc., via formulation of FWS policy	15	FWS/Climate Adaptation Network	mark_shaffer@fws.gov
55	2	2.1.4	Maintain Fire Adapted Communities under shifting climate regimes	Develop adaptive management frameworks to prescribed fire manipulations to assess potential manipulations in fire treatments to fire adapted communities	16	BRMD, NIFC	cat_hawkins_hoffman@nps.gov for Benson, Eckert, Brown, Cook
56	2	2.1.4	Picayune Strand Restoration Project, a Comprehensive Everglades Restoration Plan (CERP) project	Restore natural hydrology within a portion of the Big Cypress ecosystem, implement a more natural fire regime, control invasive and nuisance plant species, provide connecting habitat for the Florida panther	15/16	USACE, FWS, SFWMD, FL Division of Forestry	Lacy.E.Shaw@usace.army.mil
57	2	2.1.8	Green Infrastructure Collaborative	EPA has established a "Green Infrastructure Collaborative" to help communities rapidly adopt "green infrastructure" practices. The collaborative will provide technical assistance to at least 25 communities in FY 15.	15/16	EPA	Kloss.Christopher@epa.gov

58	2	2.1.8 & 2.1.9	Systems Approach to Geomorphic Engineering (SAGE)	SAGE is an initiative that brings together experts and practitioners from the federal, academic, non-profit and private sectors to pursue and advance a comprehensive view of shoreline change to slow/prevent/mitigate/adapt impacts to coastal communities from the consequences of climate change, linking 'soft' ecosystem-based approaches with 'hard' infrastructure approaches.	15	USACE, NOAA, Coastal States Organization, TNC	charles.b.chesnutt@usace.army.mil; marriah.s.abellara@usace.army.mil
59	2	2.1.9	Decision Analysis for Coastal Wetland Management and Embracing Uncertainty about Sea Level Rise	Construct a decision support tool for coastal wetland managers in Delaware to identify optimal management actions and conservation investments for coastal managed wetlands while accounting for uncertainty related to sea level rise impacts on wetland habitats.	15/16	DNREC, FWS	james_lyons@fws.gov
60	2	2.2.1	Design and implement management actions to address risks identified in vulnerability or risk assessments.	LCC projects will use data gathered in risk assessments to design and implement appropriate management actions for initial species and habitats of concern. (Ongoing efforts include identifying and prioritizing conservation actions to enhance resilience under a changing climate for Yellowstone cutthroat trout.)	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
61	2	2.2.1	Integrate multi-stressor assessments	Will modify EPA's Eco-Risk Framework to incorporate climate impacts into a multi-stressor assessment of SHEN forests. Use vulnerability and risk assessments to design and implement management actions at species to ecosystem scales.	15/16	BRMD, ARD, CCRP	cat_hawkins_hoffman@nps.gov for Eckert , Hogan, Blett, Fisichelli, Schuurman
62	2	2.2.2	Develop criteria and guidelines that foster the appropriate use, and discourage inappropriate use of translocation, assisted	Work with revived interagency team to identify risk assessment factors and probabilities as precursor to a decision making framework. Host synthesis/analysis/framework development through USGS Powell Center, Fort Collins CO	15/16	NPS, USFWS, USFS	cat_hawkins_hoffman@nps.gov for CCRP, BRD, (USFS, FWS, etc.)

			relocation, and captive breeding as climate adaptation strategies. Guidance on Active population movements				
63	2	2?	Promoting biological carbon sequestration	The USDA and DOI are both working on identifying actions that promote biological carbon sequestration. The USDA is proposing voluntary actions that may be taken in forestry (both public and private), agriculture, livestock management, and others that could lead to substantial enhancement of C sequestration. The DOI is currently investigating how existing programs, policies, and activities may be used to increase sequestration. It has established three task teams to explore opportunities and constraints for carbon-related efforts for 1) Conservation of Sensitive Lands, 2) Stewardship of Federal Forests and Grasslands, and 3) Energy Generation and Efficiency		USGS	Bradley Reed, reed@usgs.gov
64	2	2?	Species Viability Team and Focal Species Team assembled	Teams asked to clarify species viability approach to climate adaptation and to recommend selection and use of focal species	White papers completed in 2015	FWS NCTC	dave_lemarie@fws.gov
65	3	3.1	CDFW Climate College	The California Department of Fish and Wildlife (CDFW) Climate College is an educational initiative geared towards CDFW staff. The College aims to increase awareness of climate changes issues as they relate to CDFW responsibilities, and enhance overall capacity to address these issues. Planning for the next iteration of the College will begin in 2015.	15/16	CDFW	Kurt.Malchow@wildlife.ca.gov
66	3	3.1	Climate Issues incorporated into plant conservation and restoration	Incorporate climate issues into Park Conservation Alliance efforts to develop and share research, practices and expertise	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert
67	3	3.1	Communicating climate change training	Deliver Communicating Climate Change course once per year.	15/16	FWS NCTC	dave_lemarie@fws.gov

68	3	3.1	Increase awareness and capacity of natural resource managers and other decision makers	Support applied research projects to enhance understanding and integration of climate information, e.g., implementation of NOAA Sentinel Sites Cooperatives.	15/16	NOAA	Roger.B.Griffis@noaa.gov
69	3	3.1	Increase awareness and capacity of natural resource managers	Increase capacity of natural resource managers through development of tools and trainings, e.g. Coral Triangle Initiative, Digital Coast, and Climate.gov.	15/16	NOAA	Roger.B.Griffis@noaa.gov
70	3	3.1	Increase awareness and capacity of natural resource managers	Connect with NOAA stakeholders, customers and users through regional, state, and local extension capabilities and activities to translate climate information, e.g. RISAs, RCSDs, Sea Grant, NERRS, and other NOAA regional offices.	15/16	NOAA	Roger.B.Griffis@noaa.gov
71	3	3.1	Increase awareness and capacity of natural resource managers	Support existing and foster new communities of practice (e.g. SAGE –Systems Approach to Geomorphic Engineering).	15/16	NOAA	Roger.B.Griffis@noaa.gov
72	3	3.1	Provide data that increases the capacity of managers to implement climate adaptation programs.	Various Landscape Conservation Cooperative (LCC) projects will provide information that increases managers' ability to implement appropriate climate adaptation program. (For example, sea-level rise modeling, including site-specific data and modeling results, will be disseminated to land managers.)	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
73	3	3.1	Update CC Scorecard	Implement next steps to increase Agency CC knowledge by revising agency scorecard.	16	FWS/CAN	mark_shaffer@fws.gov
74	3	3.1	Various planning and climate change	Ecosystem restoration planning courses are being updated to include climate change effects considerations. Joint interagency training is also being developed for more coordinated restoration efforts.	15	USACE, FWS	shawn.b.komlos@usace.army.mil

			training development				
75	3	3.2	Ensuring Robust Cooperative Agreement Process	Examine the cooperative agreement process to ensure that APHIS is responsive to increased demand for collaboration and partnerships with others on climate change issues.	15	APHIS, Marketing and Regulatory Programs Business Services, Financial Management Div.	Michael Paranoid, michael.g.peranio@aphis.usda.gov
76	3	3.2	Facilitate a coordinated response	Coordinated development of tools, resources and information at scales relevant to managers that enable stakeholders to make decisions using the best available information, E.g. NERRS, Digital Coast, Climate.gov, Vulnerability of Fish Stocks in a Changing Climate Assessment Tool.	15/16	NOAA	Roger.B.Griffis@noaa.gov
77	3	3.2	Participation in local and regional climate collaborative	CDFW will continue to participate in local and regional collaboratives to help facilitate a coordinated response to climate change.	15/16	CDFW, LCCs	Whitney.Albright@wildlife.ca.gov
78	3	3.2	Wisconsin Initiative on Climate Change Impacts (WICCI)	WICCI is a network of individuals and organizations, each working on reducing vulnerability to climate change in their areas. The WICCI network covers a host of topics, including heat stress, waterborne disease, agriculture, wildlife, natural communities, stormwater, community planning, and more. FOR EXAMPLE, In response to the need for lake temperature data for specific frequencies and durations, a multi-disciplinary team from UW Madison, Wisconsin DNR, NASA, USGS, and the University of Iowa have developed a hydrodynamic model that allows them to hindcast the daily thermal profiles and annual ice cover from 1979-2012 for more than 2,300 Wisconsin lakes. The model's results allow users to derive lake-specific and time varying estimates of temperatures which influence species of interest to biologists, managers and users of Wisconsin's lakes. To date, the team has looked at lake records for more than 2,400 lakes around the state and has included these observations into the model.	2007-Present	Wisconsin Department of Natural Resources & University of Wisconsin and various partner agencies and organizations	info@wicci.wisc.edu
79	3	3.3	Greenhouse Gas Reduction Fund	CDFW will use cap and trade funds to establish a program titled Wetland Restoration for Greenhouse gas Reduction. The new program and additional staff will enhance CDFW's capacity to support climate adaptation and mitigation activities. The program is currently being established, and will continue to be expanded in 2015.	15/16	CDFW	Helen.Birss@wildlife.ca.gov

