



THE STATE OF THE BIRDS 2011
REPORT ON PUBLIC LANDS AND WATERS
United States of America





“Birds should be saved for utilitarian reasons; and, moreover, they should be saved because of reasons unconnected with dollars and cents... The extermination of the Passenger Pigeon meant that mankind was just so much poorer... And to lose the chance to see frigate-birds soaring in circles above the storm, or a file of pelicans winging their way homeward across the crimson afterglow of the sunset, or a myriad of terns flashing in the bright light of midday as they hover in a shifting maze above the beach— why, the loss is like the loss of a gallery of the masterpieces of the artists of old time.”

—Theodore Roosevelt, 1916

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COVER PHOTOS (CLOCKWISE FROM TOP LEFT): SALT MARSH, LOUISIANA, BY GERRIT VYN; GREATER PRAIRIE-CHICKENS BY GERRIT VYN; ELEGANT TROGON BY GREG LAVATY; ROCKY MOUNTAIN NATIONAL PARK, COLORADO, BY GREG LAVATY; AUDUBON'S ORIOLE AND RUDDY DUCK BY GERRIT VYN. THIS PAGE: SUNSET OVER MISSISSIPPI RIVER DELTA, LOUISIANA, BY GERRIT VYN.

FOREWORD

Public Lands and Waters Are Essential for Birds

Each year, the State of the Birds report provides important scientific data to a broad audience with a call to action to improve the conservation status of birds and the environment. This year's report brings attention to the tremendous promise of public lands and waters for conserving America's wildlife and habitats. The United States has a long history of conservation on public lands. More than one-third of U.S. lands and all of our oceans are publicly owned, including some of our nation's most spectacular natural areas. These habitats support more than 1,000 bird species, one-third of which are endangered, threatened, or of conservation concern.

In 1864, President Abraham Lincoln established Yosemite as the first park set aside by the federal government specifically for public use and preservation. As environmental exploitation continued across unprotected lands, the Passenger Pigeon, once the world's most abundant bird, was driven to extinction in the wild by the turn of the century. Recognizing that this loss meant "mankind was just so much poorer," President Theodore Roosevelt championed the irreplaceable value of birds and other wildlife, and set aside 80 million acres for public land conservation, including the first National Wildlife Refuge in 1903.

Today, more than 850 million acres of land and 3.5 million square miles of ocean are publicly owned, including more than 245 million acres managed by the Bureau of Land Management, 6,000 State Park units, 1,600 Marine Protected Areas, 550 National Wildlife Refuges, 350 military installations, 150 National Forests, and nearly 400 National Park Service units. These areas support our native bird species, many of which are declining, as described in the 2009 and 2010 State of the Birds reports.

This year's report provides the nation's first assessment of the distribution of birds on public lands and helps public agencies identify which species have significant potential for conservation in each habitat. This assessment used high-performance computing techniques to analyze a massive data set on bird distribution from citizen-science participants across the U.S. (eBird), along with the first comprehensive database of public land ownership (Protected Areas Database of the U.S.).

The state of our birds is a measurable indicator of how well we are doing as stewards of our environment. The signal is clear. Greater conservation efforts on public lands and waters are needed to realize the vision of a nation sustained economically and spiritually by abundant natural resources and spectacular wildlife.



BICKNELL'S THRUSH NESTLINGS BY KENT MCFARLAND

President Obama's new initiative, "America's Great Outdoors," recognizes that throughout our nation's history, conservation actions have been grounded in the premise that our natural heritage belongs to the people, and that its protection is shared by all Americans. The call to action for bird conservation in this report goes hand in hand with "America's Great Outdoors," which empowers all Americans to share in the responsibility to conserve, restore, and provide better access to our lands and waters in order to leave a healthy, vibrant outdoor legacy for generations yet to come.

North American Bird Conservation Initiative, U.S. Committee
American Bird Conservancy
Association of Fish and Wildlife Agencies
Bureau of Land Management
Cornell Lab of Ornithology
Department of Defense/DoD Partners in Flight
Klamath Bird Observatory
National Audubon Society
National Oceanic and Atmospheric Administration
National Park Service
The Nature Conservancy
University of Idaho
U.S. Fish and Wildlife Service
USDA Forest Service
U.S. Geological Survey

OVERVIEW

The State of our Nation's Birds on Public Lands and Waters

Nearly 850 million acres of land and 3.5 million square miles of ocean in the U.S. are owned by the American people. These habitats are vital to more than 1,000 bird species in the U.S., 251 of which are federally threatened, endangered, or of conservation concern. More than 300 bird species have 50% or more of their U.S. distribution on public lands and waters. Public agencies therefore have a major influence on the success of conservation efforts to restore declining species and keep common birds common.

This report provides the nation's first assessment of the distribution of birds on public lands and the opportunities for public agencies in each habitat. We combined bird distribution data from the eBird citizen-science project with the Protected Areas Database of the U.S. to determine the percentage of each species' *U.S. distribution on public lands*. We focus on *habitat obligates*, those species restricted to a single primary habitat. We also did a qualitative analysis for birds in oceans, coasts, and wetlands.

The results highlight the critical role of public agencies in bird conservation as well as urgent needs for increased protection and management. Conservation and management of habitats and birds on public lands and waters, in partnership with private efforts, are essential to prevent the extinction of entire suites of island species, to buffer forest and aridland species from urban development and agriculture, to provide vital resources for severely declining ocean birds, and to balance our nation's need for resources from logging, mining, and energy extraction with conservation in all habitats.



SNOW GESE AT BOSQUE DEL APACHE NATIONAL WILDLIFE REFUGE, NEW MEXICO, BY MARIE READ

The Gold Standard: Wetlands Protection and Management

Our nation's acquisition and management of wetlands have contributed to a notable increase in wetland bird populations in the past 40 years. National Wildlife Refuges provide a network of 150 million acres managed for 700 bird species, including millions of ducks, geese, and shorebirds. The National Park Service and other public land managers in Florida protect the nation's largest freshwater marsh system, the Everglades, providing essential habitats for millions of wetland birds.

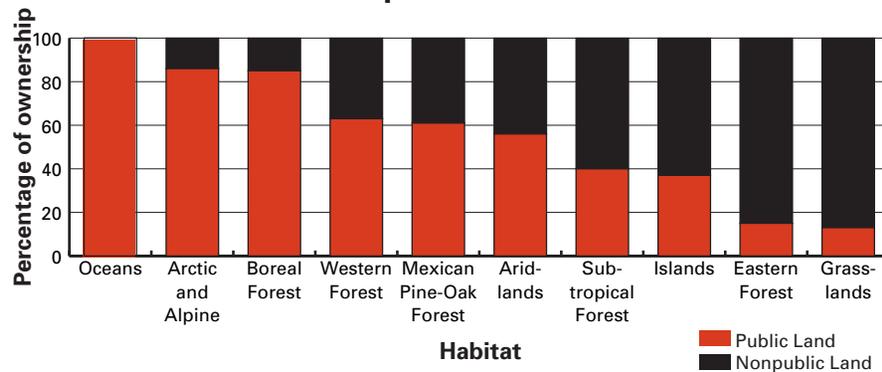
Oceans and Coasts: Vital Habitats for Birds

All U.S. marine waters are publicly owned and are home to 86 ocean bird species and 173 coastal species. Declining seabird and shorebird populations indicate stress in these ecosystems. Public agencies play an important role in conservation by managing threats such as invasive species on islands with nesting seabirds, interactions with fisheries, human disturbance and development, and pollution. More than 1,600 Marine Protected Areas conserve essential areas for many birds. Publicly owned islands and coasts provide protected areas for numerous birds of conservation concern.

Islands Essential for Nation's Most Endangered Birds

One-third of all birds listed under the Endangered Species Act occur in Hawai'i, more than anywhere else in the United States. Public lands are essential to save species that are in danger of extinction in Hawai'i, Puerto Rico, and other U.S. islands. Public lands in Hawai'i support 73% of the distribution of declining forest birds and the entire world populations of several endangered species. Intensive management is critical, such as removal of invasive species, especially on the 85% of state lands that are open to uses incompatible with bird conservation. In Puerto Rico, species such as the Puerto Rican Parrot would be extinct if not for their protection on federal and commonwealth forestland.

Public and Nonpublic Lands and Waters



Percentage of public and nonpublic ownership in primary habitats. Coasts and marshes are not depicted because of insufficient data.

Public Lands Protect Vast Arctic Tundra and Boreal Forests

Alaska has nearly as much public land as the rest of the U.S. combined. Arctic, alpine, and boreal forest-breeding birds in Alaska have more than 90% of their U.S. distribution on public lands, including 12 shorebird species. Although these vast public lands provide habitat for millions of birds, greater protections from habitat degradation are needed to ensure healthy bird populations, especially in lowland tundra, where only 6% of public land is protected to maintain natural habitats.

Stewardship Opportunities in Aridlands and Forests

Public lands support more than half of the U.S. distribution of aridland and western forest bird species during the breeding season, indicating enormous stewardship opportunities for public agencies. The Bureau of Land Management is the primary steward of habitat for Gunnison and Greater sage-grouse and other sagebrush-dependent species. The USDA Forest Service is the largest single manager of U.S. forests and supports at least 50% of the distribution of eight western forest species.

Grasslands Underrepresented on Public Lands

Grassland birds are among our nation's fastest declining species. The percentage distribution of grassland birds on public lands is low because such a small amount of U.S. grassland (less than 2%) is both publicly owned and managed primarily for conservation. Grassland bird conservation should be a higher priority on grasslands with multiple uses.

Eastern Forests Need Greater Protections from Development

Public lands in the East are often the largest blocks of remaining forest in rapidly developing urban landscapes. Expanding the network of protected lands is important for bird populations. National Parks, National Forests, and state-owned forests support core populations of eastern birds. Improved management is key for declining species that require young forests.

Public Agencies: Stewards of Our Nation's Birdlife

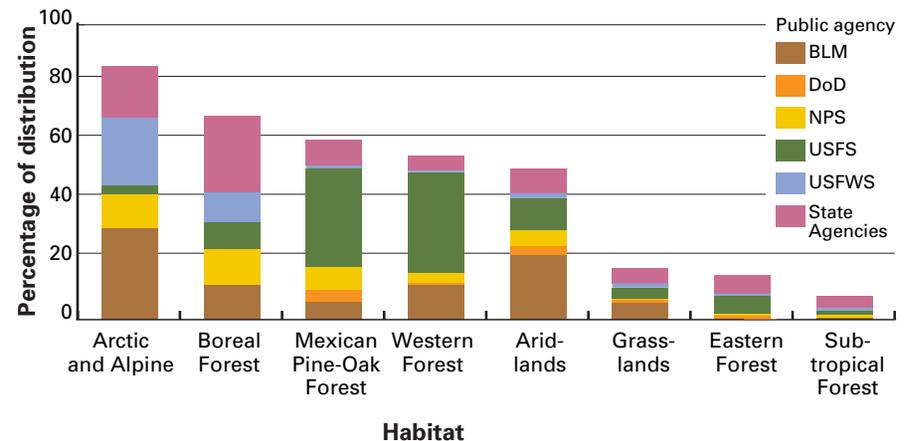
The vast acreages of public lands and waters, and proven successes in targeted conservation efforts, indicate tremendous promise for birds if management efforts can be amplified in all habitats. The Bureau of Land Management (BLM) manages 245 million acres from the arctic tundra to southwestern aridlands. The Department of Defense (DoD) manages more endangered and imperiled species per acre on its 30 million acres than any other federal agency. The National Oceanic and Atmospheric Administration (NOAA) manages coastal and deep ocean waters needed by some of

the world's most endangered seabird populations. The National Park Service (NPS) manages 88 million acres of public lands and waters in all major bird habitats across 394 units, including National Parks, National Monuments, National Seashores, and National Recreation Areas. State agencies manage 189 million acres, including more marsh than all other agencies combined. The USDA Forest Service (USFS) manages 193 million acres, 23% of which are protected to maintain habitats for birds. The U.S. Fish and Wildlife Service (USFWS) administers 553 National Wildlife Refuges that are essential for wetland birds, including many imperiled species.

Effective Management is Key to Healthy Bird Populations

Although birds benefit in part because most public lands are protected from residential and commercial development, increased protections and more effective management of habitats and bird populations are essential. Natural processes must be restored to ensure functional and resilient ecosystems through management actions such as control of nonnative species and diseases, prescribed cuts and burns to reinvigorate forests and grasslands, and water delivery and management to sustain wetlands. Many of these needs are expected to intensify because of climate change. All agencies are faced with the challenge of balancing needs for resource extraction, energy development, recreation, and other uses with the growing urgency to conserve birds and other wildlife. To succeed, they will need additional resources and greater public support to increase land protection and management. Better collaboration among agencies will also increase the effectiveness of public lands management for birds that migrate across political boundaries.

Bird Distribution on Public Lands



Percentage of the U.S. distribution of bird species dependent on public lands in each primary terrestrial habitat in the United States.

ARIDLANDS

Public Lands Support More than Half of the Distribution of Aridland Birds

Noteworthy

- Public lands are very important for the conservation of aridland bird species; more than half of U.S. aridlands are publicly owned.
- Public lands are especially important for Gunnison Sage-Grouse, a candidate for listing under the Endangered Species Act, with 79% of its U.S. distribution on public lands.
- Nearly 90% of the public lands on which aridland birds occur are protected against conversion to agriculture and urban development to some degree.
- However, the majority of these lands permit activities known to degrade habitats for birds, including energy development, grazing, mining, and logging, so active management is needed to protect vulnerable species.

Aridland Birds on Public Lands

Aridlands include some of our country's most unique habitats: all of our deserts, sagebrush, chaparral, and other habitats characterized by a lack of precipitation and a highly variable climate. Thirty-nine percent of aridland bird species are of conservation concern and more than 75% of aridland species are declining. About 18% of the U.S. is aridlands, 56% of which is publicly owned. An average of 51% percent of the U.S. distribution of 36 obligate aridland bird species is on publicly owned lands during the breeding season and 54% during winter.

Gunnison Sage-Grouse, a candidate for listing under the Endangered Species Act, is more dependent on public lands than any other aridland species, with 79% of its distribution on public lands. Sage Sparrow and Le Conte's Thrasher also have more than 75% of their distribution on public lands during the breeding season. In contrast, the endangered Black-capped Vireo has just over 7% of its distribution on public lands.

Four land managers (BLM, USFS, states, and NPS) are responsible for more than 90% of the aridland bird species found on public lands during the breeding season, highlighting the vital role these agencies play in bird conservation. BLM lands are particularly important for sagebrush birds, supporting more than two-thirds of the U.S. distributions of Sage Thrasher, Sage Sparrow, and Brewer's Sparrow during the breeding season. USFS lands are important for many species, espe-

cially Wrentit in coastal chaparral, with 63% of the breeding distribution on public lands. State lands are important for Rufous-winged Sparrow, with more than 50% of the species' distribution on public lands. NPS lands are important for some desert species, such as Lucifer Hummingbird, California Condor, and Bendire's Thrasher. DoD lands generally do not support a large proportion of the distribution of aridland species but are extremely important for California Gnatcatcher, with almost 46% of the species' distribution on public lands.

Nearly 90% of public lands on which aridland birds occur are protected to some degree from major threats such as conversion to agriculture and urban development. For lands managed under multiple-use mandates, energy development, mineral exploration and production, livestock grazing, and other uses are permitted but need to be analyzed for their ability to support wildlife conservation. Most management plans that focus on natural ecosystems in public aridlands allow for fire and other natural processes that are essential for the long-term survival of many bird species.

Conservation Successes

Almost 46% of the distribution of the California Gnatcatcher on public lands is found on DoD lands such as Camp Pendleton. In the past two decades, DoD has spent more than \$9 million on conservation for this threatened species. Although the USFWS has designated nearly 200,000 acres of

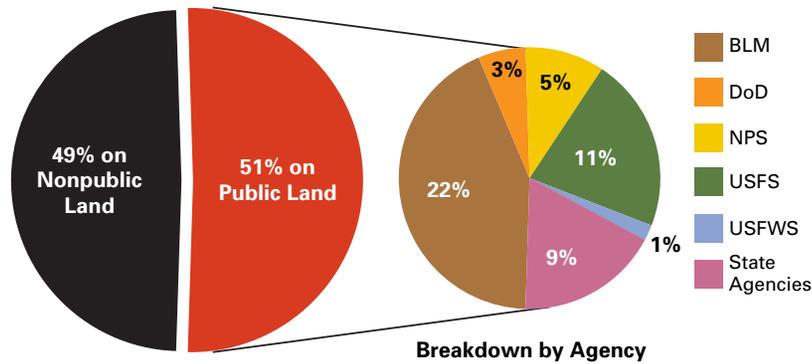
SAGEBRUSH HABITAT, WYOMING, BY GERRIT VYN



CALIFORNIA GNATCATCHER BY BRIAN SULLIVAN

Public lands are essential for the conservation of aridland birds. Continual management will be needed to protect vulnerable species on multiple-use lands.

Aridland Bird Distribution



Percentage of the U.S. distribution of 36 aridland-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

critical habitat for the species, management plans for military lands already address gnatcatcher conservation priorities and are excluded from critical habitat designation. Therefore, military training lands provide a refuge for the California Gnatcatcher without sacrificing training activities.

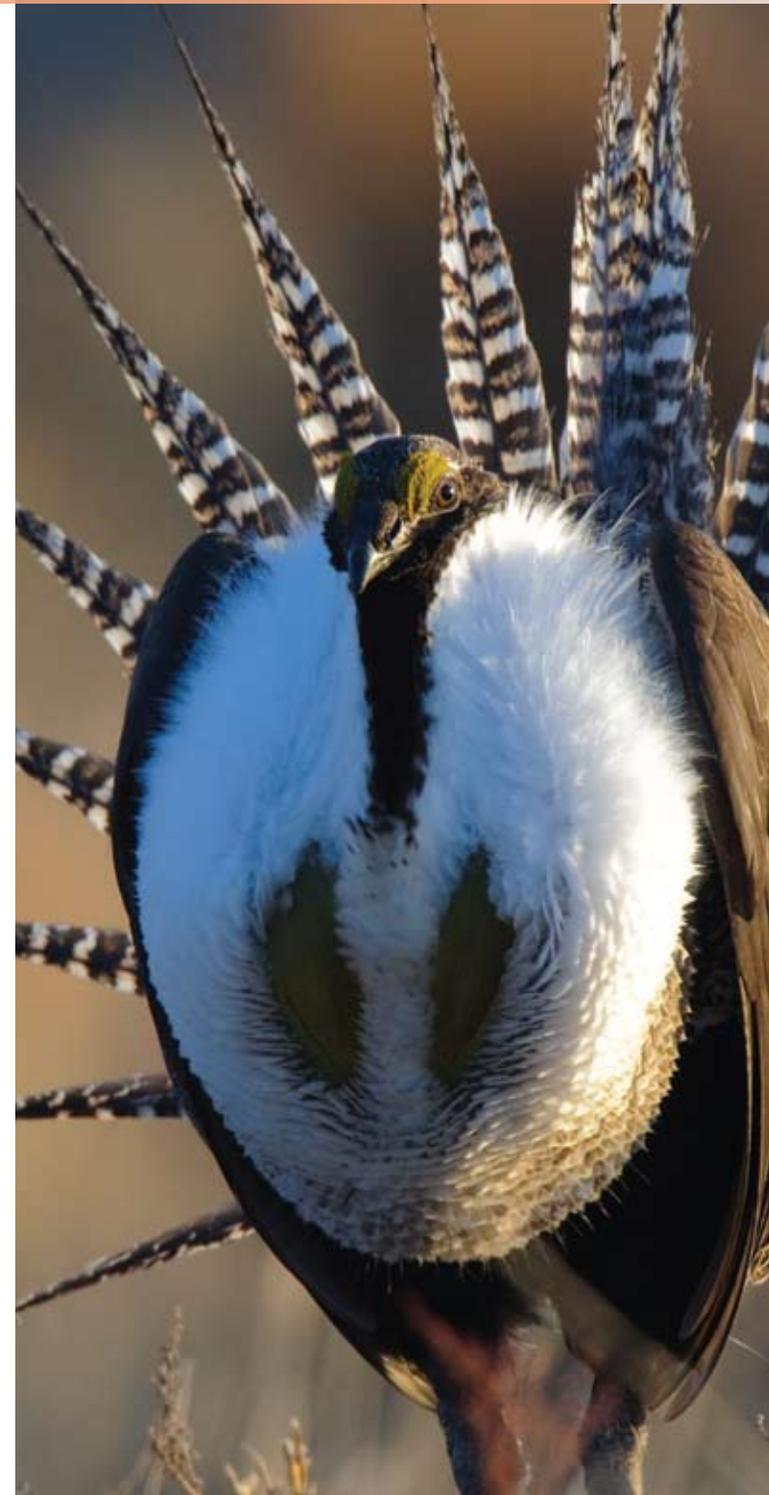
BLM's Carrizo Plain National Monument in California and nearby saltbush scrublands provide the last strongholds in this region for Le Conte's Thrasher whose habitat has been largely converted to agriculture and oil fields. In the Mojave Desert, the BLM has secured the two largest habitat blocks as the Bendire's Thrasher Area of Critical Environmental Concern and is developing a management plan.

