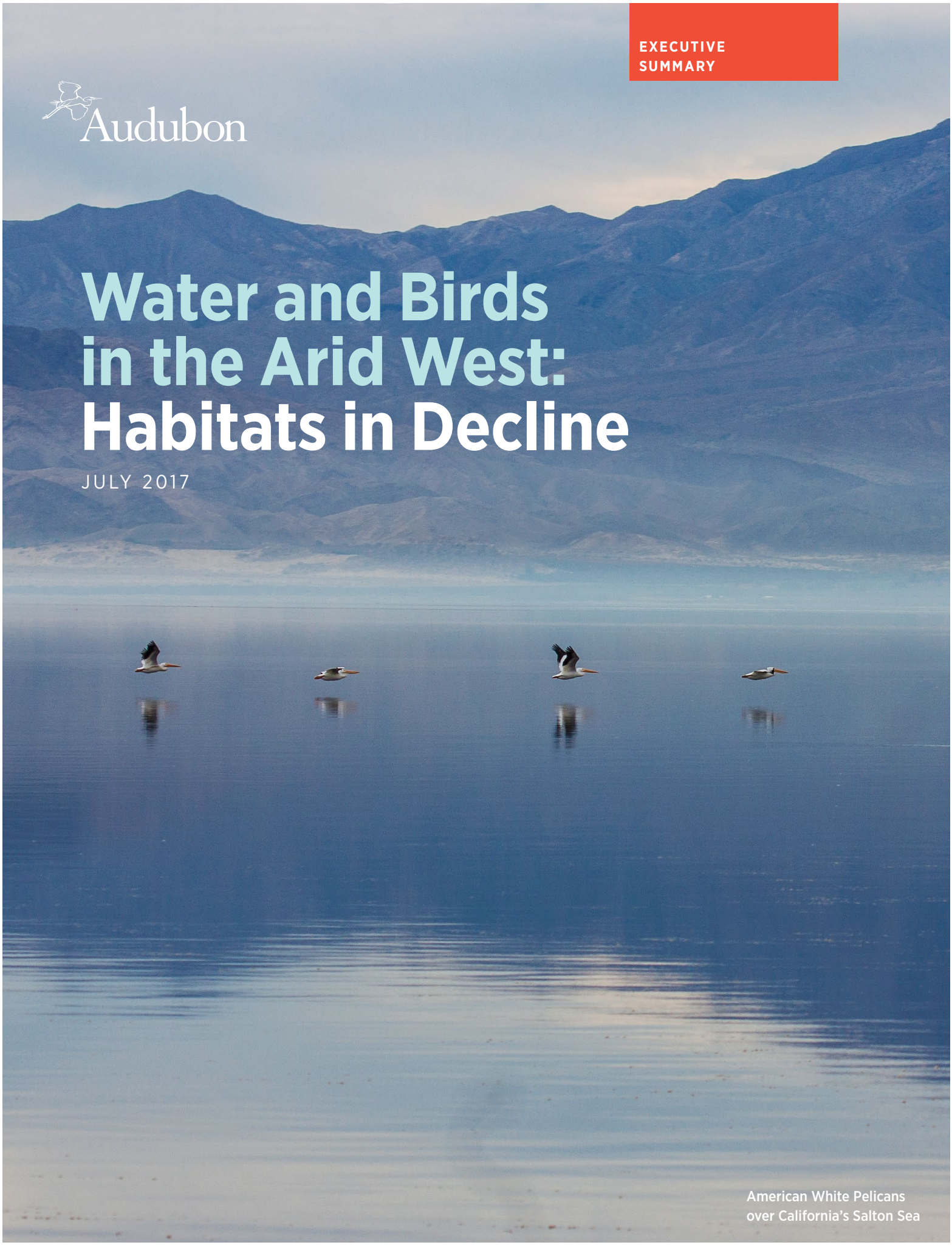
EXECUTIVE SUMMARY

Audubon

Water and Birds in the Arid West: Habitats in Decline

JULY 2017



American White Pelicans over California's Salton Sea

For the full report, visit: audubon.org/westernwater

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FOREWORD

Karyn Stockdale
Western Water Initiative Senior Director

This report is an urgent call to action. Birds tell us there are essential freshwater-dependent habitats throughout the West—these include the rivers of the Colorado River Basin; Great Salt Lake, Salton Sea, and dozens of other saline lakes; the Rio Grande; as well as tributaries, wetlands, and groundwater connections to essential waterways. **But climate change is intensifying droughts, jeopardizing urban and rural community viability and eroding habitat health.**