80	3	3.3	Increase agency awareness and emphasis on managing climate change	Reorganization: Combine Sustainability unit in Bus Ops with Chief's Climate Change Advisor's Office	15	Forest Service	
81	3	3.3	Update NPS Restoration Guidance	NPS guidance on ecological restoration will be reviewed and revised to add more detail on addressing targets and strategies to incorporate adaptation opportunities	15/16	NRSS and NIFC	cat_hawkins_hoffman@nps.gov for Benson, Eckert, Hogan
82	3	3.4	Optimize use of existing FWP conservation funding sources	Incorporate climate change adaptation into National Estuarine Research Reserve System (NERRS) and National Marine Sanctuary management plans.	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
83	3	3.2.3	Additional climate-related training	Each year, will provide four Climate Change Vulnerability Assessment classes, one Climate Academy (online), one Decision Analysis for Climate Change (online), two Decision Analysis in a Changing Climate and one Scenario Planning Toward Climate Change Adaptation. Flexibility will be built in to the schedule to meet changing demand.	15/16	FWS NCTC	mark_shaffer@fws.gov
84	3	3.1.1, 3.1.2	Provide trained Type 3 Incident Management Teams to respond to all-hazard emergencies, some of which will be associated with climate-related extreme-weather events.	Provide Incident Management Teams (IMTs) of designated and trained personnel which may be activated, if available, to support management in all-hazard emergencies that extend beyond one operational period. A Type 3 IMT is a multi-agency/multi-jurisdiction team for extended incidents formed and managed at the State, regional, or metropolitan level, typically utilized in emergency response resulting from severe storm or incident of animal or plant disease. Such incidents may increase in frequency or intensity with climate change. (Incident Types range from Type 5, often contained within a few hours after resources arrive on scene, to a Type 1, which is national in scope and involves responders from multiple agencies and/or jurisdictions.)	(ongoing)	APHIS, Marketing and Regulatory Programs Business Services (MRPBS), Emergency Management Safety and Security Division, Emergency Preparedness Branch	James Premo James.L.Premo@aphis.usda.gov
85	3	3.1.1, 3.1.2	Revision of the Emergency	Emergency Support Function (ESF) #11 of the National Response Framework provides coordination for five functions in Agriculture and Natural Resources for the protection of the Nation's agricultural and natural resources during national	(ongoing)	APHIS, Marketing and	Craig Aughe Craig.A.Aughe@aphis.usda.gov

			Support Function (ESF) #11 Annex to the National Response Framework	emergencies. ESF#11 activities include technical assistance for animal and agricultural emergency management that may be necessary following of extreme weather and weather-related events (e.g., floods, hurricanes, fires). Such events may increase in frequency or intensity with climate change		Regulatory Programs Business Services (MRPBS), Emergency Management Safety and Security Division	
86	3	3.1.2	Climate Smart training	Provide Climate Smart training to the Fish and Wildlife Service (FWS) and other federal and state agency staff. A minimum of four classes will be scheduled per year.	15/16	FWS NCTC	dave_lemarie@fws.gov
87	3	3.1.2	National Climate Academy	California Department of Fish and Wildlife (CDFW) serves on the planning committee for the National Climate Academy. Spearheaded by the U.S. Fish and Wildlife Service National Conservation training Center (NCTC), the National Academy is intended to increase understanding of the evidence, potential impacts, and range of management choices related to climate change. Planning is now underway for the next training, which is slated to begin in February 2015.	15	USFS, NCTC, AFWA, NPS, TWS, CDFW, Society for Conservation Biology, Minnesota Department of Natural Resources	Whitney.Albright@wildlife.ca.gov
88	3	3.1.3	Develop training on the use of existing and emerging tools for managing under uncertainty (e.g., vulnerability and risk assessments, scenario planning, decision support tools,	Reclamation has been collaborating with the Climate Change and Water Working Group (CCAWWG) and University Corporation for Atmospheric Research (UCAR) COMET program to develop and pilot climate change training tools for Federal and non-Federal water agency staff and explore sustained delivery approaches. In order to ensure that Reclamation staff is adequately trained, Reclamation is planning to develop and implement a continuing training program serving Reclamation's diverse staff needs, relying on and incorporating available training tools and working with other agencies to leverage new tools as they become available.	15/16	BOR	draff@usbr.gov

			and adaptive management).				
89	3	3.1.3	Provide training in adaptation planning	Design and deliver tribal climate adaptation planning training nationwide (not restricted to Tribes).	15/16	BIA	sean.hart@bia.gov
90	3	3.1.6	Increase data analysis capacity	Add 1.5 Tribal geospatial analysis positions to support adaptation planning and identify best practices/planning scenarios for new planners.	15	BIA	sean.hart@bia.gov
91	3	3.1.6	Increase web presence	Add "tribal landing page" to Climate Resilience Toolkit. Add Tribal climate web portal for sharing of management and planning level information.	15/16	BIA	sean.hart@bia.gov
92	3	3.2.	Facilitate a coordinated response	Continue working with states and regional consortiums of state, local and tribal managers, businesses, and NGOs to incorporate climate change into natural resource management, e.g., via CZMA, ROPs, LCCs, etc.	15/16	NOAA - NMFS	Roger.B.Griffis@noaa.gov
93	3	3.2.1	California LCC Landscape Conservation Design	Beginning to work with the California LCC to develop a landscape conservation design for the central valley of California, which will include climate adaptation.	15/16	CA LCC	guthrie_zimmerman@fws.gov
94	3	3.2.1	Flyway activities	Work with states and NGO's on various aspects of harvest and habitat management plans for waterfowl, which will include climate adaptation.	15/16	climate change vulnerability assessment	dave_lemarie@fws.gov
95	3	3.2.1	Use LCCs to support ecoregional invasive plant response	Work with Desert and Great Lakes LCCs to support (respectively) native plant community restoration planning, plant materials, and invasive plant management prioritization; and wide-ranging forest species risk analysis and response.	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert, Hogan
96	3	3.2.1	Use regional venues, such as LCCs, to collaborate across jurisdictions and develop conservation goals and landscape/seascape scale	The Southern Rockies LCC provided funding to the Valles Caldera National Preserve, The Nature Conservancy, and University of New Mexico to quantify how forest restoration efforts impact water yields and reduce risks of catastrophic wildfires exacerbated by climate change. Results can be incorporated into conservation management plans for fisheries, riparian restoration, and terrestrial wildlife species threatened by long-term changes in habitat and climate.	15/16	BOR/Nature Conservancy /Valles Caldera National Preserve	svaddey@usbr

			plans capable of sustaining				
97	3	3.2.5	Engage with international neighbors	Engage with Canada, Mexico, Russia, and nations in the Caribbean Basin, Arctic Cirle, and Pacific Ocean to help adapt to and mitigate climate change impacts in shared trans-boundary areas and for common migratory species. Reclamation was part of a binational team supporting the adoption of Minute 319, which supplements the 1944 Water Treaty with Mexico. Minute 319 will help increase resilience to climate change by preserving reservoir elevations in the Colorado River, providing environmental flows in the Colorado River Delta in Mexico, and facilitating investments to improve water infrastructure in Mexico.	15/16	BOR	acoykendall@usbr.gov
98	3	3.2.5	Working w/International Partners	Incorporating climate change in to North American Wetland Conservation Act (NAWCA) Grant and matching funds to support projects aimed at protecting, restoring, and enhancing wetland and associated upland migratory bird habitat.	15/16	Division of Bird Habitat Conservation	dave_lemarie@fws.gov
99	3	3.2.5	Working w/International Partners	Incorporating climate change in to Neotropical Migratory Bird Conservation Act (NMBCA) Grant and matching funds to support projects aimed at promoting the conservation of migratory birds.	15/16	Division of Bird Habitat Conservation	Leakhena_Au@fws.gov
100	3	3.2.5	Working w/International Partners	Convention of Migratory Species Climate Change Working Group working to develop and implement a Program of Work to address climate change issues and migratory species	15/16	Migratory Bird Program	Eleanora_Babij@fws.gov
101	3	3.3.1	Update Review on legal , policy support for restoration	Since we need to review NPS policy support for restoration, could extend to an analysis of federal programs and legislation, particularly in light of GAO interest in large landscapes.	16	NPS	cat_hawkins_hoffman@nps.gov for Eckert, Budde
102	3	3.3.2	Non-federal tools for private land conservation	Assemble a portfolio of private lands efforts by NGOs such as EDF and TNC for climate resilient landscapes.	15	NPS	cat_hawkins_hoffman@nps.gov for Hogan, Budde, Hardy
103	3	3.3.4	Review existing legal, regulatory and policy frameworks	Review existing legal, regulatory and policy frameworks that govern floodplain mapping, flood insurance, and flood mitigation and identify opportunities to improve their usefulness to reduce risks and increase adaptation of natural resources and communities in a changing climate. Update Floodplain Management DO 77-2. NPS Director's Order 77-2 provides a process for national parks to assess development proposal impacts within floodplains. This Director's Order will be updated to ensure adherence to Executive Order 11988 and the Presidential Memorandum for establishing a Federal flood risk management standard.	15/16	NPS	forrest_harvey@nps.gov
104	3	3.3.5	Develop and	Develop and utilize an analytical framework to assess impacts associated with	15/16	APHIS,	Wendy Hall,