Captive-bred California Condors were released back into the wild in California in 1992 and in Arizona in 2006. Six birds were transferred from captive breeding facilities to an acclimation pen on top of the Vermilion Cliffs and were released to the wild. Since then, program personnel have released approximately six to ten birds per year. There are now more than 70 condors in Arizona and Utah, mostly in Grand Canyon National Park, Zion National Park, and Glen Canyon National Recreation Area.

Conservation Challenges

Given the high proportion of aridland birds on public lands, management actions will be extremely important in maintaining these species nationally. However, only about 20% of these lands are protected to maintain natural habitats, suggesting that many of these publicly owned aridlands and their birds remain vulnerable to a variety of threats. Land uses that potentially degrade habitat for aridland birds are permitted on the great majority of public-use lands. These include energy development and associated infrastructure, off-road vehicular traffic, grazing, mining, and logging. Although many land uses can be compatible with aridland bird conservation, management plans for these vulnerable landscapes need to incorporate measures to ensure long-term healthy populations of aridland birds.

Key challenges that will require active attention and management by public land managers include control of invasive plant species; keeping fire and other forms of disturbance within normal limits; promoting natural patterns of plant succession; and helping birds and other biodiversity adapt in the face of climate and land-use change.



GUNNISON SAGE-GROUSE BY GERRIT VYN

GRASSLANDS

Greater Protections Needed in America's Heartland

Noteworthy

- More than 97% of the native grasslands of the U.S. have been lost, mostly because of conversion to agriculture. As a result, grassland bird populations have declined from historic levels far more than any other group of birds.
- Although only 13% of remaining grassland is publicly owned, public lands support 17% of the U.S. distribution of breeding and 20% of wintering grassland-dependent birds, indicating the value of public grasslands to birds.
- Forty-four percent of the U.S. winter distribution of Baird's Sparrow (a species of conservation concern) is on public land.
- More public grasslands specifically protected for birds and other wildlife are needed. Grassland bird conservation should be a higher priority on public grasslands with multiple uses.
- Acquisition and restoration of native grasslands are critical to provide larger habitat patches and movement corridors for bird population sustainability, especially in the face of climate change.

Grassland Birds on Public Lands

Grassland birds are among the most consistently declining species in the United States. Forty-eight percent of grassland-breeding bird species are of conservation concern, including four with endangered populations.

More than 11% of the contiguous 48 states is native grassland, with an additional 7% in pastures and hayfields. Of these 366 million acres of native grasslands, pastures, and hayfields, only 13% is publicly owned. Of the 36 obligate grassland bird species (20 in both seasons, 9 species only during the breeding season, and 7 only in winter), 17% of their distribution during the breeding season and 20% during winter are found on public lands, indicating the value of public grasslands to birds.

Six grassland species have more than 30% of their U.S. distribution on public lands in winter: Baird's Sparrow, Ferruginous Hawk, Lark Bunting, Rough-legged Hawk, McCown's Longspur, and Western Meadowlark. All except Baird's Sparrow use BLM lands more than any other public land. All of these birds are western species, reflecting greater public ownership in the West compared with the East.

Only three grassland species have more than 30% of their distribution on public lands during the breeding season: Long-billed Curlew, Ferruginous Hawk, and Mountain Plover. These western birds inhabit BLM lands more than any other lands managed by a single agency.

Four grassland species have 5% or less of their distribution on public lands: breeding Dickcissels, Scissor-tailed Flycatchers, and Eastern Meadowlarks, and wintering Harris's Sparrows. All of these are predominantly found in the Midwest, in states with much less public land compared with

those farther west.

We have not included row-crop agricultural lands in this report because although they cover almost as much acreage as grasslands, only 3% of row-crop land is publicly owned. In addition, row-crop lands provide little quality habitat for birds. However, a few grassland birds breed in row-crop fields, and many more winter in them.

Conservation Successes

Ferruginous Hawk, one of three breeding species with more than 30% of its distribution on public lands, is one of the few grassland species with an increasing population trend over the past 40 years.

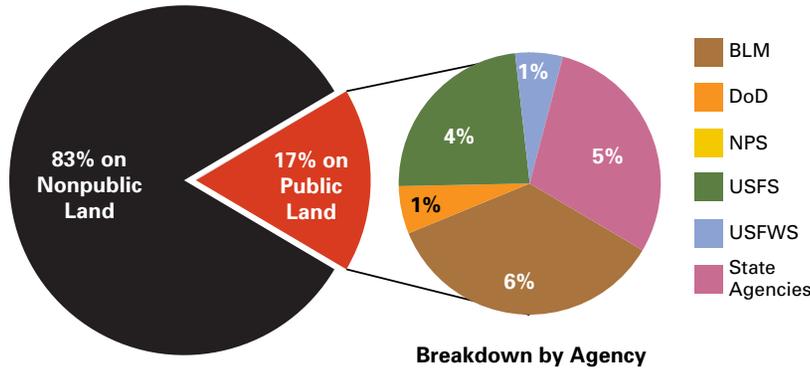
The Bartel Grassland Restoration Project has successfully restored grassland birds on Cook County public lands near Chicago, Illinois. Invasive trees, such as box elder and buckthorn, were removed from the site. Soon after, birds such as Grass-



WESTERN MEADOWLARK BY GERRIT VYN

CIMARRON NATIONAL GRASSLAND, KANSAS, BY GERRIT VYN

Grassland Bird Distribution



Percentage of the U.S. distribution of 29 grassland-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

hopper and Henslow's sparrows, meadowlarks, Bobolink, and Short-eared Owl increased. When complete, the site will include 900 acres of restored grassland and wetlands.

Conservation Challenges

Only 13% of U.S. grassland is publicly owned, less than 14% of which is protected to maintain natural habitats. Thus, less than 2% is both publicly owned and managed primarily for conservation. Sixty-three percent of publicly owned grassland is protected from conversion to other uses, but is subject to multiple-use demands, and the remaining 22% is unprotected from development or conversion. Fortunately, grassland birds can coexist with other uses, such as livestock grazing, if habitat is managed with birds in mind. For example, grazing animals and grassland birds are both threatened by invasive plants that diminish the quality of grassland, so livestock owners and conservationists share an interest in combating invasive plants. Management practices such as

burning, grazing, and mechanical intervention to resist invasion by woody plants can benefit both livestock and birds.

Proper siting of energy development projects on public lands is critically important to grassland birds, including gas, oil, solar, and wind, as well as roads and transmission lines required to deliver power from the source to the end-user. These projects cause habitat loss and degradation; in addition, many grassland bird species have been shown to avoid areas near tall structures in otherwise suitable habitat.

Grassland has always been undervalued as wildlife habitat. The percentage of grassland birds on public lands is low because such a small amount of U.S. grassland (less than 2%) is both publicly owned and managed primarily for conservation. More public land specifically protected for grassland birds is needed, and a higher proportion of multiple-use lands should be managed with grassland birds in mind.



BAIRD'S SPARROW BY GERRIT VYN

Grassland birds are among our nation's fastest declining species, yet only 2% of all U.S. grassland is both publicly owned and managed primarily for conservation.

WETLANDS

A Model for Conservation on Public Lands

Noteworthy

- All of our nation's 46 waterfowl species and many other wetland birds depend on a network of National Wildlife Refuges and other publicly protected wetlands during all or part of their life cycle.
- Wetland birds often congregate in the highest quality habitats, such as National Wildlife Refuges and other public lands.
- According to the USFWS, National Wildlife Refuges in the Prairie Pothole Region account for less than 2% of the landscape yet produce nearly 23% of the region's waterfowl.
- The NPS Everglades National Park and adjacent public lands and waters in Florida protect the nation's largest freshwater marsh system, providing essential habitat for significant resident and wintering marsh bird communities.
- Wetland bird populations have increased steadily as a result of focused and ongoing wetland habitat protection, restoration, and management.

Wetland Birds on Public Lands

Millions of ducks and geese gather on public wetlands every year, providing tremendous recreational opportunities for hunters and bird watchers. In the mostly arid western U.S., large protected wetlands around Great Salt Lake and the Salton Sea support millions of migratory and wintering shorebirds and waterfowl and breeding marsh birds. These include species of high conservation concern such as Clark's Grebe, Snowy Plover, and Yuma Clapper Rail.

All federal land agencies manage some wetlands. The USFWS and many state wildlife agencies prioritize wetlands for acquisition and management because of their value for waterfowl. These wetlands are typically managed in an integrated manner that provides habitat to benefit other birds and wildlife.

At Everglades National Park and adjacent public lands in Florida, the NPS protects the largest extent of freshwater marsh in North America, supporting millions of wetland birds. BLM manages boreal forest wetlands and wet arctic tundra in Alaska that are essential for nesting waterfowl, loons, and shorebirds.



WOOD STORKS BY GREG LAVATY



RUDDY DUCK BY GERRIT VYN

Wetland birds often congregate in the highest quality habitats. Public lands generally have greater infrastructure and management capacity to improve wetland quality and thus can support more wetland birds on fewer acres than on non-public lands lacking such infrastructure.

For example, in the Prairie Pothole Region, considered the "duck factory" for North America, National Wildlife Refuges account for less than 2% of the landscape, yet they are responsible for producing nearly 23% of the region's waterfowl.

Conservation Successes

The overall health of waterfowl and other wetland-dependent bird populations in the U.S. reflects the huge investment in wetlands conservation by federal and state agencies over the past 30 years.

Since the 1930s, the USFWS has targeted the acquisition, enhancement, and restoration of wetlands and associated habitats to conserve waterfowl and other migratory bird populations. Since 1934, Federal Migratory Bird Hunting and Conservation Stamps ("Duck Stamps") have generated funds to purchase or lease more than 5.3 million acres of wetland habitat, now protected in the National Wildlife Refuge System.

Since 1989, the North American Wetlands Conservation Act has provided funds to federal and state agencies in the United States to acquire, enhance, and restore an estimated 2.9 million acres of wetlands and associated uplands for birds.

The National Wildlife Refuge System includes nearly 7,000 Waterfowl Production Areas (WPAs) that preserve vital wetlands and grasslands for millions of nesting waterfowl and other wildlife.

These WPAs preserve more than 677,000 acres of wetlands nationwide. Incorporated into the refuge system in 1966, nearly 95 percent of WPAs are in the Prairie Pothole Region. The 1991 requirement for nontoxic shot has greatly contributed to the recovery and health of waterfowl throughout the United States.

Goose Pond State Fish and Wildlife Area once was the largest cornfield in Indiana. In 2005, the state of Indiana acquired it and restored marsh habitat. It now supports many species, including breeding Blue-winged Teal and Black-crowned Night-Herons, and thousands of migrating waterbirds and waterfowl such as Sandhill Crane, Great Egret, sandpipers, and ducks. Hunters, anglers, bird watchers, and photographers now enjoy this productive wetland.

Conservation Challenges

Freshwater is vital to the productivity of marshes and other freshwater wetlands, but it is also highly valued in agricultural and urban landscapes. The demand for freshwater by multiple constituencies creates a management challenge. On publicly protected wetlands, managing water levels to benefit birds can be difficult if water is diverted or depleted in the surrounding landscape.



A related challenge is the need to better protect mosaics of temporary and seasonally flooded wetlands such as playa wetlands for migrating shorebirds that need to rest and refuel as they approach breeding destinations. Additionally, the overall supply of freshwater is predicted to decrease in the future because of climate change.

Nonnative plants have invaded wetlands, causing profound changes in wetland composition, structure, and function, which can have a negative impact on many species of birds. For example, bird diversity is lower in wetlands dominated by purple loosestrife, which has invaded many wetlands throughout the Midwest.

Most publicly owned wetlands are protected from development, but may be affected directly by other uses (e.g., contaminant runoff and sedimentation, grazing effects, dredging, disturbance). Such incompatible uses degrade the value of this habitat for wetland birds. A conservation priority on public lands is to increase the protection level of marshes.

Waterfowl are fortunate to have strong, proactive federal programs that preserve wetlands. Pesticide use for mosquito control in wetlands should be carefully managed to avoid wildlife impacts such as the spread of disease.

Continued investment in wetland conservation and management will be needed to maintain healthy populations of birds in the face of growing threats such as water diversions, intensified conversion of wetlands in urban and agricultural landscapes, and loss of federal protections for isolated wetlands.

EARED GREBE (LEFT) AND AMERICAN BITTERN (RIGHT) BY GERRIT VYN



Public land acquisition, including the establishment of National Wildlife Refuges, has targeted wetland and waterfowl conservation since the 1930s, contributing to recovery of bird populations.

ARCTIC AND ALPINE

Public Lands Support 86% of Arctic and Alpine Bird Distribution

Noteworthy

- Public lands are crucial for arctic and alpine birds. They support 86% of the U.S. distribution of these species, higher than for birds dependent on any other terrestrial habitat.
- Only 6% of lowland tundra on public lands in northern Alaska is protected to maintain natural habitats. Ensuring protection for birds on these lands should be a priority for state and federal agencies.
- Climate change and energy development pose significant challenges in arctic habitats, which are vital to many of our nation's shorebirds and waterfowl.



WHITE-TAILED PTARMIGAN BY GERRIT VYN

Arctic and Alpine Birds on Public Lands

Alpine and arctic landscapes range from the subtle to the spectacular. They constitute 44% of all lands within Alaska but just 1% of lands in the contiguous 48 states, mostly in the West. Public lands are important for the conservation of breeding arctic and alpine birds—86% of arctic and alpine habitats are publicly owned and support 86% of the U.S. distribution of arctic and alpine bird species. Of the 59 species inhabiting primarily arctic or alpine habitats, 23 are of conservation concern.

Eighteen species, all of which occur within Alaska, have more than 90% of their distribution on public lands, and 10 are of conservation concern. Public lands are especially important breeding grounds for arctic-nesting Yellow-billed Loons and alpine-nesting Surfbirds.

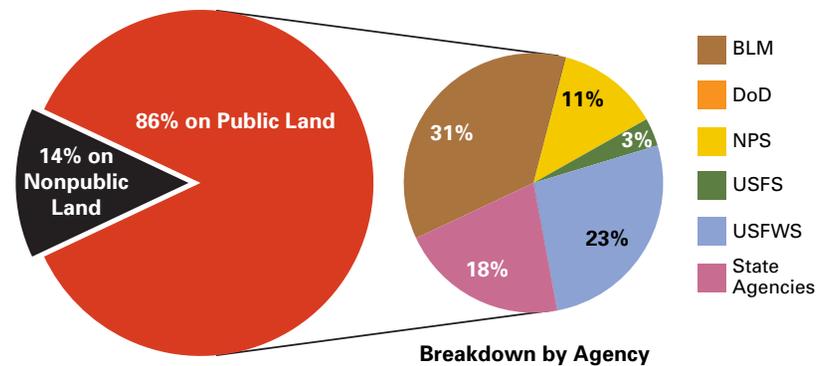
Arctic species breeding in northern Alaska tend to have more of their breeding range on public land (e.g., 95% for Stilt Sandpiper) than species breeding exclusively in western Alaska, such as the Emperor Goose (64%).

In the contiguous 48 states, the five alpine-breeding species have 76% of their average distribution on public lands. About 91% of alpine habitats in the contiguous 48 states is publicly owned; 70% is managed by the USFS and is important for the conservation of White-tailed Ptarmigan, American Pipit, and Black, Browned-capped, and Gray-crowned rosy-finches.

Within Alaska, ownership is more evenly distributed among federal agencies and the state of Alaska; the state manages 18% of the average distribution of arctic and alpine species. Together, BLM and USFWS lands are important for arctic and alpine birds, with 54% of the distribution of these species. BLM lands alone support more than



Arctic and Alpine Bird Distribution



Percentage of the U.S. distribution of 59 arctic- and alpine-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

DENALI NATIONAL PARK, ALASKA, BY GERRIT VYN

40% of the distribution of the King Eider, Long-billed Dowitcher, Snowy Owl, and Bluethroat. Virtually all breeding McKay's Buntings occur on islands in the Bering Sea managed as part of the Alaska Maritime National Wildlife Refuge.

Conservation Successes

In 1980, President Jimmy Carter signed the Alaska National Interest Lands Conservation Act into law. Considered the most significant land conservation measure in U.S. history, the statute protected more than 100 million acres of federal lands in Alaska, doubling the size of the country's National Park and National Wildlife Refuge systems. The act consolidated and expanded public ownership within the Yukon Delta and Arctic National Wildlife Refuges, which now each include more than 19 million acres.

In 2008, the BLM elected to defer for 10 years any oil and gas leases in the National Petroleum Reserve Alaska surrounding Teshekpuk Lake. The tundra around the lake provides one of the largest known arctic goose molting areas in North America for 70,000 geese of four species and supports high densities of nesting shorebirds such as the Red Phalarope and the threatened Spectacled Eider.

Conservation Challenges

Forty-two percent of the distribution of arctic and alpine birds occurs on publicly owned lands that are protected to maintain natural habitats. Within the arctic, western Alaska has a higher percentage of these protected lands. More importantly, northern Alaska has very little lowland tundra areas that are managed primarily to maintain natural habitats for biodiversity (6%) relative to western Alaska (57%). Lowland tundra in northern Alaska



YELLOW-BILLED LOON AND RED KNOT BY GERRIT VYN

is important nesting habitat for several species of conservation concern, including Buff-breasted Sandpiper. Increasing the amount of lowland tundra managed primarily to maintain natural habitats in northern Alaska should be a priority for federal agencies and the state of Alaska.

Public lands are crucial for maintaining arctic and alpine breeding bird species. Modifications in environmental conditions caused by global climate change, including sea-level rise, changes in hydro-

logical regimes, and expansion of trees and shrubs into sedge-dominated tundra and alpine areas, are perhaps the most challenging long-term threats facing arctic and alpine birds. Balancing the need for energy development with the conservation needs of birds is a continuing challenge on public lands in arctic Alaska. Although more than half of all alpine public lands in the contiguous 48 states is protected to maintain natural habitats, alpine lands can take years to recover from mining, grazing, and recreation disturbances.

A key priority is to improve management of lowland tundra in northern Alaska, where only 6% of public land is protected to maintain natural habitats.

