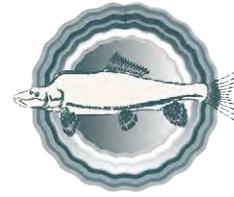


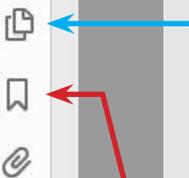
Program Highlights



Upper Colorado River Endangered Fish Recovery Program

San Juan River Basin Recovery Implementation Program



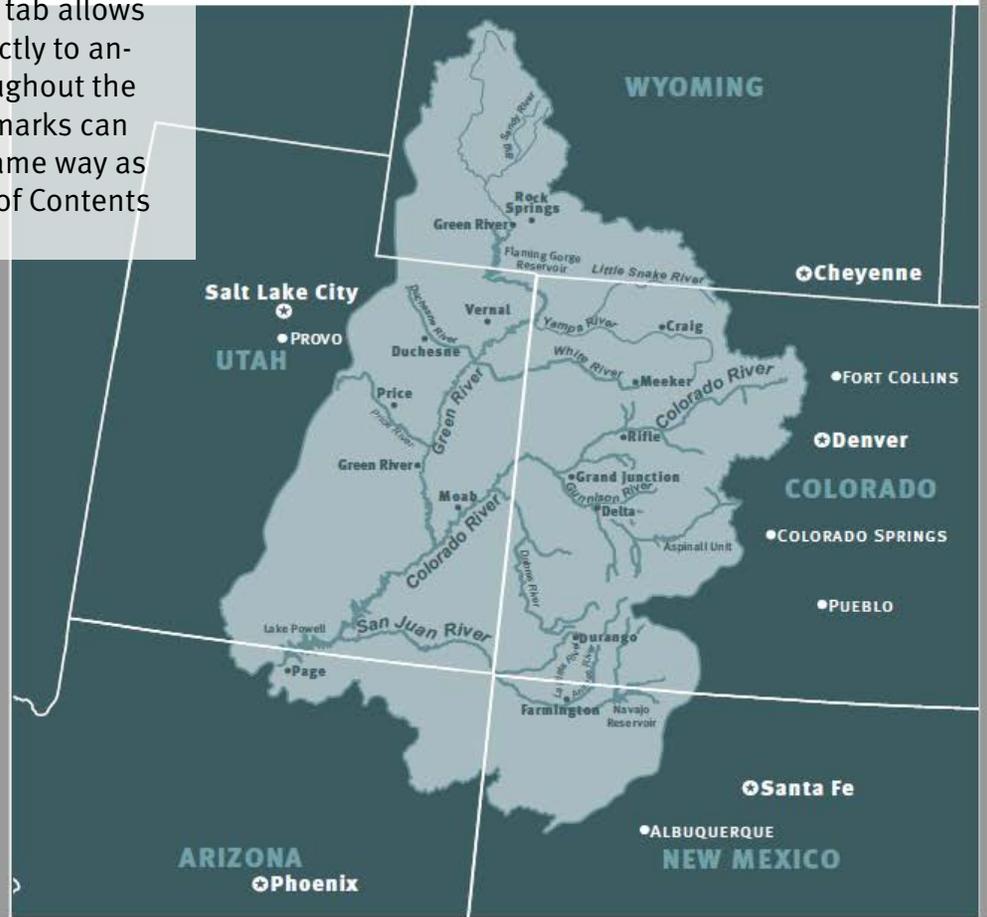


Page Thumbnails: This tab allows you to see thumbnails of all of the pages in the document. You can move from one page to another by clicking on the page image.

