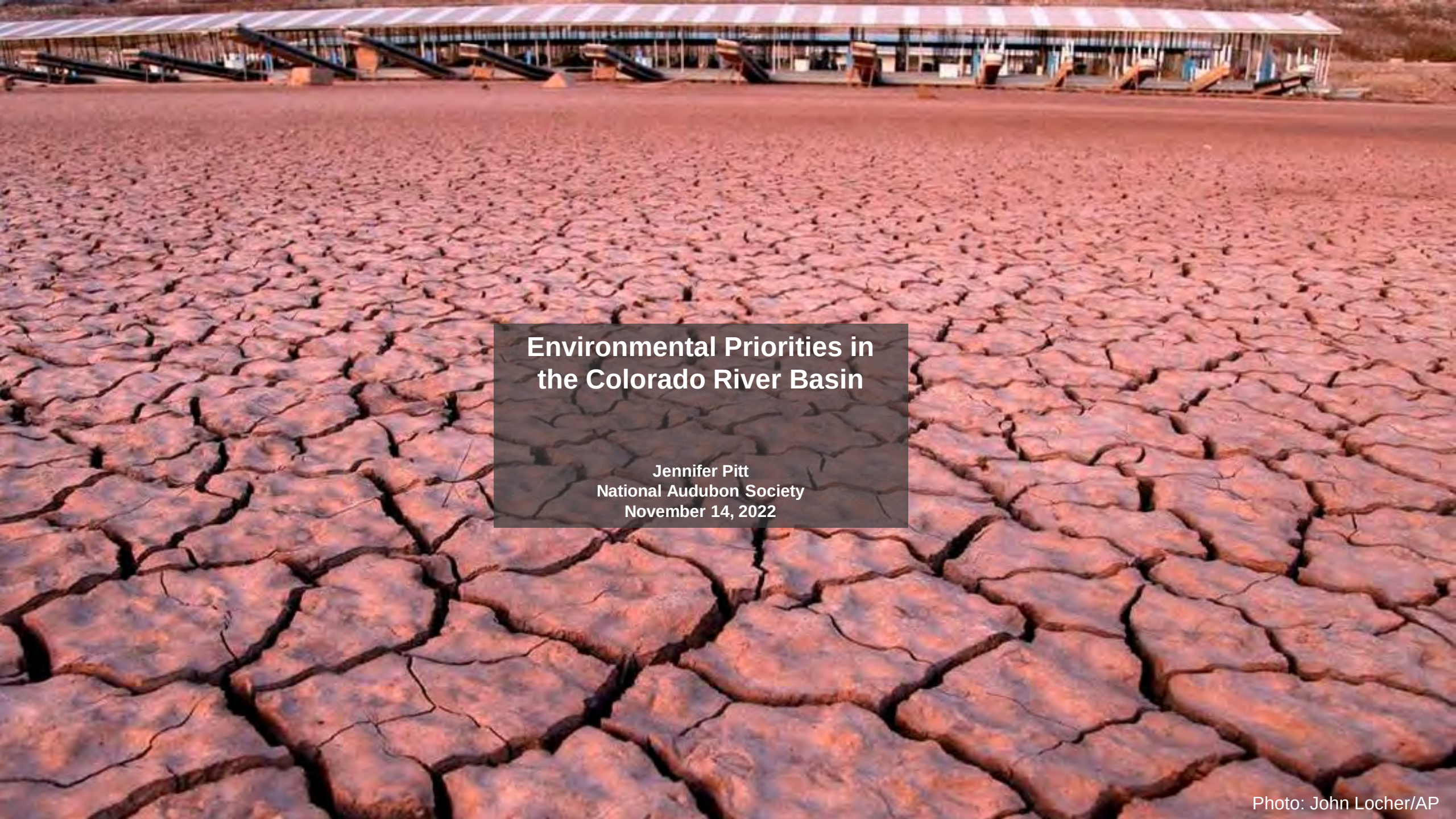
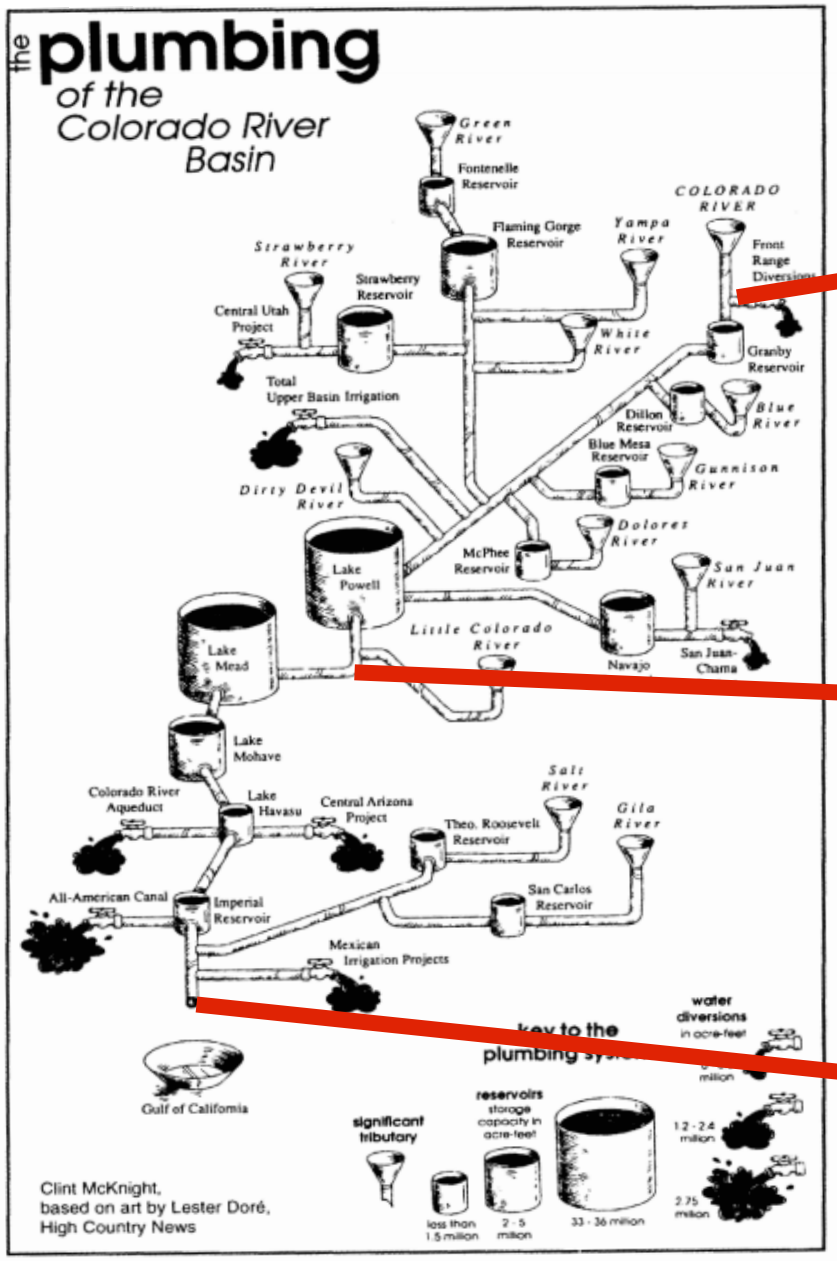