			utilize a framework to assess climate change for Agency actions subject to NEPA, consistent with draft CEQ guidance.	climate change for Agency actions subject to the National Environmental Policy Act (NEPA), consistent. Develop and utilize guidance on how to address impacts associated with climate change, including those on low income, minority and Tribal communities, in environmental compliance documents. Deploy the framework and associated guidance to inform analyses within National Environmental Policy Act (NEPA) documents.	[ongoing]	Policy & Program Development, Environmental and Risk Analysis Services	wendy.f.hall@aphis.usda.gov
105	3	3.4.1	Prioritize funding for land and water protection programs that incorporate climate change considerations.	WaterSMART Grants provide cost-shared financial assistance to carry out water and energy efficiency improvements, including projects that save water, increase energy efficiency and the use of renewable energy in water management, address endangered species and other environmental issues, and facilitate transfers to new uses. On-the-ground projects may also include implementation of climate adaptation strategies identified in a completed Basin Study. In May, 2015, Reclamation announced the selection of more than $24 million in WaterSMART Grants for 50 water and energy efficiency projects in 12 western states, including five projects that are implementing adaptation strategies identified in completed WaterSMART Basin Studies. For example, the Uncompahgre Valley Water Users Association in Montrose, Colorado, will install a 4.8 megawatt hydroelectric facility on the existing “Drop 4” irrigation canal drop structure located on the South Canal. The Association expects to generate 17,817,000 kilowatt hours annually, which will be provided locally to the City of Delta, Colorado. As part of the project, the Association will also pipe 1,344 linear feet of canal, thereby allowing water to bypass leaking canals through a steel penstock. The project is expected to result in annual water conservation of 77 acre-feet of water annually due to seepage. The water conserved by this project will be made available to downstream water users. The project implements adaptation strategies that were addressed in the 2012 WaterSMART Colorado River Basin Water Supply and Demand Study, which the Association participated in as a stakeholder.	15/16	BOR	jgerman@usbr.gov
106	3	3.4.1 and 3.4.2	Develop best practices for applying resilience criteria to land acquisition and financial assistance	Develop Service policy on incorporating climate change considerations into existing land acquisition and financial assistance programs, as appropriate.	15/16	FWS/CAN	mark_shaffer@fws.gov

			programs.				
107	4	4.1	Effects of climate change on cisco, a keystone fish species in Wisconsin's deepest lakes	Develop a network of long-term trend lakes to monitor cisco responses to human impacts and management activities as well as statistical models to explain patterns of cisco occurrence and/or abundance in relation to environmental and biotic variables.	Ongoing	Wisconsin Department of Natural Resources	john.lyons@wisconsin.gov
108	4	4.1	Monitoring Changing Ecological Conditions	CDFW will continue to monitor water temperature in the Sacramento River and its effects on aquatic habitat. Monitoring efforts allow for early detection of impacts from climate change, and enable the Department to determine if/when management actions need to be altered.	15/16	CDFW	Kevin.Shaffer@wildlife.ca.gov
109	4	4.1	National Community-level climate and hazard resilience indicators	USGS has been participating in the FEMA/NOAA – led interagency development of the "National Community-Level Climate and Hazard Resilience Indicators." This effort aims to develop a set of national indicators of community level resilience to climate change and related hazards that is federally actionable and supported by available data. Specifically, each indicator will be relevant to community climate/hazard resilience; relevant to federal policy priorities and programs; and data driven.		USGS	Kristin Ludwig, kaludwig@usgs.gov
110	4	4.1	NSSI Data Catalog and Project Tracking	The North Slope Science Initiative (NSSI) is an intergovernmental effort, administered by BLM, to increase collaboration at the local, state, and federal levels to address the research, inventory, and monitoring needs to support decision-making about development and climate change on the North Slope of Alaska.	15,16,17	BLM	jpayne@blm.gov/ ktripp@blm.gov
111	4	4.1	Seagrass Integrated Mapping and Monitoring/Coastal Habitats Independent Mapping and Monitoring Program	SIMM and CHIMMP are ongoing projects that seek to coordinate statewide efforts to map and monitor critical coastal habitats in Florida in order to complete a data gap analysis and to compile all existing mapping and monitoring data sets.		Florida Fish and Wildlife Conservation Commission	Paul.Carlson@myfwc.com (SIMM) or Ryan.Moyer@myfwc.com (CHIMMP)
112	4	4.1	Support and coordinate monitoring, observation and information	Sustain NERRS SWMP to track and assess impacts of climate and other stressors on the condition of the nation's estuaries	15/16	NOAA - OCM	Roger.B.Griffis@noaa.gov

			systems				
113	4	4.1	Support and coordinate monitoring, observation and information systems	Improve ability to monitor the physical and ecological consequences of climate change and apply this information to better understand and manage natural resources; e.g. Expand, refine, and network existing monitoring and observation systems that provide data in support of scenario forecast models on the ecosystem impacts of climate change (e.g. the ecosystem effects of sea level rise through NOS Sentinel Site Program).	15/16	NOAA-OCM	Roger.B.Griffis@noaa.gov
114	4	4.2	Identify, develop and employ decision support tools	Develop and pilot methodology for assessing the Climate Vulnerability of marine protected species (e.g., marine mammals).	15/16	NOAA	Roger.B.Griffis@noaa.gov
115	4	4.2	Identify, develop and employ decision support tools	Explore management options for adapting to or mitigating climate change impacts on natural resources, protected species, and coastal and ocean habitats by developing climate change scenarios in ecosystem-based, forecast models, e.g. Scenario forecast models developed by NCCOS Ecological Effects of Sea Level Rise Program (EESLR) and implemented through NOS Sentinel Site program	15/16	NOAA-NCCOS	Roger.B.Griffis@noaa.gov
116	4	4.2	Identify, develop and employ decision support tools	Understand vulnerability of coastal and marine ecosystems and living marine resources to climate change	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
117	4	4.2	Identify, develop and employ decision support tools	Deliver data analysis and synthesis products on the progression and impacts of climate change to resource managers and stakeholders, e.g. SLR viewers	15/16	NOAA - OCM	Roger.B.Griffis@noaa.gov
118	4	4.2	Identify, develop and employ decision support tools	Develop new frameworks for effective management of natural resources, protected species, and coastal and ocean habitats actions under climate change	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
119	4	4.2	Identify, develop and employ decision support tools	In 2015, NOAA will help fishing-dependent communities prepare for climate impacts on fish stocks by completing climate vulnerability assessments for major commercial and recreational marine fish stocks; helping communities undertake risk assessment and adaptation planning; conducting collaborative research on climate variability and change on fish stocks and fisheries in the U.S. Northeast Shelf Large Marine Ecosystem; and, establishing Resilient Fishing Communities Demonstration Projects to provide technical assistance to fishing-dependent	15/16	NOAA - NMFS	Roger.B.Griffis@noaa.gov

				communities in risk assessment and adaptation planning.			
120	4	4.2	Identify, develop and employ decision support tools	Over the next year, NOAA will deploy new or expanded resilience tools, including a Northeast climate and marine ecosystem dashboard for information on current and future conditions; an expanded Coastal Flood Exposure Mapper for coastal states on the East Coast and Gulf of Mexico; a Climate Change Vulnerability Assessment tool for Coastal Habitats; and a new performance support tool for GIS professionals working with agencies and organizations on natural infrastructure planning for coastal resilience. These resources and tools will be developed with a goal of future incorporation into the Climate Resilience Toolkit.	15/16	NOAA - NMFS	Roger.B.Griffis@noaa.gov
121	4	4.2	Identify, develop and employ decision support tools	Complete Fish Stock Climate Vulnerability Assessments for the West Coast and Alaska marine ecosystems.	15/16	NOAA - NMFS	Roger.B.Griffis@noaa.gov
122	4	4.2	Revise Forest Plans Implement 2012 Planning Rule monitoring requirement	Emphasis on improving adaptive management in Land Management planning	16	Forest Service	
123	4	4.2	State Wildlife Action Plan Climate Adaptation Implementation Objectives	Florida's SWAP Objective 3 states that, by 2017, Florida will integrate adaptation planning into a broader suite of habitats and species, using previous vulnerability assessments as a template for identifying threats. Plans include expanding scenario planning and/or vulnerability assessments, developing and funding on-the-ground pilot adaptation projects, and funding research projects that will provide the information needed to better manage habitats and/or species in response to climate change.		Florida Fish and Wildlife Conservation Commission	Andrea.Alden@myfwc.com
124	4	4.2	Wisconsin Driftless Area Master Planning	Located in the western and southwestern portion of the state, the Driftless Area escaped the last glacial period and as a result is characterized by rugged topography, coldwater streams, rock outcroppings and caves. The Driftless Area planning team used two of the newest science-based stream models to help evaluate the suitability of current and future habitat conditions for brook trout, brown trout, and smallmouth bass.	15/16	Wisconsin Department of Natural Resources	Paul.Cunningham@wisconsin.gov
125	4	4.1.6	Abundance and Distribution of Breeding Shorebirds in the Yukon-	In an area with some of the highest breeding shorebird densities in the world, develop a survey sampling framework to estimate population size and distribution of breeding shorebirds, compare results to prior survey efforts, and provide robust information for future analysis of climate change in arctic and boreal habitats.	15/16	FWS, Manomet, ADFW, Audubon	james_lyons@fws.gov

