



Year One Report America the Beautiful

December 2021

An update on progress made to support locally led conservation and restoration efforts across the country during the first year of the America the Beautiful initiative

Table of Contents

Letter to America	3
Introduction.....	5
Progress to Date and the Path Ahead.....	6
A. Early Progress in Focus Areas	8
Creating More Parks and Safe Outdoor Opportunities in Nature-Deprived Communities.....	8
Supporting Tribally Led Conservation and Restoration Priorities.....	9
Expanding Collaborative Conservation of Fish and Wildlife Habitats and Corridors.....	13
Increasing Access for Outdoor Recreation.....	17
Incentivizing and Rewarding the Voluntary Conservation Efforts of Fishers, Ranchers, Farmers, and Forest Owners.....	20
Creating Jobs by Investing in Restoration and Resilience.....	22
B. Status of Interagency Collaboration, Planning, and Measurement Efforts.....	26
C. Continued Listening, Learning, and Sharing.....	26
D. Congressional, Tribal, State, and Local Efforts.....	27
State of Lands, Waters, and Wildlife	28
A. Review of Land-Cover Change.....	29
B. Review of Fish and Wildlife Habitats and Populations.....	33
Conclusion	37
Endnotes.....	38

Letter to America

This year, President Biden laid out an inspiring and inclusive vision for how the United States can come together to conserve, protect, connect, and restore our lands and waters across the country. His call to action, the America the Beautiful initiative, will help strengthen the economy, address the interconnected climate and biodiversity crises, and advance environmental justice.

The events of 2021 have underscored the need for collaboration and bold action to confront our nation's tough environmental challenges. Climate change impacts continue to have costly and deadly consequences for many communities—from wildfires and drought to more frequent superstorms, flooding, and heat waves. Underserved and disadvantaged communities continue to bear a disproportionate share of the impacts of climate change and environmental degradation.

Earlier this year, the U.S. Fish and Wildlife Service proposed removing 23 species of plants and animals from protection of the Endangered Species Act because they have gone extinct—a somber reminder of the threats facing nearly one million species across the globe. Loss of biodiversity and climate change both, in turn, compromise the many benefits that nature provides to us.

In its first year, the Biden-Harris administration laid the foundation for a more sustainable, just, healthy, and equitable future. The President assembled the most diverse and experienced cabinet in history; re-established the United States as a global leader on climate change; delivered historic investments in clean energy and environmental justice; and, through America the Beautiful, established a goal of conserving and restoring 30 percent of our lands and waters by 2030.

To achieve his ambitious climate change, environmental justice, and conservation agenda and to truly build a better America, the President has worked with Congress to advance historic and critically needed legislation. The Bipartisan Infrastructure Law, which the President signed in November, provides a major boost to the America the Beautiful initiative. As the largest investment in the resilience of physical and natural systems in American history, the law will help communities



President Biden signing the Bipartisan Infrastructure Law. *Official White House Photo by Cameron Smith*

to be more resilient to drought and wildfire; address the legacy of pollution and environmental degradation from orphan wells and abandoned mines; build highway infrastructure that connects habitat and reduces collisions; invest in clean drinking water; fund watershed rehabilitation and flood prevention projects; and improve coastal resilience efforts. Combined with the Great American Outdoors Act of 2020, the infrastructure law will provide communities with needed funding to improve the care of lands, waters, and wildlife across the country. We look

forward to launching the Civilian Climate Corps as another key investment in climate resilience, conservation, and people across the nation.

In addition to securing critical investments and legislative victories that will accelerate conservation and restoration work across the country, the Biden-Harris administration took action to restore protections for some of our most cherished lands and waters. President Biden restored protections for Bears Ears, Grand Staircase-Escalante, and Northeast Canyons and Seamounts National Monuments; halted oil and gas leasing in the Arctic National Wildlife Refuge; commenced the process to reinstate protection of the Tongass National Forest under the Roadless Rule; reproclaimed the Northern Bering Sea Climate Resilience Area; reinstated the process to protect Bristol Bay and the world-class salmon fishery it supports; and kicked off public processes to consider further protections for the spectacular Boundary Waters in Minnesota and culturally significant Chaco Canyon in New Mexico.

In the years ahead, there is far more to do to advance land and water conservation in a manner that is faithful to our shared principles of conservation—building a locally led movement that benefits people and our economy, is guided by science, honors Tribal sovereignty, and respects private landowners. The past year was a strong start to the President’s conservation agenda and a demonstration of the Biden-Harris administration’s determination to consult with Tribes and to partner with States, territories, businesses, agricultural producers, fishermen, non-profit organizations, private landowners, hunters and anglers, and countless communities and individuals across the nation to care for the lands and waters that sustain us.

This first annual America the Beautiful report is by no means comprehensive of all the efforts underway across the Federal family—let alone the country—but it provides a snapshot of how the Biden-Harris administration is kicking off a decade-long effort to conserve and restore the lands and waters we cherish as Americans. The last section, entitled “State of Lands, Waters, and Wildlife,” paints a clear picture that the challenges we face are urgent and merit our sustained attention.

We are inspired by actions big and small across our nation to steward our lands and waters for the generations who follow us, and we look forward to the collaborative work ahead.

Sincerely,

America the Beautiful Interagency Working Group Co-Chairs:



Deb Haaland, Secretary of the Interior



Thomas J. Vilsack, Secretary of Agriculture



Brenda Mallory, Chair, Council
on Environmental Quality



Gina M. Raimondo, Secretary of Commerce

Introduction

In response to the climate and biodiversity crises, environmental injustices, and broad recognition that healthy ecosystems can strengthen the economy and create jobs, President Biden has issued a call to action for all Americans to join together to help conserve, protect, connect, and restore the lands and waters that sustain us.

In January, President Biden signed Executive Order 14008 on *Tackling the Climate Crisis at Home and Abroad*, which charged the Secretary of the Interior—in consultation with the Secretary of Agriculture, the Secretary of Commerce, and the Chair of the Council on Environmental Quality—to recommend how the United States can achieve the goal of conserving at least 30 percent of our lands and waters by 2030. The first-ever national conservation goal echoes recommendations from scientists of what is necessary to safeguard the nation’s water and food supplies, benefit local economies, stem the decline of wildlife populations and biodiversity, and improve climate resilience.

Informed by conversations with a wide range of stakeholders, the Biden-Harris administration released the *Conserving and Restoring America the Beautiful* report in May that outlines a vision for a locally led, decade-long effort to restore and conserve lands and waters across the nation. Input shared by State, local, Tribal, and territorial governments, as well as agricultural and forest landowners, fishers, non-profit organizations, and other key stakeholders demonstrated universal appreciation for the value of America’s lands and waters and emphasized our responsibility to pass the resources on to future generations.

The America the Beautiful initiative is rooted in the desire to better support and honor the people and communities who serve as stewards of our lands, waters, and wildlife—from Tribes and Indigenous peoples, to fishermen, farmers and ranchers, to local and State governments—and to ensure that all people of this nation benefit from America’s rich and vibrant lands and waters. In recognition that the “how” is just as important as the “what,” the report lays out eight principles by which the nation should pursue the ambitious conservation effort. These principles commit the administration to:

- Pursue a Collaborative and Inclusive Approach to Conservation
- Conserve America’s Lands and Waters for the Benefit of All People



Secretary Haaland planting vegetation with youth at the San Diego National Wildlife Refuge. *Photo by DOI*

- Support Locally Led and Locally Designed Conservation Efforts
- Honor Tribal Sovereignty and Support the Priorities of Tribal Nations
- Pursue Conservation and Restoration Approaches that Create Jobs and Support Healthy Communities
- Honor Private Property Rights and Support the Voluntary Stewardship Efforts of Private Landowners and Fishers
- Use Science as a Guide
- Build on Existing Tools and Strategies with an Emphasis on Flexibility and Adaptive Approaches

The report also outlines six areas of focus that elected officials, Tribal leaders, and stakeholders lifted up as early opportunities for successful collaboration: creating more parks in underserved communities; supporting Tribally led conservation and restoration priorities; expanding collaborative conservation of fish and wildlife habitats and corridors; increasing access for outdoor recreation; rewarding voluntary conservation efforts of fishers, ranchers, farmers, and forest owners; and creating jobs by investing in restoration and resilience.

This progress report on America the Beautiful provides an overview of what the Biden-Harris administration has done in the first year to advance locally led conservation efforts, and to protect, connect, and restore our lands and waters in line with the initiative's goals and principles. It also outlines next steps the administration will take to develop the American Conservation and Stewardship Atlas, including assessing how to best measure and reflect the continuum of effective conservation tools. The report includes a brief review of existing scientific literature on land-cover changes and the status of fish and wildlife habitats and populations. Collectively, this report can serve as a motivator to continue our collaborative efforts to restore and support healthy, functioning ecosystems.

Progress to Date and the Path Ahead

The America the Beautiful initiative is part of the broader vision that President Biden laid out on his first day in office: the nation has a can't-miss opportunity to build back better and address the intersecting issues of a global pandemic, climate change, and environmental injustice.

In its first year, the Biden-Harris administration made significant progress to support effective and enduring conservation strategies. This effort included listening and learning from the families and communities that know and care for American lands and waters to ensure that the initiative reflects their priorities, needs, and perspectives. The administration also made huge investments in restoration and conservation through the Great American Outdoors Act (GAOA); reversed harmful policies that undermined protections for sacred and special places; supported the remarkable conservation work already underway in communities nationwide; and enhanced existing tools and strategies that have made the United States a global leader in conservation.

The single most consequential conservation step the country took this year was when President Biden signed the Infrastructure Investment and Jobs Act, also known

as the Bipartisan Infrastructure Law. As the largest investment in the maintenance and resilience of physical and natural systems in American history, the law will create good-paying jobs by investing in science-based restoration and resilience of our forests, wetlands, waterways, and coasts, and help achieve the conservation and restoration goals of the President's America the Beautiful initiative. From plugging orphan wells and reclaiming abandoned mine land to addressing the growing threats of drought and wildfire, the Bipartisan Infrastructure Law will build a better America and benefit the economy and health of communities for decades to come.

These investments come at a moment when State, Tribal, territorial, and local leaders, communities, and private landowners are expanding community-led efforts to conserve natural and cultural resources. Nevada, Maine, New York, California, and New Mexico are among the States who have recently adopted their own conservation goals. In consultation sessions, Tribal leaders have brought forward ideas for how Federal agencies can better support Tribally led conservation and stewardship work—these consultations have already resulted in the adoption of new policies on co-stewardship, the protection of sacred sites, and the use of Indigenous Traditional Ecological Knowledge (ITEK). Community leaders from across the country have shared their ongoing work to secure more equitable access to nature and identified tools that reduce barriers to connecting more people to the outdoors. Farmers and ranchers from the Great Plains to the Rocky Mountains have spoken up for policies and approaches that recognize their own contributions to wildlife stewardship, honor private property rights, and incentivize voluntary stewardship efforts; these are principles and priorities that the Biden-Harris administration is fully committed to defending and upholding. Hunters and fishers, meanwhile, are making remarkable strides in their efforts to restore fish stocks, conserve key habitat and migration corridors, and expand access for hunting and fishing—work that the Biden-Harris administration is proud to support.

What follows is a brief summary of some of the work that the Biden-Harris administration has undertaken during the past year—in collaboration with many partners—through the America the Beautiful initiative. This report does not capture all the work that is underway, and it spotlights only a small subset of the countless local, State, and Tribal conservation and restoration efforts that communities are leading. It also does not include a numerical summary of how much land is currently protected, conserved, or restored in the United States; the development of the American Conservation and Stewardship Atlas will enable that reporting to occur in future annual progress reports. Further, it is important to note that many of the items highlighted in this report have been decades in the making or build on existing programs that have been embraced by local, State, and Tribal governments as well as previous administrations. The compilation is both a celebration of what has been done to date and a call to action to continue inspiring future conservation and restoration work in the coming years.

A. Early Progress in Focus Areas

Creating More Parks and Safe Outdoor Opportunities in Nature-Deprived Communities

To help address inequitable access to nature and its benefits, the administration is working to create more parks and safe outdoor opportunities in nature-deprived communities, many of which are communities of color or low-income communities. Examples from this year include:

- Outdoor Recreation Legacy Partnership:** The Biden-Harris administration reinstated and strengthened the Land and Water Conservation Fund's Outdoor Recreation Legacy Partnership Program, the National Park Service (NPS) program dedicated to addressing the recreational gap in underserved urban areas. After rescinding a Trump-era policy that undermined the program, the Department of the Interior (DOI) announced \$150 million for local communities to create new outdoor recreation spaces, reinvigorate existing parks, and form connections between people and the outdoors in economically underserved communities.
- Urban Forests and Urban Agriculture Programs:** The Department of Agriculture (USDA) Forest Service (FS) Urban and Community Forestry Program provided \$40 million to restore and sustain the health of urban and community forests—forests by which more than 84 percent of Americans reside. In addition, the USDA Natural Resources Conservation Service (NRCS) provided \$4.75 million in urban agriculture grants to support 21 community garden and farm projects that will increase access to green spaces while improving food production, job training, and education in economically distressed and food-insecure communities.
- Urban Waters Federal Partnership:** Fifteen Federal partners celebrated the 10-year anniversary of the partnership, which helps communities reconnect to their waterways, reduce the adverse impacts of urbanization on human health, and restore degraded riverfronts, parks, and watersheds. The anniversary celebration recognized major urban conservation accomplishments in 20 locations nationwide and the nearly 600 community members pursuing environmental justice and urban conservation projects through the Urban Waters Learning Network. Actions this year include completing construction of a pedestrian bridge in New York that connected 30,000 low-income Bronx



Local and Federal employees collaborate at Urban Sprouts Farm a few miles southeast of downtown Atlanta, Georgia.
Photo by USDA

residents to the river, parks, and greenspace; reconnecting residents to the Delaware River Waterfront by transforming a 5.3-acre brownfield site into a recreational resource; re-greening vacant lots into functional parks, vegetable gardens, and rain gardens in Baltimore, Maryland; and supporting local partners in Northwest Indiana who leveraged nearly \$3 million in grants to advance green infrastructure and revitalize communities.