Our research on the Colorado River Basin confirmed what we suspected: western riparian habitats are in trouble. The individual studies included in our analysis add up to a picture that doesn't look good for birds. Demand for water and climate change have devastated cottonwood-willow forests and other native riparian habitats which support 40% of the bird species in America's Southwest. Birds like the Yellow Warbler and Summer Tanager, once familiar sights along the Colorado River, have experienced significant regional declines. The outlook for Yuma Ridgway's Rail, Western Yellow-billed Cuckoo, and Southwestern Willow Flycatcher, all listed as federally endangered, is especially bleak if current trends continue.

What hasn't been well-documented before this report is the importance of another ecosystem— western saline lakes—for millions of shorebirds and waterbirds, and the implications of its potential loss. The Great Salt Lake and the Salton Sea, along with other less known landlocked salt lakes, are the unsung heroes that birds like the American Avocet and Eared Grebe depend on for survival. Western saline lakes function as a network of critical habitats. Each is a vital link on migratory pathways from winter to breeding grounds and back again. But throughout the West, saline lakes are drying up at an alarming rate, not only eliminating bird habitat but risking regional economies and exposing toxic dust that threatens neighboring communities.

The West's declining water supplies threaten to exacerbate the problems of inequitable access to water—for both the environment and tribal communities—resulting from a legal framework designed more than 100 years ago. Our research shows that waiting to fix water crises is exorbitantly expensive and can have catastrophic consequences for birds and our quality of life.

Audubon's Western Water team, with dedicated staff in key western states and Washington D.C., works to align bird habitat protection and restoration with more reliable water supplies for all communities, while addressing historic injustices. These include disproportionate health impacts associated with water issues at the Salton Sea in California, desiccation of the Colorado River Delta ecosystem in Mexico, and lack of water infrastructure and access to drinking water in many tribal communities. With drought conditions persisting into a third decade and climate change increasingly affecting water supplies and habitat in the West, we see unprecedented urgency for inclusive and equitable solutions that avoid catastrophic water shortages. Audubon advocates for policies, funding, and on-the-ground actions to protect and restore healthy rivers and lakes, for every living thing that depends on them.

Audubon envisions a livable and equitable future in the West. We strive for resilient rivers, wetlands, and lakes that sustain water reliability, and can support birds and people.

OVERVIEW

Water is the most precious resource in the West—for people, birds, and other wildlife. Riparian habitats like the forests and wetlands that line the Colorado River support some of the most abundant and diverse bird communities in the arid West, serving as home to some 400 species. The Colorado River also provides drinking water for more than 36 million people, irrigates 5.5 million acres of farms and ranches, and supports 16 million jobs throughout seven states—with an annual economic impact of $1.4 trillion. But dams, diversions, drought, and water demand are triggering declines in cottonwood-willow forests and other native river habitat. Saline lakes—landlocked saltwater lakes fringed with wetlands found throughout the Intermountain West—are beacons for millions of birds crossing an otherwise arid landscape. However, these lakes are shrinking and in some cases nearly disappearing. In short, precipitous declines in western water quantity and quality are exacting a toll on health, prosperity, and quality of life for rural and urban communities—and putting birds and wildlife at jeopardy.

Water and Birds in the Arid West: Habitats in Decline represents the first comprehensive assessment of the complex and vital relationships that exist among birds, water, and climate change in the region. Our research focused on two of the most imperiled and irreplaceable western ecosystems: 1) the Colorado River Basin; and 2) the West's network of saline lakes—including the Great Salt Lake and Salton Sea as well as other smaller but vitally important lakes. Audubon science staff collaborated with outside experts in hydrology, water chemistry, and ecotoxicology, as well as ornithology, in an extensive review of the scientific literature on birds, water, and climate change in the region, with a particular focus on eight western states: Arizona, California, Colorado, New Mexico, Nevada, Oregon, Utah, and Wyoming. In addition, we synthesized regional bird data from a number of sources to assess impacts on birds in the region, and convened avian experts to deepen our shared understanding of the migratory movement of shorebirds and waterbirds among western saline lakes.