Bookmarks: This tab allows you to move directly to anchored text throughout the document. Bookmarks can be used in the same way as the linked Table of Contents

Program Highlights

Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program



Bookmarks

- 2020 Briefing Summary
 - Committed Collaborative Partnerships That Work
 - Annual and Capital Funds Provide Resources to Focus on Seven Elements of Recovery
 - Status of the Endangered Colorado River Fishes
 - Recovery Programs' Future after 2023
- 2020 Financial Summary
 - Endangered Species Act Compliance Streamlined for Water Projects
 - Expenditures Upper Colorado Program
 - Expenditures San Juan Program
 - Cost-Sharing Commitments and Power Revenues
- 2020 Species Updates
 - Humpback Chub
 - Razorback Sucker

2020 Combined Updates
Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program

Table of Contents

2020 Briefing Summary

- [Committed Collaborative Partnerships That Work](#) 3
- [Annual and Capital Funds Provide Resources to Focus on Seven Elements of Recovery](#) 3
- [Short Update of Species Recovery Programs' Future after 2023](#) 4-5

2020 Financial Summary

- [Endangered Species Act Compliance Streamlined for Water Projects](#) 6
- [Expenditures Upper Colorado River Endangered Fish Recovery Program](#) 7
- [Expenditures San Juan River Basin Recovery Implementation Program](#) 8
- [Cost-Sharing Commitments and Power Revenues Support Species Recovery](#) 9

2020 Species Updates

- [U.S. Fish & Wildlife Service Proposes Downlisting Humpback Chub to Threatened](#) 10
- [Signs of Natural Recruitment Increase for Razorback Sucker](#) 11
- [Mixed Results for Colorado Pikeminnow in Basin](#) 12-13
- [Bonetail Diet Study Shows Promise](#) 13

The Path to Fish Recovery in the Upper Colorado River Basin

- [The Path: Recovery Elements](#) 15
- [Colorado River Basin Endangered Fish Status Report](#) 16-17

The Recovery Program Partners

- [The Upper Colorado and San Juan Recovery Program Partners](#) 18

**TO NAVIGATE TO ANY PAGE
PLEASE CLICK ON THE LINK IN THE TABLE OF CONTENTS
OR USE THE BOOKMARKS TAB**

2

You can use the Table of Contents or the Bookmarks Tab to take you to the same place in the document.

The Table of Contents has links that take you to the content indicated in the table.



2020 Combined Updates

Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program



Table of Contents

2020 Briefing Summary

| | |
|---|-----|
| Committed Collaborative Partnerships That Work | 3 |
| Annual and Capital Funds Provide Resources to Focus on Seven Elements of Recovery | 3 |
| Short Update of Species | 4-5 |
| Recovery Programs' Future after 2023 | 5 |

2020 Financial Summary

| | |
|--|---|
| Endangered Species Act Compliance Streamlined for Water Projects | 6 |
| Expenditures Upper Colorado River Endangered Fish Recovery Program | 7 |
| Expenditures San Juan River Basin Recovery Implementation Program | 8 |
| Cost-Sharing Commitments and Power Revenues Support Species Recovery | 9 |

2020 Species Updates

| | |
|---|-------|
| U.S. Fish & Wildlife Service Proposes Downlisting Humpback Chub to Threatened | 10 |
| Signs of Natural Recruitment Increase for Razorback Sucker | 11 |
| Mixed Results for Colorado Pikeminnow in Basin | 12-13 |
| Bonytail Diet Study Shows Promise | 13 |

The Path to Fish Recovery in the Upper Colorado River Basin

| | |
|--|-------|
| The Path: Recovery Elements | 15 |
| Colorado River Basin Endangered Fish Status Report | 16-17 |

The Recovery Program Partners

| | |
|---|----|
| The Upper Colorado and San Juan Recovery Program Partners | 18 |
|---|----|

**TO NAVIGATE TO ANY PAGE
PLEASE CLICK ON THE LINK IN THE TABLE OF CONTENTS
OR USE THE BOOKMARKS TAB**



2020 Briefing Summary

Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program



Committed Collaborative Partnerships That Work

The **Upper Colorado River Endangered Fish Recovery Program** (Upper Colorado Program) was established in 1988. The goal of the Upper Colorado Program is to recover four fish species (Colorado pikeminnow, humpback chub, razorback sucker, and bonytail) of the Colorado River basin listed as endangered under the Endangered Species Act (ESA) in the Green and Colorado river basins while water development proceeds in accordance with state, tribal and federal law.

The **San Juan River Basin Recovery Implementation Program** (San Juan Program) was established in 1992 to recover Colorado pikeminnow and razorback sucker in the San Juan River basin.