- **Watershed Projects:** The National Oceanic and Atmospheric Administration's (NOAA) Bay Watershed Education and Training Program works with underserved and disadvantaged communities to increase their opportunities to engage and enjoy the outdoors. This past fiscal year, 182 new and continuing projects benefitted from a total of over \$7 million in funding, bringing the cumulative total to 874 projects supported with \$110 million since 2002.
- **Rivers, Trails, and Conservation Assistance Program:** Through this program in 2021, experienced NPS staff provided free, on-location help to 165 communities who are working to create and restore parks and conservation areas. Completed projects helped to restore rivers, wildlife habitats, and impaired resources; improve outdoor recreation opportunities to meet changing demands; and support natural disaster recovery.
- **Community Development Block Grants:** In fiscal year 2021, the Department of Housing and Urban Development (HUD) provided \$152 million in funding directed by States, cities, and counties to develop and improve parks and recreational facilities and to plant trees.

Next Steps: The Biden-Harris administration will continue to implement the Justice40 initiative, established in Executive Order 14008, with a goal to deliver at least 40 percent of the overall benefits from Federal investments in climate and clean energy to disadvantaged communities. The America the Beautiful initiative will continue to advance work on nature access, parks, and tree cover that connects to the administration's overarching environmental justice goals and commitment to leave no community behind. As the investments flow toward new projects and undertakings, Federal agencies will work through an interagency working group to build capacity and develop new strategies to make every person feel welcome in the outdoors. For example, the administration is looking to expand opportunities to tell a more complete story of America through its network of public lands and waters. The Bipartisan Infrastructure Law also includes new programs to support access for underserved communities including the Reconnecting Communities Program and Complete Streets efforts, which are connected to the Department of Transportation (DOT).

Supporting Tribally Led Conservation and Restoration Priorities

Honoring Tribal sovereignty and supporting the priorities of Tribal Nations are central components of the Biden-Harris administration and the America the Beautiful initiative. The administration has acted swiftly to conduct Tribal consultation, support place-based Tribal priorities, and advance Tribal co-stewardship of Federal lands and waters. Examples from this year include:

- **Tribal Consultation.** In January, the White House issued a memorandum, "Tribal Consultation and Strengthening Nation-to-Nation Relationships," charging all executive

departments and agencies to engage in regular, meaningful, and robust consultation with Tribal officials in the development of Federal policies that have Tribal implications. This year, many federal agencies updated and strengthened their Tribal consultation policies.

- **Tribal Co-Stewardship of Public Lands and Waters:** DOI and USDA created the “Tribal Homelands Initiative” to improve stewardship of public lands, waters, and wildlife by strengthening the role of Tribal communities in Federal land management. Through a joint Secretarial Order, the two departments codified a policy to facilitate agreements with Tribes to collaborate in the co-stewardship of Federal lands and waters. The departments also committed to ensuring that all decisions relating to Federal stewardship of lands, waters, and wildlife include consideration of how to safeguard the treaty, spiritual, subsistence, and cultural interests of Indian Tribes.
- **Protection of Tribal Treaty Rights:** Seventeen Federal agencies formally committed to protecting Tribal treaty rights in agency policymaking and regulatory processes. The agreement affirms the Federal Government's commitment to enhancing interagency coordination and collaboration to protect treaty rights and to fully implement Federal Government treaty obligations.
- **Commitment to Sacred Sites:** Eight Federal partners, including DOI, USDA, DOT, the Department of Energy (DOE), Environmental Protection Agency (EPA), White House Council on Environmental Quality (CEQ), Tennessee Valley Authority (TVA), and Advisory Council on Historic Preservation (ACHP), announced an interagency commitment to improve the protection of, and access to, Indigenous sacred sites. The agreement, which builds on one originally established in 2012, will help ensure Tribal stewardship and access to sites, and incorporate Indigenous Traditional Ecological Knowledge (ITEK) into management, treatment, and protection procedures.
- **Tribal Fee-to-Trust Policy:** Interior Secretary Haaland took steps to improve Tribes' ability to establish and consolidate their homelands by empowering Bureau of Indian Affairs (BIA) regional directors to review and approve applications to place land into trust. This action reversed steps taken by the previous administration that caused unnecessary delays in restoring Tribal homelands.



Vice President Kamala Harris at the White House Tribal Nations Summit. *Photo by DOI*

- **Indigenous Traditional Ecological Knowledge:** The White House Office of Science and Technology Policy (OSTP) and CEQ jointly committed to elevating ITEK in Federal scientific and policy processes. A memorandum formally recognized Indigenous knowledge as one of the many important bodies of knowledge that contributes to scientific, technical, social, and economic advancements and the nation's collective understanding of the natural world. The memorandum also created an interagency working group to develop government-wide guidance on elevating ITEK and highlighted ongoing examples of collaboration between Tribal Nations, Native communities, and the Federal Government. A Tribal revegetation effort completed this year at the DOE Nevada National Security Site reflects these goals: the project combined ITEK with western scientific ecological methods to revegetate impacted areas with native plants.
- **Replacement of Derogatory Names:** DOI is establishing an advisory committee to accelerate the process to identify, review, and replace derogatory names of geographic features on Federal lands.
- **Advancement of Place-based Priorities:** DOI, USDA, and NOAA made progress conserving landscapes of particular importance to Tribes, including:
 - **Chaco Canyon:** DOI announced steps to protect Chaco Canyon and the greater connected landscape, home to a rich Tribal and cultural legacy in New Mexico. The Bureau of Land Management (BLM) will seek public comment regarding a proposed 20-year withdrawal of Federal minerals within a 10-mile radius around Chaco Culture National Historical Park, which would bar new oil and gas leasing on those Federal lands. DOI will also undertake a broader assessment of the landscape to ensure that public land management better honors the sacred sites, stories, and cultural resources in the region.
 - **Bears Ears National Monument:** President Biden took action to restore protections for this national monument in Utah, which is the first monument designated at the request of Tribal Nations. The area has supported Indigenous people of the Southwest from time immemorial and continues to be sacred land to the Ute Mountain Ute Tribe, Navajo Nation, Ute Indian Tribe of the Uintah and Ouray Reservation, Hopi Tribe, Pueblo of Zuni, and many other Tribal Nations and Pueblos. The President also restored protections for Grand Staircase-Escalante National Monument in Utah and called for the establishment of a Federal Advisory Committee to include Tribal representation.
 - **Proposed Chumash Heritage National Marine Sanctuary:** NOAA initiated steps to designate the proposed Chumash Heritage National Marine Sanctuary on the central coast of California. The proposal is based on a nomination submitted in 2015 by the Northern Chumash Tribal Council with broad community support. It seeks to protect the area's rich biodiversity, maritime heritage resources, and Tribal history while creating new opportunities for research and economic development.
 - **Tongass National Forest:** USDA announced its intent to restore protections to the 9.3 million acres of inventoried roadless areas in the Tongass National Forest. FS is taking public comment on a proposal to repeal the action taken by the previous administration to exempt the Tongass from the 2001 Roadless Rule, with

consultation from Alaska Natives, to conserve the unique natural and cultural resources of the world's largest intact temperate rain forest. USDA also announced the Southeast Alaska Sustainability Strategy, through which USDA will end large-scale old growth timber harvest on the Tongass and focus economic development on opportunities that directly support local Alaskans in forest restoration, recreation, tourism, commercial fishing, and wildlife habitat and watershed improvement. USDA will consult with Alaska Native corporations in the area to develop sustainable opportunities for economic growth while conserving cultural and natural resources important to Alaska Natives and local communities.

- **Arctic National Wildlife Refuge:** DOI suspended activities related to the implementation of the oil and gas leasing program in the refuge to allow for a new review and analysis of the potential impacts and legal deficiencies of the current program. The refuge is considered sacred to the Gwich'in people, and the Inupiat community of Kaktovik is located within the refuge, immediately adjacent to the area where oil and gas activities would occur.
- **Northern Bering Sea Climate Resilience Area:** On Day One, President Biden re-instated the Northern Bering Sea Climate Resilience Area, originally established through Executive Order in 2016. The Biden-Harris administration restored the withdrawal of certain offshore areas in Arctic waters and the Bering Sea from oil and gas drilling, which were revoked in 2017. The administration is establishing a Federal Task Force and a Tribal Advisory Council to help conserve Arctic biodiversity; support and engage Alaska Native Tribes; incorporate traditional knowledge into decision-making; and build a sustainable Arctic economy.
- **Grants and Funding:** A wide variety of grants and funding from across the Federal Government supported Tribally led priorities. Examples include:
 - **Wetland Program Development Grants for Tribal Governments:** The Environmental Protection Agency (EPA) selected 18 different Tribal jurisdictions to receive approximately \$160,000 each to engage members in developing wetland restoration and protection plans and to identify critical wetland areas for protection.
 - **Nationally Significant Federal Lands and Tribal Projects Grant Program:** Through this program, DOT provided Federal financial assistance for the construction, reconstruction, or rehabilitation of transportation projects providing access to or located next to or on Federal or Tribal lands. This year, DOT awarded \$40 million to the Native Village of Eyak for a project that will help protect marine and terrestrial wildlife from future oil spills in southeast Prince William Sound. The Bipartisan Infrastructure Law continues the program through 2026 with a guaranteed \$55 million per year, an additional amount authorized subject to Congressional appropriation, and 50 percent of the available funds assured for Tribal transportation facilities.
 - **Tribal Climate Resilience Grants:** BIA awarded nearly \$14 million to Tribes and Tribal organizations for climate adaptation planning, capacity building, and relocation, managed retreat, and protect-in-place planning for climate risks. The

adaptation planning and data development awards alone are estimated to benefit more than 444,000 Alaska Native people.

- **Native American Lands Environmental Mitigation Program:** The Department of Defense (DoD) advanced work over the past year to address environmental impacts to Tribal lands from past military activities. The department is working to restore the lands by executing 15 cooperative agreements with federally recognized Tribes, including 10 in Alaska.

Next Steps: The Bipartisan Infrastructure Law invests more than \$13 billion directly in Tribal Nations across the country and makes Tribal communities eligible for billions more in much-needed investments. These infrastructure investments will, among other items, support critical projects that will deliver clean and safe drinking water for Tribal communities; make communities more resilient against the impacts of climate change; and provide climate-related transition and relocation assistance. In addition to ensuring that these funds will quickly benefit Tribal Nations and the natural resources they manage, the Biden-Harris administration will continue to implement the historic commitments outlined above and consult with Tribes on how the administration can best support Tribal conservation and restoration priorities. For example, in the coming months, BIA will initiate a process to revise land-into-trust regulations to enable Tribes to acquire and lease trust land for conservation purposes.

Expanding Collaborative Conservation of Fish and Wildlife Habitats and Corridors

In partnership with States, Tribes, local communities, and willing private landowners, the Biden-Harris administration is taking steps to improve and connect habitats, enhance migratory corridors, and support the full diversity of wildlife in America. Examples from this year include:

- **Western Big Game and Migration**

Corridors: In furtherance of Secretarial Order 3362, DOI is working to enhance the winter range and migration corridor habitat of elk, mule deer, and pronghorn in the West. This includes a grant program, administered by the National Fish and Wildlife Foundation, for projects that improve the quality of State- or Tribal-identified priority big-game habitat, stopover areas, and migration corridors on Federal land, or voluntary efforts on private and Tribal land. Additionally, DOI and USDA are looking to partner with western States to support the conservation of wildlife migration corridors, honor private property rights, and preserve working landscapes.