Environmental Priorities in the Colorado River Basin

Jennifer Pitt
National Audubon Society
November 14, 2022

Photo: John Locher/AP


the plumbing of the Colorado River Basin
Green River
Fontenelle Reservoir
Flaming Gorge Reservoir
Yampa River
COLORADO RIVER
Front Range Diversions
Strawberry River
Strawberry Reservoir
Central Utah Project
White River
Granby Reservoir
Total Upper Basin Irrigation
Dillon Reservoir
Blue River
Blue Mesa Reservoir
Gunnison River
Dirty Devil River
Dolores River
McPhee Reservoir
Lake Powell
San Juan River
Little Colorado River
Navajo
San Juan-Chama
Lake Mead
Lake Mohave
Salt River
Colorado River Aqueduct
Lake Havasu
Central Arizona Project
Theo. Roosevelt Reservoir
Gila River
All-American Canal
Imperial Reservoir
San Carlos Reservoir
Mexican Irrigation Projects
Gulf of California
key to the plumbing
water diversions
in acre-feet
million
reservoirs
storage capacity in acre-feet
1.2 - 2.4 million
2.75 million
significant tributary
less than 1.5 million
2 - 5 million
33 - 36 million
Clint McKnight, based on art by Lester Doré, High Country News

Colorado River supports wildlife

Audubon

Rocky Mountain bighorn sheep

Yellow-billed cuckoo

Sandhill crane

Razorback sucker

Humpback chub

Yuma Ridgway's Rail

Elf owl

North American river otter


RIVER RUNNERS
NRS

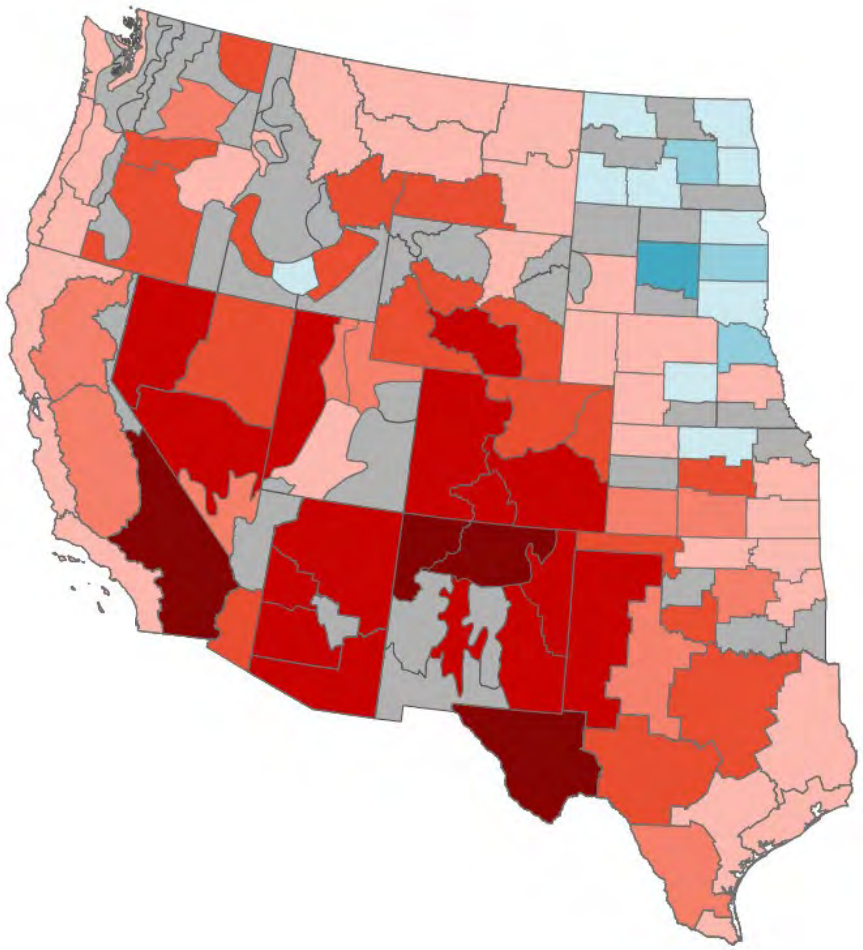
Upper Basin Forested Headwaters

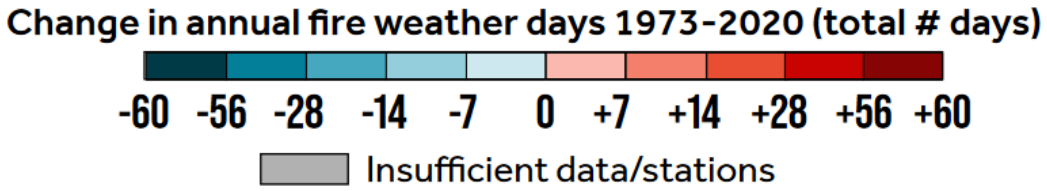
BEETLES: 20 years of impact on forests

Photos: Denver Post

FIRE: Climate change causing increase in annual fire weather days

- **Heat**
- **Low humidity**
- **Wind**





Source: NOAA/NCEI's Local Climatological Data, Climate Central analysis

2020 Grizzly Creek Fire 32,631 acres on Colorado River above Glenwood Springs

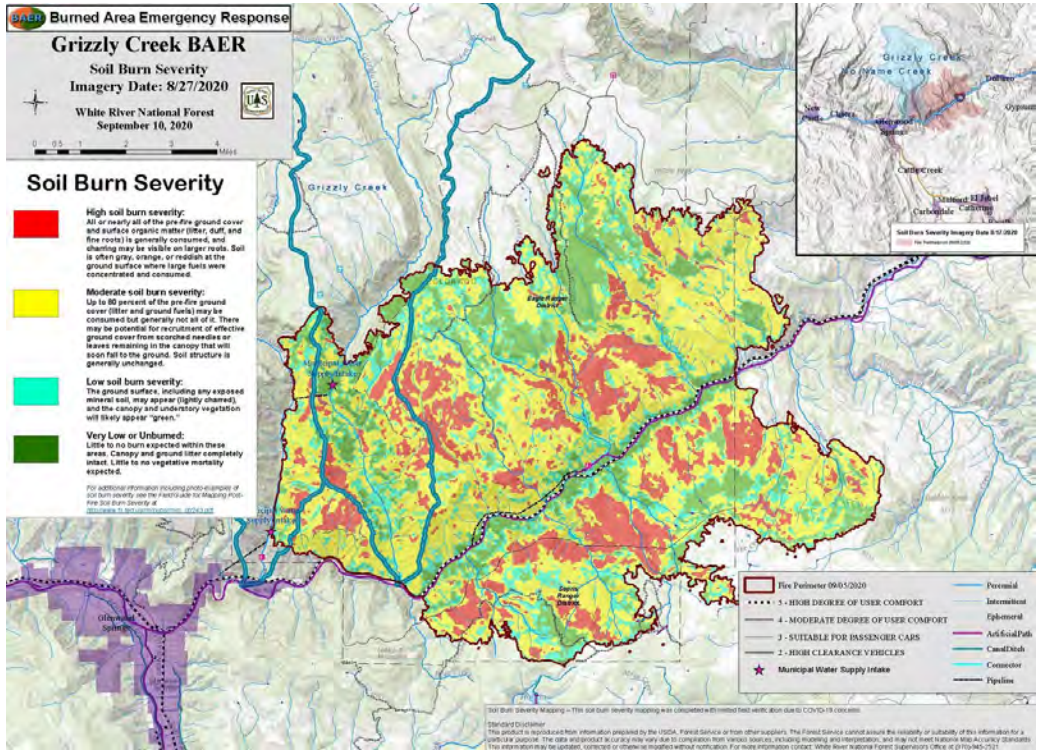


Photo: Glenwood Springs Post-Independent

2021 mudslides: highway closed in Glenwood Canyon, river choked with sediment

Photo: Hugh Carey/The Colorado Sun

TEN STRATEGIES FOR CLIMATE RESILIENCE IN THE COLORADO RIVER BASIN

THE REPORT

adapt reduce mitigate strengthen

Summary of Ten Investment Strategies and Benefits

Strategy		Benefits for Climate Resilience
Forest Management & Restoration	Prioritize forest management and restoration to maintain system functionality and biodiversity	Regulate snow melt runoff Sequester carbon Create jobs and reduce emergency costs