			Kuskokwim Delta				
126	4	4._._	Adaptive management training	Conduct one Adaptive Management: Structured Decision Making for Recurrent Decision class.	15	FWS NCTC	dave_lemarie@fws.gov
127	4	4._._	Integrate the adaptive management process and its applications into climate change training	Decision Analysis for Climate Change (online) and Decision Analysis in a Changing Climate are each to be delivered once per year. Additionally, Designing a Biological Monitoring Program: Concepts and Examples, delivered once per year, emphasize the use of adaptive management in conservation.	15/16	FWS NCTC	dave_lemarie@fws.gov
128	4	4.1.2	Annual adaptive harvest management	Conduct annual adaptive harvest management assessments for waterfowl in the face of environmental uncertainty. Work with USGS partners to improve adaptive management tools.	15/16	Division of Migratory Bird Management	guthrie_zimmerman@fws.gov
129	4	4.1.2	Modeling North American waterfowl responses to projected climate change	Evaluate long-term waterfowl breeding population data to develop an estimation framework to develop models linking waterfowl population dynamics to climate change impacts to important weather and habitat variables.	15/16	USFWS/DMBM/PHAB	scott_boomer@fws.gov
130	4	4.1.2	Review of the Waterfowl Breeding Population and Habitat Survey	Formulate recommendations for survey modifications and/or auxiliary survey efforts to assess change in waterfowl breeding distribution or relative abundance and implications for population estimates and management decision frameworks.	15/16	FWS	mark_koneff@fws.gov; ken_richkus@fws.gov
131	4	4.1.4	Support and coordinate monitoring, observation and information systems	Expand the NOAA Sentinel Site Program to provide integrated monitoring and assessment of key climate and other variables for effective decision making in coastal and estuarine areas.	15/16	NOAA-NCCOS	Roger.B.Griffis@noaa.gov
132	4	4.1.5	Build online	Cooperate with other key agencies in providing an online 'front door' to the array	15/16	Science	elsa_haubold@fws

			tools	of regional information, services and tools available for addressing climate change		Applications	.gov
133	4	4.1.6	Adaptive Monitoring of Salt Marsh Elevation Dynamics and Prescribed Fire at Blackwater NWR	Use a novel application of GPS-RTK technology and hierarchical models to monitor salt marsh surface elevation and evaluate salt marsh habitat loss and change as a result of sea level rise, prescribed fire, and environmental factors.	15/16	FWS	james_lyons@fws.gov
134	4	4.1.6	Assist with development and implementation of monitoring protocols that provide information needed to manage as climate changes.	Various LCC projects will provide managers the monitoring tools they need to evaluate climate change effects. (For example, the University of California Riverside's Center for Conservation Biology will create a sustainable resource monitoring framework that will provide empirical data identifying if and how climate change is changing the composition and vitality of Joshua Tree National Park.)	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
135	4	4.1.6	Ecosystem Restoration and Mitigation Project Monitoring	All Corps construction projects that include ecosystem mitigation or restoration are required to be monitored for habitat success. Current Ecosystem Restoration projects: Arkansas River Corridor (SWT), Crow Creek (SWT), Brownsville Resacas (SWG). Mitigation monitoring Brays & Greens Bayous (SWG), Little Fossil Creek, Dallas Floodway Extension, Waco Lake, & Pecan Creek (SWF), Comprehensive Everglades Restoration Plan (SAJ).	15/16	USACE, FWS, NPS, SFWMD	Carolyn.E.Murphy@usace.army.mil (SWG); Daniel.Allen@usace.army.mil (SWF); David.A.Tipple@usace.army.mil (SAJ)
136	4	4.1.7	Use existing or define new indicators at appropriate scales that can be used to monitor the response of	Assess NPS I&M network monitoring programs for existing (and potential additional) contributions to climate change effects monitoring	15/16	NPS	cat_hawkins_hoffman@nps.gov for K Jarvis, N Fisichelli, B Monahan

			fish, wildlife, plants, and ecosystems to climate change.				
137	4	4.1.9	California phenology project	Initiate Appalachian Trail Phenology project. Collaborate with the National Phenology Network to facilitate monitoring of phenology; create an analogous National Population Network to catalog	15/16	NPS	cat_hawkins_hoffman@nps.gov
138	4	4.2.1	Develop regional downscaling of Global Climate models to conduct vulnerability assessments of living resources.	Reclamation's Science and Technology Program is taking a leading role to develop the data and tools necessary to support climate change adaptation within Reclamation and by customers and stakeholders. Since 2007, Reclamation has led a partnership of eight Federal, academic, and Non-Governmental Organizations to provide future projections of temperature, precipitation, and streamflow throughout the continental US to support locally relevant decision making. (http://gdo-dcp.ucllnl.org/downscaled_cmip_projections/).	15/16	BOR	draff@usbr.gov
139	4	4.2.1	Develop regional downscaling of Global Climate models to conduct vulnerability assessments of living resources.	Desert LCC project led by The Nature Conservancy in 2014 builds on the Colorado River Basin Study to develop a decision support tool for incorporating ecological flows into water management models used for basin-wide water supply planning. Will build on this project in 2015 by developing an environmental flows database, including calculations of flow needs developed across geography.	15	BOR/Nature Conservancy	svaddey@usbr.gov
140	4	4.2.3	Climate Vulnerability of Marine Ecosystems	CDFW is in the early stages of planning a climate vulnerability assessment for the marine environment in association with the State Wildlife Action Plan revision. The assessment will likely begin in 2015.	15/16	CDFW	Whitney.Albright@wildlife.ca.gov
141	4	4.2.3	Climate Vulnerability of Vegetative Communities in California	In association with the State Wildlife Action Plan revision, CDFW is partnering with UC Davis to conduct a vulnerability assessment of vegetative communities across the entire state of California. The study will increase our knowledge of which communities in California are most vulnerable to climate change and why. The assessment will be completed in 2015.	15	CDFW, UC Davis	Whitney.Albright@wildlife.ca.gov
142	4	4.2.6	Scenario workshops	Scenario workshops in several national parks including Yellowstone National Park, Acadia National Park, Cape Lookout National Seashore, Dry Tortugas.	15/16	NPS	cat_hawkins_hoffman@nps.gov

				Engage scientists, resource managers, economists, and stakeholders in climate change scenario planning processes, including identification of a set of plausible future scenarios associated with climate phenomena and socioeconomics likely to significantly impact fish, wildlife, and plants.			
143	4	4.2.6	Climate Adaptation Planning	Through the Basin Studies, Reclamation partners with non-Federal stakeholders to evaluate the impacts of climate change to multiple water uses within a basin, and to identify adaptation strategies. To date, 19 Basin Studies have been initiated, with five completed, in 15 western states. Engage scientists, resource managers, economists, and stakeholders in climate change scenario planning processes, including identification of a set of plausible future scenarios associated with climate phenomena and socioeconomics likely to significantly impact fish, wildlife, and plants.	15/16	BOR	aerath@usbr.gov
144	4	4.2.7	Adaptive management training	Conduct one Adaptive Management: Structured Decision Making for Recurrent Decision class.	15	FWS NCTC	dave_lemarie@fws.gov
145	4	4.2.7	Integrate the adaptive management process and its applications into climate change training	Decision Analysis for Climate Change (online) and Decision Analysis in a Changing Climate are each to be delivered once per year. Additionally, Designing a Biological Monitoring Program: Concepts and Examples, delivered once per year, emphasize the use of adaptive management in conservation.	15/16	NOAA-OCM	Roger.B.Griffis@noaa.gov
146	4	4.2.7	Publish "Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans"	The Workbook presents a guide to climate change adaptation planning and is intended to assist organizations that manage environmental resources to prepare a broad, risk-based adaptation plan. http://www2.epa.gov/sites/production/files/2014-09/documents/being_prepared_workbook_508.pdf	15	EPA	Craghan.Michael@epa.gov
147	4	4.2.8	Adaptive Management of Horseshoe Crabs and Red Knots in Delaware Bay	Provide adaptive harvest management framework to Atlantic States for horseshoe crab harvest decisions and a modeling and estimation framework to evaluate changes in migration phenology and match-mismatch of migratory shorebirds and their food resources in Delaware Bay	15/16	FWS, USGS, Delaware, New Jersey, Atlantic States Marine	james_lyons@fws.gov