The Working Lands for Wildlife program addresses monarch butterflies like this one, pictured on a national wildlife refuge in Pennsylvania. *Photo by FWS*

- **Enhancement of National Wildlife Refuge System:** The National Wildlife Refuge System, which provides important anchors for wildlife conservation nationwide, was strengthened through funding from the Land and Water Conservation Fund (LWCF) and other grant programs. For example, the Fish and Wildlife Service (FWS) added approximately 4,800 acres to the Laguna Atascosa National Wildlife Refuge in Texas to help safeguard and connect critical migration corridors for endangered ocelots and other wildlife, and to improve outdoor recreation opportunities for the local community.
- **Federal Partnerships:** Many effective partnership programs continued to blossom across the Federal Government over the past year. Examples include:
 - **Invasive Species:** The Biden-Harris administration is re-focusing coordination efforts to address invasive species across the country. This includes reconstituting an Invasive Species Advisory Committee to help inform and prioritize Federal family investments. The DOI Office of Insular Affairs this year provided grants to help combat invasive species where threats are particularly acute in Guam, the Commonwealth of the Northern Mariana Islands (CNMI), Micronesia, and the Marshall Islands.
 - **National Seed Strategy for Rehabilitation and Restoration:** In partnership with the Plant Conservation Alliance, BLM advanced its extensive public-private collaboration with 380 partners including 17 Federal agencies and more than 20 Tribal Nations across 52 States and territories to protect native plants and develop native seed for restoration. This year, the partnership published the National Seed Strategy Progress Report, continued to assess native seed needs and capacities, and advanced large-scale research of native production to meet increasing demand.
 - **Recovery and Sustainment Partnership:** DoD plays a critical role in managing habitats across the country with over 500 threatened and endangered species on its installations and ranges. This DoD initiative, in collaboration with DOI, continued to support the balance between stewardship and mission activities and, in 2021, focused on improving the conservation status of 29 species.
- **Regional Partnerships:** Landscape-level conservation efforts continue to develop and deepen, reflecting a diversity of participants and regions. Several highlights include:
 - **Grasslands and the Northern Bobwhite:** Twenty-four States participated in the development of NRCS's Working Lands for Wildlife Northern Bobwhite, Grasslands & Savannas Framework for Conservation Action to improve landscape health in the central and eastern regions of the country.
 - **Northern Arizona Landscape Connectivity Alliance:** Three national forests in Arizona established the Northern Arizona Landscape Connectivity Alliance to enhance landscape connectivity for wildlife by strengthening partnerships and building efficiencies. The integration with these forests and neighboring landowners promotes effective stewardship of wildlife habitat across a contiguous landscape and enhances habitat resiliency in the face of climate change.
 - **America's Longleaf Restoration Initiative:** This initiative works to manage native longleaf forests across public and private lands from east Texas to southern Virginia with 18 locally led teams, a partnership council, and a coordinating

committee with USDA, DOI and DoD. Work continued this past year, building on the more than 1.7 million acres of longleaf pine trees that have been planted, approximately 14 million acres that have received controlled burning, and 270,000 acres of forestland that have been conserved through fee or easement acquisition over the past decade. These restoration efforts have translated to positive outcomes not only for forest resiliency and carbon sequestration, but also for national defense and local economies.

- **Watersheds, Rivers, and Oceans:** Significant progress has been made in the conservation and restoration of watersheds and ocean and coastal areas, including:
 - **Northeast Canyons and Seamounts Marine National Monument:** President Biden took action to restore management conditions to this marine national monument in the Atlantic Ocean, protecting a rich diversity of deep-sea corals, endangered whales, endangered and threatened sea turtles, and numerous fish and invertebrate species.
 - **Everglades Restoration:** The United States Army Corps of Engineers (USACE) and South Florida Water Management District completed two large-scale projects in 2021, with 44 miles of the Kissimmee River channel and more than 25,000 acres of Kissimmee River floodplain restored. A 3,400-acre reservoir was also completed to help restore more natural hydrology to the St. Lucie River and Indian River Lagoon.
 - **Gulf of Mexico:** NOAA expanded the Flower Garden Banks National Marine Sanctuary to include portions of 14 additional reefs and banks in the northwestern Gulf of Mexico, representing approximately a 104 square mile increase in protected area. This locally supported expansion protects habitat for recreationally and commercially important fish as well as threatened or endangered species of manta ray, sea turtles, and corals.
 - **Estuary Conservation and Restoration:** NOAA advanced community-led efforts to propose designations of national estuarine research reserves in southeast Connecticut, on Lake Michigan in Wisconsin, and in Louisiana. These designations will focus on stewardship, research, training, and education and include habitat restoration and protection, and community-based research projects. EPA supported the National Estuary Program and partnered to conserve, protect, and restore over 100,000 acres across 28 watershed-based estuarine systems in 2021.
 - **Wetland Restoration:** This year, DOI announced more than \$118 million in funding for wetland conservation projects and national wildlife refuges. The wetland grants, approved by the Migratory Bird Conservation Commission, will provide FWS and its partners the ability to help conserve or restore approximately 665,000 acres of wetland and associated upland habitats for waterfowl, shorebirds, and other birds across North America—including Canada and Mexico. These efforts were also matched with \$199 million in partner funds.
 - **Coastal Restoration:** Through FWS's Coastal Program, the agency completed 151 projects this fiscal year, which restored and enhanced 1,859 upland acres, 7,040 wetland acres, 16 river miles and protected 14,070 upland acres, 8,111 wetland acres and 19 river miles. Additionally, every dollar in the Coastal Program dollar

leveraged approximately 34 non-program dollars to maximize return on investment.

- **Fish Passage:** Through the FWS's National Fish Passage Program, the agency worked with partners to remove or bypass over 80 barriers to fish passage in fiscal year 2021. These projects benefitted local communities and aquatic species, including Pacific and Atlantic salmon, American shad, bull trout, and freshwater mussels.
- **Fish Habitat:** The National Fish Habitat Partnership program, supported by NOAA, FWS, EPA, FS, and the Geological Survey (USGS), engaged Tribal governments, State agencies, non-governmental organizations, and individuals to conduct habitat restoration projects and angler engagement projects. This year, the program completed projects in multiple States including Texas, Minnesota, Louisiana, Maryland, Washington, and Alaska.
- **Healthy Watersheds:** The EPA Healthy Watersheds Program helped grantees and their partners protect an estimated 800,000 acres and 3,300 perennial stream miles in the past year.
- **Coral Reefs:** NOAA's Coral Reef Conservation Program awarded nearly \$21.4 million in financial assistance in 2021 through 44 grants and cooperative agreements to projects and scientific studies benefitting coral reef ecosystem management in seven States and territories and in the Caribbean, Mesoamerica, the South Pacific, and Micronesia. In addition, NOAA is engaging with world-renowned scientists, academic and non-profit organizations, local restoration partners, and other Federal and State agencies to implement a first-of-its-kind approach to comprehensively restore seven ecologically and culturally significant coral reef sites that include threatened elkhorn and staghorn coral in the Florida Keys National Marine Sanctuary. DOI also provided \$1.2 million in grants to protect coral reefs in the CNMI, American Samoa, Palau, United States Virgin Islands, and Guam.

Next Steps: The historic infrastructure investments will help catalyze and spur action in expanding and improving habitats and corridors for fish and wildlife. For example, the law includes funding for the establishment of a \$350 million DOT competitive grant pilot program for construction of wildlife road crossings to reduce vehicular crashes and benefit migration corridors; more than \$4 billion across the Federal Government for fish passage; funding for pollinator-friendly practices on highways and roadways; restoration of iconic



A sage grouse in the Warner Mountains of Oregon. *Photo by BLM*

species like salmon in the Pacific Northwest; \$905 million to restore DOI public lands; and \$255 million for restoration of important ecosystems and watersheds, such as the Klamath Basin, Delaware River Basin, Sagebrush Steppe, and Lake Tahoe.

Further, there is significant energy around State and Tribal fish and wildlife restoration efforts, which have identified important areas for conservation and restoration. The administration will work through an interagency working group to elevate and prioritize public-private resources for existing, locally led efforts. The State Wildlife Action Plans, for example, provide valuable blueprints to guide conservation for the 12,000 species identified with greatest conservation need. In December, the Association of Fish and Wildlife Agencies and FWS created a task force to support landscape conservation collaboration, which will provide a durable foundation for working more effectively with Tribes, other State and Federal agencies, landowners, conservation organizations, and other partners.

Increasing Access for Outdoor Recreation

Outdoor recreation is a huge economic driver for the nation, generating more than \$374 billion in revenue in 2020 and accounting for nearly two percent of the economy, according to the Bureau of Economic Analysis. The Biden-Harris administration is committed to supporting the outdoor recreation economy and the many benefits that hiking, hunting, fishing, boating, biking, and other activities offer for healthy communities, economies, and wildlife. Examples from this year include:

- Rural Economies:** EPA, FS, and the Northern Border Regional Commission jointly launched the second round of the Recreation Economy for Rural Communities program, which provides planning assistance to help rural communities leverage outdoor recreation as an economic development and Main Street revitalization strategy. In its first year, the program supported 10 communities in developing action plans.
- Innovative Transportation Solutions:** DOI and DOT expanded their partnership agreement with new emphases on innovation deployment that will improve visitor experiences and help protect natural and cultural resources at national parks and public lands across the country. The departments will work together to advance emerging mobility technology pilots to improve access to public lands and opportunities for car-free trips, including electric shuttles, shared mobility integration, the electrification of transit fleets, the addition of electric vehicle charging stations.



Secretary Raimondo going clamming on Narragansett Bay in Rhode Island. *Photo by DOC*

- **Hunting and Fishing Access:** This year, FWS opened new or expanded hunting and sport fishing opportunities across 2.1 million acres in 88 national wildlife refuges and one national fish hatchery.
- **Trails Programs:**
 - NPS added 10 new national recreation trails in eight States. The National Trails System recognizes existing land- and water-based trails on Federal, State, and local resources to promote recreational opportunities for rural and urban communities as well as tourism-based economic development. With the new additions, the network now includes more than 1,300 trails with at least one in every State, the District of Columbia, and Puerto Rico.
 - DOT administers the Recreational Trails Program, which provides up to \$84 million annually to the States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses.
 - Rail-to-Trails and Rails-with-Trails facilities help communities safely develop and expand their bicycle and pedestrian and trail networks along abandoned or near active railway corridors. This year, DOT issued an updated Rails-with-Trails Report that identified effective design practices for project development.
- **Travel, Tourism, and Outdoor Recreation Grants:** These grants from the Economic Development Administration (EDA) focus on supporting the communities that rely on travel, tourism, and outdoor recreation. EDA is investing \$750 million of its funds from the American Rescue Plan Act, allocating \$510 million directly to States and territories and setting aside \$240 million for competitive grants.
- **Recreation Infrastructure:** Through the Great American Outdoors Act, FS has initiated infrastructure work on more than 500 recreation sites, 144 public service facilities, 312 trail systems, 175 road and trail bridges, and more than 200 water and wastewater systems designed to restore access and improved customer experience across national forests and grasslands. Additionally, DOI initiated work on 165 projects supported by the Act in fiscal year 2021, including 50 primarily focused on transportation, 49 primarily focused on buildings and structures, and 38 primarily focused on water and utilities.
- **Military Installation Projects:** This past year, DoD provided funds to 21 military installations in 11 States and Guam to support projects that enhance the natural and cultural resources on military lands that are open for recreation.
- **Actions to Expand and Preserve Access:** The Biden-Harris administration took steps to strengthen the travel and tourism economy, and to ensure that future generations can experience world-class outdoor recreation opportunities. Place-based examples include:
 - **Wisconsin Shipwreck Coast National Marine Sanctuary:** NOAA designated the new Wisconsin Shipwreck Coast National Marine Sanctuary to encompass a portion of the waters and submerged lands of Lake Michigan. The area includes a nationally significant collection of underwater cultural resources, including 36 known shipwrecks and about 59 suspected shipwrecks, and promotes heritage tourism and recreation in the area.
 - **Sabinoso Wilderness:** BLM accepted the largest wilderness land donation in its history, expanding the Sabinoso Wilderness Area in New Mexico by over 9,600 acres

and nearly 50 percent. The donation will boost local economies through increased access to hunting, hiking, horseback riding, and other opportunities.

- **Aravaipa Canyon:** BLM opened access to 30,000 acres of formerly inaccessible public lands by acquiring approximately 2,800 acres of privately owned land through the LWCF. The lands link BLM and FS lands throughout southeastern Arizona.
- **Boundary Waters:** DOI and USDA initiated consideration of further protections for the Boundary Waters Canoe Area Wilderness and the surrounding Rainy River Watershed in Minnesota. In response to concerns about the impacts of mining on the wilderness area's watershed, fish and wildlife, Tribal trust and treaty rights, and the nearly \$100 million annual local recreation economy, the administration is engaging the public regarding a proposed 20-year withdrawal of national forest lands from new mining claims.
- **Blackstone River Valley National Historical Park:** Secretary Haaland established the boundaries of Blackstone River Valley National Historical Park in Rhode Island, not only increasing recreational options in the State but also strengthening the local economy, restoring impaired natural resources, and honoring the rich history of the region. The newly completed acquisition of the first successful industrial mill and associated lands fulfills Congress' mandate for the park.
- **Community Forest and Open Space Conservation Program:** FS provided \$4 million through this program to help local governments, Tribes, and non-profits with purchases of forests to create publicly accessible community assets for recreation and education and to create productive working forests. Funds are used to help communities permanently conserve forested land that will be managed locally as a park, nature preserve, or town forest for community benefits and biodiversity. For example, FS previously funded Rio Hondo Community Forest, located in Mayaguez, Puerto Rico, that serves the densely populated community of Rio Hondo and the larger island community providing numerous recreational, educational, and environmental opportunities.

Next Steps: Historic investments from the Bipartisan Infrastructure Law will sustain and strengthen ongoing efforts to increase outdoor recreational opportunities across the country. For example, increased funding in the Federal Lands Transportation and Tribal Program along with the Recreational Trails Program will help expand both non-motorized and motorized trail-based activities, and language from the legislation underscores the connection between outdoor recreation and strong local economies.

Federal agencies will continue to seek ways to increase recreational opportunities by improving the visitor experience on public lands and along the coast, considering strategies to manage increased visitation, enabling safe and inclusive outdoor experiences, and enhancing mapping efforts to improve access to public lands and waters.