FORESTS

Diverse U.S. Public Forests Support Diverse Birdlife



PACIFIC COAST RAINFOREST, ALASKA, BY GERRIT VYN

Noteworthy

- The largest single forestland manager is the USFS, with 147 million acres or about 40% of publicly owned forests.
- Roughly 33% of public forests, mostly on NPS lands and Wilderness Areas, is protected to maintain natural habitats, offering greater benefits for some bird populations. Other birds will benefit from more effective management on multiple-use forestlands.
- Public lands support 45% of the breeding distribution of 149 obligate forest bird species in the United States.
- Public forests are crucial for the recovery of endangered species, including Kirtland's Warbler, with 97% of its U.S. distribution on public lands.
- Public agencies need more resources and tools to achieve vital conservation actions for forest birds, such as restoring natural fire regimes and managing the proliferation of invasive insect pests and diseases.

Forest Birds on Public Lands

Diverse U.S. forests harbor more than 300 breeding bird species. Nearly 40% of the U.S. land area is forested (856 million acres). Roughly one-third of the forests in the lower 48 states and 87% of Alaskan forests are on public lands, with a much higher proportion of publicly owned forests in the West than in the East. The largest single land manager is the USFS, with 147 million acres or roughly 40% of all publicly owned forests. Other significant managers of public forestlands are state agencies, with 95 million acres (26%) and the BLM, with 63 million acres (17%).

Public lands support 45% of the U.S. distribution of the 149 obligate forest bird species. Species groups with more than two-thirds of their U.S. distribution on public lands (and therefore the greatest conservation opportunities) include birds of high-elevation, Pacific-Northwest, and boreal conifer forests, as well as those in pinyon-juniper woodlands and pine-oak forests of the Southwest. Groups with less than 10% of their distribution on public lands include species restricted to subtropical forests in south Texas and many common, yet steeply declining, species dependent on early successional eastern forests.

Public lands often represent the largest unfragmented forests in many regions, and are therefore very important to the long-term health of forest bird populations. Management policies that can enhance or restore declining species that are highly dependent on public lands (more than 50% of their distribution) are especially important.

Stewardship Opportunities

Forty-five percent of public forests are managed for multiple uses. Although these lands are

protected from urban development and clearing for agriculture, they are often open to energy development, mining, grazing, logging, and other activities that may conflict with wildlife and other natural resource values. Roughly 123 million acres (33%) of public forests, mostly on NPS lands and Wilderness Areas, are protected to maintain natural habitats and potentially offer greater benefits for many bird populations. However, 59% of public forests in Alaska offer no permanent protections against extraction or conversion.

Major challenges arise chiefly from agency mandates and policies that may conflict with the needs of species of high conservation concern. For example, the desire to exploit mineral or energy resources (including wind), or to gain economically from logging, grazing, or recreational use, needs to be balanced with the desire to provide healthy habitats for birds and other wildlife. Particularly harmful to some bird populations are activities that fragment large blocks of forest, such as road-building, or those that remove essential structural features such as snags, old-growth trees, or riparian corridors. In other cases, management decisions that prevent the maintenance of forests of diverse ages may be harmful to species dependent on young forests.

Perhaps the single greatest challenge for forest managers nationwide is the restoration of fire regimes as a vital component of healthy forest ecosystems. Many forest types, as well as birds and other wildlife of high conservation concern, require natural fire cycles, and a century of unnatural fire suppression has created conditions that are not only harmful to bird populations, but also pose grave economic and safety threats to humans. Another huge challenge is the proliferation of invasive species, including plants, insect pests, and diseases that are threatening the future of en-



WHITE-HEADED WOODPECKER BY GERRIT VYN

tire forest communities. These threats are increasingly exacerbated by a changing climate, as well as by a rapidly expanding urban-forest interface. Public agencies need greatly increased resources and tools for meeting these challenges.

WESTERN FORESTS

Western forests represent some of the last intact ecosystems in North America, providing essential habitat for many bird species. Western forests encompass roughly 269 million acres (13% of the land area of the contiguous 48 states), including pine and other conifer forests, pinyon-juniper woodland, and oak woodlands of the Pacific Coast. An additional 19 million acres of western forests extend into southeastern Alaska, 62% of which are in two National Forests. Including Alaska, 63% of western forests are publicly owned, with 41% in National Forests, 10% on BLM land, 5% on state lands, and 3% on NPS lands.

Western Forest Birds on Public Lands

Public lands have tremendous importance for western forest birds, supporting 55% of the distribution of the 41 obligate breeding species (34% in National Forests, 11% on BLM lands, 5% on state land, and 3% on NPS lands).

Public lands support more than 70% of the U.S. distribution of Common Black-Hawk, White-headed Woodpecker, Williamson's Sapsucker, Clark's Nutcracker, and Sooty and Dusky grouse. Seven western bird species have 50% or more of their distribution in National Forests. BLM forests support significant distributions of Gray Flycatcher (37%), Black-throated Gray Warbler (29%), and Pinyon Jay (27%).

California oak woodland specialists (Oak Titmouse, Nuttall's Woodpecker, Yellow-billed

Magpie) have much smaller distributions on public lands (10–25%). The lack of protections for oak woodlands in Pacific states is a significant conservation challenge, affecting many plant and animal species in addition to birds. The two most endangered western forest species, Golden-cheeked Warbler in Texas and Island Scrub-Jay in California, have among the lowest percentages of U.S. bird distributions on public land.

Conservation Successes

Riparian forest bird populations have increased dramatically in response to restoration of 5,000 acres of riparian forest since 1998 on the Sacramento River National Wildlife Refuge and adjacent California Fish and Game lands. In 1987, cattle were removed from portions of BLM's San Pedro River National Conservation Area in Arizona, resulting in dramatic regeneration of riparian vegetation and increases in many riparian forest bird populations.

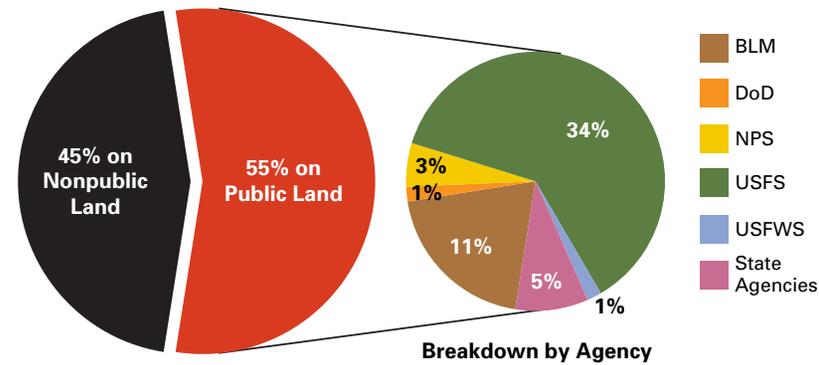
Active management in National Forests has improved habitat for western forest birds. For example, prescribed fire treatments implemented by USFS in the Inland Northwest have created habitats for Black-backed, American Three-toed, and White-headed woodpeckers in locations that were previously unoccupied by these species. Silvicultural practices that promote hardwood regeneration have benefited shrub-nesting birds such as Wilson's and MacGillivray's warblers.

Conservation Challenges

Many western forest bird species depend on conifer seeds and are threatened by the loss of pines, especially pinyon and whitebark pine, due to spread of white pine blister rust, mountain pine bark beetle, and other invasive pests. These threats are exacerbated by years of fire suppression and by severe drought conditions attributed to climate change.

Policies regarding fire suppression, thinning to reduce fuel loads, and post-fire logging are

Western Forest Bird Distribution



Percentage of the U.S. distribution of 41 western forest-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

Crucial to the long-term health of bird populations, public lands are often the largest blocks of unfragmented forest in many regions.



GOLDEN-CHEEKED WARBLER COURTESY OF USFWS

especially important to many forest birds. Restoration of natural fire regimes will benefit birds of high conservation concern, such as White-headed Woodpecker, that are highly dependent on public lands. Other public land policies that will benefit birds in western forests include limiting fragmentation and clearing for energy extraction, fencing and reduced grazing of riparian forests, protecting remaining old-growth stands in the Pacific Northwest and Sierra Nevada, and expanding protected areas in California oak woodlands.

EASTERN FORESTS

Eastern forests encompass 430 million acres, or 22% of the land area of the contiguous 48 states, including central and northern hardwoods, mixed-conifer forests, and southern pine forests. Only 15% of eastern forests is publicly owned, much less than in the West. As urban sprawl increases dramatically, however, large blocks of public forestland are increasingly important for the long-term conservation of birds. State ownership of forests is three times greater in the East than the West, with 31 million acres of state forest lands that are extremely important for the long-term protection of eastern forest birds. More than 2 million acres of forest are protected in Great Smoky Mountains and other National Parks.

Eastern Forest Birds on Public Lands

Public lands support only 15% of the distribution of the 34 eastern forest obligate breeding species, a much lower percentage than in the West. About 6% is on state lands and 6% in National Forests.

Two endangered birds are also the species with the highest proportion of their geographic distribution on public forestland. Ninety-seven percent of the Kirtland's Warbler's small breeding distribution is on public land, with 56% on state land and 35% in National Forests. Similarly, 90% of the Red-cockaded Woodpecker distribution is on public land, including 41% in National Forests, 29% on DoD land, and 12% on state land. Publicly managed forests are critical for the recovery of these endangered species.

Mature deciduous forest species, such as Kentucky and Cerulean warblers, tend to have a higher-than-average proportion of their distribution on public lands, especially in National Forests. In contrast, common yet steeply declining birds of shrub-scrub habitats, such as Brown Thrasher, Eastern Towhee, and Field Sparrow, have 10% or less of their distribution on public land. An exception is the Golden-winged Warbler, one of the most steeply declining songbirds in the U.S., with 30% of its distribution on public land, including 16% on state land and 12% in National Forests.

Conservation Successes

One of the nation's most endangered bird species, the Kirtland's Warbler, has increased in numbers and distribution in response to intense management of jack pine forests on 190,000 acres of National Forest, National Wildlife Refuge, and state lands in Michigan, including prescribed cuts and fires to restore natural conditions. These efforts represent successful partnerships among public landowners to implement recovery goals under the Endangered Species Act.

DoD lands in the Southeast have been very important for the recovery of the endangered Red-cock-

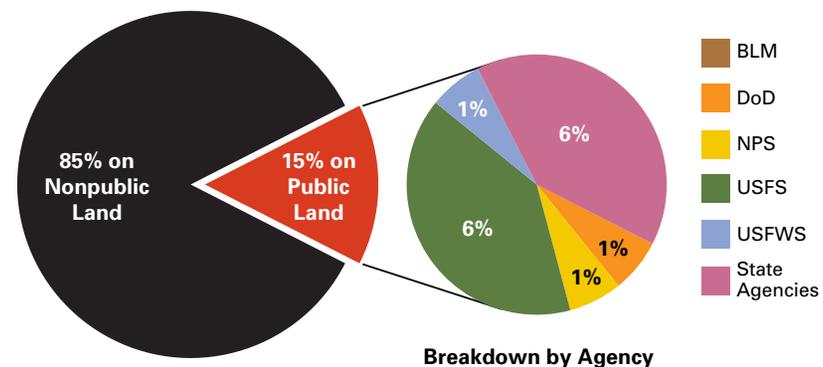
aded Woodpecker. Fort Bragg, North Carolina, was the first public land unit to reach the population recovery goal of 350 nesting clusters, and the frequent fires on military lands are compatible with healthy woodpecker populations.

Conservation Challenges

As privately owned forests in the East are rapidly lost to urban and exurban development, increasing the total area of public forestland will be important for maintaining healthy populations of forest birds. Improved management of the urban-forest interface through zoning buffers, reduction of deer populations, and control of feral cats and other invasive species will also benefit bird populations. Aggressive actions to limit the effects of nonnative forest pests will be necessary for public lands to serve as future refugia for birds and other biodiversity.

Although many large forest areas are protected on public lands, historic recovery of eastern forests after a period of vast clearing for agriculture, combined with a century of fire suppression, have resulted in a loss of structural features and age diversity necessary to sustain many birds of high conservation concern, especially those dependent

Eastern Forest Bird Distribution



Percentage of the U.S. distribution of 34 eastern forest-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).



KENTUCKY WARBLER BY GREG LAVATY

on forest understory and disturbance. Active management to create and maintain early successional habitats is vital for the long-term conservation of many declining species, including increased restoration of naturally disturbed habitats such as pine-barrens and oak glades.

MEXICAN PINE-OAK FORESTS

Spanning roughly three million acres, the pine-oak forests of the “sky island” mountains of southeastern Arizona, southern New Mexico, and west Texas are an extension of the forests in Mexico’s Sierra Madre ranges. Sixty-one percent is on public lands, more than half of which is in several large National Forests in Arizona and New Mexico. Other significant public lands include Big Bend and Guadalupe Mountains national parks in Texas and Fort Huachuca in southeastern Arizona.

Mexican Pine-Oak Birds on Public Lands

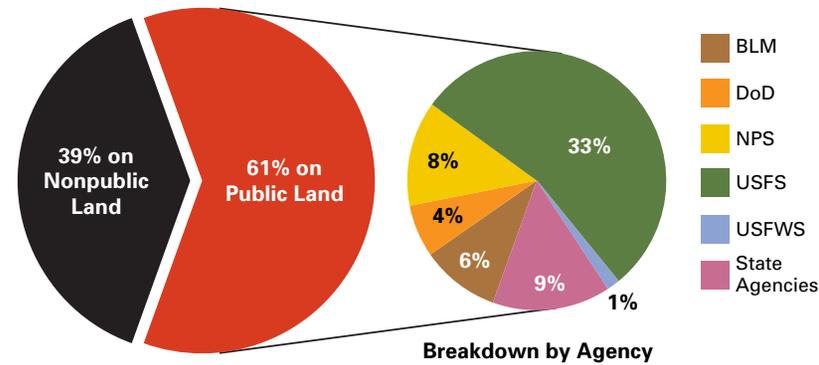
Mexican pine-oak forests support distinctive birds that are primarily Mexican and occur nowhere else in the United States. Public lands support 61% of the U.S. distribution of the 20 species of obligate pine-oak forest birds, with more than half in National Forests. In general, species at higher elevations (e.g., Olive Warbler, Mexican Chickadee)

and those restricted to sycamore-lined mountain canyons (e.g., Painted Redstart, Elegant Trogon) have the highest proportion of their distribution on public lands, including 40–60% of their distributions in National Forests.

Species at lower elevations and in drier forests (e.g., Mexican Jay, Hepatic Tanager) have lower percentages of their distribution on public lands (though still 50% or more), with a high percentage (10–15%) on BLM land. The entire known U.S. breeding range of Colima Warbler is in Big Bend National Park. DoD lands on Fort Huachuca support 10–15% of the U.S. distribution of several species in the Huachuca Mountains (e.g. Buff-breasted Flycatcher, Elegant Trogon).

All of these birds are at the northern limit of their distribution in this region, and although vast public lands in the southwestern U.S. are very important, international cooperation with Mexico is essential for their long-term conservation. A majority of the public land in this region is managed for multiple uses (grazing, recreation, military training, forestry), but is protected from residential and commercial development. Big Bend National Park protects 814,000 acres and is managed to maintain extensive natural habitats.

Mexican Pine-Oak Forest Bird Distribution



Percentage of the U.S. distribution of 20 Mexican pine-oak breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

Conservation Successes

As bird watchers flock to Mexican pine-oak forests to see primarily Mexican bird species in the U.S., bird-related tourism adds significantly to the local economy in spring and summer. For example, Cave Creek Canyon in the Coronado National Forest, Arizona, receives thousands of visitors annually, many of who come to see Elegant Trogons and other species representative of the Mexican pine-oak forest.

Fort Huachuca in southeastern Arizona has developed a comprehensive management plan to protect up to eight pairs of threatened Mexican Spotted Owls, including reducing the impacts of military activities and managing fires. Policies to protect large expanses of forest also benefit the entire suite of birds dependent on pine-oak forests.

Conservation Challenges

Fire suppression, intensive grazing, and heavy recreational use are major threats to birds in publicly owned pine-oak forests. The altered fire regime in these forests has resulted in the absence of some bird species (e.g., Buff-breasted Flycatcher) in mountain ranges where they were considered

common at the turn of the 20th century. With fire frequency increasing, Buff-breasted Flycatchers and other fire-adapted species are exhibiting dramatic expansions back into their historical ranges.

SUBTROPICAL FORESTS

Subtropical forests occur in the U.S. only in the southern border states, with roughly 2.7 million acres primarily in south Texas and the southern tip of Florida. About 40% of U.S. subtropical forest is protected on public land, mostly in Florida, with more than 200,000 acres of hardwood hammocks in Everglades National Park and Big Cypress National Preserve. Important public lands in south Texas include the South Texas Refuge Complex (120,000 acres) and the Bentsen-Rio Grande Valley, Resaca de la Palma, and Falcon state parks along the lower Rio Grande Valley.



AUDUBON'S ORIOLE BY GERRIT VYN

Subtropical Forest Birds on Public Lands

Public lands support only 8% of the geographic distribution of the 17 bird species restricted to subtropical forests in the United States. Gray Hawk and Short-tailed Hawk have the largest percentage of their small U.S. distributions on public lands. Species with very small ranges in the lower Rio Grande Valley, including Red-billed Pigeon and Altamira Oriole, have only 2–3% of their distributions on public lands, primarily on National Wildlife Refuges and state parks.

Unlike most other forest types, nearly half of the public lands supporting subtropical forests are managed to maintain natural habitats, providing greater protection for bird populations. Because most subtropical forest birds have large portions of their distributions within Mexico and the Caribbean, international cooperation is essential for their long-term conservation.

Conservation Successes

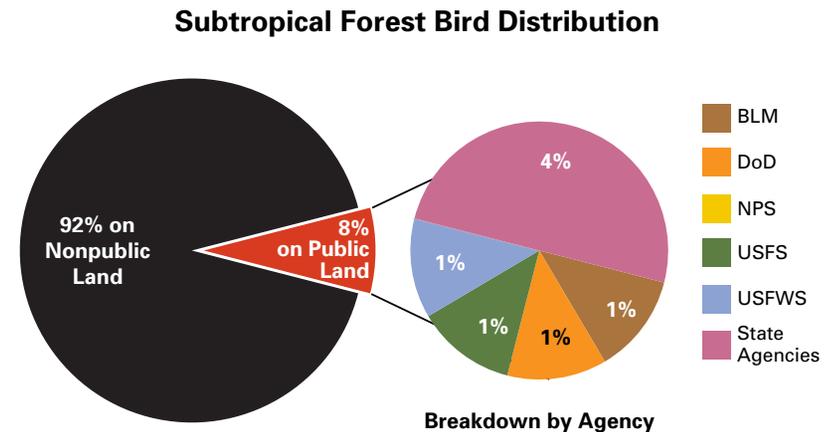
The Rio Grande Joint Venture is working on the South Texas Refuge Complex implementation plan, including expanding the National Wildlife Refuges to their full acquisition potential and conserving forest corridors within Mexico, connecting the lower Rio Grande Valley with coastal thorn forests near the Laguna Madre inland to the Sierra Picachos.

In South Florida, large-scale efforts by the NPS, USFWS, and other federal and state partners to eradicate invasive trees such as melaleuca, Australian pine, and Brazilian pepper on public lands are essential for improving the populations of both breeding and wintering-migrant birds.

Conservation Challenges

Maintaining the distinctive birdlife in subtropical forests requires increased acquisition of public land, as well as public-private partnerships to protect and restore forests in south Texas, including the lower Rio Grande Valley. The greatest threats are rapidly expanding urbanization and continued clearing for agriculture in the U.S. and adjacent areas of Mexico. Increased support for cross-border initiatives that include the Mexican government and other Mexican partners is essential for meeting these regional challenges.

In south Florida, a rapidly expanding urban interface, continued spread of invasive plant and animal species, and proliferation of feral cat colonies in public parks present significant management challenges. Hardwood hammocks within the Everglades ecosystem are sensitive to fluctuating water levels and especially to long-term drought conditions. Restoration of natural hydrology in this system will benefit forest and wetland birds.



Percentage of the U.S. distribution of 17 subtropical forest-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).