						Fisheries Commission	
148	4	4.2.8	Adjusting waterfowl adaptive harvest management decision protocols to directional system shifts associated with climate change	Adjust current Adaptive Harvest Management protocols by developing optimization frameworks that explicitly account for non-stationary system dynamics over finite time horizons.	15/16	USFWS/DMBM/PHAB and the Harvest Management Working Group	scott_boomer@fws.gov
149	4	4.2.8	Integrated Waterbird Management and Monitoring	Develop monitoring protocols and management decision support tools for managers at flyway, regional, and local scales to meet multiple objectives for waterbird conservation and management during migration and over-wintering	15/16	FWS	james_lyons@fws.gov
150	5	5.1	"Barriers and Opportunities to Managing for Disturbance and Environmental Change in the Upper Midwest."	Through this project we surveyed and interviewed land managers across Minnesota, Wisconsin, and Michigan to assess factors that serve as barriers and opportunities to climate adaptation	Complete	Wisconsin Department of Natural Resources	tricia.knoot@wisconsin.gov
151	5	5.1	Coastal Climate Impacts to First Foods, Cultural Sites, and Tribal Community Health and Well-being	Using computer modeling to forecast future conditions on the west side of the Reservation, we will estimate the impacts from sea level rise and storm surge on the nearshore environment	15/16/17	Swinomish Indian Tribal Community	PI: Dr. Jamie Donatuto; Co-PIs: Aundrea McBride, Skagit River Systems Cooperative and Sarah Grossman, Swinomish Tribe
152	5	5.1	Regional Science Coordination	The DOI Northwest Climate Science Center (NWCSC) will pilot a regional approach to identifying key management priorities and related information needs. Focusing on specific climate relevant topic areas (e.g. fire, sea level rise,	15/16	USGS NCCWSC, DOI NW	(NCCWSC) Robin O'Malley romalley@usgs.go

				coldwater fisheries), the NWCSC will summarize existing scientific knowledge about climate change and adaptation for the topic, convene regional decision makers and science partners to identify key decisions, identify information gaps, and identify appropriate “division of labor” among entities that can contribute to filling those gaps. This will move science collaboration from a project level to a program level.		CSC	v (NW CSC) Gustavo Bisbal, Director gbisbal@usgs.gov
153	5	5.2	"Potential Effects of Climate Change on Inland Glacial Lakes and Implications for Lake Dependent Biota in Wisconsin"	Evaluate how changes in freshwater lake habitat quality (specifically lake clarity) may impact common loon lake occupancy in the Trout Lake watershed of northern Wisconsin under detailed climate-change scenarios.	Complete	Wisconsin Department of Natural Resources	michael.meyer@wisconsin.gov
154	5	5.2	Climate / Drought Toolkit for Adaptive Management	USGS National Climate Change and Wildlife Science Center (NCCWSC) and several DOI Climate Science Centers (CSC) have begun work on a toolkit for managers to support them as they anticipate and adapt to drought, with a focus on ecological impacts. FY2015 will include place-based work (2 areas to be selected) with data synthesis, scenario development, and visualization tool improvement. All activities will be based on continuing interactions with managers, through “actionable science” work groups. FY2016 will expand the integration of socio-economic and ecological impacts and the application and visualization of these models with decision makers and resource managers.	15/16	USGS NCCWSC, DOI South Central CSC, Southwest CSC, and North Central CSC	Shawn Carter, scarter@usgs.gov
155	5	5.2	Conduct research	Ongoing research programs aim to understand major ecological shifts due to changing environmental conditions and variability, including studies on no-analogue ecological communities, state transitions and their reversibility, and ecological tipping points and thresholds; e.g. Continue programs to build understanding of the capacity of keystone, foundational, protected, and harvested species to resist or adapt to climate change and ocean acidification	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
156	5	5.2	Conduct research	Investigate how climate and climate change (e.g. ocean acidification, temp, sea level rise, etc.) shapes ecosystem structure and function	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
157	5	5.2	Conduct research	In 2015, NOAA proposes to increase efforts to provide fisheries and other decision makers in the Alaska region with information on climate impacts on major fish stocks and protected species, and implement a distributed biological observatory to improve understanding of how climate and human-induced change are affecting subsistence cultures and the environment in the Arctic.	15/16	NOAA-NMFS	Roger.B.Griffis@noaa.gov
158	5	5.2	Conduct research	NOAA will launch new program to support collaborative research on climate impacts on fish stocks and fisheries of the Northeast marine ecosystem.	15/16	NOAA-NMFS	Roger.B.Griffis@noaa.gov

159	5	5.2	Snowshoe Hare: "Forest and snow cover shape the southern range boundary of a northern-adapted mammal"	Documented a continued northward range boundary shift of snowshoe hare in Wisconsin. Areas of range contraction are associated with regions characterized by a shortened snow cover season.	ongoing	Wisconsin Department of Natural Resources & University of Wisconsin Madison	bzuckerberg@wisc.edu
160	5	5.2	Songbirds "Climate variability drives the arrival of temperate migrants to the Upper Midwest"	Exploring the use of citizen science programs for studying spring migration phenology throughout the Upper Midwest. We have found that milder climate conditions on overwintering grounds promote early arrival to breeding grounds.	ongoing	Wisconsin Department of Natural Resources & University of Wisconsin Madison	bzuckerberg@wisc.edu
161	5	5.3	Advance understanding	Develop ecosystem-based, scenario forecast models to assess and predict the efficacy of management strategies for mitigating ecosystem impacts of climate change, in order to inform management goal-setting, validation, and adaptation.	15/16	NOAA-NCCOS	Roger.B.Griffis@noaa.gov
162	5	5.3	Advance understanding	Strengthen modeling and tools for estimating carbon services of ocean and coastal habitats for use in decision making concerning the protection and/or restoration of coastal habitats	15/16	NOAA-NCCOS	Roger.B.Griffis@noaa.gov
163	5	5.3	Assessment, Inventory and Monitoring Strategy and Model Development	Assessment, Inventory and Monitoring Strategy is designed to develop conceptual ecological models illustrating the key components (attributes) of ecosystem sustainability and the interaction of stressors (e.g. fire, development, invasive species, and climate change) on ecosystem capacity.	15/16/17	BLM	gtoevs@blm.gov/ ktripp@blm.gov
164	5	5.3	Development and Evaluation of Watershed Models for Predicting Stream Fishery Potential	Develop watershed-scale models to predict the occurrence of fish species in Wisconsin streams under current climate conditions and to project possible changes in fish species occurrence in response to global climate change	15	Wisconsin Department of Natural Resources	gretchen.hansen@wisconsin.gov

165	5	5.3	Massasaga Rattlesnake	"Demographic consequences of climate change and land cover help explain a history of extirpations and range contraction in a declining snake species." Developed demographically-informed species distribution models to better understand the mechanisms driving range contraction of Eastern Massasauga rattlesnakes. We have found that extreme events, such as flooding, interact with habitat loss in driving over 30 years of population extirpations throughout the Upper Midwest.	ongoing	Wisconsin Department of Natural Resources & University of Wisconsin Madison	bzuckerberg@wisc.edu
166	5	5.3	Modeling bass-walleye interactions in northern Wisconsin lakes.	Using historical data to identify what lake conditions continue to support walleye and what conditions are associated with increasing bass populations. Also project changes to these important sport fishes under different scenarios of climate and land use change, and identify management actions most likely to be successful in reversing undesirable trends.	15	Wisconsin Department of Natural Resources	gretchen.hansen@wisconsin.gov
167	5	5.3	Use modeling to understand potential impacts of climate change on key habitats	LCC projects will use modeling to identify potential impacts of climate change on key habitats so that those impacts can be considered in management of resources. For example, several projects are ongoing to model sea-level rise along the Pacific Coast including at several National Wildlife Refuges.	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov
168	5	5.1 and 5.2	Develop National Ecosystem Services Classification System	EPA will establish a National Ecosystem Services Classification System (NESCS) that systematically maps distinct pathways by which ecosystem services enter and find value in human systems.	15	EPA	Corona.Joel@epa.gov
169	5	5.1.	Identify knowledge gaps…via collaborative processes	Work with partners, through the CGIES Task Force and SAGE, to identify knowledge gaps and research priorities for better understanding the ecosystem services and values provided by coastal green infrastructure	15/16	NOAA - OCM, PPI	Roger.B.Griffis@noaa.gov
170	5	5.1.	Identify knowledge gaps…via collaborative processes	NOAA Fisheries Service and partners will complete a Climate Science Strategy and Regional Action Plans to identify science priorities and increase the production, delivery and use of climate-related information in fulfilling NOAA's mission activities.	15/16	NOAA - NMFS	Roger.B.Griffis@noaa.gov
171	5	5.1.2	Bring managers and scientists together at the	Reclamation's Basin Studies and the WWCRAs form a robust program that utilizes Federal and stakeholder driven activities to identify adaptation strategies that help balance water supplies and demands given impacts from climate change. These activities can be enhanced to further support adaptation efforts conducted with partners and stakeholders and used to inform other Reclamation	15/16	BOR	svaddey@usbr.gov