Incentivizing and Rewarding the Voluntary Conservation Efforts of Fishers, Ranchers, Farmers, and Forest Owners

The America the Beautiful initiative recognizes the valuable contributions of voluntary conservation efforts from fishers, ranchers, farmers, forest owners, and other landowners. Faithful to the commitment to support healthy rural economies, advance climate-smart agriculture practices, and keep working lands and waterfronts productive and whole, early progress in this focus area has engaged a wide diversity of new participants and sought to provide new sources of income. Examples from this year include:



Secretary Vilsack and Congresswoman Spanberger (D-VA) touring a farm in Virginia. *Photo by USDA*

- Conservation Reserve Program:** USDA accepted 2.8 million acres from agricultural producers and private landowners for enrollment into the program in 2021 with nearly 1.9 million acres in offers through the General Signup and more than 897,000 acres through the Farm Service Agency through the Continuous Signup. This voluntary program simultaneously supports economic growth, advances conservation goals, and creates new streams of income for farmers, ranchers, producers, and private foresters. Sustaining working lands nationwide, the program improves climate-related and other environmental benefits including sequestering carbon, preserving topsoil, mitigating emissions, reducing nitrogen runoff, and providing healthy habitat.
- Wetland Reserve Enhancement Program (WREP):** USDA announced an \$11 million investment in five collaborative projects, bringing together landowners and key partners to voluntarily conserve and restore critical wetland function in agricultural landscapes. WREP supports agreements between NRCS and eligible partners to leverage resources to carry out high priority wetland protection, restoration, and enhancement and wildlife habitat improvements. Three of the projects awarded this year target benefits toward historically underserved producers.
- Regional Conservation Partnership Program:** USDA announced \$75 million in partnered projects through the Regional Conservation Partnership Program's Alternative Funding Arrangements. Funded projects include collaborative efforts to restore grasslands, reforest mine-scarred landscapes through reforestation, and drought resiliency and restoration efforts. Through this program, NRCS works with partners to implement projects that demonstrate innovative solutions to advance conservation priorities on the ground.

- **Partners for Fish and Wildlife:** FWS supported landowners in their voluntary efforts to conserve wildlife habitat, offering financial and technical assistance to interested landowners and helping to keep working lands in working hands. In the past year, the program completed 2,085 projects, which restored and enhanced 241,753 upland acres, 16,879 wetland acres, 242 river miles, and 57 fish passage structures. Every Partners for Fish and Wildlife dollar leveraged approximately four non-program dollars to maximize return on investment.
- **Forest Legacy Program:** USDA invested \$94 million of Forest Legacy funds over the past year in the voluntary conservation of lands through permanent conservation easements contributed by private landowners, and land acquisitions by State natural resource agencies. These projects leveraged approximately \$81 million in non-Federal contributions from States, private landowners, non-profit partners, and private donors.
- **Sentinel Landscapes Partnership:** Founded in 2013 by DoD, this partnership in coordination with USDA and DOI empowers private landowners around military installations to carry out sustainable management practices on their farms, ranches, and forests that protects against development that may negatively impact current or planned mission capabilities. The program has multiple benefits for national security, biodiversity, and the farmers, ranchers, and forest owners who voluntarily participate. This year, the Landscapes Federal Coordinating Committee initiated a process to designate new landscapes and build on the work accomplished to date, which has protected over 515,000 acres and implemented sustainable management practices on an additional 2.7 million acres.
- **Candidate Conservation Agreements with Assurances:** FWS continued to support these collaborative agreements, which provide non-Federal landowners with additional incentives for engaging in voluntary conservation that supports non-listed species. For example, this year FWS strengthened an agreement for monarch butterfly habitat and enrolled additional partners; to date, the cumulative commitments cover more than 750,000 acres across 31 States. In total, the program's 52 active agreements involve 49 States and more than 670 landowners, cover nearly 26.4 million acres and 93 stream miles, and support 82 species.
- **Safe Harbor Agreements:** This year, FWS solidified two new safe harbor agreements, which support the voluntary efforts of non-Federal landowners whose actions specifically contribute to the recovery of species listed as endangered or threatened. The two recent additions bring the current total to 115 active agreements with 737 landowners, covering more than 5.8 million acres and 84 linear miles of stream and providing conservation benefits to 123 species.
- **Watershed Groups:** The Bureau of Reclamation (BOR) awarded \$2.6 million to western communities to establish or expand watershed groups. The funding for these self-sustaining, non-regulatory, consensus-based groups of private property owners, non-profit organizations, Federal, State, or local agencies, farmers, and Tribes allowed groups to develop mission statements, complete stakeholder outreach, and develop restoration and project design plans for priority watershed projects.

- **Gulf of Mexico Grants:** Under the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act, Federal agencies represented on RESTORE Council continued to address the long-term health of the region. For example, EPA awarded more than \$1.9 million in funding to recipients with its Gulf of Mexico Conservation Enhancement Grant Program, which will protect approximately 20,000 acres by fee acquisition or conservation easement, restore and enhance 1,650 acres of habitat, conserve and protect 496 marsh acres, and restore 12.6 acres of wetlands.
- **Species in the Spotlight:** In April 2021, NOAA renewed its commitment to the “Species in the Spotlight” initiative for 2021 through 2025 to take continued, targeted actions to halt the decline of nine marine species that are most highly at risk of extinction. These efforts increase public awareness, marshal resources, and focus conservation actions, including through voluntary measures and public-private partnerships.

Next Steps: The Bipartisan Infrastructure Law supports and increases avenues for expanding on the work described here. The law, for example, formally authorizes funding to the existing Joint Chiefs Landscape Restoration Partnership Program within USDA, furthering the collaboration between the Chiefs of FS and NRCS in joint decision-making. NRCS and FS will continue to invest in previously awarded projects as well as advance new projects that mitigate wildlife risk, improve water quality, and restore healthy forest ecosystems on public and private lands.

Promising areas for continued focus include voluntary agreements addressing both at-risk and Endangered Species Act-listed species, the Conservation Without Conflict approach to collaborative conservation, tools such as credit trading (conservation banking), FWS Partners for Fish and Wildlife Program funding for partnerships with landowners and State fish and wildlife agencies, and other NRCS Farm Bill-associated programs. Additionally, other conservation finance opportunities that generate returns for private investors, such as sustainable forestry and agriculture as well as environmental credit markets, offer potential for landowner-led efforts that align with the guiding principles of America the Beautiful.

Creating Jobs by Investing in Restoration and Resilience

Restoring the nation’s lands and waters has the potential to create tens of thousands of good-paying jobs and deliver economic benefits to communities nationwide. The Biden-Harris administration is investing in restoration, reforestation, reclamation, and other activities that improve our natural systems and bolster America’s



Chair Mallory discussing job creation opportunities during a trip to California with Secretary Haaland. *Photo by DOI*

resilience to sea level rise, flooding, extreme wildfires, droughts, storms, and other climate-related impacts. Examples from this year include:

- **Great American Outdoors Act:** This Act provides an unprecedented opportunity to create jobs and address critical deferred maintenance projects on public lands and at Bureau of Indian Education schools. For example, the \$1.6 billion of investments from DOI in fiscal year 2021 are estimated by the DOI Office of Policy Analysis to support 19,000 jobs and generate \$2 billion in local economies. Examples of major infrastructure improvements underway include:
 - **NPS:** In fiscal year 2021, NPS selected 50 projects and 80 Maintenance Action Team activities across 45 States plus the District of Columbia, Puerto Rico, and the U.S. Virgin Islands for the Legacy Restoration Fund (LRF). In partnership with DOT's Federal Highway Administration, numerous projects have already begun construction, including safety and accessibility improvements to the popular multi-use trail along the Rock Creek and Potomac Parkway in Washington, D.C.; cleaning of the Jefferson Memorial exterior dome on the National Mall; rehabilitation and modernization of the Tuolumne Meadows campground at Yosemite National Park in California; and repair of the historic Grandview picnic area at the New River Gorge National Park and Preserve in West Virginia.
 - **FS:** To date, FS has selected more 1,046 projects across 38 States. These projects focus deferred maintenance reduction on improving visitor access and experience, supporting underserved communities, mitigating climate change, and leveraging partnerships. The projects leverage \$198 million in partner contributed funds and more than 40 percent of the projects directly benefit underserved communities.
 - **BLM:** In fiscal year 2021, BLM identified 98 projects across the rural West to support with GAOA LRF funding and hosted five listening sessions in the West to engage partners and stakeholders. Significant work progressed, including completion of the Grand Junction Air Center Repair Containment Pond project in Colorado that enabled critical fire-retardant operations to continue during the wildfire season. BLM also awarded contracts to repair asphalt road surfacing to improve recreation access and perform climate resilient repairs to bridges that accommodate fish passage.
 - **FWS:** This past year, FWS worked on projects at eight national wildlife refuges for the demolition, rehabilitation, or replacement of over 200 specific assets and stood up dedicated Strikeforce Maintenance Action Teams to accomplish work around the country. For example, the project at Crab Orchard National Wildlife Refuge (NWR) in Illinois focuses on repairing a decaying levee to improve safety for visitors and the surrounding community, and a project at LaCreek NWR in South Dakota will allow water to flow through wetlands and reestablish natural hydrography.
- **Legacy Pollution Clean Up:**
 - **Reclamation of Abandoned Mine Land:** In fiscal year 2021, DOI announced more than \$152 million in State and Tribal Abandoned Mine Land grants, which will

address environmental impacts of legacy mining to benefit 25 current and former coal-producing states and two Tribes.

- **Superfund Sites for Recreational and Conservation Purposes:** EPA's Superfund program cleans up some of the nation's most contaminated lands and protects public health and the environment. This year, the Superfund Redevelopment Program contributed approximately \$138,000 in site-specific recreational and conservation reuse planning support for three Superfund sites. For example, reuse planning aided community members in Creede, Colorado in listing the Nelson Tunnel/Commodore Waste Rock Superfund site on the NPS National Register of Historic Places.
- **Wildfire Risk and Action:** The Biden-Harris administration made significant investments in caring for the health and safety of firefighters on the frontlines. President Biden announced pay initiatives to recognize and support Federal wildland firefighters, including ensuring all were paid at least \$15 an hour. The Biden-Harris administration is also working to mobilize an all-of-government response to wildfire risk and resilience. FS initiated development of a 10-year strategy for wildfire and post-fire risk reduction and resilience, focused on working with partners on landscape-scale, outcome-driven projects. One example of this work is the Four Forests Restoration Initiative in Arizona, where USDA recently announced nearly \$60 million dollars for fire and post-fire risk mitigation work in fiscal year 2022.
- **Hazard Mitigation:** Within DHS, the Hazard Mitigation Assistance Program under the Federal Emergency Management Agency (FEMA) provides funding to State, local, Tribal, and territorial governments to reduce, or mitigate, future natural disaster losses in their communities. These programs received nearly \$3.5 billion in 2021 to increase resilience to the impacts of climate change nationwide, and the additional funding made available through the Bipartisan Infrastructure Law will provide communities with the resources to invest in adaptation and resilience work.
- **Youth Opportunities:** The administration is expanding opportunities for young people and veterans to help conserve public lands and waters, bolster community resilience, and address climate change. Corps and partnerships programs are creating pathways to good-paying jobs and inspiring the next generation of outdoor stewards, and examples include:



A conservation corps completes trail work in Montana.
Photo by NPS

- **AmeriCorps Projects:** Last year, approximately 15,000 AmeriCorps members and AmeriCorps Seniors volunteers engaged in nearly 600 AmeriCorps-funded projects in which they improved 330,000 acres of public lands, provided environmental education to 230,000 individuals, treated 18,000 miles of trails or rivers, delivered training to nearly 225,000 individuals, weatherized or retrofitted more than 5,000 housing units or public structures, and protected or restored 2,000 structures after natural disasters, among other impacts.
- **Public Lands Corps Projects:** More than 13,000 young people, veterans and others served on hundreds of Youth Conservation and Public Lands Corps projects hosted by the FS and DOI. These corps members contributed to a range of conservation work such as maintaining and constructing hundreds of trails, performing fuels reduction work and supporting fire response, planting thousands of trees and native plantings, removing tons of invasive species, and conducting surveys to track forest conditions.
- **Indian Service Youth Corps:** The administration released draft guidelines and conducted Tribal consultation on how to establish the Indian Youth Service Corps Program at DOI, USDA, and NOAA. The program, authorized by Congress in 2019, will provide meaningful education, employment, and training opportunities to Indigenous youth through conservation projects on public lands, Indian lands, and Hawaiian homelands.
- **GulfCorps:** Through this signature program, NOAA hired approximately 250 young people this year, who helped restore more than 6,400 acres of habitat across the Gulf of Mexico coast. The GulfCorps program is a collaborative program with local partner corps and nonprofit organizations that focuses on protecting and restoring the Gulf of Mexico lands and waters while providing short-term employment in natural resource conservation for local young adults.
- **Aquatic Resources:** A variety of efforts focused on restoring and building the resiliency of coastlines and shores. For example, EPA's Trash Free Waters program in the Gulf of Mexico and Great Lakes regions helped provide more than \$10 million in grants for projects to reduce trash pollution and support citizen science initiatives.