Both programs

- are partnerships among the states, the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Western Area Power Administration, other federal agencies, tribes, environmental interests, hydropower customers and water users,
- operate in accordance with state water and wildlife law and interstate water compacts,
- apply adaptive management to improve fish populations and promote healthy ecosystems,
- use capital funds to build infrastructure and annual funds for management actions to support recovery, and (stated below)
- provide ESA compliance for over 2,500 federal, nonfederal and tribal water and hydropower projects.

See pages 3-4 in the “*Program Highlights*” publication to learn more about the partners and how the recovery programs were formed.

Annual and capital funds provide resources to focus on seven elements of recovery:

Funding for the program is provided by congressional appropriations to the Bureau of Reclamation and U.S. Fish and Wildlife Service; Colorado River Storage Project hydropower revenues from federal hydropower customers, the states of Colorado, Utah, Wyoming and New Mexico, and water users. The partners allocate annual and capital funds to recovery activities and projects to recover the endangered fish.

- **Instream Flow Management** — work cooperatively with federal, state, and local water managers to provide flows for endangered fish.
- **Habitat Restoration** — reconnect historical habitat with fish passages, create habitat in flood plains, and screen irrigation canals to prevent entrainment of endangered fish.
- **Nonnative Fish Control** — work with state partners to manage nonnative sportfisheries in a manner that is compatible with endangered species recovery.
- **Information and Education** — communicate to the general public the need for the programs and their accomplishments.
- **Propagation and Stocking** — stock endangered fish raised in hatcheries to reestablish self-sustaining populations in the rivers.
- **Research and Monitoring** — evaluate management actions to provide the scientific basis for decision making and monitor fish populations’ progress toward recovery.
- **Program Management** — adaptively manage on-the-ground recovery actions within budgetary constraints to achieve recovery.

See pages 7 -21 in the “*Program Highlights*” publication to learn more about the seven elements of recovery.

Status of the Endangered Colorado River Fishes



HUMPBAC CHUB

Lives 40+ years. Completes life cycle in short stretches of deep canyon habitat.

STATUS: 'Endangered' since 1967. Proposed downlisting to 'Threatened' published January, 2020.

GOOD NEWS: Grand Canyon population has rebounded from ~5,000 adults in the year 2000 to nearly 11,000 adults currently. Most Upper Basin populations appear stable.

MAJOR ACCOMPLISHMENTS: Flow and temperature management, and nonnative fish control actions appear to be on target and providing positive results.

WHAT'S NEXT: Final downlisting rule anticipated in late 2020 pending the results of the public comment period. Revision of Recovery Goals will likely begin once the downlisting process has been completed.

RAZORBACK SUCKER

Lives 40+ years. River populations spawn during peak flows in the spring; larval razorback sucker need warm productive floodplain habitat to survive. This species can also complete its life cycle in reservoirs and reservoir inflow areas in Lake Powell.

STATUS: 'Endangered' since 1991. Recommended for downlisting to 'Threatened'

MAJOR ACCOMPLISHMENTS: Stocked razorback sucker

continue to spread across the upper basin, actively spawning and producing viable larvae in many locations. Captures of wild juvenile razorback sucker are increasing throughout the Upper Basin. Lower basin populations are generally stable through active stocking.

GREATEST REMAINING THREAT: Persistent high densities of invasive predatory fish prey on young razorback sucker, limiting recruitment.

WHAT WE'RE DOING ABOUT IT: Managing spring flows; controlling nonnative fish; increasing the number of floodplain wetlands to provide safe nursery habitat to promote self-sustaining populations in the wild.

WHAT'S NEXT: A proposed downlisting rule will be published in the Federal Register in 2020.



BONYTAIL

Live 40+ years. Very near extinction in the late 1980's, requiring an aggressive stocking program.

STATUS: 'Endangered' since 1980.

MAJOR ACCOMPLISHMENTS: Both Upper and Lower Basin have developed hatcheries and currently stock large numbers of healthy adults. Researchers recently recaptured a bonytail that had survived twelve years in the Colorado River since stocking. In 2015 through 2017, stocked bonytail reproduced in the wild in the Green River subbasin. More fish are being detected on in-stream antennas.