			appropriate scales to prioritize research needs that address resource management objectives considering a changing climate.	planning policies, programs, and activities. Reclamation has identified two immediate actions to support climate adaptation planning, including: (1) Enhancing the Basin Studies and WWCRAs; and (2) initial steps to incorporate climate information across a range of planning activities.			
172	5	5.1.7	Ecosystem Goods & Services Tools Development and Methods Refinement	Develop web-based tools to assess ecosystem services, and test a developed EGS framework that can be used to consider ecosystem services in water resources planning.	15/16/17	USACE	janet.a.cushing@usace.army.mil; elizabeth.o.murray@usace.army.mil
173	5	5.1.7	Research on carbon sequestration	Strengthen research on role of coastal and ocean habitats in carbon sequestration and storage.	15/16	NOAA - NCCOS	Roger.B.Griffis@noaa.gov
174	5	5.2 and 5.3	Conduct research and Advance Understanding	NOAA will launch new three year research and modeling project to better project climate impacts on major US fisheries in the Bering Sea and provide fisheries managers and industries with more robust information for decision making.	15/16	NOAA-NMFS	Roger.B.Griffis@noaa.gov
175	5	5.2.2	Annual population status reports	Analyze population data from annual surveys and publish estimates in our annual waterfowl trend and status reports. Aid in the development of new tools for monitoring populations from existing surveys in peer reviewed journals	15/16	Division of Migratory Bird Management	guthrie_zimmerman@fws.gov
176	5	5.2.2	Arctic Migratory Bird Survey Report	Document distribution and densities of several flagship species in portions of the Canadian Arctic that are seldom surveyed, and that are vulnerable to climate changes.	15	FWS, CWS, Sea Duck JV, Arctic Goose JV, Inuvialuit Final Agreement, Polar Continental Shelf	pam_garrettson@fws.gov

						Project, and the Atlantic, Mississippi, and Flyways	
177	5	5.2.2	Golden eagle survival meta-analysis	Working with several collaborators on conducting a meta-analysis to estimate survival trends in golden eagles based on satellite telemetry data	15/16	Division of Migratory Bird Management	guthrie_zimmerman@fws.gov
178	5	5.2.2 and 5.2.3	Research on ecosystem and population responses	Understand physical-biological connections and mechanisms of ecosystem and population responses to climate change impacts.	15/16	NOAA-NCCOS	Roger.B.Griffis@noaa.gov
179	5	5.2.3	Identify Knowledge Gaps	NPS - NRSS contribute staff time to a GOVT / NGO workgroup to Identify and address priority climate change knowledge gaps and needs (e.g., species adaptive capacity, risk/rewards of assisted relocation, climate change synergy with existing stressors).	16	NPS	cat_hawkins_hoffman@nps.gov for Hogan, Resnick, Budde, G. Plumb
180	5	5.2.4	Identify Plant Material knowledge gaps	Synthesize NPS info needs on Native Plant Materials	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert, Hogan (PCA)
181	5	5.2.6	Deep water horizon oil spill	Working with NRDA biologists to analyze data to inform mortality of waterbirds exposed to oil	15	Natural Resource Damage Assessment and Restoration	Veronica_Varela@fws.gov
182	5	5.2/5.3	Increase research capacity/technical expertise	Add 5 Tribal climate scientist/extension liaisons, In cooperation with Climate Science Centers to address tribal research needs and to provide technical expertise for adaptation planning	15/16	BIA and USGS	sean.hart@bia.gov
183	5	5.3	Assessing biological carbon stocks	The USGS has recently completed an assessment of biological carbon stocks and fluxes for the conterminous US based largely on remotely sensed data and summarized at 250m spatial resolution. The assessment is also under way for Hawaii and Alaska and is expected to be completed in 2015. This information will be used to help assure consistency across jurisdiction and with methods such as those used by IPCC and reporting requirements under the UNFCC. In addition, DOI bureaus are cooperating on several pilot projects to consider biological carbon management as part of their overall decision making process. The first of	15/16		Bradley Reed, reed@usgs.gov

				these projects is being undertaken in Great Dismal Swamp National Wildlife Refuge by USGS and USFWS and considers the implications of water management strategies on carbon accumulation in peat soils and aboveground biomass, as well as other ecosystem services (e.g. water quality, biodiversity, etc.). Additional pilots are being initiated in Puget Sound, interior Alaska, Florida, and elsewhere. Finally, USGS is investigating blue carbon and the restoration and protection of coastal habitats in the mid-Atlantic coast and in mangrove ecosystems through pilot projects (e.g. with FWS) and is also investigating the integration of remote sensing with other research activities for blue carbon in mangrove ecosystems. A pilot study testing an approach is being initiated in Florida at the Ding Darling NWR in Florida.			
184	5	5.3.5	Provide access to current climate data and ensure alignment with data management and decision support tools at agency and departmental levels.	In the future, Reclamation will focus efforts on making the following types of information available through web-based portals in coordination with efforts by other Federal agencies: (1) future climate and hydrology projections; (2) results and reports from the WWCRA Impact Assessments, WaterSMART Basin Studies, and SECURE Studies; (3) real-time and historical operational data of Reclamation's reservoirs and other facilities; and (4) geospatial information that can be used to analyze and visualize historical and temporal climate and hydrological data. This information portal will help Reclamation enhance internal and external knowledge networks (e.g., LCCs), make information access cheaper and faster, and build awareness among Reclamation staff and partners on cutting-edge information, tools, and adaptation approaches.	15/16	BOR	svaddey@usbr.gov
185	6	6.1	Educational and outreach efforts in the State Wildlife Action Plan	CDFW (California Department of Fish and Wildlife) staff will identify opportunities to increase awareness of the various stresses to California ecosystems (including climate change) and to communicate the importance of addressing these stressors. Outreach objectives and associated actions will be outlined in the revised State Wildlife Action Plan, which will be completed in 2015.	15/16	CDFW	Armand.Gonzales@wildlife.ca.gov
186	6	6.1	Increase public awareness and understanding	NOAA (National Oceanic and Atmospheric Administration) will continue operation and advancement of their Digital Coast website to communicate information to the public and decision makers.		NOAA-OCM	Roger.B.Griffis@noaa.gov
187	6	6.1	Make information available to the public to increase awareness	Providing information to increase the public's awareness and understanding of climate impacts will take a variety of forms depending on the particular project. One example is the North Pacific LCC Conservation Planning Atlas (CPA, an on-line resource providing data discovery, visualization, and an analytical platform for stakeholders.	15/16	LCC lead agencies (FWS, NPS, BOR, BLM,FS)	elsa_haubold@fws.gov

			and understanding of climate impacts.				
188	6	6.1	Produce monthly communication: Forest Service Climate Update	The US Forest Service produces a monthly Climate Update which describes field activities, upcoming events alerts, online tools, and the resource center on climate change.	15/16	Forest Service	
189	6	6.2	Youth Engagement	An Intertribal Climate Youth Leadership Congress (training/engagement) will involve 100 tribal youth.	15	BIA, USFWS, US Forest Service, USGS, NPS	sean.hart@bia.gov, or jim_siegel@fws.gov
190	6	6.2	Youth Engagement	A climate impact photo contest will be held for tribal youth in grades K-12.	15	BIA	sean.hart@bia.gov
191	6	6.3	Coordinate climate change communication efforts across jurisdictions	NOAA (National Oceanic and Atmospheric Administration) will continue development of interagency websites that communicate climate data and information, e.g. Climate.gov, Digital Coast		NOAA	Roger.B.Griffis@noaa.gov
192	6	6.1.1	Community Outreach on Climate Change Adaptation	Subject to appropriations, EPA (Environmental Protection Agency) will expand activities in each of its 10 Regional offices to assist small and disadvantaged communities in addressing environmental risks, building resilience and addressing the impacts of climate change.	16	EPA	TBD
193	6	6.1.1	Develop Public "Climate Adaptation 101" Training	The EPA (Environmental Protection Agency), in partnership with its Local Government Advisory Committee, will develop a public version of the “Climate Adaptation 101” Training Module recently created for internal climate change training. The public version will be targeted to local decision-makers in small communities.	15; first quarter	EPA	Nurse.Leanne@epa.gov
194	6	6.1.4, 6.1.5, 6.2.2	NWRS Public Communications/Engagement Plan	Implement climate related components of the NWRS Public Communications/Engagement Plan.	15/16	Refuges	?
195	6	6.1.5	Increase	NPS Interpreter Curriculum, Superintendents' Academy, and e-learning module	15/16	NPS	cat_hawkins_hoff