Next Steps: The Bipartisan Infrastructure Law will make transformative investments in restoration and resilience. Specifically, the law includes a \$16 billion investment in legacy pollution clean-up, including \$11.3 billion for abandoned mine land reclamation projects and \$4.7 billion for orphaned well site plugging, remediation, and restoration activities. These investments will create thousands of jobs and benefit the millions of Americans living within a mile of abandoned mines and oil and gas wells. Additionally, the legislation supports more than \$8 billion to expand fire resiliency and ecosystem restoration programs and improve Federal wildland firefighter pay to strengthen federal agencies' response capabilities.

B. Status of Interagency Collaboration, Planning, and Measurement Efforts

In July, CEQ Chair Mallory established the America the Beautiful Interagency Working Group (IWG) to coordinate the administration's conservation and restoration efforts. Chair Mallory co-chairs the IWG along with Secretaries Haaland, Raimondo, and Vilsack. A goal of the IWG is to expand the coalition of Federal partners supporting and implementing conservation efforts to best advance the vision of America the Beautiful as an all-of-government initiative.

To reflect the critical and diverse roles that many different entities play in conserving America's natural heritage, the IWG includes the Departments of Defense, Transportation, Energy, Housing and Urban Development, and Homeland Security as well as the Environmental Protection Agency, Corporation for National and Community Service, Advisory Council on Historic Preservation, and General Services Administration. Additionally, the Climate Policy Office, Domestic Policy Council, Office of Management and Budget, and Office of Science and Technology represent the Executive Office of the President.

Two committees stem from the leadership of the IWG. The Collaborative Conservation and Engagement Committee focuses on building a robust public process of consultation and engagement and helping coordinate a government-wide approach.

The Measurement Committee primarily focuses on developing the American Conservation and Stewardship Atlas. Co-chaired by USGS, USDA, and NOAA, the committee has been working on compiling readily available data and laying the groundwork for public outreach. In early 2022, the administration will seek public feedback to inform development of the Atlas, including a public comment period, with a goal to release a beta version of the Atlas by the end of the year.

The tool will help provide a more accessible and more comprehensive picture of conservation and restoration work in America, though no single database—no matter how many data layers and analyses—can perfectly capture the texture of why a specific place is valuable to a community or characterize why a conservation partnership is particularly effective. Many successful efforts that provide significant benefits for improving equity, combating climate change, or supporting wildlife populations may not be captured by a national data portal, but are valuable to local communities all the same. In its development and future iterations, the Atlas should be considered additive—not determinative—to help inform and improve the nation's collective understanding of existing strategies and additional opportunities to support communities in their efforts to conserve, protect, connect, and restore lands and waters.

C. Continued Listening, Learning, and Sharing

Since the *Conserving and Restoring America the Beautiful* report was published in May, the agencies represented in the IWG have continued to gather input from a wide range of stakeholders. Senior agency officials have engaged with and learned from Tribal leaders and Indigenous-led organizations; governors and their associations like the National Governors Association and

Western Governors Association; Members of Congress and congressional committees; elected officials at the county, city, and State levels as well as organizations like the National Association of Counties; State fish and wildlife agencies; equity and environmental justice leaders; organizations focused on environmental advocacy, hunting and fishing, farming and ranching, outdoor recreation, and youth opportunities; trade associations; forestry representatives; the seafood industry; scientists and academic institutions; advisory bodies such as regional fishery management councils and sanctuary advisory councils; and others. The outreach conducted included virtual meetings, listening sessions, Tribal consultations, keynote addresses and panel discussions, workshops, site visits, and review of written letters and submissions.

The co-chairs of the IWG—Interior Secretary Haaland, Agriculture Secretary Vilsack, Commerce Secretary Raimondo, and CEQ Chair Mallory—have visited more than a dozen states to learn about and lift up local communities’ conservation and restoration efforts.

Formal engagements of note include two Tribal consultations in October and a session with community-based organizations supporting Black, Indigenous, and People of Color, facilitated by CEQ. DOI hosted listening sessions with Tribal leaders and organizations focused on implementation of the LWCF, as well as public listening sessions to better understand barriers that underserved communities face in participating in recreation opportunities. NOAA has opened a public comment period and held public listening sessions to receive input on how it can use its existing authorities to advance the goals and recommendations of the initiative. ACHP also held listening sessions for Tribal and Native Hawaiian leaders, as well as for preservation advocates and the public, about the role of cultural resources within the initiative.

Ongoing engagement with State, local, Tribal, and territorial governments, agricultural and forest landowners, fishers, and many other key stakeholders will remain a top priority for the Biden-Harris administration.

D. Congressional, Tribal, State, and Local Efforts

The national initiative to conserve and restore America the Beautiful is about celebrating, leveraging, and enhancing existing efforts, as well as inspiring additional on-the-ground, voluntary collaboration across the country. Already this year, we have seen the President’s call to action become part of a larger mosaic of efforts to build more ambitious and inclusive conservation goals and to restore our nation’s lands and waters.

Members of Congress have played, and will continue to play, a crucial and important role in advancing the nation’s conservation and restoration goals. The tremendous investments Congress has made through the Great American Outdoors Act and the Bipartisan Infrastructure Law will benefit generations to come. Furthermore, the Senate and House of Representatives have moved numerous locally supported, place-based bills through committees that, if signed into law, will strengthen the outdoor recreation economy, celebrate cultural heritage, and improve conservation outcomes across the nation.

Many Tribal leaders and organizations across the country have expressed clear support for the national conservation goal, with more than 50 federally recognized Tribes and more Tribal consortia and organizations expressing formal support for the America the Beautiful initiative. Hundreds of city, county, and other local elected officials across the country have also voiced formal support for the goals and guiding principles of America the Beautiful.

States across the country are forging their own paths to conserve and restore more lands and waters. Activities of note this year include:

- **California:** The State convened topical advisory panels and held listening sessions over the course of 2021 to inform its draft plan and mapping tool in support of the State's goal to conserve and restore 30 percent of its land and coastal waters by 2030.
- **Hawaii:** The Division of Aquatic Resources continued developing its strategy for management of nearshore resources, consistent with its 2016 commitment, and the State also worked to support its ongoing 30x30 Watershed Forest Initiative over the past year.
- **Illinois:** Lawmakers established the bipartisan Illinois 30x30 Conservation Task Force in 2021 to host listening sessions Statewide.
- **Maine:** The governor included a proposal to conserve at least 30 percent of the State's lands by 2030 in its Climate Action Plan.
- **Michigan:** Lawmakers introduced a bipartisan resolution urging a statewide goal of conserving at least 30 percent of land and water as part of the nationwide effort.
- **Nevada:** Lawmakers became the first in the nation to pass a resolution supporting the national conservation goal and urging State and local agencies to work cooperatively.
- **New Mexico:** The governor signed an executive order establishing a statewide goal of protecting 30 percent of lands and waters by 2030.
- **New York:** Lawmakers passed State legislation setting a goal that would conserve at least 30 percent of the State's land by 2030.

State of Lands, Waters, and Wildlife

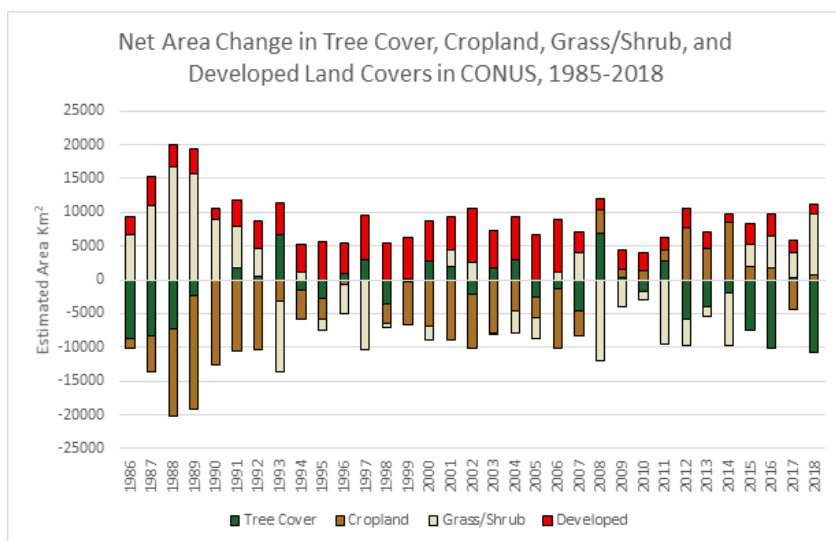
The May America the Beautiful report called for subsequent progress reports to include reviews of land-cover changes and the condition of fish and wildlife habitats and populations. This section, developed collaboratively with interagency input from Federal scientists, summarizes existing information about recent conditions of, trends in, and threats to natural systems across America. This science synthesis is not exhaustive; rather, it provides an initial survey that can provide a foundation on which to build future discussions, analysis, and reporting. In particular, future updates and reports will endeavor to include additional information on the extent and pace at which open space in the United States is disappearing and being fragmented, and how non-Federal science and analyses can be better incorporated into this reporting. In aggregate, however, the information presented in this report underscores the urgent need to conserve and

restore more lands and waters to safeguard the water we drink, the air we breathe, the food we eat, and the wildlife upon which we all depend.

A. Review of Land-Cover Change

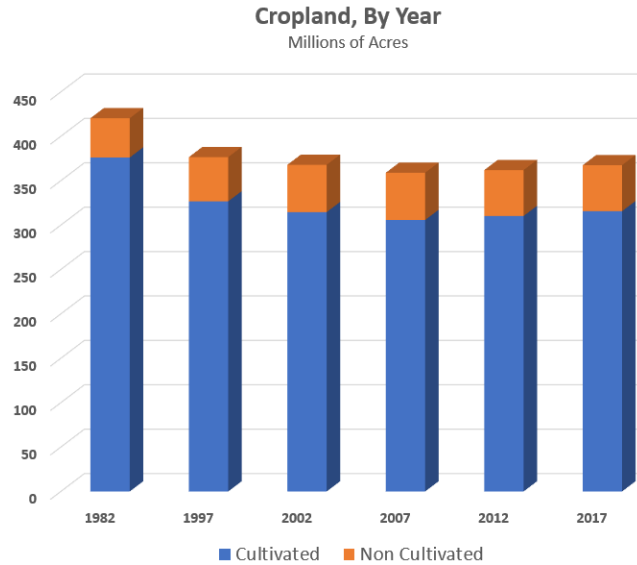
Land cover describes what covers the land surface at a given time, whereas land use describes the way in which land is used. Land use and land cover data, used separately and in combination, offer unique and complementary perspectives on land base trends.

Human Land Use. Human use and management of landscapes is the largest aggregate driver of landscape change in the country. Developed land cover including residential, commercial, industrial lands, and transportation networks represents one of the most permanent forms of landscape change in America: developed land cover has increased by 30 percent in the lower 48 states since the mid-1980s.¹ Developed land cover increased by nearly 15,445 square miles from 2001 to 2019, with associated impervious surfaces accounting for a greater than 8,800 square miles increase during that time period.² Energy development also drives extensive land-use change, with nearly 580 square miles converted into developed lands for wind turbines, oil pads, or natural gas pads between 2001 and 2019.³



Net change in major land-cover classes is shown above as measured by the Landscape Change Monitoring, Assessment, and Projection project from 1986 to 2018.

Agricultural land use has also driven landscape change, with fluctuations in response to economic conditions, policy, and overall demand for agricultural commodities.⁴ For example, irrigated cropland replaced vast swaths of natural habitat, particularly after the development of the center pivot, an irrigation tool, in the 1950s.⁵ In recent years, analysis of satellite observations measured a 7 percent increase from 2002 to 2017 in irrigated area in the lower 48 States.⁶ The largest gains were in the central and eastern parts of the country, while the largest losses were in California and the southern Plains.



Cropland change from the USDA show changes over time from 1982 to 2017.