RESEARCH OBJECTIVES:

- Increase our understanding of how the decline of riparian habitat in the Colorado River Basin and at saline lakes is impacting birds
- Assess the status of key western bird species representative of multiple species that depend on riparian and saline lake habitat
- Analyze impacts and threats to these species' habitat posed by lack of available water and the anticipated effects of climate change
- Provide recommendations for water management policy priorities and practices and future science research

"Both people and wildlife need a resilient and reliable water supply in the Colorado River—the kind of forward-looking management suggested in this report will move us closer to that goal."

Anne Castle
Senior Fellow at the Getches-Wilkinson Center for Natural Resources, Energy and the Environment at the University of Colorado School of Law

Western Water Priority Landscapes: The Colorado River Basin and Saline Lakes

WESTERN WATER PRIORITY LOCATIONS

- Saline Lakes
- Rivers of the Colorado River Basin
- Global IBAs (Important Bird Areas)
- WHSRN Sites (Western Hemisphere Shorebird Reserve Network)

The Western Yellow-billed Cuckoo is one of the federally threatened species that relies on western riparian habitat in the Colorado River Basin.

RIPARIAN SYSTEMS OF THE COLORADO RIVER BASIN

Lower Colorado River Basin, Arizona.

Although riparian zones account for less than 5% of the southwestern landscape, they support over 40% of all bird species found in the region and over 50% of breeding bird species. These include at least 400 species along the lower Colorado River. If current western water trends continue and are compounded by climate change, many bird species face diminished and degraded habitat and an uncertain future.

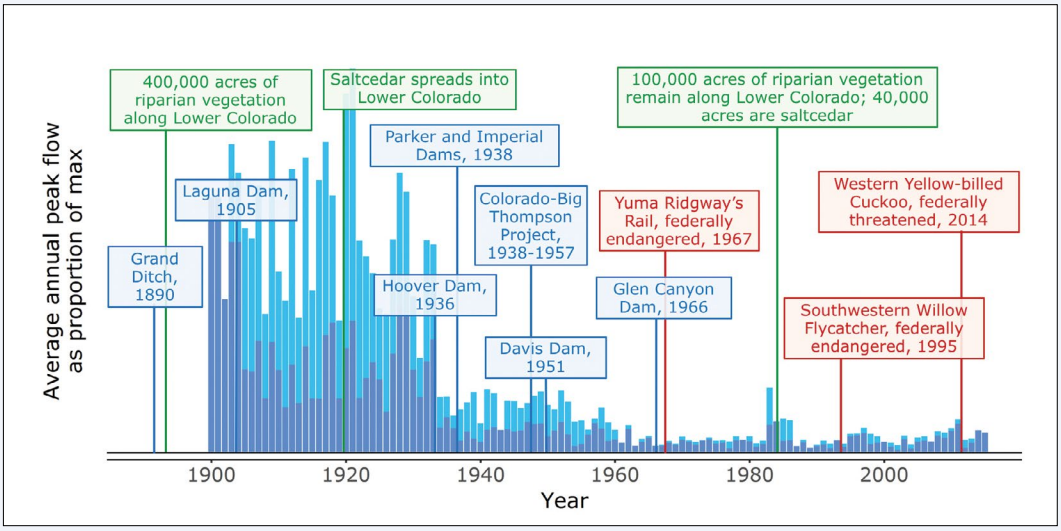
KEY FINDINGS:

- Native riparian trees and shrubs such as cottonwood-willow ecosystems that provide productive habitat for birds and other wildlife are disappearing as a result of water development—including damming, flow regulation, surface water diversion, and groundwater pumping.
- Hydrology changes have also spurred the spread of non-native plants, particularly saltcedar, throughout the Colorado River Basin—reducing biodiversity and the number and variety of birds in many riparian habitats.
- Populations of the following breeding birds, once common along the Colorado River, have experienced significant regional declines: Bell's Vireo, Yellow Warbler, Yellow-breasted Chat, and Summer Tanager.
- Three species, Yuma Ridgway's Rail, Western Yellow-billed Cuckoo, and Southwestern Willow Flycatcher, are now listed as federally threatened or endangered, and at risk of extinction if current trends continue.
- Climate change is projected to exacerbate habitat declines across the basin, reducing water supply, raising temperatures and aridity, and disrupting phenology—the timing of seasonal natural phenomena such as spring floods, plant flowering, and insect hatching.

"Science grounds and guides Audubon's approach to western water. It's an important part of what earns us an influential place at negotiating and policy-planning tables."

Jennifer Pitt, Director of Audubon's Colorado River Project, works with irrigation districts, water utilities, urban water users, tribes, government agencies, and other conservation groups to design agreements that will make the water supply for both people and the environment more reliable.

The Colorado River Basin: How Reduced Flows Impact Birds and Habitat



TIME-SERIES of average annual peak flows in the Lower Colorado River and Colorado Headwaters sub-basins over the past century. Both sub-basins show a sharp decline in the magnitude and variability of peak flows over the past century, concurrent with increasing hydrologic modifications within the Colorado River Basin. Text boxes depict construction of major dams (blue), notable changes in vegetation (green), and federal listing of threatened and endangered species (red) that relate to the lower Colorado River as a case study of change. Peak flow data are from the National Water Information System (USGS 2016b).

COLORADO RIVER BASIN PRIORITY BIRDS

- Yuma Ridgway's Rail
- Sandhill Crane
- Western Yellow-billed Cuckoo
- Southwestern Willow Flycatcher
- Bell's Vireo
- Yellow Warbler
- Yellow-breasted Chat
- Summer Tanager

PHOTO: ECOFLIGHT

SUCCESS STORY: BRINGING A DESICCATED DELTA BACK TO LIFE

The 2014 Colorado River pulse flow taught us just how resilient habitat can be. For nearly two decades, the river had failed to reach the sea. But in 2014, billions of gallons of water flowed for three weeks to its long-dry delta as part of the agreement between the U.S. and Mexico. The Colorado River "pulse flow" proved that a limited return of water can have immediate impacts on even on the most desiccated of landscapes, providing a scientific argument for continued work in this area. A 2016 International Boundary and Water Commission (IBWC) report on the pulse flow describes the results: newly germinated plants and increases in bird diversity and abundance. Further studies will help demonstrate if these encouraging developments will hold.

SALINE LAKES AND WETLANDS OF THE WEST

We focused our analysis on the nine western saline lakes with the greatest importance for birds. More than half of these have shrunk by 50 to 95% over the past 150 years. However, despite widespread awareness of the importance of water—and concern about adequate western water supply—much of the available research on saline lakes and birds was focused on individual lakes. By bringing these isolated studies together, we were able to better understand how birds "use" the widely dispersed lakes and wetlands as an interconnected network of habitats. No other linked ecosystems in the Intermountain West can meet these species' requirements—and because shorebirds and waterbirds congregate in large numbers at major lakes, they are particularly vulnerable to habitat loss.

KEY FINDINGS:

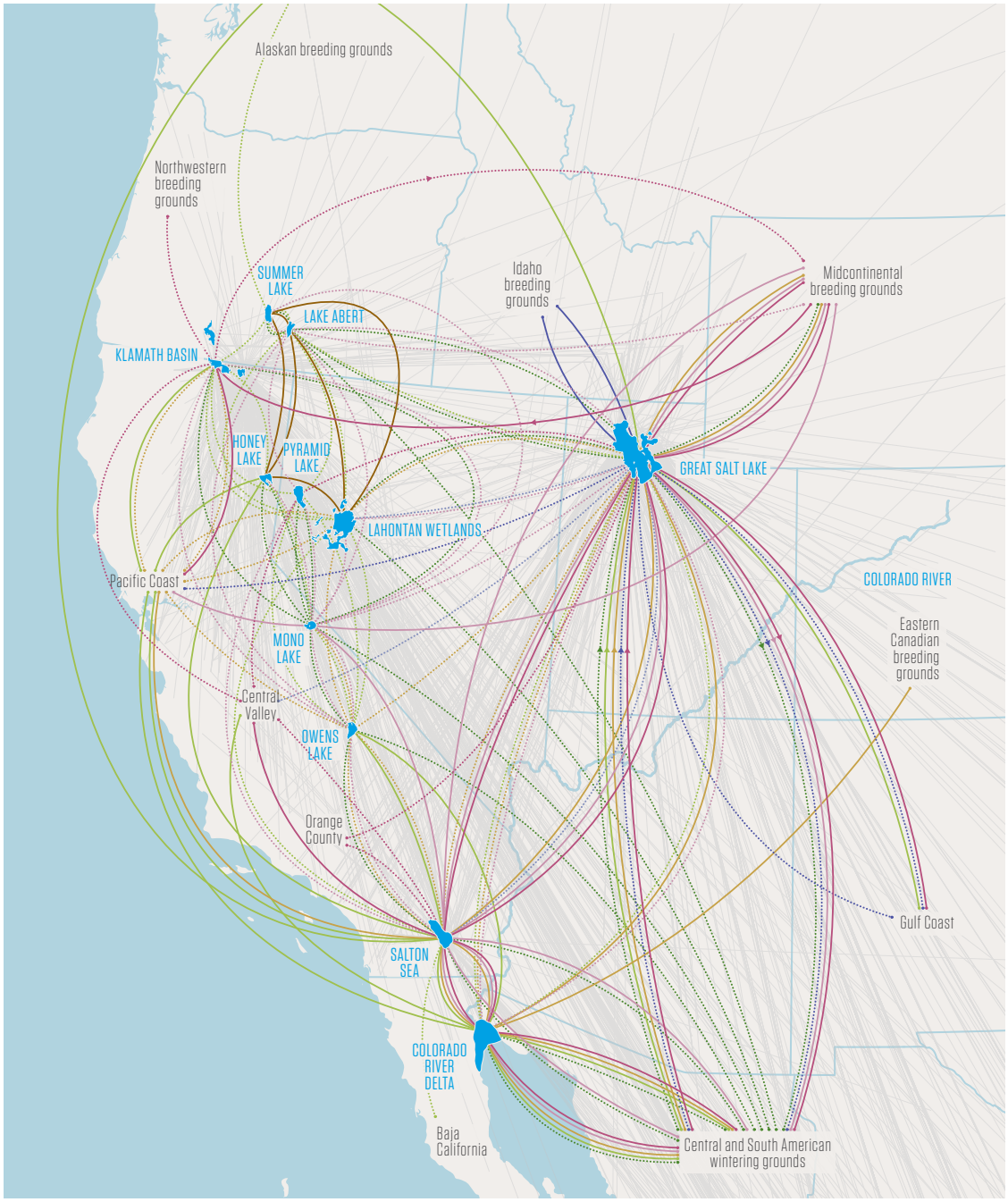
- Collectively, saline lakes in the West support global populations of birds, including over 99% of the North American population of Eared Grebes, up to 90% of Wilson's Phalaropes, and over 50% of American Avocets.
- Saline lakes are critically important to migratory shorebird species, whose populations have declined nearly 70% since 1973.
- Water levels in saline lakes have declined dramatically in the last 100+ years due to draining, diversions of inflows, and lake and groundwater extraction.
- Lower water levels have increased lake salinity, altering food webs and reducing invertebrate food sources for migrating and resident shorebirds and waterbirds.
- Drier conditions under climate change will exacerbate the impacts of water diversion on saline lakes by decreasing freshwater inflows.

"It's natural to seek a solution for the lake's woes that will benefit people and birds. When you protect the environment, you protect people."

Frank Ruiz, Director of Audubon's Salton Sea Program, envisions a Salton Sea where wetlands and habitat restoration also reduce asthma-causing dust, offer nesting habitat to birds, and draw ecotourists to the economically struggling region.