BOREAL FORESTS

Alaska has the largest area of boreal forests in the nation: roughly 138 million acres or one-third of the entire state. Nearly 88% of Alaska's boreal forest is publicly owned, with management divided among state lands (35%), BLM lands (24%), National Wildlife Refuges (20%), and NPS lands (9%). Much of this boreal forest region of Alaska includes a mosaic of important wetland habitats.

Roughly half of the 9.5 million acres of boreal forest in the lower 48 states is publicly owned, with more than 2 million acres each of state forestlands and National Forests. These acreages pale in comparison with the 800 million acres of boreal forests in Canada, however, so the future of boreal birds depends on international cooperation.

Boreal Forest Birds on Public Lands

Public lands support 69% of the U.S. breeding distributions of 38 obligate boreal forest species. For 16 species that breed primarily in Alaska, including wetland birds such as Trumpeter Swan and Short-billed Dowitcher, more than 90% of the breeding distribution is on public lands. In the contiguous 48 states, 18 obligate species have 34% of their U.S. distribution on public lands.

More than half the U.S. breeding distribution of Black-backed Woodpecker, Blackpoll Warbler, and Gray-cheeked Thrush is on state-owned land. NPS lands support more than one-third of the distribution of Common Loon, Common Goldeneye, Lesser Yellowlegs, and Great Gray Owl. More than 25% of the distribution of Spruce Grouse, Hudsonian Godwit, and Least Sandpiper is on several vast National Wildlife Refuges in Alaska. BLM lands in Alaska support more than 20% of the distribution of 10 boreal forest species, including Boreal Chickadee, Trumpeter Swan, and the rapidly declining Rusty Blackbird.

Conservation Successes

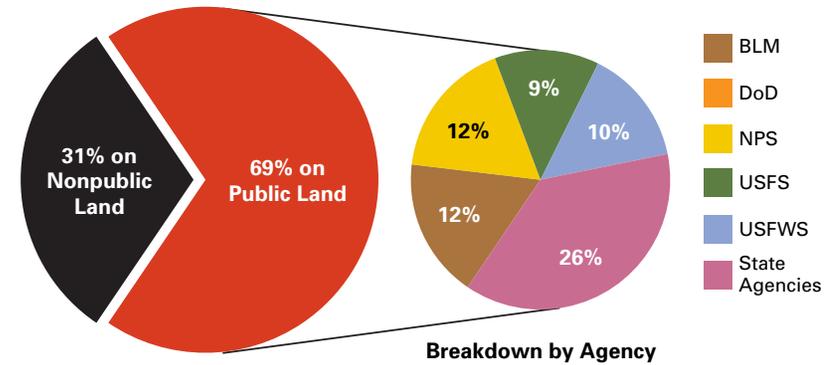
New York's Adirondack Park is one of the largest protected areas in the contiguous 48 states, including 2.6 million acres of state-owned high-elevation and boreal forests that support more than 25% of the U.S. population of Bicknell's Thrush, a species of conservation concern.

In Alaska, the USFWS protects more than 26 million acres of boreal forest in several National Wildlife Refuges. With areas large enough to allow natural disturbance such as fire and flooding, these refuges support large populations of breeding waterfowl such as White-winged Scoters, Hudsonian Godwits and other shorebirds, as well as Spruce Grouse and many other boreal birds.

Conservation Challenges

Spruce bark beetle infestations have affected 3 million acres of forests in Alaska since 1989. Unusually mild winters and summers, consistent with global climate change, have exacerbated the proliferation of beetles. Climate change also has contributed to more frequent and larger fires in the Alaska boreal forest and a steady shrinking of acreage in the United States. Exploration and extraction of oil and natural gas can cause permanent loss and fragmentation of slow-growing boreal forests. Unlike in Canada, however, large-scale industrial forestry is not a major threat to bird populations in the United States.

Boreal Forest Bird Distribution



Percentage of the U.S. distribution of 38 boreal forest-breeding bird species on public vs. nonpublic lands (left). Breakdown of bird distribution on public lands shown for each public agency (right).



GRAY JAY BY GERRIT VYN

ISLANDS

Island Birds Depend on Essential— But Sometimes Rare—Public Lands

Noteworthy

- Among declining Hawaiian forest birds on Kauaʻi, such as Puaiohi and ʻAnianiau, an average of 78% of their distribution is on state land. Four endangered species in the Northwest Hawaiian Islands occur entirely on federal lands.
- Eighty-five percent of state land in Hawaiʻi is open to uses incompatible with bird conservation, undermining efforts to manage, protect, and restore critically important habitat for endangered birds.
- Continued conservation efforts are needed by DoD in cooperation with USFWS and NOAA's National Marine Fisheries Service in Guam and the Commonwealth of the Northern Mariana Islands, especially in light of planned expansion of military bases.
- In Puerto Rico, the endangered Puerto Rican Parrot and Elfin-woods Warbler are highly dependent on the small amount of public land. The future of birds on public lands depends on cooperative projects with adjacent private landowners and the expansion of public protected areas.



ŪʻŪʻŪ BY MICHAEL WALTHER

Birds on Public Lands in Hawaiʻi

One-third of all birds listed under the Endangered Species Act (ESA) are native to Hawaiʻi. Ten of these may already be extinct. Public lands in Hawaiʻi are vitally important, with more than 50% of land area under state or federal management. Averaged across Hawaiʻi, public land supports about 73% of the distribution of upland/forest birds. State lands support 45% of the average proportion of species' ranges, mostly managed by the Department of Lands and Natural Resources. State lands are particularly important for declining forest birds on Kauaʻi, with 78% of the distributions of species such as Puaiohi and ʻAnianiau.

In the Northwest Hawaiian Islands, 100% of all endangered Laysan Ducks, Laysan and Nihoa finches, and Millerbirds are under federal management. Nearly 50% of high priority wetlands for endangered waterbirds is federally managed in National Wildlife Refuges (NWRs). Recent restoration at Hanalei and Huleia NWRs on Kauaʻi is having a dramatic, positive impact on populations of endangered Hawaiian Duck (Koloa), Hawaiian Coot (ʻAlae keʻokeʻo), the Hawaiian subspecies of Black-necked Stilt (Aeʻo) and Common Moorhen (ʻAlae ʻula), and Nēnē (Hawaiian Goose).

Invasive nonnative species are pervasive problems. Intensive management is necessary, especially fencing and removing grazing mammals such as pigs, goats, and mouflon/sheep, and controlling predators such as cats, rats, and mongooses. Haleakalā and Hawaiʻi Volcanoes national parks have been fenced and nonnative grazing mammals almost completely excluded, benefiting forest recovery.

HANAWI NATURAL AREA RESERVE IN HAWAII BY ASHLEY DAYER



The U.S. Army conducts predator control on 250 acres of Oʻahu ʻElepaio habitat and the state conducts predator control in Palila habitat in Mauna Kea Forest Reserve. However, 85% of state land is open to uses known to be incompatible with bird conservation. The needs of protecting birds listed under the ESA often come second to management for hunting. Proposals to fence land for ungulate removal often cause agency-public conflict over reduced hunting opportunities. Better outreach is needed to build public understanding and support for fencing lands important to endangered birds and for eradicating nonnative grazing mammals in fenced areas.

Guam, Commonwealth of the Northern Mariana Islands (CNMI), and American Samoa

Invasive, nonnative species and military expansion are two of the greatest threats to the nine endangered bird species and six other species of conservation concern. Nearly 50% of land in Guam and 80% in CNMI is under public management. The average percentage of bird species' distributions on territorial and federal lands is 58% on Guam and 18% on CNMI. Public land is very important on Rota, CNMI, where 81% of the range of an experimental Guam Rail population and 69% of the distribution of the endangered Mariana Crow are on territorial land. On Guam, the rail has been extirpated and only two male crows remain, so Rota populations are essential for the species' survival. DoD is the leading fed-

Public lands provide the best opportunities to protect birds through removal of exotic invasive plants and animals on islands.

eral land manager in Guam and CNMI, managing 20% of the land area, including about two-thirds of Tinian, CNMI, where the Tinian Monarch, delisted in 2004, may face new threats from military expansion. The nonnative brown tree snake has extirpated all native forest birds on Guam, and is a major threat to remaining species if it spreads to CNMI. The DoD-funded Micronesia Biosecurity Plan is important to identify threats from brown tree snakes and other invasive species and to prevent their accidental exportation to other islands. It will require concerted efforts from DoD and partner agencies and organizations to implement appropriate prevention, early detection, and rapid responses. DoD is also trapping brown tree snakes at cave sites of the endangered Guam Swiftlet.

In American Samoa, 73% of the land is territorial and the NPS is the most significant federal land manager, with 27% under lease as the National Park of American Samoa. The NPS controls invasive species and monitors bird populations there. An average of 86% of bird distributions is on territorial land. The Fiji Shrikebill and the Blue-crowned Lorikeet have more than 27% of their distribution on NPS-managed land.



In Guam, CNMI, and American Samoa, an ongoing challenge is increasing the amount of land managed for birds in cultures that generally have a utilitarian view of wildlife. In light of planned military base expansion in Guam and CNMI, continued collaboration and cooperation by DoD with USFWS and the National Marine Fisheries Service is needed to enhance conservation.

RUFIOUS FANTAIL BY JACK JEFFREY

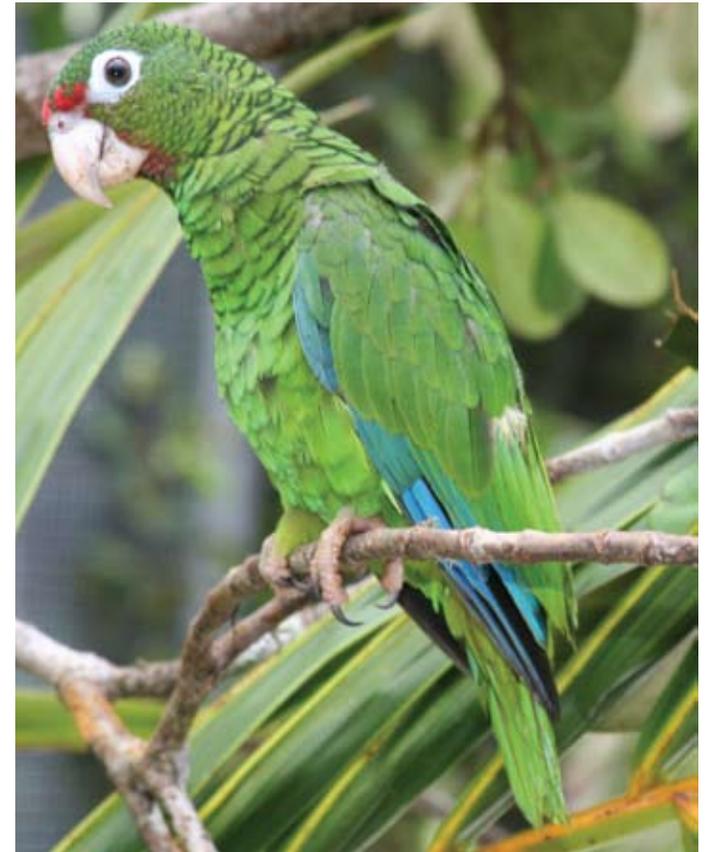
Puerto Rico and the U.S. Virgin Islands

With 16 endemic species and six listed under the ESA, these islands give the U.S. a significant stake in the conservation of West Indian biodiversity. Only 8% of the Commonwealth of Puerto Rico and 11% in the U.S. Virgin Islands (USVI) are under public management. Seventeen percent of the distribution of forest birds such as the endangered Puerto Rican Sharp-shinned Hawk and endemic Puerto Rican Tody is protected on commonwealth or federal land. The El Yunque National Forest and commonwealth forests include 97% of the ranges of the Puerto Rican Parrot and 51% of the Elfin-woods Warbler. The average distribution of 25 other forest species on public land is just 9%. Among waterbirds such as West Indian Whistling-Duck and White-cheeked Pintail, the percentage is much higher, with 44% in coastal commonwealth refuges and NWRs offering significant protection.

In Puerto Rico, the commonwealth manages 58% of public land. The USFS is the largest federal landholder, managing 28,242 acres in the El Yunque National Forest. The NPS manages 72% of public land in the USVI as Virgin Islands National Park, important for many bird species. In Puerto Rico and the USVI, the vast majority of land is private and open to development. Wind farm and cell tower construction clear forests important for species such as Puerto Rican Nightjar and Elfin-woods Warbler. Species with ranges largely on private land are especially vulnerable, such as the endangered Plain Pigeon. Their future depends on cooperative projects with private landowners and increases in public protected areas.

Conservation Successes

- Hanawi Natural Area Reserve and Hakalau Forest National Wildlife Refuge are two of the very few sites in Hawai'i where native forest birds are stable or increasing. Endangered species such as Maui Parrotbill (Kiwikiu), Crested Honeycreeper (Ākohekohe), Ākepa, and Hawai'i Creeper benefit from intensive ungulate control and reforestation.



PUERTO RICAN PARROT BY TOM MACKENZIE, USFWS

- On Saipan, CNMI, an upland mitigation bank was established on territorial land to offset impacts of development on the endangered Nightingale Reed-Warbler.
- In Puerto Rico, the persistence of the Puerto Rican Parrot is due almost entirely to provision of nest boxes, control of predators and competitors, and captive breeding and reintroduction in El Yunque National Forest and adjacent forests.
- Shiny Cowbirds in Puerto Rico often lay their eggs in the nests of Yellow-shouldered Blackbirds, an endangered species. Intensive control of cowbirds on Cabo Rojo and Laguna Cartagena NWRs is improving reproductive success of the blackbirds and other species.

COASTS

Public Areas Support Key Nesting, Feeding, and Stopover Habitats

Noteworthy

- Coastal habitats are essential to shorebirds as they migrate between wintering and breeding grounds. Most important stopover sites are publicly owned.
- The entire global populations of Saltmarsh and Seaside sparrows are dependent on healthy U.S. coastal salt marshes that need public management.
- Federal and state lands include 53% of sites along the Atlantic Coast that support wintering and migrant Red Knots, a rapidly declining species.
- All coastal inshore waters are publicly owned. They are important foraging and resting areas for wintering birds such as Black Scoters, Common Eiders, Northern Gannets, and Red-throated Loons.



GULF COAST SALT MARSH BY GERRIT VYN



SNOWY PLOVER BY GERRIT VYN

Coastal Birds on Public Lands and Waters

Although coastal areas occupy less than 10% of our nation's land area, 173 bird species rely on these key habitats, including beaches, intertidal mudflats, estuaries, salt marshes, mangroves, and coastal inshore waters. Half of all coastally migrating shorebirds have declined, indicating stress in coastal habitats. Publicly owned coastal areas are managed primarily by the states, BLM, USFWS, NPS, and DoD. Examples of federally managed coastal areas include National Wildlife Refuges, National Seashores, and National Monuments.

Open beach and intertidal mudflats are critical for migrating and wintering shorebirds such as Red Knot, Sanderling, and Western Sandpiper. Of 34 sites that support more than 100,000 shorebirds during spring or fall migration, 25 (74%) are coastal. Ownership of important shorebird stopover sites ranges from virtually 100% public (e.g., Copper River Delta, Alaska; Cape Romain National Wildlife Refuge, South Carolina) to a mix involving federal, state, and private conservation organizations, and private citizens (e.g., Delaware Bay; Laguna Madre, Texas).

Beaches are important for nesting birds such as Gull-billed Tern and endangered Piping Plover, Snowy Plover, and Least Tern.

Salt marsh habitat is crucial to species such as the Saltmarsh Sparrow, Black Rail, Seaside Sparrow, and endangered populations of Clapper Rail. Activities that affect estuarine wetlands and salt marsh are regulated by federal and state agencies.

Rocky shorelines are especially important for breeding Black Oystercatcher and wintering Surf-bird and Rock Sandpiper. Major threats include

coastal development and increased human disturbance and shoreline contamination from oil spills.

Most of the small amount of U.S. mangrove habitat is in Florida, more than 80% of which is publicly owned. Mangroves provide important breeding habitat for White-crowned Pigeon, Black-whiskered Vireo, and other tropical species such as the Mangrove Cuckoo. Sensitive to habitat fragmentation, Mangrove Cuckoos depend on public lands that provide sanctuary for part of the population in large tracts of mangrove forests, including Everglades National Park, Biscayne National Park, Key Largo Hammocks State Botanical Preserve, and the National Wildlife Refuges of the Florida Keys.

Coastal inshore waters are important foraging and resting areas for wintering waterbirds such as Black Scoter, Common Eider, Northern Gannet, and Red-throated Loon. All coastal waters are publicly owned. More than 140 federal laws and more than 20 entities are associated with coastal waters and ocean management within the federal government.



CLAPPER RAIL BY GERRIT VYN

Public management is critical on coastal lands and waters providing essential habitat for 173 bird species.

States have management responsibility for most activities within three nautical miles from the coastline (except in the Gulf of Mexico, where the jurisdictions of Florida, Louisiana, and Texas extend seaward nine nautical miles).

Some coastal areas are designated as marine protected areas (MPAs), which include land and water, and can thus provide additional protection for coastal resources within the MPA boundary. (See page 25 for more on MPAs.)

Conservation Successes

Intensive management of important coastal habitat has proven beneficial to several species. The breeding success of birds such as the Least Tern and Piping Plover increased in response to management focusing on nest protection.

About three-quarters of threatened U.S. Atlantic Coast Piping Plovers nest on publicly managed beaches. Labor-intensive management by a network of cooperators minimizes threats from habitat loss, beach recreation, and predation.

With improved nesting success and habitat protection, the U.S. Atlantic population of Piping Plovers has more than doubled in the last 20 years. Examples on federal lands include growth from 15 to 85 pairs at the Cape Cod National Seashore and from 5 to 32 pairs at Monomoy National Wildlife Refuge in Massachusetts and from 19 to 45 pairs at the Sandy Hook Unit of the Gateway National Recreation Area in New Jersey.

Black Brant and other sea ducks have benefited from the establishment of state-managed Padilla

The Deepwater Horizon oil spill of 2010 reminds us of the fragility of coastal ecosystems, and that even protection of nesting colonies on state and federal lands may not necessarily safeguard birds, such as this Brown Pelican, from the effects of large-scale environmental catastrophes.

Bay National Estuarine Research Reserve in Washington. This MPA protects formerly privately owned tidelands from development and has one of the nation's largest contiguous eelgrass beds. The 11,000-acre reserve provides a significant wintering and migratory stopover area for waterfowl.

Conservation Challenges

Major threats to coastal birds include habitat loss and degradation, human disturbance, and predators. Public recreation, development interests, and wildlife compete for beaches. Public ownership of beaches varies among states. In most states, all land below the mean high tide line belongs to the state, and citizens have the right to unrestricted access. Primary threats to birds on beaches include human-caused disturbance, increased predators, sea-level rise, and habitat loss. Many states allow off-road vehicles (ORVs) or unrestricted public access with pets such as dogs and cats. ORVs can be highly disturbing to nesting or feeding shorebirds.



OILED BROWN PELICAN BY GERRIT VYN



DUNLIN BY GERRIT VYN

Shorebird numbers and foraging time have been observed to decrease on beaches with heavy ORV use. Although the majority of beaches and intertidal zones are publicly owned, management of these sites is essential to bird conservation.

Threats to salt marshes include loss and degradation of habitat through coastal development or filling, draining, diking, and pollution, all of which affect the declining Saltmarsh Sparrow. The primary threat to mangrove habitat in Florida is clear-cutting for crops such as sugarcane, affecting White-crowned Pigeons, which have a restricted range and steeply declining populations.

Although our coastal waters and oceans are public, private entities can acquire proprietary rights for oil, natural gas, sand, gravel, salt, and utility transmission lines. The Bureau of Ocean Energy Management, Regulation and Enforcement has active oil and gas leases that cover millions of acres of oceanic waters; states regulate these activities in nearshore coastal waters. In addition, new leasing programs are currently being considered for renewable energy. All of these activities provide additional threats for coastal and ocean birds from oil spills and collisions with alternative energy facilities or offshore oil platforms.