Forest land use has been near stable for more than five decades,⁷ though forest cover in the lower 48 states has declined slightly between 2001 and 2019.⁸ The change in forest cover reflects substantial temporary fluctuations, as 18 percent of forest cover in that time had been burned, harvested, or otherwise disturbed.⁹ Forest cover is more dynamic and, to be understood, requires reporting gains and loss: between 2011 and 2016, there were 8,104 square miles of canopy gains compared to the 21,826 square miles of canopy losses for a net canopy cover loss of 13,812 square miles.¹⁰ Shifts in forest cover and condition have a strong impact on habitat condition and fragmentation, with unbroken forest area declining at a higher or faster rate than other forest land.¹¹

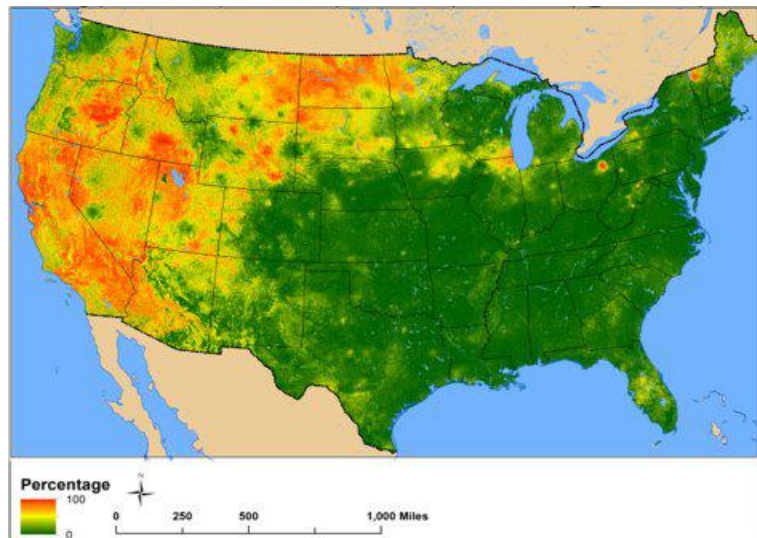
Climate Change. Climate directly and indirectly drives landscape change, affecting disturbance patterns, species distributions, carbon sequestration and storage, and landscape suitability for human uses. Climate impacts on agriculture, for example, have shifted croplands to more favorable climates: the trend of corn production shifting from the southern and eastern parts of the country to the Midwest continues, with 10 to 35 percent of observed domestic corn and soybean expansion in the last 30 years attributable to climate shifts in temperature and precipitation, primarily in the upper Midwest and northern Great Plains.¹²

Landscapes nationwide are also being impacted by climate change in distinct ways across different regions, and habitat ranges are shifting throughout the country. As outlined in the Fourth National Climate Assessment from 2018¹³:

- in the Northeast, seasons are becoming less distinct as winters warm and coastal oceans are acidifying;
- in the Southeast, low-lying coastal areas are experiencing sea-level rise and more extreme rainfall events—leading to more flooding;

- throughout the Midwest, soils are eroding and degrading faster due to effects of increasing warm-season humidity and rainfall;
- across the West and much of the Great Plains, water supply is being stressed as drier conditions become longer lasting and more widespread, and climate change has doubled the area burned by wildfire over natural levels and doubled tree death;
- in the Northwest, warmer winters are decreasing snowpack and reducing the contribution of snowmelt to the region's freshwater supply—contributing to more wildfires and drought;
- in Hawaii, the United States affiliated Pacific Islands, and the United States Caribbean, freshwater sources are being strained as drought, sea level rise, and saltwater intrusion increase; and
- throughout Alaska, landscapes are undergoing widespread change as warming is thinning summer sea ice, thawing permafrost, and melting glaciers.

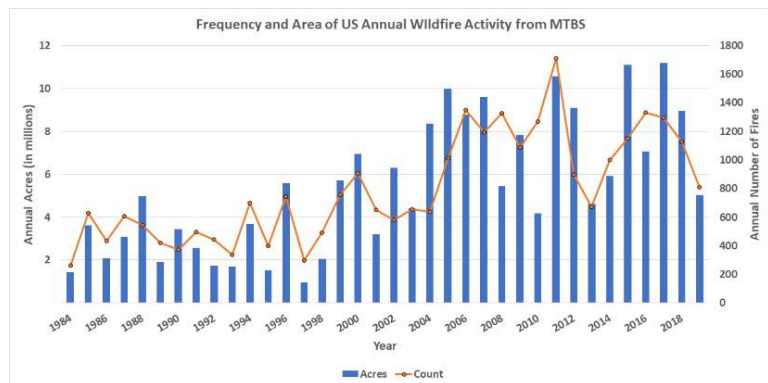
Water Use and Availability. Short- and long-term perturbations in water use and availability based on precipitation, surface water, and groundwater impact both human land use and habitat condition and persistence. Drought drives short-term changes in vegetation condition as well as agricultural land use, and the type of vegetation covering land surfaces plays an important role in regulating water availability in soils, surface water, and air. With drought likely to become more frequent, severe, and longer-lasting due to the impacts of climate change, longer-term shifts in vegetation communities and agricultural patterns are likely. For example, by December of 2021, more than 93 percent of the western U.S. was experiencing moderate to exceptional drought conditions.¹⁴



Drought impacts in 2021 show areas of moderate to exceptional drought conditions as monitored by USGS.

Changing Disturbance Regimes. Natural disturbances on the landscape such as wildfire, invasive species, insects, and disease are changing in frequency and distribution in response to both human and natural forces. Maps of burn severity and fire perimeters across all the country between 1984 and now depict a general increasing trend in both counts of large fires and burned acreage.¹⁵ Invasive species are displacing native species and contributing to the fine fuels that help ignite, spread, and increase the severity of fires. Over the past 35 years, for example, coverage of exotic annual grasses in western parts of the country has expanded by an average of over 965 square miles per year. Under even modest anticipated climate change scenarios, 18 percent of rangelands in the northern Great Basin are projected to increase in invasive grass cover by 2070, with similar increases expected elsewhere.¹⁶

Multiple stressors, including climate change, have also led to increased insect and disease outbreaks and resultant vegetation change in recent decades. Native bark beetles have impacted over 3,860 square miles of coniferous forests just in the southern Rocky Mountains between 1997 and 2019.¹⁷ Beetle kill, fire, and forest harvesting lead to notable declines in stored carbon in live trees in forests of Rocky Mountain states.¹⁸ An estimated 112,000 square miles of the forests in the lower 48 States and 15,000 square miles of Alaskan forest are at risk in the coming decade from bark beetle, spruce budworm, balsam wooly adelgid, sudden oak death, and other insect and disease agents.¹⁹



Mapped trends show changes in fire frequency and burned area (number of fires includes all fires >1,000 acres in the western U.S. and >500 acres in the eastern U.S.)

Coastal Processes. Coastal regions are vulnerable to unique processes driving landscape change, including sea level rise, storm events, subsidence, and human activity. The country has more than 95,000 miles of coastline. Counties along coasts in the lower 48 States and Hawaii account for less than 10 percent of the country's land mass but are home to nearly 40 percent of the country's population.²⁰ Coastal regions of the lower 48 States account for almost two-thirds (63.7 percent) of the nation's wetlands and contain a disproportionate amount of the country's developed area (37.2 percent of all development) placing greater stress on the habitat and ecosystems in these unique areas.²¹

Nearly 10 percent of the country's coastal regions experienced a net change in land cover between 2001 and 2019, compared to 6.7 percent of the interior regions.²² Developed land covers increased by 37 percent in coastal areas, displacing agricultural, forest, and wetland habitats. These same areas have experienced significant losses of wetlands, with over 770 square miles lost between 2001 and 2019. Some wetland change is due to periodic fluctuations in water levels, while some

coastal wetland losses may be more permanent due to altered sediment flow, subsidence, and sea level rise.²³

B. Review of Fish and Wildlife Habitats and Populations

An exceptional diversity of plants, animals, and habitats exist in America, and partnerships between private landowners, communities, Tribal Nations, private sector, and the Federal Government strive to conserve, restore, and protect these populations. Nonetheless, roughly one-third of plant and animal species in the United States are at risk for extinction.²⁴ Currently 1,268 species are listed as endangered (i.e., at imminent risk of extinction), and 394 are listed as threatened under the Endangered Species Act (ESA). In 2005, States and territories identified 12,351 species of greatest conservation need; 10 years later, this number increased to 13,544.²⁵ Internationally, a million species are threatened with extinction.²⁶ To illustrate the conditions and trends of biodiversity in the United States, this section provides a brief overview of the status of demonstrative species, species groups, and their habitats.

Birds. Across the country, bird populations have experienced widespread declines. Nearly three billion birds—one out of four—have disappeared from the United States and Canada since 1970.²⁷ Habitat loss and degradation are the biggest drivers of the net loss of bird abundance in all major breeding areas.²⁸ While targeted investment in population surveys and habitat conservation actions have led to increased waterfowl populations,²⁹ sharp population declines have been reported in some of the most common birds in our nation’s forests, grasslands, and coastlines.³⁰

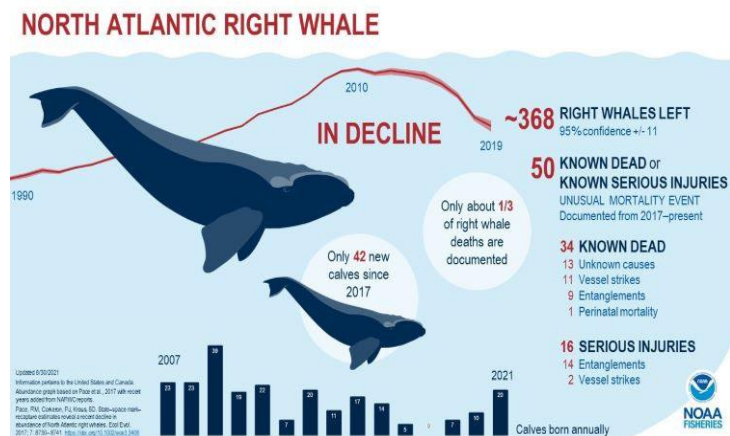
Specifically, populations of forest-associated birds have declined by more than one billion individuals since 1970, with the greatest loss in boreal forest (-33.1 percent) followed by western forest (-29.5 percent), and eastern forest (-19.2 percent). Grassland bird populations have declined by 53 percent since 1970.³¹ Although this overall decline has stabilized in recent years, some species declines continue.³²

Bird populations connected to marine habitats have also experienced declines. Nearly 70 percent of the world’s marine birds, which depend on seas for food, have declined since the 1950s, as a direct result of human activity, with several species going extinct within the last 150 years.³³ Birds nesting in tidal marshes have experienced some of the steepest population declines of all birds, due to accelerated rates of sea level rise in parts of the country.³⁴

Nevertheless, conservation efforts have supported population growth for certain bird species. Bald eagles declined drastically during the 1900’s due to habitat degradation, illegal shooting, and pesticide contamination of their food, but the Bald Eagle Protection Act³⁵ and ensuing conservation actions resulted in bald eagles recovering from a low of 487 breeding pairs in 1963 to the current estimate of 71,400 pairs and 316,700 individuals.³⁶ Kirtland’s warbler offers another example: in Michigan, the Kirtland’s warbler recovered from 200 singing males in 1971 to in excess of 1,000 breeding pairs by 2001 and was delisted in 2019.³⁷

Mammals. The International Union for Conservation of Nature (IUCN) considers 14.5 percent of North American mammals to be threatened, due to habitat loss or challenges unique to their species.³⁸ Bats, for example, are a unique group of mammals that support healthy ecosystems and provide critical pest management for agricultural work.³⁹ White-nose syndrome has been confirmed in 12 North American bat species, significantly impacting at least 9 species and killing over 90 percent of 3 species in affected areas.⁴⁰

Some marine mammal populations are also declining. Polar bears, a marine mammal of concern, were listed as threatened under the ESA in 2008. The continued decline of sea ice habitat due to a changing climate is the most serious threat to the long-term persistence of polar bears, but they face a number of additional threats to their health and survival including oil and gas activities, increased recreation, and exposure to pollutants and pathogens.⁴¹ In Alaska, for example, the Southern Beaufort Sea polar bear population is at its lowest abundance in five decades.⁴² Some of the 259 marine mammal stocks that are currently tracked are increasing or stable, while others are declining.⁴³ For example, the number of



The North Atlantic Right Whale is critically endangered, with total number of whales remaining below 400 and only 42 calves born since 2017.

endangered North Atlantic right whale numbers increased from 1990 to 2010 but has been declining since then.⁴⁴ Vessel strikes, which can kill or seriously injure marine mammals, are another significant threat; of vessel strikes that are reported, most involve large whales, seals, or sea lions.

Fish. In America, more than 3,000 species of fish inhabit cold mountain streams, coastal estuaries, offshore waters, and the warm water streams, rivers, lakes, and pools in between. About 800 of these fish species spend all or part of their lives in freshwaters. Across the continental United States, 61 percent of fish species occur in watersheds that are mostly forested.⁴⁵ Aquatic biodiversity overall and the diversity of forest-associated fish are particularly high in the Southeast.⁴⁶ Freshwater aquatic biodiversity, which includes fish along with a wide diversity of species, is declining at rates roughly double that of marine or terrestrial ecosystems.⁴⁷

In North America, approximately 39 percent of freshwater fish and diadromous fish, which spend portions of their life in fresh water and portions in salt water, are considered imperiled, and populations of migratory fishes have fallen by 76 percent since 1970.⁴⁸ Fish represent 23 percent of all animals that are federally listed as endangered or threatened, and States have identified 1,180 fish species as being of greatest conservation need.⁴⁹

Inland fishes are faced with persistent and emerging threats such as habitat loss, poor water quality, changes in hydrology, flow alterations, barriers to passage, disease, nonindigenous species, changing community dynamics, and overharvest.⁵⁰ Outside of Alaska and Hawaii, 22 percent of stream habitats and 46 percent of estuaries are at high risk of degradation.⁵¹ In most areas, climate change and ongoing anthropogenic impacts are species-threatening for many fishes, particularly for species with narrow range or temperature tolerance.⁵² Of note, contemporary wild salmon returns in the Columbia River basin of the Pacific Northwest are achieving less than one percent of historic potential, with wild Chinook salmon persisting in only 4 percent of their historical range in the basin.⁵³ The Snake River salmon is listed as threatened under the ESA. Mainstem dams on the Columbia and Snake rivers are considered the primary cause of declines.⁵⁴

In marine habitats, 92 percent of the fish stocks with known status under NOAA's National Marine Fisheries Service (NMFS) are fished at a sustainable harvest level, and 80 percent are not overfished, meaning they have adequate numbers to sustain population sizes under current harvest levels.⁵⁵ The number of overfishing and overfished stocks has significantly decreased in recent decades, with 47 stocks rebuilt since 2000.⁵⁶

Amphibians. Amphibians are among the most endangered group of vertebrates worldwide, and their status has deteriorated in the past decade: more than 40 percent of species are now considered imperiled globally at some level by the IUCN, though amphibians are understudied compared to other species groups.⁵⁷

Amphibians are estimated to be disappearing each year from more than three percent of the ponds and other places they inhabit within a set of research sites across the nation.⁵⁸ If that trend continues, amphibian species on average may be lost from approximately half of these habitats in 22 years. Amphibians are sensitive to changes in soil moisture and surface waters like wetlands, for which over half have been lost in the contiguous United States since 1780.⁵⁹ These losses are a major factor in the declines of many species of fish and wildlife including amphibians. Factors driving amphibian declines differ across the United States.⁶⁰ The lungless salamanders, a type of amphibian of which the United States has the highest diversity in the world, is particularly affected by habitat changes in forests and streams.⁶¹

Invasive species, pathogens, and contaminants also affect amphibians.⁶² For example, an amphibian chytrid fungal pathogen, recognized as one of the world's most destructive wildlife pathogens due to the number of amphibian species it affects, is widespread in the country.