Natural Distributed Storage	Restore degraded natural meadow systems to improve local aquifer recharge and water retention, reconnect historic floodplains, and support productive meadows and riparian ecosystems	Build resistance to and support recovery from extreme weather events Sequester carbon Improve land value and ranch economics
Regenerative Agriculture	Promote farming and ranching principles and practices that enrich soils, enhance biodiversity, restore watershed health, and improve overall ecosystem function and community health	Build resistance to extreme weather events Enhance water-holding capacity of soils Sequester carbon Improve farm and ranch economics
Upgrading Agricultural Infrastructure & Operations	Upgrade diversion, delivery, and on-farm infrastructure and operations, including irrigation systems	Increase water efficiency Reduce consumptive use Sequester carbon or reduce greenhouse gas emissions Improve farm economics
Cropping Alternatives & New Market Pathways	Develop on-farm operational shifts, as well as market and supply chain interventions, to incentivize water conservation, e.g. shifting to lower water-use crops	Provide options for producers experiencing impacts to crop productivity Reduce consumptive use Reduce greenhouse gas emissions Improve economic viability of farms
Urban Conservation & Reuse	Incentivize conservation technologies, indoor and outdoor conservation programs, and direct and indirect potable reuse	Increase water efficiency Reduce consumptive use Reduce greenhouse gas emissions Create jobs and limit rate shocks and impacts of water shortages
Industrial Conservation & Reuse	Incentivize modifications and upgrades to reduce water use and increase energy efficiencies	Increase water and energy efficiency Reduce consumptive use and/or offset water use Reduce greenhouse gas emissions Support water-smart economic development
Coal Plant Retirement Water	Purchase or reallocate water rights from closed or retiring coal plants to be used for system or environmental benefits, or other uses	Dedicate water to system or environmental benefit Repurpose water (e.g. drinking water) Reduce greenhouse gas emissions
Reducing Dust on Snow	Improve land management practices to reduce the dust on snow effect—which controls the pace of spring snowmelt that feeds the headwaters of the Colorado River	Improve snowmelt and runoff dynamics Improve water yields

Forest Management & Restoration

- Mitigating wildfire risk
- Protecting communities
- Improving wildlife habitat
- Safeguarding water quality
- Climate adaptation and resilience
- Recreation
- Influencing watershed hydrology
- Snowpack management