Side-by-side comparisons of satellite imagery for selected priority saline lakes in 1985 and 2015; two years separated in time for which precipitation across the western U.S. was similar for a two-year period (1984-85 and 2014-15).

Saline Lakes: a Critical Web for Waterbirds, Waterfowl, and Shorebirds



MAP KEY

Lines link known and suspected migration paths among the saline lakes and to other sites. Each color represents a different priority species (listed at right). Arcs show connections between sites, not exact routes.

- Known connection
- Suspected or weak connection
- Connection, based on banding data, from a saline lake to another North American site

Spring migration paths arc to the left or top.

Autumn migration paths arc to the right or bottom.

SUCCESS STORY: OWENS LAKE

Work initiated by Audubon and partners two decades ago demonstrates how science-based planning can restore vital bird habitat, even with limited water. By directing relatively small amounts of water to southern California's saline Owens Lake, we were able to create an array of distinct bird habitats. This experiment in habitat restoration was a resounding success: in a recent spring count, 115,000 birds—including 20 different shorebird species—were tallied.

SALINE LAKES PRIORITY BIRDS

- American White Pelican
- Eared Grebe
- Ruddy Duck
- White-faced Ibis
- American Avocet
- Marbled Godwit
- Western Snowy Plover (Not included on map)
- Western Sandpiper
- Wilson's Phalarope

RECOMMENDATIONS

Approaches to western water that protect the needs of birds and wildlife as well as people are possible, but only if stakeholders align good outcomes for water-dependent habitats with solutions that decrease shortage risks for people. Ultimately, the challenge is to find sustainable ways for people and birds to use water and co-exist in the West. That is where Audubon—and this report—comes in. By providing a clear, credible assessment of the importance of sound western water management for birds and habitat, we can mobilize the Audubon network of members, chapters, and others who love birds around balanced water solutions. The following recommendations provide a springboard for conservation action; they also lay the foundation for further research and the development of innovative water management solutions.

- **Identify and support balanced solutions and water policies** at the local, state, and federal levels that avoid depleting water supplies for rivers, lakes, and wetlands and associated habitats
- **Engage with water users, policy-makers and community leaders** to collectively improve understanding of the importance of finding solutions that work for people and birds
- **Train and mobilize the Audubon network** on behalf of creative, sensible water solutions and policies
- **Increase public and private investment** in water conservation, habitat restoration, and research
- **Secure voluntary water-sharing agreements**, including market-based solutions, and encourage flexible water management practices to improve water flows for habitats
- **Leverage our science** to develop and implement management plans that factor in habitat needs and restoration of native vegetation
- **Foster greater dialogue and action** to reduce global climate change and its impacts on water availability
- **Advance scientific understanding** of bird populations and habitat linkages across western landscapes through additional research, field study, and monitoring
- **Use climate change and connectivity modeling** to prioritize conservation and restoration

HOW AUDUBON AND PARTNERS CAN ADVANCE BALANCED SOLUTIONS

Increase the reliability of water supplies for communities across the West and prevent continued dewatering of rivers, lakes, and wetlands and associated habitats

Define habitat connectivity to prioritize restoration

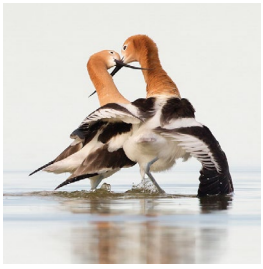
Increase dollars available for water conservation and habitat restoration