Reptiles. Roughly 334 native reptile species live in the United States including 52 turtles and tortoises, 154 snakes, 120 lizards, an alligator, and a crocodile.⁶³ Reptiles occupy the entire range of habitats from the edges of salt flat barrens below sea level right up to the alpine tundra on top of the great mountain chains, though the status of most reptile populations is not well known. In the United States, 18 percent (61 species) of reptiles are considered imperiled at some level with turtles and tortoises representing 64 percent of these vulnerable species.⁶⁴

Six of the seven species of sea turtles worldwide are found in United States waters,⁶⁵ and all six species—Hawksbill, Kemp's ridley, Olive ridley, leatherback, loggerhead, and green sea turtles—are

listed and protected under the ESA. Population trends of sea turtles found in the United States vary depending on species and geography. In the Atlantic, green turtle numbers have been increasing, while in the Pacific, leatherback turtles continue to decline.⁶⁶ Pacific leatherbacks are considered one of the most at-risk species because of drastic population declines since the 1980s.⁶⁷ Western Pacific leatherbacks have declined more than 80 percent, and Eastern Pacific leatherbacks have declined by more than 97 percent.⁶⁸ Of all the species NMFS protects under the ESA, the Pacific leatherback is considered to be one of the nine species most at risk of extinction in the near future.⁶⁹ As with marine mammals, sea turtles are threatened by bycatch and entanglement in fishing gear as well as vessel strikes because they come to the surface to breathe and bask, congregate off beaches during the nesting season, and forage in shallow areas where they cannot easily escape vessel traffic.⁷⁰ Additionally, nesting and foraging habitat is being lost and degraded due to coastal development, pollution, and climate change, and turtle populations are also increasingly imperiled by wildlife trafficking.⁷¹

For other reptiles, habitat loss, modification, and fragmentation are primary threats, with vehicular recreation, invasive species, disease, and climate change posing additional threats to populations.⁷² Renewable energy development in the desert Southwest sometimes overlaps with hotspots of reptile diversity, although intentional planning and siting of new renewable energy development could avoid any further conversion of sensitive habitat.⁷³

Insect Pollinators. Insects are experiencing multicontinental reductions in abundance, diversity, and biomass, and evidence shows that insect pollinators are in decline in America. Roughly 4,000 species of bees that pollinate wild plant species and crop plants reside in the United States.⁷⁴ Preliminary assessments indicate that approximately 25 percent of the 50 species of bumble bees in the United States are in great decline possibly due to introduced pathogens.⁷⁵ Three quarters of the world's flowering plants depend on pollinators.⁷⁶ Accidental introduction of novel honeybee diseases and pathogens and continued decline of habitats that are rich in native plant species, are the main threats to bee population stability.

Monarch butterflies have experienced similar declines.⁷⁷ Over the last two decades, the eastern migratory population of monarch butterflies has declined by approximately 80 percent, and the western migratory population has declined by more than 99 percent.⁷⁸ The long-term decline in the eastern population is linked to declines in the monarch's host plant, milkweed, which it uses for breeding.⁷⁹ This decline in milkweed is associated with agricultural herbicide use.⁸⁰

Coral Reef Ecosystems. Coral reefs rival the biodiversity of tropical rainforests: up to 2 million species are found in, on, and around coral reefs. More than 500 million people around the world depend on coral reefs for food, income, coastal protection and more. Coral reefs near human population centers are moderately to critically impacted by water quality issues, fishing, warming water, and acidification. Nationally, United States coral reefs were rated as being in fair condition.⁸¹ Overall, reefs are considered moderately impacted or in moderate decline.

Climate change and resulting ocean surface warming are among the biggest threats to coral reefs followed by land-based sources of pollution and unsustainable or damaging fishing practices. The worst global coral bleaching event due to ocean surface warming occurred during 2014-2017 with multiple coral reef ecosystems around the world—including in the Florida Keys, Hawaii, and Guam—experiencing severe bleaching in back-to-back years.⁸² Climate change may also be exacerbating other threats, including the ongoing epidemic in the Caribbean of Stony Coral Tissue Loss Disease, which began in 2014.⁸³



United States coral reefs conditions as monitored by NOAA.

Kelp Forests. Kelp forests are iconic, ecologically significant, and economically valuable habitats. Found in nutrient-rich cold waters, they are extensive underwater habitats that range along 25 percent of the world's coastlines. In the past half-century, threats have increased in number and severity, leading to an annual global decline in abundances of approximately two percent.⁸⁴ Since 2014, northern California has lost over 95 percent of its beds due to ecological events triggered by a marine heatwave.⁸⁵ The losses caused the collapse of a vital ecosystem that provided habitat to threatened and endangered salmon, abalone, and commercial and recreational fisheries.

Kelp forests face a variety of threats such as over grazing by sea urchins, which are typically present in kelp forest ecosystems but whose populations have grown significantly unchecked after a syndrome that made their predators functionally extinct.⁸⁶ Additional threats to kelp survival include climate change, which exacerbates El Niño southern oscillation events that can bring damaging storms and warm waters; commercial harvest; pollution in the form of sewage, industrial waste, inorganic fertilizers, and pesticides; and sedimentation from watershed development.

Conclusion

President Biden's goal to restore and conserve 30 percent of United States lands and waters by 2030 has the potential to bring out the best in Americans and achieve durable outcomes that improve the lives of people for generations to come. In its first year, the Biden-Harris administration took important steps to lay out an inclusive vision that honors America's conservation traditions and sparks action across the country. In leveraging the historic infrastructure investments and continuing to forge strong working partnerships with States, Tribes, local communities, and other key stakeholders, America is already capitalizing on this tremendous opportunity to honor the lands and waters we know and love, and to build a better America.

Endnotes

- ¹ U.S. Geological Survey, Land Change Monitoring, Assessment, and Projection website, available at <https://www.usgs.gov/core-science-systems/eros/lcmap/lcmap-data-access>
- ² U.S. Geological Survey, National Land Cover Database website, available at <https://www.usgs.gov/centers/eros/science/national-land-cover-database>
- ³ U.S. Geological Survey, Land Change Monitoring, Assessment, and Projection website, available at <https://www.usgs.gov/core-science-systems/eros/lcmap/lcmap-data-access>; U.S. Geological Survey, National Land Cover Database website, available at <https://www.usgs.gov/centers/eros/science/national-land-cover-database>
- ⁴ U.S. Department of Agriculture, "Summary Report: 2017 National Resources Inventory," available at <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/nri/results/>
- ⁵ W. Splinter, "Center-Pivot Irrigation," JSTOR, 1976, available at <https://www.jstor.org/stable/24950374>
- ⁶ D. Shrestha and others, "Exploring the Regional Dynamics of U.S. Irrigated Agriculture from 2002 to 2017," Land, 2021, available at <https://doi.org/10.3390/land10040394>
- ⁷ M.D. Nelson and others, "Defining the United States Land Base: A Technical Document Supporting the USDA Forest Service 2020 RPA assessment," available at <https://doi.org/10.2737/NRS-GTR-191>
- ⁸ U.S. Geological Survey, National Land Cover Database website, available at <https://www.usgs.gov/centers/eros/science/national-land-cover-database>
- ⁹ W. Cohen and others, "Forest disturbance across the conterminous United States from 1985-2012: The emerging dominance of forest decline," Forest Ecology and Management, 2016, available at https://www.fs.fed.us/rm/pubs_journals/2016/rmrs_2016_cohen_w001.pdf; K. Schleeweis and others, "US National Maps Attributing Forest Change: 1986–2010," Forests, 2020, available at <https://www.mdpi.com/1999-4907/11/6/653>
- ¹⁰ Multi-Resolution Land Characteristics Consortium, "NLCD 2016 USFS Tree Canopy Cover," available at <https://www.mrlc.gov/data/nlcd-2016-usfs-tree-canopy-cover-conus>
- ¹¹ K. Riitters and G. Robertson, "The United States' Implementation of the Montréal Process Indicator of Forest Fragmentation," Forests, 2021, available at <https://www.mdpi.com/1999-4907/12/6/727>
- ¹² L. Sloat and others, "Climate adaptation by crop migration," Nature Communications, 2020, available at <https://www.nature.com/articles/s41467-020-15076-4>; X. Cui, "Climate change and adaptation in agriculture: Evidence from US cropping patterns," Journal of Environmental Economics and Management, 2020, available at <https://doi.org/10.1016/j.jeem.2020.102306>
- ¹³ Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States, available at <https://nca2018.globalchange.gov/>
- ¹⁴ U.S. Drought Monitor, "West; Map released: Thurs. December 2, 2021," available at <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?West;>; J. Brown and others, "The Vegetation Drought Response Index (VegDRI): A New Integrated Approach for Monitoring Drought Stress in Vegetation," available at <https://www.tandfonline.com/doi/citedby/10.2747/1548-1603.45.1.16?scroll=top&needAccess=true>
- ¹⁵ J. Eidenshink and others, "A Project For Monitoring Trends In Burn Severity," Fire Ecology, 2007, available at <https://mtbs.gov/sites/default/files/inline-files/Eidenshink-final.pdf>

- ¹⁶ S. Boyte and others, “Cheatgrass Percent Cover Change: Comparing Recent Estimates to Climate Change — Driven Predictions in the Northern Great Basin,” *Rangeland Ecology and Management*, 2016, available at <https://doi.org/10.1016/j.rama.2016.03.002>
- ¹⁷ K. Rodman and others, “Effects of Bark Beetle Outbreaks on Forest Landscape Pattern in the Southern Rocky Mountains, U.S.A.,” *Remote Sensing*, 2021, <https://doi.org/10.3390/rs13061089>
- ¹⁸ S.N. Oswalt and others, coords, “Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment”, General Technical Report WO-97, 2019, available at <https://www.fs.usda.gov/treesearch/pubs/57903>; G.M Domke and others, “Greenhouse gas emissions and removals from forest land, woodlands, and urban trees in the United States, 1990–2019”, 2021, available at <https://www.fs.usda.gov/treesearch/pubs/62418>
- ¹⁹ F. Krist and S. Romero, “2013-2027 National Insect and Disease Forest Risk Assessment: Summary and data access,” *Forest Health Monitoring: National Status, Trends and Analysis*, 2014. General Technical Report SRS-209, 2015, available at <https://www.fs.usda.gov/treesearch/pubs/57824>
- ²⁰ Bureau of Labor Statistics and Bureau of Economic Analysis, available as seen on <https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html>
- ²¹ High Resolution Land Cover Data website available at <https://coast.noaa.gov/digitalcoast/data/ccapregional.html>
- ²² Ibid.
- ²³ B. Couvillion and others, “Land area change in coastal Louisiana (1932 to 2016),” *U.S. Geological Survey Scientific Investigations Map 3381*, 2017, available at <https://doi.org/10.3133/sim3381>
- ²⁴ <https://islandpress.org/books/state-nations-ecosystems-2008>
- ²⁵ U.S. Geological Survey – Compiled National List of Species of Greatest Conservation Need, available at https://www1.usgs.gov/csas/swap/national_list.html
- ²⁶ Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, “Global assessment report on biodiversity and ecosystem services on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services,” 2019, available at <https://zenodo.org/record/5657041>.
- ²⁷ K. Rosenberg and others, “Decline of the North American avifauna”, *Science*, 2019, available at <https://www.science.org/doi/abs/10.1126/science.aaw1313>
- ²⁸ Ibid.
- ²⁹ U.S. Fish & Wildlife Service, Migratory Bird Program, available at <https://www.fws.gov/birds/surveys-and-data/population-surveys.php>
- ³⁰ North American Bird Conservation Initiative, “State of the Birds 2019”, <https://www.stateofthebirds.org/2019/>
- ³¹ K. Rosenberg and others, “Decline of the North American avifauna”, *Science*, 2019, available at <https://www.science.org/doi/abs/10.1126/science.aaw1313>
- ³² North American Bird Conservation Initiative, “State of the Birds 2014”, available at <https://www.partnersinflight.org/wp-content/uploads/2017/03/State-of-the-Birds-2014.pdf>
- ³³ U.S. Geological Survey, Seabirds and Forage Fish Ecology, available at https://www.usgs.gov/centers/asc/science/seabirds-and-forage-fish-ecology?qt-science_center_objects=0#qt-science_center_objects; National Oceanic and Atmospheric Administration, Modeling and mapping marine bird distributions on the U.S. Atlantic Outer Continental Shelf to support offshore renewable energy planning, available at <https://coastalscience.noaa.gov/project/statistical-modeling-marine-bird-distributions/>