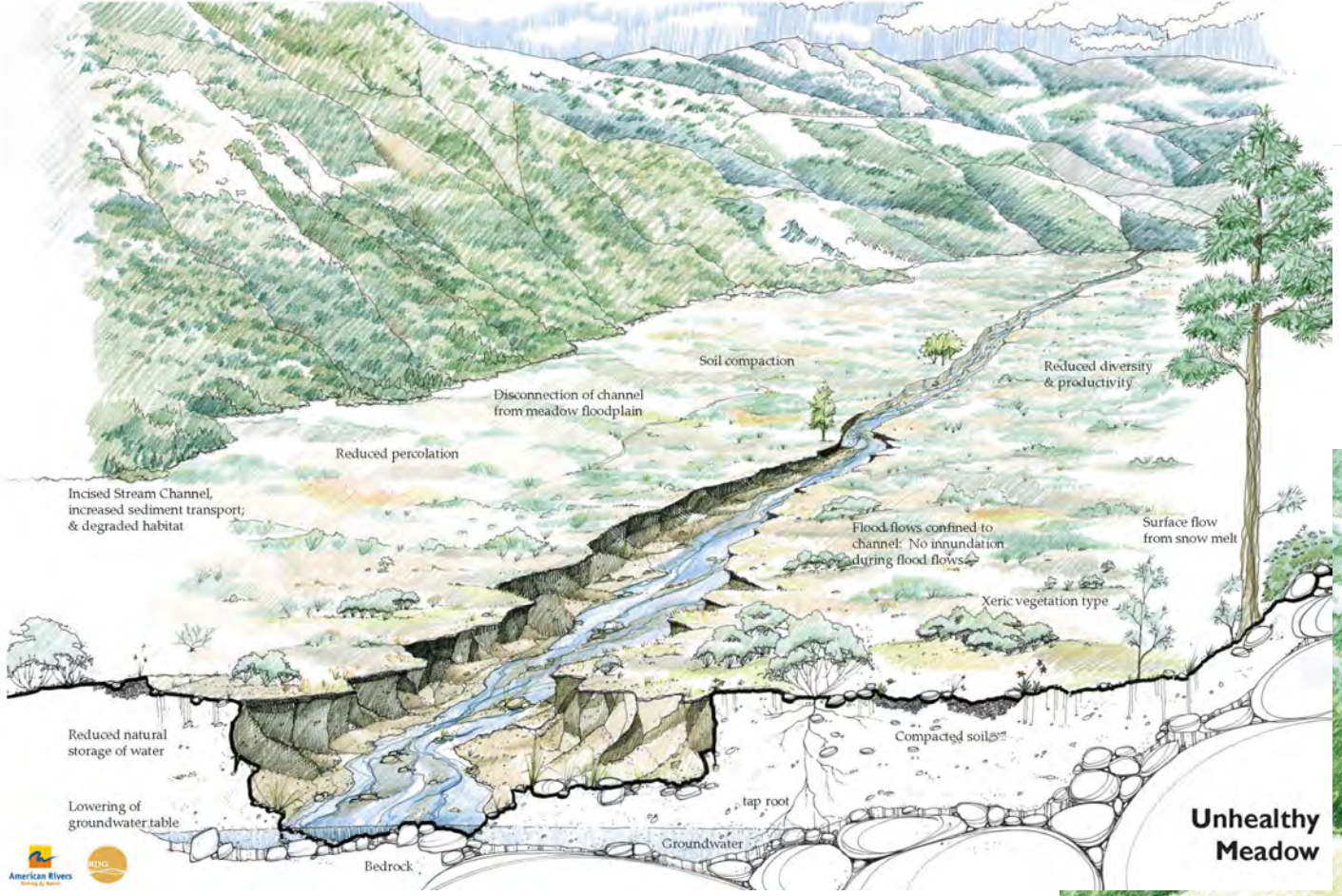
Natural Distributed Storage

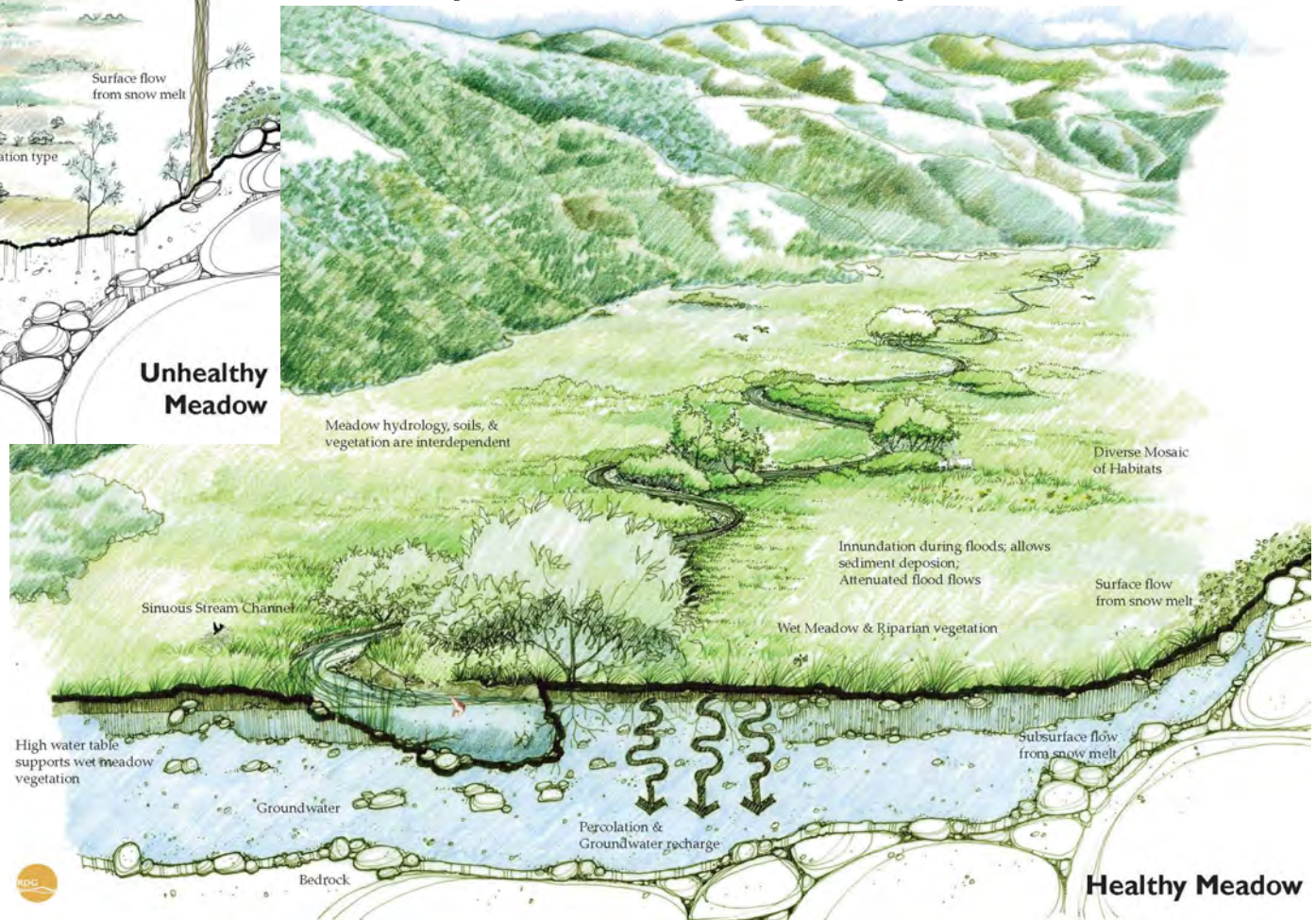
Restoring highly degraded natural meadow systems to improve local aquifer recharge, water retention, reconnect historic floodplains, and support productive meadows and riparian ecosystems