			public awareness of existing habitat conditions and the benefits of building resiliency of those habitats.				man@nps.gov for Stubblebine, Holly
196	6	6.1?	Invasive species awareness	Review existing efforts to educate managers and the public, and develop a cohesive strategy for a systematic awareness campaign.	16	NPS-IPM, etc.	cat_hawkins_hoffman@nps.gov for DiSalvo, Hogan, Resnick
197	6	6.2.1	Songbirds "Climate variability drives the arrival of temperate migrants to the Upper Midwest"	Wisconsin Department of Natural Resources is exploring the use of citizen science programs for studying spring migration phenology throughout the Upper Midwest. They have already found that milder climate conditions on overwintering grounds promote early arrival to breeding grounds.	ongoing	Wisconsin Department of Natural Resources & University of Wisconsin Madison	bzuckerberg@wisc.edu
198	6	6.2.3	Coastal Climate Impacts to First Foods, Cultural Sites, and Tribal Community Health and Well-being	Bureau of Indian Affairs will work with community members to talk about how the forecasted changes to the nearshore environment may impact community health and wellbeing.	15/16/17		
199	6	6.2.6	Educate on plant species response to CC	Through PCA's action plan and network of collaborators, and JFSP Fire Knowledge Exchanges, develop model and outreach materials to educate public and managers	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert, S. Plumb, Drees
200	6	6.2.7	Working with Garden Club of America	National Park Service will use a Memo Of Understanding with Garden Club of America to disseminate information and messages about climate change.	15	NPS	cat_hawkins_hoffman@nps.gov for Eckert, S. Plumb, Drees

201	6	6.3.3	Provide access to tools that promote improved collaboration, interactive dialog, and resource sharing to minimize duplication of effort across jurisdictions.	The Bureau of Reclamation has led a partnership with Federal and non-Federal entities since 2007 to develop and support the Downscaled Climate and Hydrology Projections Website, hosted at Lawrence Livermore National Laboratories. This web-based tool provides scientists, engineers and planners quick and easy access to local future climate and hydrology information essential for adaptation planning. In 2014, Reclamation and its partners updated the website to include hydrology projections for the contiguous U.S. consistent with new CMIP5 climate projections. New generations of climate modeling will continue to be made available through this partnership.	15/16	BOR	lbrekke@usbr.gov
202	6	6.4.1	Youth Engagement	The Bureau of Indian Affairs will provide Climate Management-related internships for Tribal youth in the areas of forestry/wildlife, research, and planning.	15/16	BIA	sean.hart@bia.gov
203	7	7	Amend western Forest and Grassland LMP's	Control activities to reduce negative impacts on sagebrush ecosystems and reduce non-climatic stressors on Sage Grouse and their ecosystems	2015		
204	7	7	Develop process to request support from USDA and/or the Federal community for large-scale responses	Work with USDA and DHS to develop procedures for requesting support and coordinating activities for large-scale emergency responses.	(ongoing)	APHIS, Marketing and Regulatory Programs Business Services, Emergency Management Safety and Security Division	Craig Aughe craig.a.aughe@aphis.usda.gov
205	7	7.2	Greater Sage-grouse and Sagebrush Conservation. Planning and Implementatio	The BLM, working jointly with the Forest Service, has developed a series of Environmental Impact Statements (EISs) to incorporate Greater Sage-Grouse conservation measures on the lands they manage. These Draft EISs were released to the public in 2013. Our goal is to release the final EISs in the early summer of 2015, with final plans released before the end of the fiscal year	15/16/17	BLM	

			n Initiative				
206	7	7.2	Slow, mitigate and reverse where feasible ecosystem degradation…	Watershed Management and Conservation Action Planning and Implementation in priority watersheds in Puerto Rico, American Samoa, and Hawaii in collaboration with multiple federal, state and local entities through the US Coral Reef Task Force		NOAA-OCM	Roger.B.Griffis@noaa.gov
207	7	7.3	Coordinate the development of epidemiological forecasting tools for plant pests and diseases	USDA Animal and Plant Health Inspection Service's Center for Plant Health Science Technology (CPHST), jointly with North Carolina State University's Center for Integrated Pest Management and Oregon State University's Integrated Plant Protection Center (IPPC), is working to integrate state of the art epidemiological models into APHIS pest risk analyses. These efforts inform import decision-making by assessing the potential impacts associated with exotic pest entry and establishment, being mindful of trade and land use patterns, as well as climate change effects.	(ongoing)	APHIS, Plant Protection and Quarantine (PPQ), Center for Plant Health Science and Technology	
208	7	7.3	Enhance USFWS ability to identify invasive species threats.	The Service will continue to develop peer-reviewed tools such as the Risk Assessment Mapping Program (RAMP) that maps and scores invasive species climate niches using projections of changing climate conditions. Data generated by those improved risk assessment models will allow the USFWS and partners to better identify high-priority threats and take more effective action for the benefit of trust resources. This information, which incorporates climate data, will continue to be shared with industry, the public and State partners to promote and encourage environmentally responsible actions in the trade of harmful species and take voluntary and regulatory risk management actions.	15/16	FWS/FAC	dolores_savignano@fws.gov and Craig_Martin@fws.gov
209	7	7.3	Invasive Species Program	CDFW's Invasive Species Program will continue to take action to reduce the negative impacts of invasive species on California's wildlands and waterways.	15/16	CDFW	Invasives@wildlife.ca.gov
210	7	7.3	Non-native plants and animals	Invasive, non-native plants and animals degrade and diminish Florida's conservation lands and waterways. The state devotes significant resources to monitoring and managing these species. Efforts include Exotic Pet Amnesty Days, and the Python Challenge which seek to raise awareness and reduce numbers of exotic animals, and extensive ongoing programs to remove Hydrilla and water hyacinth from rivers.		Florida Fish and Wildlife Conservation Commission	Bill.Caton@myfwc.com (plants) or Kristen.Sommers@myfwc.com (animals)
211	7	7.3	Reinvigorating Habitattitude Outreach Campaign	USFWS will work with industry and other partners to promote and encourage environmentally responsible consumer behavior in selecting and owning pets. For example, reinvigorating the Habitattide campaign will lead to fewer releases, whether accidental or intentional, of pets that pose a threat to native resources that are already stressed by climate change.	15/16	FWS/FAC, NPS, NOAA	dolores_savignano@fws.gov and Craig_Martin@fws.gov
212	7	7.3	Statewide	Wisconsin has developed an invasive species identification, classification and	15/16	Wisconsin	invasive.species@

			invasive species management program	control rule and administers a variety of technical and financial assistance programs to support prevention, detection, rapid response and control efforts		Department of Natural Resources and Wisconsin Invasive Species Council	wisconsin.gov
213	7	7.3	SWD District Reservoir Master Plan Updates	Control of invasive is a goal for Corps lands; green infrastructure is a goal of all Corps facilities. Master Plans undergoing updating include Tenkiller, Fort Gibson, John Redmond, Keystone, Pat Mayes, Robert S. Kerr, Texoma, Whitney, Sam Rayburn, Lavon, Canyon, Addicks & Barker, Wallisville, Beaver, Table Rock, Bull Shoals Reservoirs.	15/16	USACE	David.K.White@usace.army.mil
214	7	7.4	Reduce destructive capture practices	Kahekili Herbivore Fisheries Management Area. Maui, Hawaii		NOAA-OCM	Roger.B.Griffis@noaa.gov
215	7	7.1	Assess biological carbon stocks	The USGS has recently completed an assessment of biological carbon stocks and fluxes for the conterminous US based largely on remotely sensed data and summarized at 250m spatial resolution. The assessment is also under way for Hawaii and Alaska and is expected to be completed in 2015. This information will be used to help assure consistency across jurisdiction and with methods such as those used by IPCC and reporting requirements under the UNFCC. In addition, DOI bureaus are cooperating on several pilot projects to consider biological carbon management as part of their overall decision making process. The first of these projects is being undertaken in Great Dismal Swamp National Wildlife Refuge by USGS and USFWS and considers the implications of water management strategies on carbon accumulation in peat soils and aboveground biomass, as well as other ecosystem services (e.g. water quality, biodiversity, etc.). Additional pilots are being initiated in Puget Sound, interior Alaska, Florida, and elsewhere. Finally, USGS is investigating blue carbon and the restoration and protection of coastal habitats in the mid-Atlantic coast and in mangrove ecosystems through pilot projects (e.g. with FWS) and is also investigating the integration of remote sensing with other research activities for blue carbon in mangrove ecosystems. A pilot study testing an approach is being initiated in Florida at the Ding Darling NWR in Florida.			Bradley Reed, reed@usgs.gov
216	7	7.1.4	Project Formulation	Navigation and Flood Risk Management projects are formulated and coordinated during the Planning process to accomplish these goals. Larger projects include Matagorda Ship Channel (SC), Houston SC (numerous), Gulf Intracoastal Waterway projects (numerous), Sabine to Galveston, Coastal Texas, and Dallas Floodway.	15/16	USACE	Robert.W.Heinly@usace.army.mil