Grow support for flexible management tools like voluntary water markets

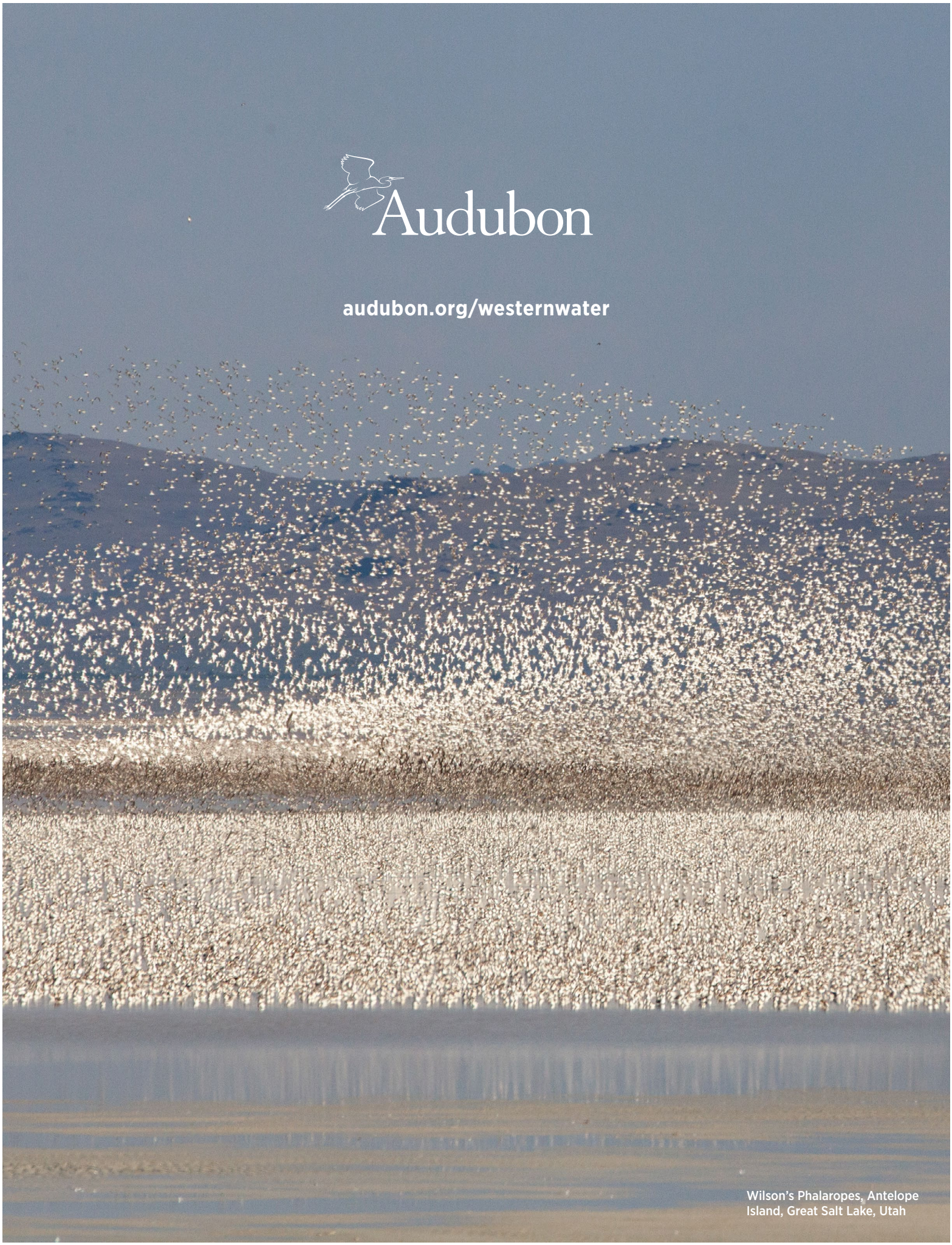
Great Blue Heron over the Salton Sea.

CONCLUSION

Water management practices that fail to take into account ecosystem health and the impacts of climate change are the greatest threats to birds that rely on the Colorado River Basin and western saline lakes. It is our hope that the findings and recommendations in this report will play a vital and much-needed role in shaping the future of water in the West. Decisions about water allocation and management are being made now: cities, states, and even countries are coming to the table to develop water solutions. The challenges we face on the Colorado River and across saline lakes are significant. However, this does not mean there is not enough water to go around. There is. We need a new phase of collaboration, innovation, and flexibility when it comes to how we use, share, and manage water, coupled with investments in water conservation, improved infrastructure, and habitat restoration. Solving these water management challenges will enable the people, birds, and wildlife of the arid West to thrive together—now and into the future.



The American Avocet is one of many species of waterbirds that depend on the West's network of saline lakes.



Wilson's Phalaropes, Antelope Island, Great Salt Lake, Utah