Climate change and sea level rise are expected to have a major impact on all coastal habitats, primarily through habitat loss (e.g., flooding of salt marshes, intertidal areas, and rocky shorelines, and increased coastal erosion).

OCEANS

Birds Depend on Healthy Oceans and Protected Islands

Noteworthy

- Publicly owned islands support more than half of the entire global nesting population of 16 ocean bird species.
- Major threats to breeding colonies include introduced predators and invasive plants.
- Major threats to foraging birds include interactions with oil, other pollution, competition with fisheries, and bycatch (the unintended take of birds and other wildlife).
- The overall protection of the oceanic resources within designated Marine Protected Areas is vital to improving foraging habitat for ocean birds.



LAYSAN ALBATROSS BY BRIAN SULLIVAN



ASHY STORM-PETRELS BY BRIAN SULLIVAN

Ocean Birds on Public Lands

Nearly half of the ocean bird species in the U.S. are of conservation concern. Most ocean birds breed on remote islands, a majority of which are publicly managed, primarily by the USFWS.

These islands support more than half of the entire global population of 16 of the 48 ocean bird species that nest in the United States. Publicly owned lands are especially important to the endangered Hawaiian Petrel, with more than 90% of its breeding population on these lands.

Colonial nesting birds, such as the Black-footed Albatross, Red-legged Kittiwake, Pelagic Cormorant, and Ashy Storm-Petrel depend heavily on oceanic food resources. Thus, conservation and management that preserve oceanic ecosystems are critical for conservation.

NOAA is the primary federal agency that manages our oceans in partnership with states and other federal agencies. Federal agencies and states also manage activities conducted in oceans within designated Marine Protected Areas (MPAs).

Conservation Successes

Invasive species are a major threat to island-nesting ocean birds. Active management, particularly complete eradication of invasive species, can yield stunning results. For example, the nesting success of Xantus's Murrelet increased by 81% on Anacapa Island in Channel Islands National Park (California) after rats were eradicated. The Alaska



ATLANTIC PUFFINS BY DERRICK Z. JACKSON/BOSTON GLOBE FROM WWW.PROJECTPUFFIN.ORG

Maritime National Wildlife Refuge removed introduced foxes from many of its islands, resulting in increases of more than 200,000 breeding seabirds of at least 15 species.

In Haleakalā National Park, an endangered Hawaiian Petrel colony had only 400 known nests in the 1980s. Intensive management and predator control beginning in the 1980s have led to an increase to more than 1,500 known nests.

At Maine's Seal Island National Wildlife Refuge, Atlantic Puffins were restored using translocations and puffin decoys to attract nesting birds to the protected island. Now the 500 pairs of puffins in this remote island refuge are the largest colony of this threatened species in Maine. At nearby Matinicus Rock, an Audubon project used decoys and sound recordings to attract the first nesting Common Murres in the Northeast since 1883.

Public agencies can dramatically improve conditions for ocean birds by managing threats such as invasive species, competition with fisheries, human disturbance, and contaminants.

Conservation Challenges

Few islands are unaffected by invasive animals and plants, which are responsible for the loss of millions of nesting ocean birds every year. Feral ungulates destroy habitat and trample nests; introduced mammals such as rats, foxes, pigs, goats, and feral cats are especially destructive because they can kill large numbers of long-lived breeding ocean birds in short periods of time.

Invasive plants can be just as lethal. Management can be difficult and expensive because most breeding bird colonies are remote, with some management agencies unable to conduct site visits more

than every few years. Invasive species eradication projects tend to be expensive, often requiring partnerships to fund implementation, presenting an opportunity and challenge for private parties and public agencies to realize conservation victories together.

Competition for oceanic resources with commercial and recreational fisheries, bycatch, and pollution are threats to ocean birds globally. MPAs in the U.S. may allow some protections of these resources through restrictions on commercial or recreational fisheries and human access, but these protections vary widely.



PETE LEARY

During the winter of 2011, strong storms and the recent tsunami killed up to tens of thousands of Laysan Albatross chicks on Midway Atoll, demonstrating how natural disasters may impact seabirds nesting on low islands.

Marine Protected Areas

MPAs are defined areas where natural and/or cultural resources receive greater protection than surrounding waters, but the level of protection varies greatly. More than 1,600 MPAs have been designated in the U.S., spanning a range of habitats including open ocean, coastal areas, intertidal zones, estuaries, and the Great Lakes. MPAs include diverse ecosystems and resources and are managed by federal, state, and county agencies. About 40% of U.S. waters are in MPAs, of which most are multiple-use and only 1% do not allow any take of natural resources.

The overall protection of oceanic resources within MPAs is expected to result in increased stocks of forage fish for ocean birds. For example, five years after the establishment of the Channel Islands marine reserve network in California, there were measureable increases in the species targeted by fisheries inside reserves. These fish species include important prey for ocean birds that use the waters around the Channel Islands or that breed locally.

An evaluation of the presence or absence of foraging ocean bird hotspots within MPAs in the California Current region (from the Straits of Juan de Fuca in Washington to the California/Mexico border except for the Puget Sound region) found that 193 MPAs (73%) included ocean bird hotspots. The majority of MPAs that contain these hotspots have some level of fishing restrictions, with 70 prohibiting commercial fishing and 49 prohibiting recreational fishing. Protection of ocean resources through MPAs may not be adequate for assuring benefit to ocean bird species. For example, species that are wide-ranging, such as highly pelagic foragers, rely on prey whose distributions may shift unpredictably in response to changes associated with climate change.

RESIDENT GAME BIRDS



HAVEN BARNHILL

Noteworthy

- There are 19 native resident game bird species in the U.S., including grouse, ptarmigan, turkey, and quail. State wildlife resource agencies set regulations for these species, which are not protected under the Migratory Bird Treaty Act.
- Half of the resident game bird species in the U.S. have more than 50% of their U.S. distribution on public lands. All of these species are found in the West or in Alaska.
- Access to public lands provides hunting opportunities for millions of people each year.
- Public lands support 79% of the distribution of Gunnison Sage-Grouse, a species of high conservation concern, and 81% of the U.S. distribution of White-tailed Ptarmigan.
- Public lands play an important role for western quail and grouse, with USFS and BLM responsible for the majority of lands occupied by these species. National Forests support more than 50% of the U.S. distributions of Dusky Grouse, Sooty Grouse, and Mountain Quail.

Conservation Successes

- Although some early declines of resident game bird species were attributed to overhunting, hunting regulations have removed this threat. State wildlife agencies now set hunting regulations (e.g., bag limits, season length) for resident game birds each year based on factors such as population trends, age and sex ratios, reproductive success, and density.
- Wild Turkeys were restored from a low of 30,000 in the 1920s to more than 7 million today, largely because of efforts on public lands. Beginning in the 1950s, public land management agencies trapped birds on public lands and transported them to public and private release sites across the nation. By 2004, after reintroduction efforts, regulated hunting, and habitat management, Wild Turkeys inhabited more than 99% of suitable habitat.

Conservation Challenges

- Although the Association of Fish and Wildlife Agencies has endorsed range-wide conservation plans for the majority of resident game bird species (e.g., Northern Bobwhite, prairie grouse, Ruffed Grouse, western quail, Wild Turkey), funding and capacity are limited to implement priority objectives at scales that are relevant on public lands.
- Public land managers must work with adjacent private entities to surmount the challenges of managing bird populations. For example, to restore Ruffed Grouse to 1980s levels, 31 million acres of young forest must be added to the current landscape; arguably all of these acres cannot be maintained by a single public landowner.



GREATER PRAIRIE-CHICKENS BY GERRIT VYN

- Prairie grouse and both species of sage-grouse have elaborate and spectacular social and breeding systems. They require large blocks of habitat for display and nesting grounds, as well as habitat to support their widely dispersed populations throughout the annual cycle. Without effective and targeted management on large public lands within the range of these species, we are in danger of losing this spectacular element of our nation's birdlife.

IMPROVING BIRD CONSERVATION ON PUBLIC LANDS AND WATERS

A defining pillar of our American heritage is the extensive network of public land that helps fulfill our nation's passion for outdoor recreation, our economic need for energy and other natural resources, and our daily reliance on healthy ecosystems. This State of the Birds report demonstrates the overwhelming importance of public lands and waters for sustaining the diversity of our nation's birdlife.

Simply having public land, however, is not enough. Improved management and increased protections for birds and other wildlife are more important than ever before, as demands for resources and recreation escalate. Balancing those demands can be a challenge. The many government agencies entrusted with management of

these treasures must often strike a delicate balance between use and sustainability of our public lands and waters.

Stewardship Across Agencies

Thirty-six percent of the U.S. landscape is managed by more than one hundred state agencies and primarily eight federal agencies. These agencies have different missions that ultimately affect birds and their habitats. Although public lands have varying degrees of safeguards against loss of biodiversity, multiple-use management based on agency missions and objectives has the potential to conflict with long-term bird and habitat conservation. These conflicts present challenges to

maintaining viable populations of birds on public lands and waters.

This report highlights the shared stewardship responsibility across multiple agencies for birds in every major U.S. habitat. Increased coordination and cooperation among agencies will be necessary to implement conservation policies and actions at broad scales to reverse species declines and to minimize management conflicts on adjacent lands.

The U.S. North American Bird Conservation Initiative (NABCI) is a forum of government agencies, private organizations, and bird initiatives helping federal, state, and nongovernmental organizations across the continent to meet their common bird conservation objectives. NABCI fosters collaboration on key issues of concern, including bird monitoring, conservation design, private lands, international objectives, and state and federal agency support for integrated bird conservation.

Bird conservation plans by federal agencies and partners establish blueprints for sustaining bird populations, including the North American Waterbird Conservation Plan, North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and Partners in Flight North American Landbird Conservation Plan, as well as plans for individual bird species. Many of the plans have been incorporated into Joint Venture Implementation Plans and State Wildlife Action Plans.



Public lands and waters are essential to sustain our nation's birdlife.

But this alone is not enough. Success depends on improved wildlife and habitat management, increased protections, and coordination among agencies.

Nongovernmental organizations (NGOs) also can play a key role in conserving birds on land managed by different agencies. For example, almost 1,400 publicly owned properties, including National Wildlife Refuges, National Parks and Forests, military installations, and state lands, have been identified as Important Bird Areas (IBAs). IBAs are non-regulatory designations and are an effective way to educate the public about areas that are vital to threatened or large concentrations of birds.

Another important tool for improved management of birds and habitats across agency boundaries is Executive Order 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*), signed in 2001, which directs federal agencies that have or are likely to have measurable negative effects on migratory bird populations to develop and implement a Memorandum of Understanding (MOU) with the USFWS regarding bird conservation on their lands. Although federal agencies may have differing missions, these MOUs help strengthen bird conservation efforts among agencies.



GERRIT VYN

Increasing human populations put pressures on public lands near urban areas, especially in coastal zones.

Major Challenges on Public Lands

Although each agency faces unique challenges on the lands it manages, several major issues affecting birds present huge challenges across all public lands and agencies. Prominent among these is the increasing demand for natural resources, especially energy, from public lands and offshore waters.

Bird- and wildlife-friendly guidelines and safeguards for wind and solar energy, natural gas drilling, and other energy development are urgently needed to minimize large-scale degradation and fragmentation of habitats and to prevent direct mortality from structures, including transmission lines.

Other large-scale challenges that must be addressed by multiple agencies include the proliferation of invasive species, including predators, pests, and diseases that threaten entire ecosystems, the need to restore natural fire regimes across complex landscapes, and a burgeoning human population that puts increasing pressure on the expanding urban interface.

Meeting these challenges will require a coordinated approach, as well as greatly increased resources for effective land management. In addition, all agencies must address long-term effects of climate change, including implementation of adaptation strategies and creation of corridors to connect public lands that serve as refuge for vulnerable species. The vulnerability of birds to climate change was detailed in the 2010 State of the Birds report.

Meeting Information Needs

Without strong science and associated decision-making protocols, these difficult issues will jeopardize the health of bird populations. Bird inven-



COURTESY OF USFWS

For more than 50 years, USFWS pilot-biologists have surveyed North America's waterfowl breeding grounds. Those studies, completed in cooperation with the Canadian Wildlife Service, represent the largest and most reliable wildlife survey in the world.

tories, surveys, and monitoring programs provide baseline information essential for assessments of status and trends of bird populations. Understanding how birds are faring on public lands, and their responses to human activities, can help us be better stewards of public lands and waters.

Many agencies conduct research and implement monitoring programs that are vital to their missions of managing public lands. For example, the National Park System, National Wildlife Refuge System, and USFS have inventory and monitoring programs that inform land and wildlife management decisions.

Without a multi-agency integrated approach, however, agency-specific research and monitoring provide limited information on broad patterns and trends. Conservation of highly mobile and widely dispersed bird populations requires a cross-agency, landscape-based conservation approach. Land-

Publicly owned forests, rivers, oceans, national parks, monuments, and wilderness areas depend on the support and action of all Americans to protect this natural heritage for future generations.



ROY TOFT

Tropical rainforest on the Osa Peninsula, Costa Rica, site of an Association of Fish and Wildlife Agencies' Southern Wings Program to conserve migratory birds on their wintering grounds.

scape Conservation Cooperatives represent a new inter-agency initiative that provides coordinated science support for agencies to address climate change and other large-scale challenges.

In addition, bird monitoring programs can be improved through closer alignment with management and decision-making, expanded programs for hard-to-monitor species such as marsh birds and seabirds, and making all monitoring data available through web-accessible data-management systems. NGOs and citizen-science participants play a key role in extensive monitoring programs such as the Breeding Bird Survey, Christmas Bird Count, and eBird, which are essential for State of the Birds analyses and other conservation assessments.

Thinking Beyond Borders

All public lands exist in a larger landscape, and birds do not recognize our administrative and political boundaries. Conservation of birds on our public lands will not succeed without equivalent

efforts to improve habitats on surrounding private lands. Numerous government programs, such as the North American Wetlands Conservation Act and provisions under the U.S. Farm Bill offer incentives and support for private landowners to conserve birds and other wildlife. These important efforts will be the focus of the 2012 State of the Birds report.

More than half of U.S. birds spend a large part of the year outside of the U.S. We spend millions of dollars on their conservation in the U.S., yet unless we work to stop the decline of habitats beyond our borders, we are jeopardizing our investments to protect migratory birds at home. International conservation efforts rely on partnerships and local programs that can implement bird conservation on the ground. Continued support for international programs that foster these partnerships is essential. These include the USFS International Programs, USFWS International Affairs Program, and the Association of Fish and Wildlife Agencies' Southern Wings Program that facilitates state agencies' bird conservation work internationally.

Citizen Support and Involvement

The American people ultimately have a tremendous impact on the state of our nation's public lands. For example, each year, revenue from migratory bird hunting and conservation stamps ("Duck Stamps") are used to acquire essential waterfowl habitat as units of the National Wildlife Refuge System or Waterfowl Production Areas. Organizations and people can play a vital role in gathering data, advocating for actions, and supporting policies that protect birds and their habitats.

Five ways to influence conservation on public lands:

- Provide public input on proposed management plans. Advocate for the conservation of birds and other wildlife on public lands and waters.
- Support initiatives and policies that help manage public lands and waters for the benefit of birds and their habitats.
- Participate in citizen-science programs, such as eBird, that help inventory birds on public lands.
- Support organizations that play a role in conservation efforts on public lands.
- All bird enthusiasts can purchase a "Duck Stamp" to support protection of habitats for birds.



Bureau of Land Management (BLM)



Mission: To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM Lands at a Glance

- The BLM, an agency of the U.S. Department of the Interior, manages more land than any other federal agency—more than 245 million surface acres, primarily in the West.
- The BLM administers lands essential to a wide variety of birds in habitats including aridlands, grasslands, western wetland/riparian areas, western forests, boreal forests, and arctic tundra.
- In Alaska, the BLM manages 75 million surface acres, including the 23-million acre National Petroleum Reserve on Alaska's north slope and numerous wild and scenic river corridors.



SAGEBRUSH HABITAT ON BLM LAND, WYOMING, BY GERRIT VYN

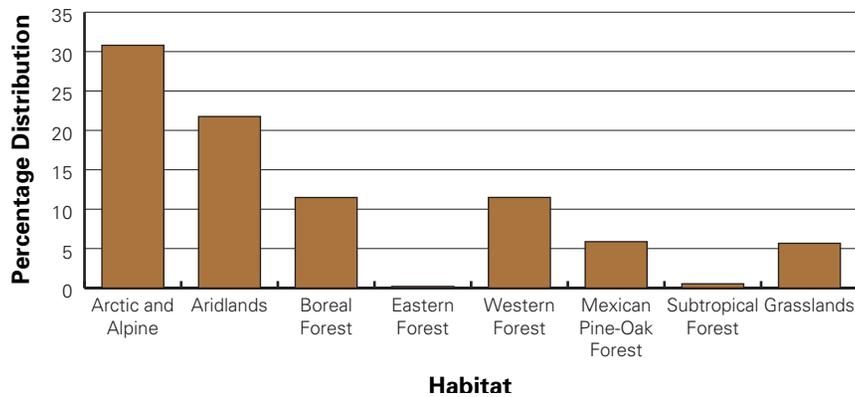
Stewardship of Birds

- Of all public agencies, the BLM has the highest responsibility for **Gunnison Sage-Grouse**, a species of high conservation concern. BLM-administered lands also support more than 30 percent of the U.S. breeding distribution for nine aridland-breeding species, including **Greater Sage-Grouse**, **Le Conte's** and **Sage thrashers**, and **Sage** and **Brewer's sparrows**.
- Vast BLM lands in Alaska include more arctic tundra than any other managing agency, supporting more than half of the U.S. distributions of **Steller's** and **Spectacled eiders**, **Snow Goose**, **White-rumped Sandpiper**, and **Bluethroat**.
- The BLM manages grasslands supporting the greatest percentage of the breeding distribution of several species, including **Ferruginous Hawk**, **Long-billed Curlew**, **Marbled Godwit**, **McCown's Longspur**, **Mountain Plover**, **Swainson's Hawk**, **Vesper Sparrow**, and **Western Meadowlark**. The BLM also has the highest percentage of the distribution of wintering species including **Cassin's Sparrow**, **Ferruginous Hawk**, **McCown's Longspur**, **Mountain Plover**, and **Rough-legged Hawk**.
- BLM lands provide critical breeding and wintering habitat for waterfowl, especially western breeding species such as **Redhead**, **Gadwall**, and **Cinnamon Teal**, as well as boreal forest wetland species such as **Trumpeter Swan**, **Bufflehead**, and **White-winged Scoter**.
- BLM lands provide habitat for many wetland species, especially birds that breed in the arid West, including **Clark's** and **Eared grebe**, **American Avocet**, and **White-faced Ibis**. Playa lakes, such as the Pariette wetlands in Utah and the Blanca Wetlands in Colorado, support thousands of migratory shorebirds and waterfowl.



TOP TO BOTTOM: SAGE THRASHER, BLUETHROAT, LONG-BILLED CURLEW, CINNAMON TEAL, CLARK'S GREBE BY BRIAN SULLIVAN

Distribution of Birds on BLM Lands



Percentage distribution of breeding bird species dependent on each habitat on BLM lands.

BLM and Bird Conservation

Through its multiple-use mandate, the BLM must address public demands for diverse land uses. The greatest challenge to BLM managers is balancing permitting requests for livestock grazing, mineral exploration, energy development, outdoor recreation, and timber production with wildlife and cultural resource conservation. Optimal conservation requires participation by an informed public throughout the planning process.

Through the National Landscape Conservation System (NLCS), the importance of wildlife conservation has increased with special designations such as Wilderness Study Areas, Wild and Scenic Rivers, National Monuments, National Conservation Areas, and Outstanding Natural Areas.