Audubon

Wet meadow restoration can:

- create fire breaks
- increase groundwater recharge
- improve forage & species habitat





Regenerative Agriculture

Promoting voluntary farming and ranching principles and practices that enrich soils, enhance biodiversity, restore watershed health, and improve overall ecosystem function and community health

Upgrading Agricultural Infrastructure & Operations

Upgrading diversion, delivery and on-farm infrastructure and operations, including irrigation systems, to improve water conservation

Water Temperature: fishing closures

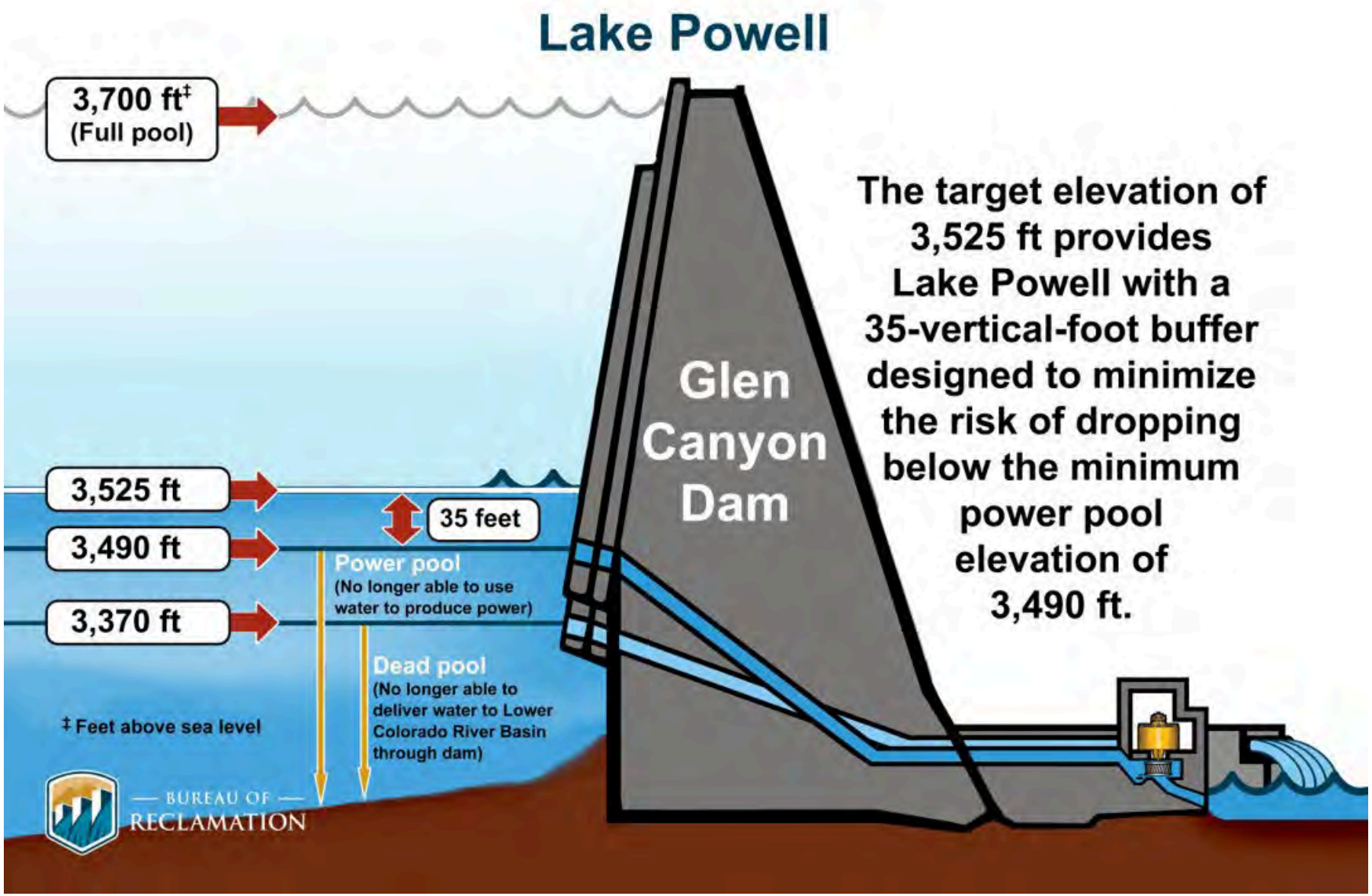
Photo: Matt Stensland/Special to The Colorado Sun

2021 Dolores River below McPhee Reservoir

Photo: Cody Perry/Rig to Flip

Upper Basin System Conservation and Demand Management

Grand Canyon


Lake Powell
3,700 ft‡
(Full pool)
3,525 ft
3,490 ft
3,370 ft
35 feet
Power pool
(No longer able to use water to produce power)
Dead pool
(No longer able to deliver water to Lower Colorado River Basin through dam)
‡ Feet above sea level
BUREAU OF RECLAMATION
Glen Canyon Dam
The target elevation of 3,525 ft provides Lake Powell with a 35-vertical-foot buffer designed to minimize the risk of dropping below the minimum power pool elevation of 3,490 ft.