217	7	7.1.4	Provide Water Utilities with Technical Assistance for Climate Change Adaptation	EPA will provide technical assistance to 20-25 water utilities in the use of the Climate Resilience Evaluation and Awareness Tool (CREAT). EPA is also updating CREAT to version 3.0 to provide enhanced data management and analysis services.	15	EPA	Baranowski.Curt@epa.gov
218	7	7.1.4	Restore floodplain connection to Big Oak Tree State Park, Missouri.	Mitigation plans for the St. Johns Bayou and New Madrid Floodway Project include providing a direct surface water connection to the park from the Mississippi River via a gated culvert to allow river water to flow through the frontline levee at times of higher stages, to mimic natural flooding.	15/16	USACE	gary.l.young@usace.army.mil
219	7	7.1.6	NPS portfolio of disturbed sites for mitigation banks	Create a portfolio of degraded resource categories and develop CC related adaptation criteria for managing these areas (to increase eligibility potential)	15/16	NPS	cat_hawkins_hoffman@nps.gov for WRD, BRMD, GRD, NIFC
220	7	7.1.7	Ecosystem Benefits of Restoration	Develop valuation criteria and data required for key restoration activities and outcomes, including C sequestration	16	NPS	cat_hawkins_hoffman@nps.gov for EQD, BRMD
221	7	7.2.1	COE/Texas Water Development Board Collaboration	COE/Texas Water Development Board collaboration on environmental flows, water rights, and water management issues in Texas.	15/16	USACE	Ray.Russo@usace.army.mil; Elston.Eckhart@usace.army.mil
222	7	7.2.10	Reforestation of mitigation sites with native vegetation.	Reforestation in the Mississippi Alluvial Valley would sequester 4.88 tons of carbon per acre/year.	15/16	USACE	gary.l.young@usace.army.mil
223	7	7.2.12	CC-adapted fuel treatment impacts to ecosystem services, fire response, and ecosystem condition	Review YOSE / SEKI project results on prescribed fire and fuel prescriptions. Tie evaluation to climate and fire regime shifts. Provide a deliverable	16	NPS, NIFC	cat_hawkins_hoffman@nps.gov for NIFC, Eckert

224	7	7.2.5	Incorporate riparian buffer strips into mitigation planning, St. Johns Bayou and New Madrid Floodway Project, Missouri.	The ecological benefits associated with buffer strips are numerous and include but are not limited to providing structure, sediment retention, nutrient removal, filtering agricultural runoff, as well as providing habitat to a variety of terrestrial/semi-aquatic wildlife resources.	15/16	USACE	gary.l.young@usace.army.mil
225	7	7.2.8	Reduce ground and surface water withdrawals in areas experiencing drought and/or increased evapotranspiration.	Beginning in FY 2016, Reclamation will expand on current Science and Technology Program water conservation research to test and demonstrate new technologies and methods that create water savings. Projects will include demonstrating the benefits of innovative canal lining techniques, such as lime stabilization or in-situ compaction.	16	BOR	draff@usbr.gov
226	7	7.2.9	cost-shared funding to plan, design, and construct water reuse projects	Reclamation will continue support for the Title XVI Program, which provides cost-shared funding to plan, design, and construct water reuse projects. Water reuse and recycling can turn currently unusable water sources into a new source of supply that is less vulnerable to drought and climate change, increasing flexibility and reducing the pressure to transfer water from agricultural to urban uses.	15	BOR	aerath@usbr.gov
227	7	7.2.9	Expand WaterSense Program	Subject to appropriations, EPA will expand the existing WaterSense to support increasing the range of products covered by the WaterSense label, to build a broader partner base, and increase the rate of GHG, energy and water savings.	FY 16	EPA	Blette.Veronica@epa.gov
228	7	7.3.9	Develop and use partnerships to leverage resources and minimize impacts of changing pest, disease, and vector	Identify specific pests, diseases, or vectors that are changing their distribution in the United States as a result of climate change and identify strategies to improve preparedness in the face of these changes.	(ongoing)	APHIS, Veterinary Services (VS), Centers for Epidemiology and Animal Health and APHIS, Wildlife	VS- Cynthia Johnson cynthia.l.johnson@aphis.usda.gov, Steve Sweeney steven.j.sweeney@aphis.usda.gov, WS - Thomas Deliberto Thomas.J.DeLibert

			distribution on the health and value of U.S. agriculture, natural, and other resources			Services (WS), National Wildlife Research Center	o@aphis.usda.gov
229	7	7.3.7	Invasive species monitoring in Mississippi Valley Division mitigation plans.	Include in Civil Works Feasibility Studies mitigation plans that prevent and monitor for establishment of invasive species.	15/16	USACE	gary.l.young@usace.army.mil
230	7	7.3.8	Feral swine eradication/control programs	Eradicate or control feral swine populations in all states and conduct disease surveillance and monitor efforts. Eradication of feral swine prevents significant ecological damage from their rooting in wetland and forested habitats which otherwise destroys habitat for native species and further exacerbates ecological effects of climate change.	(ongoing)	APHIS, Wildlife Services (WS) and APHIS, Veterinary Services (VS)	Dale Nolte, Dale.L.Nolte@aphis.usda.gov
231	7	7.3.8	The Chesapeake Bay Nutria Eradication Project (CBNEP)	The Chesapeake Bay Nutria Eradication Project (CBNEP) aims to eradicate the invasive and highly damaging nutria from the Delmarva Peninsula. Eradicating nutria allows restoration of native coastal wetlands that are vital to protecting ecosystems in the Chesapeake Bay Region and providing resilience to climate change in the region.	(ongoing) Estimated completion 2017.	APHIS, Wildlife Services (WS), Nutria Program	
232	7	7.3.9	Invasive Species/Climate Change Working Group	The interagency and extramural working group, co-chaired by APHIS and National Invasive Species Council (NISC) staff members, seeks to define and provide the Aquatic Nuisance Species Task Force (ANSTF) and NISC with information, gaps, and recommendations on the intersection between climate change and invasive species. In FY2105, it produced a report, "Bioinvasions in a Changing World: A Resource on Invasive Species-Climate Change Interactions for Conservation and Natural Resource Management." The working group will continue to monitor the topic and provide ongoing updates to the report.	Report completed FY15, Group monitoring efforts and updates to report, ongoing.	APHIS, USGS, USFWS, EPA, BIA, USFS, DOD, DOI, NOAA, Puget Sound Partnership, CA Native Plant Society,	Tom Hall, Thomas.c.hall @aphis.usda.gov

						FWC, PA Sea Grant, CA Invasive Plant Council, North Slop Science Initiative, Univ. of Wisconsin Sea Grant Institute, MIT Sea Grant College Program, NPS, NWF, Metlakatla Indian Community, BIA	

Appendix 2. List of acronyms

NFWPCAS	National Fish, Wildlife, and Plants Climate Adaptation Strategy
JIWG	Joint Implementation Working Group
APHIS	Animal and Plant Health Inspection Service
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CDFW	California Department of Fish and Wildlife
CSC	Climate Science Center
DOC	Department of Commerce
DOI	Department of the Interior
FWC	Florida Fish and Wildlife Conservation Commission
LCCs	Landscape Conservation Cooperatives
NCCWSC	National Climate Change and Wildlife Science Center
NFHAP	National Fish Habitat Action Plan
NIST	National Institute of Standards & Technology
NMFS	National Marine Fisheries Service (NOAA)
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service (NOAA)
NPN	National Phenology Network
NPS	National Park Service
SWAP	State Wildlife Action Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Appendix 3: Members of the Joint Implementation Working Group

- Council Environmental Quality
- Department of Agriculture
    - Animal and Plant Health Inspection Service
    - Farm Service Agency
    - Natural Resources Conservation Service
    - U.S. Forest Service
- Department of Commerce
    - National Marine Fisheries Service
    - National Ocean Service
- Department of Defense
    - U.S. Army Corps of Engineers
- Department of the Interior
    - Bureau of Indian Affairs
    - Bureau of Land Management
    - Bureau of Reclamation
    - National Park Service
    - U.S. Fish and Wildlife Service
    - U.S. Geological Survey
- Environmental Protection Agency
- States
    - California Department of Fish and Wildlife
    - Florida Fish and Wildlife Conservation Commission
    - New York State Department of Environmental Conservation
    - Washington Department of Fish & Wildlife
    - Wisconsin Department of Natural Resources
- Tribal Commissions
    - Great Lakes Indian Fish and Wildlife Commission