Totalling more than 27 million acres, the NLCS includes more than 10% of occupied Greater Sage-Grouse habitat, high-quality waterfowl habitat in Alaska, some of the highest quality riparian habitat in Arizona and New Mexico, two major California Condor sites in California and Arizona, and 20,000 rocks and small islands along the California coastline inhabited by Brandt's and Pelagic cormorants, Black Oystercatcher, and other birds. Future designations of other BLM lands for this system should achieve significant bird conservation goals if Important Bird Areas and other key areas are included in the criteria.

Conservation in Action

Cooperative Efforts for Sage-Grouse and Falcon Recovery

BLM and USFS lands provide most of the publicly owned habitat for Greater Sage-Grouse, a candidate for listing under the Endangered Species Act. Many federal and state agencies have begun implementing policy guidelines and initiatives to avoid or mitigate activities harmful to Greater Sage-Grouse throughout their range. These efforts include policy changes regarding energy development, fire management, and private lands programs. State agencies continue to work cooperatively with federal agencies and other partners to delineate core habitat areas, initiate changes to management plans, fund ongoing research, and deliver conservation programs.

The BLM's Wyoming and Montana offices, in collaboration with their state fish and wildlife agencies, issued guidance in 2009, including management actions to conserve Greater Sage-Grouse statewide. Other BLM state offices are expected to issue similar guidance soon. These directives may constrain activities that disrupt sage-grouse courtship or nesting, or that affect habitats within and outside core areas. The success of these efforts, measured by increased bird numbers, has yet to be realized, but these actions validate multi-agency, multi-state policy work across more than 30 million acres.

BLM has played a major role in endangered species recovery of Peregrine Falcons, no longer listed under the Endangered Species Act, and recovery of Aplomado Falcons in partnership with the USFWS and DoD. Land-use plans and activity plans address Peregrine Falcon needs for all BLM lands within nesting territories. Intensive Aplomado Falcon reintroduction and habitat improvement work is ongoing in New Mexico where BLM is a partner. One of the major California Condor reintroduction and recovery sites is on BLM lands in Arizona.



GREATER SAGE-GROUSE BY GERRIT VYN

Department of Defense (DoD)



Mission: To ensure that all military departments have access to the land, sea, and air resources necessary to ensure realistic testing and training.

DoD Lands at a Glance

- Although DoD manages less than 5% of public lands, these 30 million acres are crucial to the long-term health of bird populations.
- DoD lands support more endangered and imperiled plant and animal species per acre than any other federal agency.
- Because most DoD lands were acquired before modern urban growth, these lands now represent the largest blocks of remaining bird habitats in many rapidly developing landscapes.
- DoD manages some of the highest quality bird habitat in eastern grasslands, California coastal sage, and longleaf pine and Mexican pine-oak forests.



COURTESY OF U.S. ARMY, FORT RILEY

Fort Riley (Kansas) manages the largest block of contiguous tallgrass prairie under single ownership—50,000 acres maintained by fires from military training and prescribed burns.

Stewardship of Birds

- Reestablishment and maintenance of open longleaf pine forests has benefited the endangered **Red-cockaded Woodpecker**, **Bachman's Sparrow**, **Brown-headed Nuthatch**, and other species.
- DoD lands are disproportionately important to southwestern pine-oak forest birds, including **Buff-breasted** and **Sulfur-bellied flycatchers**, **Elegant Trogon**, and **Berylline Hummingbird**.
- Army bases provide significant expanses of unbroken habitat crucial to area-sensitive grassland and prairie species, such as breeding **Henslow's Sparrow** and wintering **longspurs**.
- **Le Conte's** and **Crissal thrashers** thrive on DoD aridlands, which also provide vast expanses of wintering habitat for shrub-scrub species such as **Sage** and **Black-throated sparrows**. DoD lands such as Camp Pendleton support nearly half of all threatened **California Gnatcatchers** found on public lands.
- Beach-nesting species, including about 50% of the endangered **California Least Tern** population, use undeveloped beaches in southern California that are found largely on DoD lands.



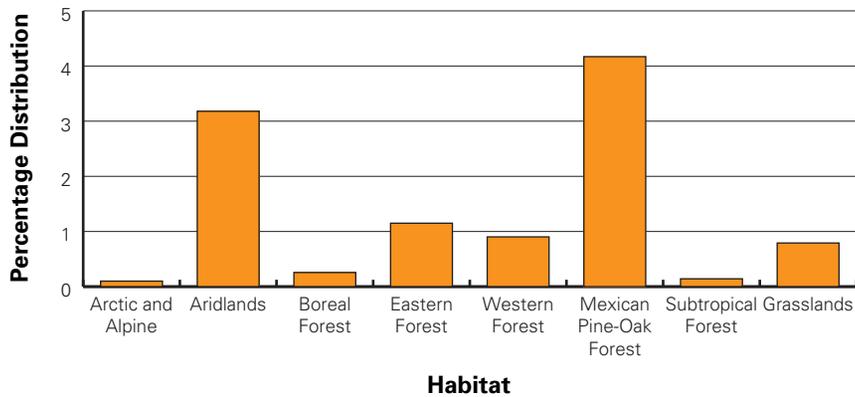
TOP TO BOTTOM: BROWN-HEADED NUTHATCH BY GREG LAVATY, BUFF-BREASTED FLYCATCHER BY CHRIS WOOD, HENSLOW'S SPARROW BY GREG LAVATY, LE CONTE'S THRASHER BY BRIAN SULLIVAN



CHRIS EBERLY

(Left) In California, Vandenberg Air Force Base maintains large, unbroken tracts of riparian habitat vital to many species of conservation concern, such as Nuttall's Woodpecker and Willow Flycatcher.

Distribution of Birds on DoD Lands



Percentage distribution of breeding bird species dependent on each habitat on DoD lands.

DoD and Bird Conservation

The Sikes Act requires the development and implementation of Integrated Natural Resources Management Plans for military installations. Prepared in cooperation with the USFWS and state fish and wildlife agencies, these plans integrate natural resources programs with military operations, training, and other programs such as master planning and cultural resources management.

DoD resource managers must balance their “compliance” mandate for listed species with the opportunity to help species with high stewardship potential before they become listed. DoD is cooperating with many public and private partners to identify and protect key habitats and species (e.g., longleaf pine, shortgrass prairie, Sonoran Desert; Rusty Blackbird, Cerulean Warbler, Northern Bobwhite, Florida Scrub-Jay) in the most cost-efficient ways possible. These efforts, plus regional partnerships (e.g., Southeast Regional Partnership for Planning and Sustainability), help DoD to maintain maximum flexibility to use its lands for mission testing and training while also ensuring the long-term health of its natural resources.

DoD will continue to explore innovative tools and technologies (radar, acoustic monitoring, geolocators, etc.) to monitor birds in inaccessible or dangerous habitats and better understand migratory connectivity to nonbreeding habitats outside the United States.

Conservation in Action

Red-cockaded Woodpecker Recovery

Prior to European settlement, more than 3 million Red-cockaded Woodpeckers nested in 90 million acres of southern longleaf pine savannas. Timber harvesting, settlement and urbanization, and fire suppression reduced longleaf ecosystems to less than 2 million acres. By 1973, the woodpecker population dropped to below 10,000.

DoD-managed lands support more than a quarter of the endangered Red-cockaded Woodpecker population in southern pine forests and have been critical for the recovery of this species. Implementation of prescribed fires, planting of seedlings, and provision of artificial nest cavities are helping recover fire-dependent longleaf ecosystems and woodpecker populations.

Army bases and Eglin Air Force Base (Florida) contributed most of the population increases in the 1990s. Fort Bragg (North Carolina) was the first public land unit to reach the population recovery goal of 350 nesting clusters, a 50% increase to its 1973 population. The North Carolina Sandhills Conservation Partnership and the Private Lands Initiative are models of public-private collaboration that have benefited Fort Bragg and this endangered species.



RED-COCKADED WOODPECKER BY GREG LAVATY

National Oceanic and Atmospheric Administration (NOAA)



Mission: To understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.

NOAA and Oceans and Coasts at a Glance

- NOAA protects, preserves, manages, and enhances the resources found in 3.5 million square miles of coastal and deep ocean waters. These publicly owned, federally managed areas provide important habitats for some of the world's largest concentrations of birds.
- NOAA has a variety of statutory mandates and agency policies to conserve, protect, and restore wildlife and fishery resources, including migratory birds and important forage or habitat resources within federally owned or managed coastal and marine environments.



SOOTY SHEARWATERS, MONTEREY BAY MARINE PROTECTED AREA, CALIFORNIA, BY BRIAN SULLIVAN

Stewardship of Birds

- NOAA manages coastal and oceanic habitats that are vitally important for a variety of birds including **albatrosses, petrels, shearwaters, storm-petrels, pelicans, cormorants, murrelets, puffins,** and **skimmers.**
- NOAA also manages coastal wetlands and intertidal habitats in cooperation with the USFWS, NPS, BLM, and others, to protect vital habitat for coastal waterfowl, wading birds, and shorebirds.
- NOAA's stewardship responsibilities include partnering with USFWS in the Agreement on the Conservation of Albatrosses and Petrels, a multilateral agreement among 13 countries to conserve 29 species of **albatrosses** and **petrels** by coordinating international fishing activities that threaten these populations.



TOP TO BOTTOM: BLACK STORM-PETREL BY CHRIS WOOD, LAYSAN ALBATROSS BY BRIAN SULLIVAN



BLACK SKIMMER BY GERRIT VYN

NOAA and Bird Conservation

NOAA considers seabirds to be well-known indicators of ecosystem condition. As part of NOAA's strategy to sustain the health of our living oceans, seabird data are obtained from oceanic research and by monitoring fisheries bycatch (the unintended take of birds and other organisms during commercial fishing).

This information can improve ecosystem-based management and reduce impacts to seabirds. For example, predictive models can address the effects of climate change or contribute to marine spatial planning. By sharing data with partners, NOAA hopes to improve bycatch reduction efforts and management of seabirds and their important habitats globally.

The overall protection of the oceanic resources within designated Marine Protected Areas (MPAs) is vital to improving migratory and foraging habitats for birds. An MPA is an area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

Under the National Marine Sanctuaries Act, NOAA establishes National Marine Sanctuaries in areas that have special conservation, recreational, or cultural qualities. The system includes 13 sanctuaries and one Marine National Monument.

The Papahānaumokuākea Marine National Monument is the single largest conservation area managed under U.S. ownership. It encompasses an area of the Pacific Ocean that is larger than all U.S. National Parks (139,797 square miles), and is managed by USFWS, NOAA, and the state of Hawai'i in consultation with the Office of Hawaiian Affairs. The monument protects habitat for more than 20 species of seabirds. About 5.5 million seabirds nest on these islands annually, including more than 97% of the world's Laysan and Black-footed albatrosses, species of high conservation concern.



LAYSAN ISLAND BY D. A. POLHEMUS, USFWS

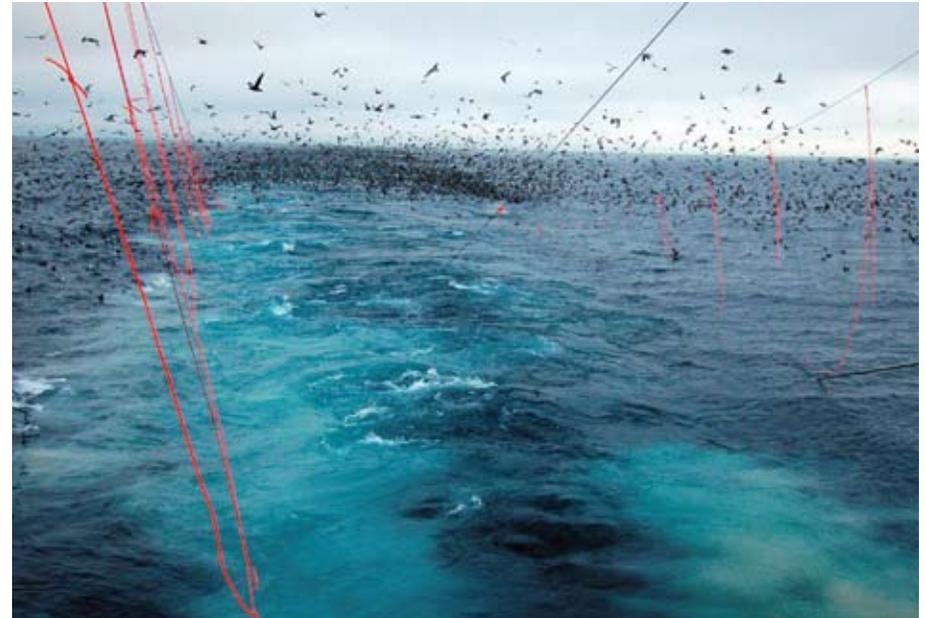
Conservation in Action

Working with Fisheries to Reduce Bycatch

The NOAA Fisheries' National Seabird Program monitors and reduces seabird bycatch in U.S. marine fisheries, works to reduce seabird interactions in international fisheries, and promotes the importance of seabirds as ecosystem indicators and a vital component of healthy oceans. In 2001, NOAA Fisheries began implementing the *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries*.

In some areas where bycatch of seabirds is well documented, measures have been taken to reduce interactions. Federal and state agencies and Sea Grant programs worked together with fishermen to explore new gear designs and examine fishing practices in an effort to develop fisheries that keep or improve target fish catch rates while reducing seabird bycatch.

For example, longline fishermen off Alaska are now using lines with streamers trailed behind the vessel to deter birds from approaching baited hooks as the line is being set. In Hawai'i, pelagic longline fishermen must comply with NOAA Fisheries' seabird mitigation measures, which have reduced incidental interactions with seabirds by more than 90 percent. Species that have benefited significantly include Laysan and Black-footed albatrosses.



ED MELVIN, WASHINGTON SEA GRANT

Seabirds congregate around fishing vessels for feeding opportunities. These birds are deterred from entering a zone where they may be vulnerable to becoming bycatch by the use of paired streamer lines.

National Park Service (NPS)



Mission: To conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

NPS Lands at a Glance

- The NPS manages 394 units and 88 million acres of public lands and waters, from small historic sites to large national parks and preserves. These units protect ecosystems, serve as reservoirs of biodiversity, and provide natural sounds, clean water, and air.
- NPS lands receive over 285 million visitors per year, more than any other federally managed lands.
- NPS lands protect all major bird habitats but are most prevalent in coastal habitats, aridlands, and pine-oak forests of the contiguous 48 states, plus arctic/alpine habitats and boreal forests in Alaska.



CAROL BEIDLEMAN

Chris Dodge, a seasonal NPS biological technician, monitors birds at Sequoia and Kings Canyon National Parks.

Stewardship of Birds

- Among federal agencies, the NPS manages lands with the highest percentage of the U.S. distribution of at least 39 breeding bird species and the highest percentage among all public land managers for 14 species.
- NPS lands are important for many aridland species, including the **Lucifer Hummingbird** and **California Condor**, which have more than a quarter of their U.S. distributions on NPS lands.
- Big Bend National Park in Texas supports all known breeding **Colima Warblers** in the United States; the species is of high conservation concern. Nearly 30% of the U.S. distribution of the **Blue-throated Hummingbird** is found in Mexican pine-oak forests on NPS lands.
- The NPS supports a large percentage of the U.S. breeding and wintering distributions of coastal species such as **Black Guillemot**, **Common Eider**, **Rhinoceros Auklet**, and **White-crowned Pigeon**.
- Alaskan National Parks provide more boreal forest habitat for **Great Gray Owl**, **Northern Hawk Owl**, **Common Loon**, **Lesser Yellowlegs**, and **Common Goldeneye**, than any other public agency lands.

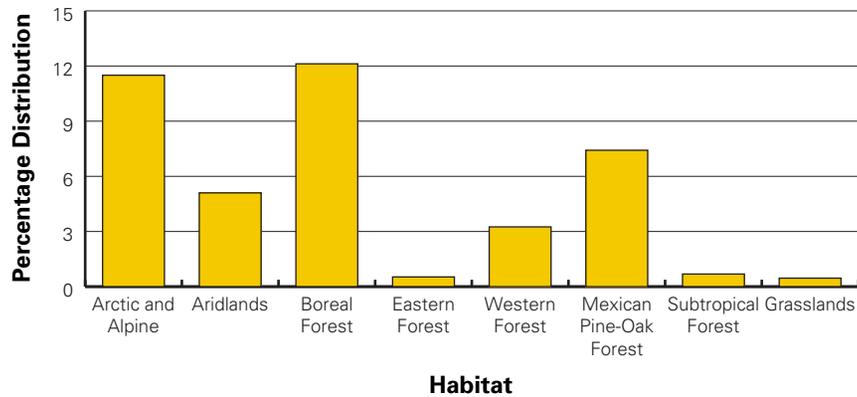


TOP TO BOTTOM: LUCIFER HUMMINGBIRD AND COLIMA WARBLER BY GREG LAVATY, RHINOCEROS AUKLET AND GREAT GRAY OWL BY GERRIT VYN



ROCKY MOUNTAIN NATIONAL PARK BY GREG LAVATY

Distribution of Birds on NPS Lands



Percentage distribution of breeding bird species dependent on each habitat on NPS lands.

NPS and Bird Conservation

The strengths of the NPS for bird conservation efforts include conservation mandates for more than 99% of NPS holdings, well-established avian inventory, monitoring and research programs, ecosystem restoration projects, invasive species management, educational programs highlighting bird conservation, and protection of coastal habitat. In National Parks within the U.S. and its territories, 732 regularly occurring native bird species and up to 44 native vagrant species can be observed.

NPS has partnered with many regional habitat protection initiatives, such as the USFS monitoring program and the Rocky Mountain Bird Observatory, to help parks across the nation contribute to the conservation of grassland birds.

Because many migratory birds that use parks seasonally come from outside the U.S., the NPS Natural Resource Stewardship and Science and International Affairs offices have brought more than 85 international volunteers from 21 countries to National Parks through the Park Flight Program. These interns assist with bird-monitoring projects and participate in programs that foster cross-cultural appreciation of birds and offer international perspectives to park visitors. These internships and the NPS Sister Park Initiative help build capacity for migratory bird conservation in countries with shared species through technical exchange and cooperation.

Conservation in Action

Restoring Endangered Condors and Murrelets

The California Condor is a critically endangered species. In 1987, fewer than 30 birds remained, and the last wild condors were captured for a captive breeding program. Of the 181 California Condors in the wild today, approximately 25% regularly use the habitats within Pinnacles National Monument, Grand Canyon National Park, and Zion National Park. The first California Condor chick to fledge anywhere in the wild since 1982 left its nest cave in Grand Canyon National Park in 2003. In 2010, a wild California Condor chick hatched within Pinnacles National Monument for the first time in more than 100 years. Park biologists help newly released condors choose safe roosting sites and avoid hazards such as power lines, buildings, roads, and lead-contaminated food. Lead poisoning is a major threat facing the successful recovery of the California Condor; at least 20 condors have died from lead poisoning since 1997. Studies have identified bullet fragments in animal carcasses as the primary source of lead ingested by condors. For more than a decade, the NPS has worked with partners to disseminate scientific evidence on lead poisoning in wildlife. Ultimately, an informed public choosing non-lead ammunition could make a major contribution to the recovery of condors and other wildlife.

Populations of Xantus's Murrelet, a rare seabird that has 98% of its U.S. nesting territory in Channel Islands National Park, had declined to only 20 nest sites on Anacapa Island by 1997, even though estimates had shown that potential habitat on the island may have supported more than 1,500 nest sites. Declines were due primarily to egg predation by nonnative black rats introduced to the island before 1939. Park management eradicated black rats from the island during 2001–02. Since then, hatching success of Xantus's Murrelet eggs in sea caves has more than doubled. Although the number of nest sites on Anacapa Island is unknown due to the difficult sampling terrain, the number of nests and clutches laid are increasing at monitored sites.