Lower Colorado River Multi-Species Conservation Program

Audubon

A Lifeline in the Desert

Groundwater makes up 40% of the state's water supply. We use it for drinking, growing food, and fueling different industries, from mining to thermoelectric energy.

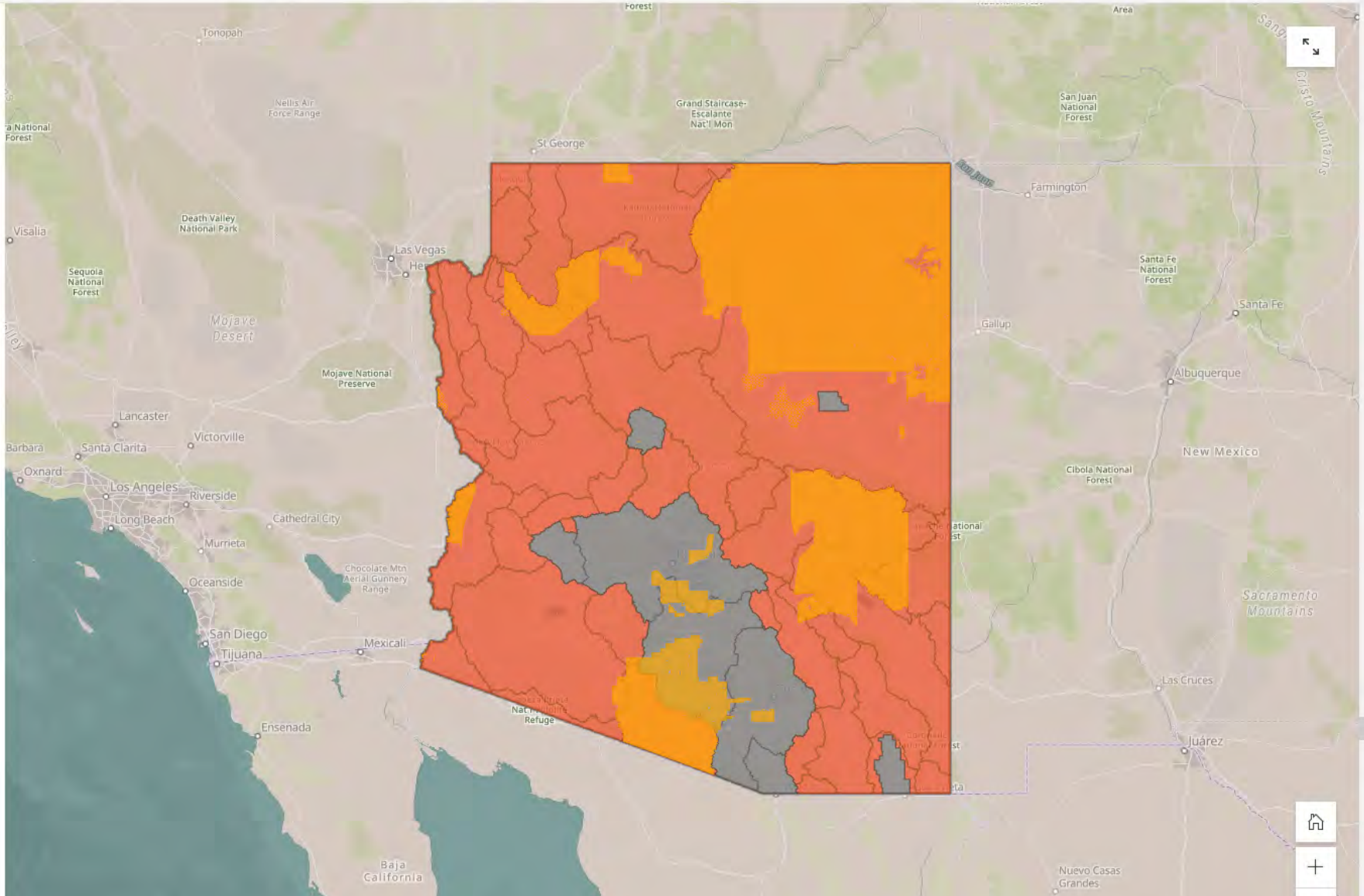
Source: Arizona Department of Water Resources

Agua Fria River. Kevin/Flickr (CC BY-NC 2.0)

Outside of **AMAs** and **INAs**—in what we sometimes call greater, or **rural Arizona**—groundwater is still largely unregulated. Outside of **sovereign tribal lands**, groundwater in rural Arizona is still governed only by the legal doctrine of "reasonable use" where there no limits on how much groundwater can be used

And rural Arizona is not completely rural anymore. It includes some fast-growing areas. The areas outside of the AMAs make up about 80% of the state's land area and are home to more than 1.5 million people.