- ³⁴ S. Roberts and others, "Preventing local extinctions of tidal marsh endemic Seaside Sparrows and Saltmarsh Sparrows in eastern North America", *Ornithological Applications*, 2019, available at <https://academic.oup.com/condor/article/121/2/duy024/5393601>
- ³⁵ Bald Eagle Protection Act, available at <https://www.fws.gov/laws/lawsdigest/BALDEGL.HTML>
- ³⁶ U.S. Fish & Wildlife Service, Bald Eagle Population Size: 2020 update <https://www.fws.gov/migratorybirds/pdf/management/bald-eagle-population-size-2020.pdf>
- ³⁷ D. Donner and others, "Influence of habitat amount, arrangement, and use on population trend estimates of male Kirtland's warblers", *Landscape Ecology*, 2008, available at <https://www.fs.usda.gov/treesearch/pubs/14202>; D. Brown and others, "Using a full annual cycle model to evaluate long-term population viability of the conservation-reliant Kirtland's warbler after successful recovery", *Journal of Applied Ecology*, 2017, available at <https://www.fs.usda.gov/treesearch/pubs/52906>
- ³⁸ International Union for Conservation of Nature's Red List of Threatened Species <https://www.iucnredlist.org>
- ³⁹ T. Kunz and others, "Ecosystem services provided by bats", *Annals of the New York Academy of Sciences*, 2011, available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.364.9737&rep=rep1&type=pdf>; ³⁹ J.G. Boyles and others, "Economic importance of bats in agriculture", *Science*, <https://www.science.org/doi/abs/10.1126/science.1201366>
- ⁴⁰ T. Cheng and others, "The scope and severity of white-nose syndrome on hibernating bats in North America", *Conservation Biology*, 2021, available at <https://conbio.onlinelibrary.wiley.com/doi/10.1111/cobi.13739>; White-Nose Syndrome Response Team, available at <https://www.whitenosesyndrome.org/>
- ⁴¹ R. Wilson and G.M. Durner, "Seismic survey design and impacts to maternal polar bear dens", *Wildlife Management*, 2019, available at <https://pubs.er.usgs.gov/publication/70207216>; ⁴¹ K. Rode and others, "Survey-based assessment of the frequency and potential impacts of recreation on polar bears", *Biological Conservation*, 2018, available at <https://pubs.er.usgs.gov/publication/70199450>; ⁴¹ H. Routti and others, "State of knowledge on current exposure, fate and potential health effects of contaminants in polar bears from the circumpolar Arctic", *Science of the Total Environment*, 2019, available at <https://www.sciencedirect.com/science/article/pii/S0048969719305091>; N. Pilfold and others, "Long-term increases in pathogen seroprevalence in polar bears (*Ursus maritimus*) influenced by climate change", *Global Change Biology*, 2021, available at <https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15537>
- ⁴² J. Bromaghin and others, "Survival and abundance of polar bears in Alaska's Beaufort Sea, 2001-2016", *Ecology and Evolution*, 2021, available at <https://pubs.er.usgs.gov/publication/70224528>
- ⁴³ National Oceanic and Atmospheric Administration, "Marine Mammal Stock Assessments", available at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>
- ⁴⁴ Ibid.
- ⁴⁵ G. Bury and others, "Forest-associated fishes of the conterminous United States", *Water*, 2021, available at <https://www.mdpi.com/2073-4441/13/18/2528>
- ⁴⁶ D. Elkins and others, "Illuminating hotspots of imperiled aquatic biodiversity in the southeastern US", *Global Ecology and Conservation*, 2019, available at <https://www.sciencedirect.com/science/article/pii/S2351989418304451>
- ⁴⁷ D. Tickner and others, "Bending the Curve of Global Freshwater Biodiversity Loss: An Emergency Recovery Plan", *Bioscience*, 2020, available at <https://doi.org/10.1093/biosci/biaa002>

- ⁴⁸ U.S. Department of Agriculture, “Conservation Status of Imperiled North American Freshwater and Diadromous Fishes, available at https://www.fs.fed.us/rm/pubs_other/rmrs_2008_jelks_h001.pdf; World Wildlife Fund, “The World’s Forgotten Fishes”, available at https://files.worldwildlife.org/wwfcmprod/files/Publication/file/4x01xgpg0m_wwfintl_freshwater_fishes_report.pdf?ga=2.146100148.1426342661.1635882577-1536150174.1631542930
- ⁴⁹ Association of Fish and Wildlife Agencies, “State Wildlife Action Plans – Blueprints for Conserving Our Nation’s Fish and Wildlife”, available at <https://www.fishwildlife.org/afwa-informs/state-wildlife-action-plans>
- ⁵⁰ D. Dudgeon and others, “Freshwater biodiversity: importance, threats, status and conservation challenges”, *Biological Reviews*, 2006, available at <https://onlinelibrary.wiley.com/doi/10.1017/S1464793105006950>; A. Reid and others, “Emerging threats and persistent conservation challenges for freshwater biodiversity”, *Biological Reviews*, 2018, available at <https://onlinelibrary.wiley.com/doi/full/10.1111/brv.12480>; V. Barbarossa and others, “Impacts of current and future large dams on the geographic range connectivity of freshwater fish worldwide”, *Proc. of the National Academy of Sciences*, available at <https://www.pnas.org/content/117/7/3648>; B. Okamura and S. Feist, “Emerging diseases in freshwater systems”, *Freshwater Biology*, 2011, available at <https://onlinelibrary.wiley.com/doi/10.1111/j.1365-2427.2011.02578.x>; U.S. Geological Survey, Nonindigenous Aquatic Species database, available at <https://nas.er.usgs.gov/about/default.aspx>
- ⁵¹ National Fish Habitat Partnership, “Through a Fish’s Eye: The Status of Fish Habitats in the United States 2015”, available at <http://assessment.fishhabitat.org/>
- ⁵² C. Paukert and others, “Climate Change Effects on North American Fish and Fisheries to Inform Adaptation Strategies”, *Fisheries Magazine*, 2021, available at <https://afspubs.onlinelibrary.wiley.com/doi/full/10.1002/fsh.10668>
- ⁵³ R. Williams and others, “Return to the River: Scientific Issues in the Restoration of Salmonid Fishes in the Columbia River”, *Fisheries*, 2011, available at https://www.fs.fed.us/rm/boise/publications/fisheries/pnw_1999_williams-bisson.pdf; R. Thurow and others, “Status and Distribution of Chinook Salmon and Steelhead in the Interior Columbia River Basin and Portions of the Klamath River Basin”, *Sustainable Fisheries Management: Pacific Salmon*, available at https://www.fs.fed.us/rm/pubs_journals/2000/rmrs_2000_thurow_r001.pdf
- ⁵⁴ P. Budy and others, “Evidence Linking Delayed Mortality of Snake River Salmon to Their Earlier Hydrosystem Experience”, *N. American J. of Fisheries Management*, 2002, available at https://www.fws.gov/columbiariver/publications/Budy_et_al.pdf
- ⁵⁵ National Oceanic and Atmospheric Administration, “NMFS Status of Stocks 2020,” available at <https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-2020>
- ⁵⁶ Ibid.
- ⁵⁷ IUCN Red List of Threatened Species, available at <https://www.iucnredlist.org/>
- ⁵⁸ U.S. Geological Survey, Amphibian Research and Monitoring Initiative, D. Miller and others, “Quantifying climate sensitivity and climate driven change in North American amphibian communities”, available at <https://armi.usgs.gov/content/?contentid=189870>
- ⁵⁹ U.S. Fish and Wildlife Service, National Wetlands Inventory, available at <https://www.fws.gov/wetlands/>
- ⁶⁰ U.S. Geological Survey, Amphibian Research and Monitoring Initiative, E. Grant and others, “Quantitative evidence for the effects of multiple drivers on continental-scale amphibian declines”, available at <https://armi.usgs.gov/content/?contentid=184601>
- ⁶¹ IUCN Red List of Threatened Species, available at <https://www.iucnredlist.org/>

- ⁶² U.S. Geological Survey, Amphibian Research and Monitoring Initiative, available at <https://armi.usgs.gov/topic.php?topic=Invasive+Species>
- ⁶³ J. Collins and others, "Standard common and current scientific names for North American Amphibians, Turtles, Reptiles, and Crocodiles", available at http://www.amphibianark.org/pdf/CNAH_Common_Names_VI_2009.pdf
- ⁶⁴ IUCN Red List of Threatened Species, available at <https://www.iucnredlist.org/>
- ⁶⁵ National Oceanic and Atmospheric Administration, Sea Turtles, available at <https://www.fisheries.noaa.gov/sea-turtles>
- ⁶⁶ National Oceanic and Atmospheric Administration, Recovering Threatened and Endangered Species: FY 2017-2018 Report to Congress, available at <https://media.fisheries.noaa.gov/dam-migration/recovering-threatened-and-endangered-species-web-508.pdf>
- ⁶⁷ National Oceanic and Atmospheric Administration, Species in the Spotlight - Leatherback sea turtles, available at <https://www.fisheries.noaa.gov/species/leatherback-turtle#spotlight>
- ⁶⁸ National Oceanic and Atmospheric Administration, "Pacific Leatherback," available at <https://www.fisheries.noaa.gov/gallery/pacific-leatherback-photo-gallery>
- ⁶⁹ National Oceanic and Atmospheric Administration, "Endangered Species Conservation: Species in the Spotlight," available at <https://www.fisheries.noaa.gov/topic/endangered-species-conservation#species-in-the-spotlight>
- ⁷⁰ National Oceanic and Atmospheric Administration, Entanglement of Marine Life: Risks and Response, available at <https://www.fisheries.noaa.gov/insight/entanglement-marine-life-risks-and-response>
- ⁷¹ Partners in Amphibian and Reptile Conservation, Collaborative to Combat the Illegal Trade in Turtles, available at <https://parcplace.org/species/collaborative-to-combat-the-illegal-trade-in-turtles/>
- ⁷² U.S. Geological Survey in partnership with U.S. Fish and Wildlife Service, "Connectivity of Mojave Desert Tortoise Populations: Management Implications for Maintaining a Viable Recovery Network", available at <https://doi.org/10.3133/ofr20211033>
- ⁷³ A. Vandergast, "Evolutionary Hotspots in the Mojave Desert", *Diversity*, 2013, available at <https://pubs.er.usgs.gov/publication/70125965>
- ⁷⁴ National Academies of Sciences, Engineering and Medicine, "Status of Pollinators in North America", available at <https://www.nap.edu/catalog/11761/status-of-pollinators-in-north-america>
- ⁷⁵ S. Cameron and others, "Patterns of widespread decline in North American bumble bees", *PNAS*, 2011, available at <https://www.pnas.org/content/108/2/662.short>
- ⁷⁶ National Academies of Sciences, Engineering and Medicine, "Status of Pollinators in North America", available at <https://www.nap.edu/catalog/11761/status-of-pollinators-in-north-america>
- ⁷⁷ J. Diffendorfer and others, "National Valuation of Monarch Butterflies Indicates an Untapped Potential for Incentive-Based Conservation", *Conservation Letters*, 2013, available at <https://doi.org/10.1111/conl.12065>
- ⁷⁸ B. Semmens and others, "Quasi-extinction risk and population targets for the Eastern, migratory population of monarch butterflies (*Danaus plexippus*)", *Nature*, 2016, available at <https://www.nature.com/articles/srep23265>
- ⁷⁹ U.S. Geological Survey, "Summary of Available Data from the Monarch Overwintering Colonies in Central Mexico, 1976–1991", Open-file Report 2020-1150, available at <https://doi.org/10.3133/ofr20201150>
- ⁸⁰ J. Pleasants and others, "Interpreting surveys to estimate the size of the monarch butterfly population: Pitfalls and prospects", *PLOS ONE*, 2017, available at <https://doi.org/10.1371/journal.pone.0181245>
- ⁸¹ C. Donovan and others, "Coral reef condition: A status report for U.S.c coral reefs," available at <https://repository.library.noaa.gov/view/noaa/27295>

⁸² National Oceanic and Atmospheric Administration, "Coral Bleaching During and Since the 2014-2017 Global Bleaching Event", available at https://coralreefwatch.noaa.gov/satellite/analyses_guidance/global_coral_bleaching_2014-17_status.php

⁸³ National Oceanic and Atmospheric Administration, "Florida's Coral Reef Disease Outbreak: Disease", available at <https://floridakeys.noaa.gov/coral-disease/disease.html>

⁸⁴ T. Wernberg and others, "Status and Trends for the World's Kelp Forests," available at <https://www.sciencedirect.com/science/article/pii/B9780128050521000036>

⁸⁵ Earth Observatory, "Monitoring the "Collapse of Kelp Forests," available at <https://earthobservatory.nasa.gov/images/148391/monitoring-the-collapse-of-kelp-forests>

⁸⁶ National Oceanic and Atmospheric Administration, "Kelp Forest", available at <https://sanctuaries.noaa.gov/visit/ecosystems/kelpdesc.html>