CALIFORNIA CONDOR BY GAVIN EMMONS

USDA Forest Service (USFS)



Mission: To sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

USFS Lands at a Glance

- The USFS administers 155 National Forests, 20 National Grasslands, and 82 Experimental Forests covering more than 193 million acres of public land. Management is guided by research and development at seven research stations with numerous field locations.
- The USFS administers about 8% of the land in the United States. It is the steward of large areas of diverse habitats, including 47% of Mexican pine-oak forest, 42% of western forest, 23% of boreal forest, 5% of eastern forest, and 5% of aridlands. Although the USFS administers only 4% of all arctic and alpine habitat, it administers 70% of the arctic and alpine habitat in the contiguous United States.
- Thirty percent of Forest Service lands are permanently protected to maintain natural habitats; 69% are permanently protected from conversion of natural land cover but permit a wider range of management and multiple uses.



BRIAN SULLIVAN

Critical habitat for endangered Red-cockaded Woodpeckers is maintained through prescribed burning and thinning of longleaf pine forests on Forest Service and other public lands.

Stewardship of Birds

- National Forests support, on average, 34% of the distribution of obligate bird species of western forests in the U.S., including more than half of the distribution of **White-headed Woodpecker** (56%), **Williamson's Sapsucker** (58%), **Dusky Grouse** (53%), **Sooty Grouse** (46%), and **Hermit Warbler** (51%).
- USFS lands support, on average, only 3% of the distribution of arctic and alpine bird species in the U.S., but more than half of the distribution of **White-tailed Ptarmigan** (77%), **Black Rosy-Finch** (61%), and **Brown-capped Rosy-Finch** (67%).
- USFS lands support high percentages of the distributions of birds of high conservation concern, including **Gunnison Sage-Grouse** (36%), **Florida Scrub-Jay** (30%), endangered **Kirtland's Warbler** (35%), and endangered **Red-cockaded Woodpecker** (41%).
- Pine-oak forest in several National Forests in Arizona and New Mexico support more than half the U.S. distribution of **Mexican Chickadee** (60%), **Painted Redstart** (56%), and **Grace's Warbler** (52%).

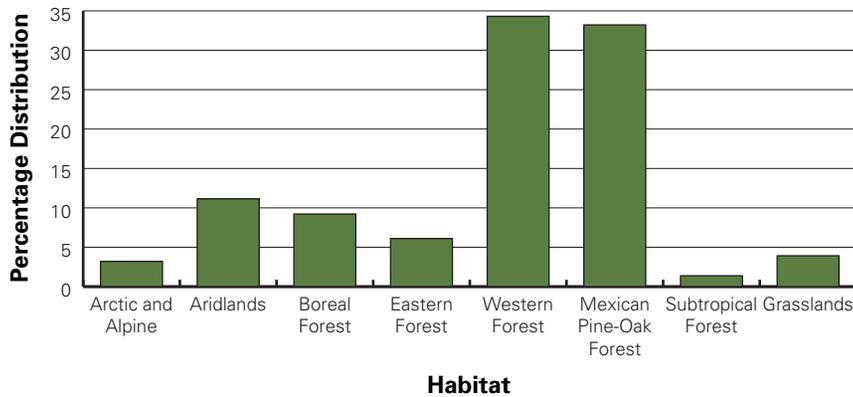


TOP TO BOTTOM: HERMIT WARBLER BY BRIAN SULLIVAN, WHITE-TAILED PTARMIGAN BY GERRIT VYN, FLORIDA SCRUB-JAY BY CHRIS WOOD, PAINTED REDSTART BY GREG LAVATY



KIRTLAND'S WARBLER BY GREG LAVATY

Distribution of Birds on USFS Lands



Percentage distribution of breeding bird species dependent on each habitat on USFS lands.

USFS and Bird Conservation

The Forest Service seeks a balance in resource use such that ecosystems are sustained for future generations. This responsibility includes providing for the diversity of plant and animal communities and sustaining individual species while also providing lands for timber harvest, grazing, energy extraction, and recreation.

The Forest Service provides valuable habitats for birds through management and conservation activities, including prescribed fire, silviculture, and designation of lands as research natural areas, late-successional reserves, roadless areas, or wilderness. The Forest Service is also committed to bird monitoring in National Forests. For example, the Southern Region has monitored more than 200 species in 14 National Forests since 1992, providing knowledge of species trends and habitat occurrences to guide management.

Forest Service scientists contribute knowledge needed for bird conservation and the Forest Inventory and Analysis program tracks changes in U.S. forests. The International Programs' "Wings Across the Americas" provides critical coordination and assistance for international conservation of migratory birds that depend on lands outside the U.S. for part of the year.

The Forest Service must reconcile multiple uses that are not always compatible with bird conservation objectives. Finding the right balance is a challenge. For example, timber harvest reduces habitat for species such as Marbled Murrelet and Northern Spotted Owl but meets other agency objectives. The Forest Service balances these uses in a forest planning process open to public, federal, and state involvement to develop National Forest and resource management plans. Given a broad mandate of sustaining biodiversity and native species, balancing the needs of multiple species that have diverse requirements is also a challenge for land management planning.

Conservation in Action

Birds Respond in Fire-Adapted Landscapes

Many forest birds of conservation concern are dependent on ecosystems maintained by fire or disturbances. Decades of fire suppression have altered the composition and structure of forests, savannas, and grasslands, resulting in declines of these bird species and threatening the health of these ecosystems. During 2001–09 the Forest Service treated 5.5 million acres with prescribed fire and 2.7 million acres with mechanical treatments to restore fire-adapted ecosystems and reduce hazardous fuels across the United States.

Returning fire to ponderosa pine forest is reestablishing interactions among woodpeckers, bark beetles, wood-boring beetles, and fungi, and is benefiting species such as White-headed and Black-backed woodpeckers. Kirtland's Warbler increased in response to prescribed fires and other management of jack pine forests on 190,000 acres of National Forests, National Wildlife Refuge, and state lands in Michigan. Prairie Warblers are 10 times more abundant on savanna and woodland sites on midwestern national forests and state lands that were restored through use of prescribed fire and thinning than non-restored sites.

The use of thinning and prescribed fire along with other changes in management resulted in increases of Red-cockaded Woodpeckers on southern National Forests while populations on private lands declined. Prescribed burning to restore overgrown sand pine scrub and scrubby flatwoods is essential for the persistence of Florida Scrub-Jays. The Northwest Forest Plan, a reserve strategy affecting 16 National Forests inhabited by the Northern Spotted Owl, has proven more effective than other management regimes in stemming the decline of the species.



COURTESY OF USFS

U.S. Fish and Wildlife Service (USFWS)



Mission: To work with others to conserve, protect, and enhance fish, wildlife, and plants, and their habitats, for the continuing benefit of the American people.

USFWS Lands at a Glance

- USFWS manages 553 National Wildlife Refuges and approximately 7,000 Waterfowl Production Areas, which conserve about 150 million acres from the southern Caribbean to the northernmost tip of Alaska across the Pacific Ocean to Japan.
- The first federal land stewardship effort to protect birds came in 1903 when President Theodore Roosevelt established Florida's Pelican Island as the first National Wildlife Refuge (NWR). Today, the National Wildlife Refuge System is the nation's most extensive network of public lands and waters with the primary mission to conserve wildlife and natural habitats.
- The 76.8 million acres conserved in Alaska on 16 National Wildlife Refuges, including the Arctic National Wildlife Refuge, conserves an unbroken continuum of arctic and subarctic ecosystems, including tundra, boreal forest, wetlands, and coasts.
- The National Wildlife Refuge System manages 180 marine or coastal wildlife refuges, including more than 20 million coastal acres and 30,000 coastal miles, and 7 million ocean acres, of which almost 3 million are in coral reef ecosystems.



ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA, BY GERRIT VYN

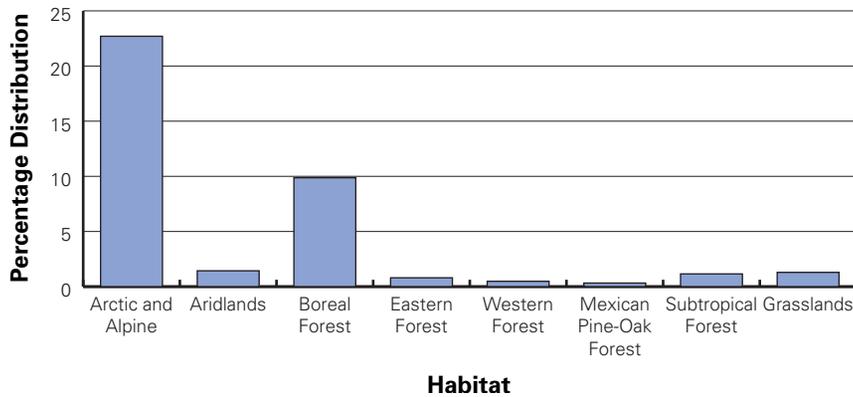
Stewardship of Birds

- More than 1 million acres of wetlands are actively managed on 356 refuges and approximately 7,000 Waterfowl Production Areas for waterfowl and other birds. USFWS lands in the Prairie Pothole Region occupy less than 2 percent of the landscape but produce nearly 23 percent of the region's waterfowl, making this region the "duck factory" of North America.
- Shorebirds depend on many of the same refuges that were established for waterfowl, including the Arctic NWR (Alaska), critical for many species of nesting shorebirds, and important stopover habitats such as Yukon Delta (Alaska), Grays Harbor (Washington), Bear River (Utah), Quivira (Kansas), and Bald Knob (Arkansas). Along the Atlantic Coast, **Red Knots** depend on coastal Refuges including Monomoy (Massachusetts), Cape May (New Jersey), and Cape Romain (South Carolina), as they migrate from the arctic to the tip of South America and back.
- Island refuges in the Bering Sea and the central Pacific provide nesting habitats for endemic seabirds and virtually all **McKay's Buntings**. Two million birds use the Midway Atoll Refuge, including the world's largest population of nesting **Laysan Albatrosses**. Islands of Alaska Maritime NWR provide essential habitats for some 40 million seabirds of more than 30 species.
- Fifty-nine National Wildlife Refuges have been established primarily to conserve threatened or endangered species; examples include Attwater's Prairie-Chicken NWR (Texas), Mississippi Sandhill Crane NWR (Mississippi), and Aransas NWR (Texas), which supports the only naturally occurring overwintering population of **Whooping Cranes**.
- Species with more than one-third of their U.S. breeding distributions on vast Alaskan NWRs include tundra-nesting **Emperor Goose, Brant, Tundra Swan, Black-bellied Plover, Bristle-thighed Curlew, and Pomarine Jaeger**, as well as boreal-forest birds such as **Rusty Blackbird, Gray Jay, and Spruce Grouse**.



TOP TO BOTTOM: NORTHERN SHOVELER, WHOOPING CRANE, RUSTY BLACKBIRD BY GERRIT VYN

Distribution of Birds on USFWS Lands



Percentage distribution of breeding bird species dependent on each habitat on USFWS lands.

USFWS and Bird Conservation

The USFWS has Congressional authority to conserve and protect migratory birds on all U.S. lands and waters through several legislative mandates. Among the first and most important is the Migratory Bird Treaty Act of 1918, which provides federal protection for 1,007 migratory species. The USFWS, in partnership with states and other organizations, is responsible for understanding population dynamics and regulating harvest of migratory game birds, including waterfowl, rails, and doves. To manage species that may negatively impact local economies or quality of life because of overabundance, the USFWS works with states and other partners to control bird species such as Double-crested Cormorant and resident Canada Geese.

In 2010, the USFWS established a National Wildlife Refuge System Inventory and Monitoring Program to strategically coordinate data and management activities with other agencies and conservation organizations. The USFWS, along with states and other partners, conducts breeding and winter waterfowl surveys, Mourning Dove “coo counts,” woodcock surveys, and surveys for endangered species as needed. USFWS also works in close partnership with the U.S. Geological Survey, which oversees the Breeding Bird Survey and other bird population monitoring programs critical to the decisions of land managers. These and other programs depend on the expertise of thousands of citizen-science participants who contribute their data.

The USFWS administers the Federal Migratory Bird Hunting and Conservation Stamps, commonly known as “Duck Stamps.” Originally created in 1934 as federal licenses required for hunting migratory waterfowl, Duck Stamps have generated more than \$750 million to help purchase or lease more than 5.3 million acres of waterfowl habitat, now protected within the National

Wildlife Refuge System. All bird enthusiasts and visitors to the National Wildlife Refuge System are encouraged to purchase a Duck Stamp annually for the protection of more bird habitat. Duck Stamps also provide free entry to all National Wildlife Refuges.

Because of its key role in conserving migratory birds on all U.S. lands, the USFWS administers habitat grant programs, including the North American Wetlands Conservation Act which since 1990 has generated more than \$1.08 billion in grants, plus another \$2.24 billion in partner contributions to improve 25.9 million acres of habitat in North America. Similarly, the Neotropical Migratory Bird Conservation Act supported 333 projects since 2002, generating more than \$35 million in grants and leveraging more than \$136 million in matching funds to conserve about 2 million acres of bird habitat throughout the Western Hemisphere. The USFWS also administers the Migratory Bird Joint Ventures, a national network of self-directed partnerships that implement bird conservation in ecoregions around the nation. Since the program's inception in 1986, Joint Ventures have invested \$4.5 billion to conserve 15.7 million acres of migratory bird habitat.

Conservation in Action

Birds of the Aleutian Islands

The Aleutian Islands are a Biosphere Reserve supporting globally significant seabird populations and supplying some of the finest seabird habitat in the world. For more than four decades, the USFWS has restored seabird habitat at Alaska Maritime National Wildlife Refuge by eradicating invasive species. In collaboration with Island Conservation and The Nature Conservancy, the USFWS has reclaimed 7,000 acres of habitat for native wildlife. For example, on the refuge's Rat Island, rats preyed on eggs and chicks, decimating native bird populations and altering native ecosystems. After the largest rat eradication effort in the Northern Hemisphere, Rat Island was declared rat-free in 2010. Over the long-term, burrow-nesting seabirds, including Tufted Puffins, Ancient Murrelets, and storm-petrels, are expected to recolonize the island.



RAT ISLAND, COURTESY OF USFWS

State Agencies

Mission: State fish and wildlife agencies have broad statutory and often constitutional authority over wildlife management with a mission to sustain, protect, and conserve wildlife.

State Lands at a Glance

- State agencies manage 189 million acres of land in the U.S., including wildlife management areas, state game lands, heritage preserves, natural areas, state forests, state parks, state trust lands, and recreation areas.
- State lands are diverse and include more boreal forest (34%), marsh (24%), and grassland (4%) than any single federal agency.
- State land holdings range from a few hundred acres to millions of acres. The 2.6 million-acre Adirondack Forest Preserve is the largest state-owned area in the United States.



KENNETH V. ROSENBERG

Blue Mountain Lake is part of the 2.6 million-acre Adirondack Forest Preserve—the largest area of state land in the United States.

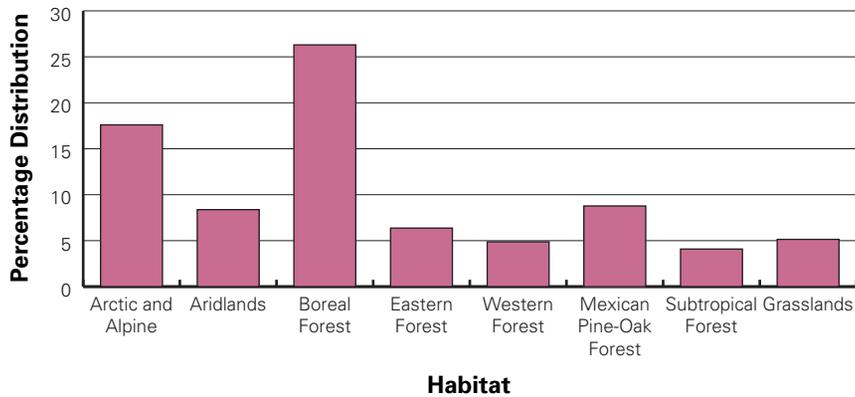
Stewardship of Birds

- In Alaska, state lands support 18% of the average U.S. distribution of arctic and alpine species. **White-tailed Ptarmigan**, **Surfbird**, **Stilt Sandpiper**, and **Snow Bunting** have greater than 30% of their distribution on state lands. In Alaska, state boreal forests support more than 50% of the U.S. distribution of **Black-backed Woodpecker**, **Blackpoll Warbler**, and **Gray-cheeked Thrush**.
- State lands in the Northeast support a disproportionate percentage of boreal bird distributions. More than 25% of the U.S. population of the **Bicknell's Thrush**, a species of conservation concern, is in Adirondack Forest Preserve and Catskill State Park, New York.
- State wildlife agencies have the primary authority for regulating and providing management recommendations for all resident game bird species. Many of the 19 native game bird species have a high percentage of their distribution on state lands, including **Spruce Grouse** (22%) and **Montezuma Quail** (14%).
- Every spring, up to a million migratory shorebirds visit Delaware Bay. During the last 10 years, Delaware and New Jersey agencies have helped conserve the **Red Knot**, a species of conservation concern. They have implemented research and monitoring projects. They have also coordinated protection of state lands, restriction of access, and harvest regulations for horseshoe crabs, a key food for Red Knots.



TOP TO BOTTOM: BLACKPOLL WARBLER BY GERRIT VYN, BICKNELL'S THRUSH BY JIM GOETZ, MONTEZUMA QUAIL BY GREG LAVATY, RED KNOT BY GERRIT VYN

Distribution of Birds on State Lands



Percentage distribution of breeding bird species dependent on each habitat on state lands.

State Agencies and Bird Conservation

All states hold acreage in public trust for purposes such as transportation, education, corrections, and cultural and natural resources. The legislative mandate of the agency holding the land dictates the amount of focus on bird conservation. In general, birds are the legislative responsibility of the natural resource agencies with a mission to sustain, protect, and conserve wildlife.

Many state wildlife agencies rely solely on hunting license revenue to fund activities and match federal grants. During 1997–2007 there was a loss of 18,579 hunters and 36,272 anglers (USFWS Online Federal License Certification). From 2008 to 2009 the USFWS reported an increase in paid license sales. The changes in license sales can impact the ability of state wildlife agencies to implement needed conservation on the ground.

Nongame programs have relied on state sales tax, public donations, car license tags, and other creative funding mechanisms. Since 2000, the State Wildlife Grants Program has aided bird conservation by requiring State Wildlife Action Plans to outline steps to conserve wildlife and habitat before they become endangered.

State wildlife agencies participate in the stewardship of migratory birds, working with Canadian and Mexican partners to conserve waterfowl populations across North America through efforts such as the North American Waterfowl Management Plan and the Flyway Councils. Many states have participated in bird conservation actions with Latin American and Caribbean partners, including through the Southern Wings Program.

Several state wildlife agencies have developed state bird conservation initiatives (AZ, FL, MI, MN, MO, MT, NE, OH, VA, and WI). For example, the 59-member Missouri Bird Conservation Initiative conserves birds across geopolitical boundaries, taxonomic groups, and landscapes. Of the \$2.8 million expended since 2004, \$1.3 million has gone to grassland and prairie restoration to conserve species such as Greater Prairie-Chicken, Henslow's Sparrow, Grasshopper Sparrow, and Upland Sandpiper.

Conservation in Action

Managing Forests for Golden-winged Warblers

Golden-winged Warblers have declined throughout their range because of habitat loss and hybridization with Blue-winged Warblers. State lands are extremely important for the conservation of golden-wings, with 16% of the species' distribution. State lands offer opportunities for intensive management for young (early successional) forests critical for the survival of the Golden-winged Warbler and other priority species such as the American Woodcock.