Note: *The web map on the right is interactive.*



Salton Sea:
Declining inflows post QSA-transfer creating exposed playa, air quality impacts, habitat loss

Photo: Mike Fernandez/Audubon

More restoration at the Salton Sea – and faster

Urban & Industrial Conservation & Re-Use

Incentivizing conservation technologies, indoor and outdoor conservation programs, and direct and indirect potable reuse without negatively impacting downstream fish, wildlife, or ecosystem functions

Tribal Water Considerations

Colorado River Delta:
Elimination of flows resulted in near-complete loss of 1.5 million acre ecosystem

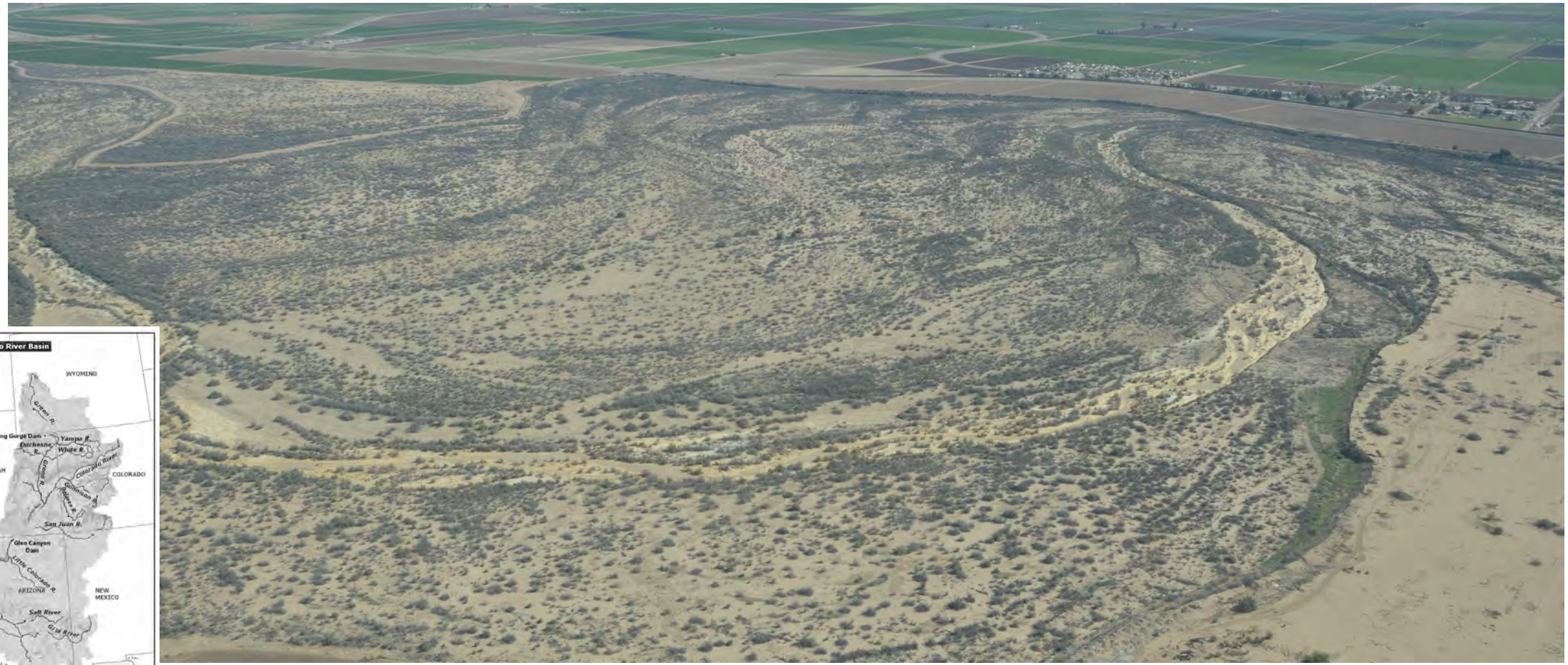


Photo: Jennifer Pitt/Audubon

Historic Agreement: Minute 319

2013-2017

Less “who gets what” and more “how we share in times of plenty and drought”

New flexibility for Mexico to store water in US reservoirs (Lake Mead)

Binational joint investments in water conservation

US and MX commitments to deliver water to the Colorado River Delta, matched by private trust

Commitment to renegotiate longer-term agreement

Environmental Flows, Restoration and Science

Minute 319 (2012 – 2017)

- **195 mcm (158,088 acre-feet) from US, Mexico, and NGOs (1/3 each)**
  - Pulse flow and base flow
- **$3.35M for restoration**
- **science and monitoring ($ not defined)**

Minute 323 (2017 – 2026)

Resources from US, Mexico, and NGOs (1/3 each):

- **259 mcm (210,000 acre-feet)**
- **$9M for restoration**
- **$9M for science and monitoring**

2022: 143 days of uninterrupted river flows

photo: Jesús Salazar/Raise the River

photo: Claudio Contreras Koob/Audubon


photos: Claudio Contreras Koob/Audubon

photo: Claudio Contreras Koob/Audubon

photo: Claudio Contreras Koob/Audubon