The Pennsylvania Breeding Bird Atlas (2004–09) found that 32% of golden-wing breeding records are on state property. Focus areas for this species include 700,000 acres of Pennsylvania Game Commission (PGC) lands. The PGC is including golden-wing management in the game land planning process and prioritizing barren-habitat restoration and management. The PGC, Indiana University of Pennsylvania (IUP), Appalachian Mountain Joint Venture/ABC, and Pennsylvania Bureau of Forestry are developing Forestland Best Management Practices for Pennsylvania and Maryland.

Many partners have contributed to management on state parks and game lands, including PGC, PA Bureau of State Parks, Ruffed Grouse Society, IUP, Wildlife Management Institute, and Woodcock Unlimited. For example, IUP has begun work at the 5,900-acre Bald Eagle State Park, adjacent State Game Lands 92, and nearby Sproul State Forest. The project aims to remove exotics, plant native species, and use silviculture to maintain early-successional habitat. Within a year, five of the seven manipulated areas begun in 2009 already had at least one territorial Golden-winged Warbler, a promising sign that it is possible to create breeding habitat for this vulnerable species. Similar management efforts are ongoing in numerous other states.



GOLDEN-WINGED WARBLER BY GERRIT VYN

OUR APPROACH

To determine the stewardship responsibilities and conservation opportunities for birds on public lands and waters, we overlaid the best available U.S. bird distribution information onto a map of public land ownership to determine the percentage of each species' distribution on public land. For this report, we focus on those species restricted to a single primary habitat, or *habitat obligates*. We use the term *distribution* to describe the breeding and wintering occupancy of each bird species based on our analysis. When reporting the percentage distribution for a group of birds, we use the group average. The term *species of conservation concern* refers to listings designated by the USFWS Birds of Conservation Concern 2008 and the 2007 WatchList produced by the American Bird Conservancy and Audubon from information compiled by bird conservation partnerships.

With an understanding of the percentage of species' distribution on public land, we can assess both the degree of protection for each species based on the biodiversity protection category and the responsibility of each public land agency for the future of each species. Visit www.stateofthebirds.org for additional information, including lists of species in each habitat and maps showing primary habitats and species distributions.

Understanding Bird Distributions

Most birds are not evenly distributed across their ranges as depicted in field guide maps, and these distributions change throughout the year as birds migrate. To represent the most accurate breeding and wintering distributions of birds in the contiguous 48 states, we analyzed bird observation data from eBird (www.ebird.org), a rapidly growing citizen-science program administered by the Cornell Lab of Ornithology and Audubon.

For this report, National Science Foundation initiatives provided access to resources typically used to analyze large-scale data sets in physics and astronomy research (e.g., 70,000 hours of computer time on TeraGrid). We analyzed more than 600,000 bird checklists collected by eBird participants during 2004–09 at 107,000 unique locations (Figure 1).

For Alaska bird distributions, we used vegetation layers to modify bird range data from the Alaska Gap Analysis Project and NatureServe. State of Hawai'i biologists compiled and analyzed distributions for Hawaiian bird species. Bird distributions for Puerto Rico, U.S. Virgin Islands, Guam, Commonwealth of the Northern Mariana Islands, and American Samoa were based on distribution of suitable habitat identified by local experts. For most ocean species, we used the best available colony-nesting data to evaluate the breeding distribution.

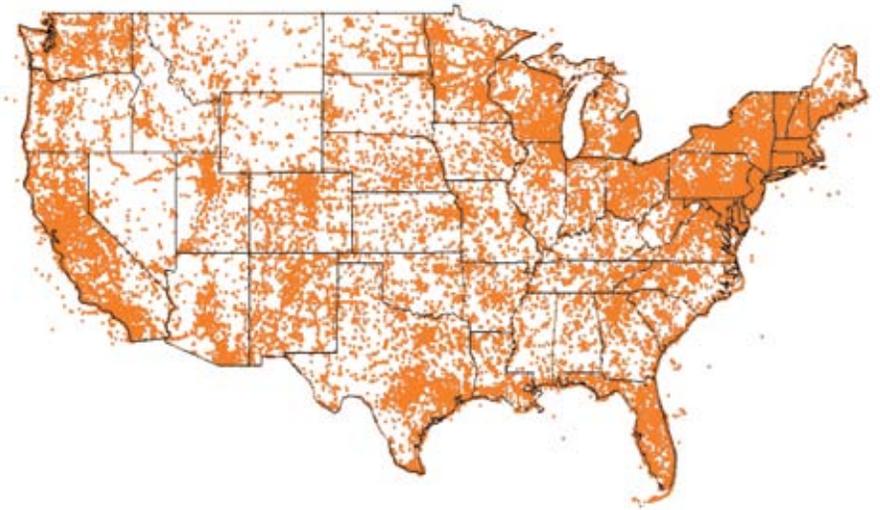


Figure 1. This map shows 107,000 unique locations (orange dots) within the contiguous U.S. with eBird data from 2004–09, used in analyses for this report. The 622,000 stationary and traveling counts submitted from these locations constitute the eBird Reference Dataset 2.0, which is available at www.avianknowledge.net. Map courtesy of Cornell Lab of Ornithology.

With support from the National Science Foundation and Leon Levy Foundation, collaborators at Oak Ridge National Laboratory, DataONE, TeraGrid, the Institute for Computational Sustainability, and the Cornell Lab of Ornithology used statistical models to account for gaps and biases in volunteer-collected data and to associate bird distributions with important environmental factors, including land cover, elevation, local climate, and human housing density for 139 species with sufficient eBird data.

These models indicated occupancy for approximately 130,000 predicted grid points in the contiguous United States. Cornell Lab experts evaluated the accuracy of predicted occupancy models for each species. See figure 2 for examples of distribution maps. For the distributions of 156 additional species with very small ranges or associated with wetlands, we used the frequency of each species reported on eBird checklists. These distribution frequency maps provided coarser data and summarized occupancy within 20-square-km blocks. Winter and breeding distributions were analyzed separately for migratory species within the United States. We used best available eBird data to represent the distribution of resident species.

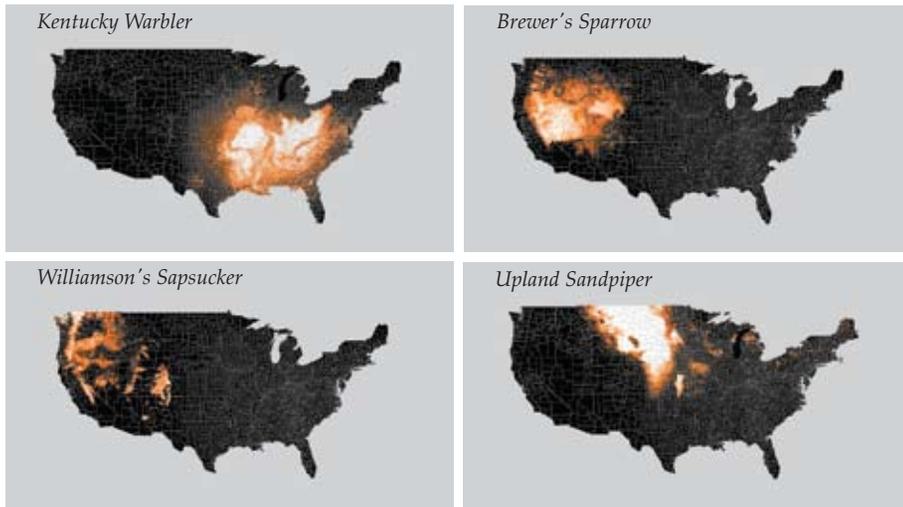


Figure 2. Examples of breeding distributions for obligate species in four habitats. Clockwise, from top left: Kentucky Warbler in eastern forests; Brewer's Sparrow in aridlands; Upland Sandpiper in grasslands; Williamson's Sapsucker in western forests. Maps are based on the predicted occupancy during peak breeding season at roughly 130,000 grid points, modeled using data from eBird and associations with land cover and other key environmental variables. Brighter areas indicate higher probability of occurrence. For additional distribution maps, see www.stateofthebirds.org. Maps courtesy of Cornell Lab of Ornithology.

Mapping Our Public Lands and Waters

We used the Protected Areas Database of the United States (PAD-US version 1.1) to determine land ownership and biodiversity protection status of all public lands for the continental U.S., Alaska, Hawai'i, Puerto Rico, and the U.S. Virgin Islands. PAD-US is a national spatial database created from authoritative data sources by the U.S. Geological Survey's Gap Analysis Program (USGS-GAP; gapanalysis.usgs.gov).

Our analysis identified lands managed by BLM, DoD, USFWS, USFS, NPS, other federal agencies, and state agencies. PAD-US also classified public lands according to biodiversity protection status. For this report we categorized lands into (1) lands protected to maintain natural habitats; (2) lands managed for multiple uses including conservation; and (3) lands with no permanent protection from development or conversion but that may be managed for conservation. The first category includes lands where natural processes are allowed without interference or are mimicked through management. All lands in the first two categories are protected from permanent conversion to urban or agricultural development. Many public lands in the third category offer some degree of current protection, but are not permanently protected.

To estimate the extent of each primary habitat, we used the USGS-GAP National Land Cover. This dataset is the most detailed, consistent map of

vegetation associations available for the United States. The 590 ecological systems and land-use classes were categorized into primary habitat designations for the analysis. These data were then overlaid with PAD-US to calculate the area of each primary habitat on public lands (not including coasts, islands, and oceans).

We considered coastal waters and oceans to be public water areas. Even though these public waters were not mapped, most states have ownership within 3 nautical miles of the coastline, with federal ownership beyond.

In all our analyses, we used the best data available for the United States. These data are valuable and relevant for evaluating broad landscape-level conservation questions, such as those posed here. However, differences may exist between data used for analyses and reported by agencies within the chapters of this report.

Thank You to eBird Volunteers

Our understanding of bird distributions has greatly improved thanks to the thousands of bird watchers who have contributed observations to www.eBird.org. This effort is especially important for tracking seasonal and fine-scale changes in bird distributions, which is not possible with other bird-monitoring programs. However, even this massive observation network provides only imperfect information for assessing the year-round status of birds on many remote public lands across the U.S., including Alaska, Hawai'i, and island territories. We urge birders to submit more observations to eBird from public refuges, parks, forests, and wilderness areas. We also urge agencies to support the submission of current and historical records to eBird and other data archives.



BIRDERS AT MONTEZUMA NATIONAL WILDLIFE REFUGE, NEW YORK, BY JESSIE BARRY

Determining Stewardship Responsibilities

To calculate the percentage of each species' distribution on public lands and biodiversity protection categories for the continental U.S., we projected the distribution model or frequency map for each bird species onto PAD-US. For the distribution model results, we calculated percentages at the locations where the model predicted occupancy.

Because the frequency maps provided coarser data and the occupancy data were summarized within 20-square-km blocks, we projected these data onto public lands and summed over the ownership categories within the blocks to calculate percentage of management responsibilities and biodiversity protection.

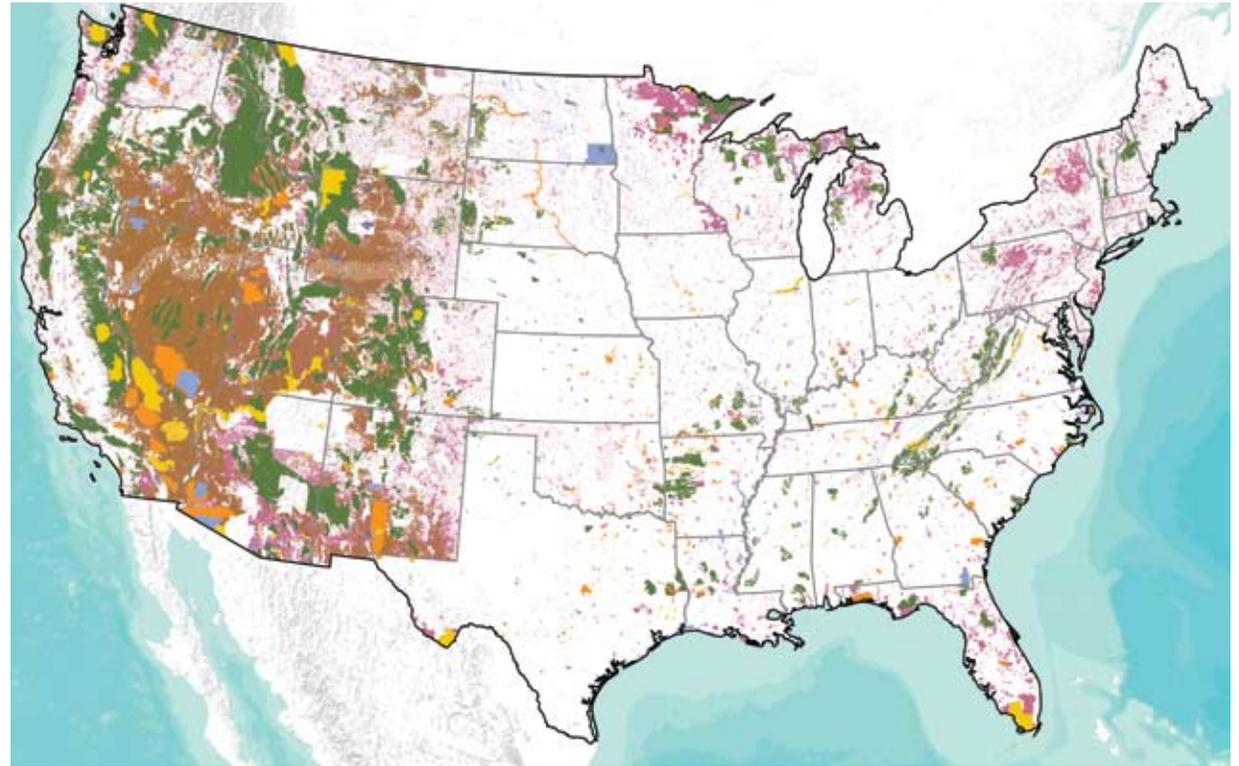
In Alaska and Hawai'i, the bird distributions were overlaid with PAD-US to determine the percentage of public land and protection status categories within each species' distribution.

For Puerto Rico and U.S. Virgin Islands, bird distributions were overlaid onto PAD-US, whereas for Guam, Commonwealth of the Northern Mariana Islands, and American Samoa, we used a qualitative assessment based on territorial and federal government data for public lands.

For coastal and marsh species, we used a qualitative assessment rather than a quantitative analysis. For ocean birds, we focused on best available data from breeding colonies to calculate the percentage of the global population occurring on public lands.

For each primary habitat, we reported the average distribution across multiple obligate species. These percentages measure both the degree of protection for each species on public lands based on biodiversity protection category and the responsibility each public land agency has for the future of each species.

PAD-US version 1.1 includes significant contributions and large aggregated data sets from BLM, USFS, GreenInfo Network, and The Nature Conservancy. USGS-GAP relies on authoritative



Public Lands

- Bureau of Land Management (BLM)
- Department of Defense (DoD)
- National Park Service (NPS)
- USDA Forest Service (USFS)
- U.S. Fish and Wildlife Service (USFWS)
- State lands

NOAA lands are included on both maps but are too small to detect.

USGS-GAP's Protected Areas Database of the U.S. (PAD-US version 1.1) was used to determine land ownership and biodiversity protection status of all public lands for the continental U.S., Alaska, and Hawai'i.

sources, such as federal, state, local, and nongovernmental organizations, and land trusts to provide valuable spatial and attribute data to improve and expand PAD-US. We encourage agencies and organizations with protected areas data to contact

USGS-GAP (gapanalysis.usgs.gov). PAD-U.S. 1.2, the newest update, is available at gapanalysis.usgs.gov.

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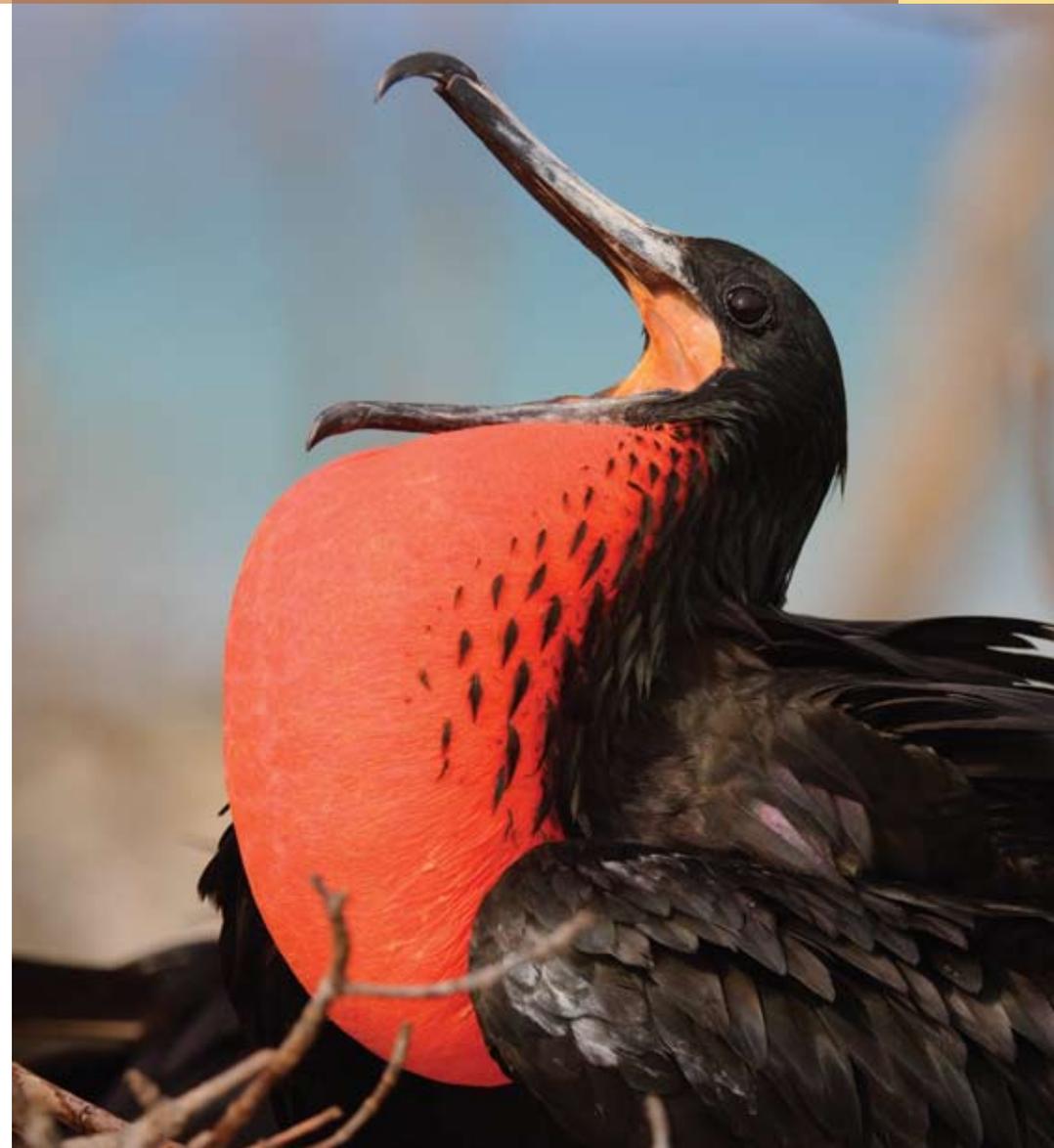
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ABOVE: MAGNIFICENT FRIGATEBIRD BY GERRIT VYN.

BACK COVER, TOP LEFT TO RIGHT: LAYSAN ALBATROSS COLONY BY PETE LEARY; GREATER SAGE-GROUSE BY GERRIT VYN; PACIFIC COAST RAINFOREST, ALASKA, BY GERRIT VYN. BOTTOM LEFT TO RIGHT: HOODED MERGANSER, SALT MARSH (LOUISIANA), AND DUNLIN BY GERRIT VYN.

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University of Idaho

The Cornell Lab of Ornithology