GREATEST REMAINING THREAT: Still unknown. Research is ongoing to improve hatchery fish for wild survival and document habitat preferences in the wild.

CURRENT ACTION TOWARD DELISTING FROM THE ESA: USFWS is not considering a change in listing status at this time.

See pages 5 - 6 in the "Program Highlights" publication to learn more about the endangered fish.

Status of the Endangered Colorado River Fishes

COLORADO PIKEMINNOW

Lives 40+ years. Adults migrate 200+miles to specific spawning bars.

STATUS: 'Endangered' since 1967. Recovery can occur upstream of Glen Canyon Dam.

CHALLENGE: The largest self-sustaining population in the Green River has declined since 2000.

GREATEST REMAINING THREAT: Persistent high densities of invasive predatory fish, which compete with, and prey on young Colorado pikeminnow are a problem throughout the Upper Basin. Few stocked Colorado pikeminnow reach adulthood in the San Juan River and documented reproduction is limited in the San Juan.

WHAT WE'RE DOING ABOUT IT: Partners have increased invasive fish control efforts over the past decade. Bureau of Reclamation experiments with summer dam releases to improve habitat for young Colorado pikeminnow. Partners are currently collecting brood- stock from the rivers to initiate stocking, if necessary.

WHAT'S NEXT: USFWS will use a recently completed Species Status Assessment to complete a 5-year review of the species listing status and to determine the need to revise recovery goals.



Recovery Programs' Future after 2023

The Cooperative Agreements that implement both programs will sunset in 2023. As outlined in PL 116-9, program partners are committed to work with the Secretary of Interior to submit a Report to Congress by the end of FY 2021 on recommendations for the programs post-2023.

The Report to Congress will contain:

- A description of the programs' accomplishments
- Current listing status of the four listed species and their projected status in 2023
- Total programs' expenditures (by funding source) through fiscal year 2021 and projected expenditures through 2023
- Identification of recovery activities and projected costs by the programs beyond 2023

Status Report – Over the past 18 months, technical and managerial representatives from both programs have identified and prioritized post 2023 activities and developed estimates of associated annual and capital costs. Program partners will submit a draft Report to Congress to DOI bureaus in Headquarters by the end of FY 2020 to meet our end of FY2021 deadline.



2020 Financial Summary

Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program



Endangered Species Act Compliance Streamlined for Water Projects

The Upper Colorado River and San Juan River Basin recovery programs respond to the challenge of water management by working with local, state, federal, and tribal agencies to meet the needs of people and endangered fish. The programs' goal is to achieve full recovery (delisting) of the endangered fishes, not just to avoid jeopardy (offset impacts of water project depletions) under the ESA. The recovery programs provide ESA compliance for water development and management activities for federal, tribal, and non-federal water users. This includes Bureau of Reclamation dams and projects across the Upper Colorado and San Juan river basins. Responsibilities to offset water project depletion impacts do not fall on individual projects or their proponents.

The recovery programs currently provide ESA compliance for 2,500 water projects depleting more than 3.7 million acre-feet per year. No lawsuits have been filed on ESA compliance for any of these water projects.

Upper Colorado River Endangered Fish Recovery Program Summary of Endangered Species Act Section 7 Consultations 1/1988 through 12/31/2019

| State | Number of Projects | Historical Depletions | New Depletions | Total |
|--------------|--------------------|-----------------------|----------------|------------------|
| | | Acre-Feet/Yr | Acre-Feet/Yr | Acre-Feet/Yr |
| Colorado | 1,250 | 1,915,682 | 207,229 | 2,122,911 |
| Utah | 266 | 517,898 | 100,587 | 618,485 |
| Wyoming | 427 | 83,498 | 39,459 | 122,957 |
| CO/UT/WY | 238 ¹ | (Regional) | (Regional) | Total |
| Total | 2,181 | 2,517,078 | 347,276 | 2,864,353 |

¹Small depletion projects (<100 acre-feet per year) consulted on between July 3, 1994, and October 1, 1997, when the Recovery Program did not track the number of these projects by state. Depletion totals associated with these 238 projects are captured by state under new depletions.

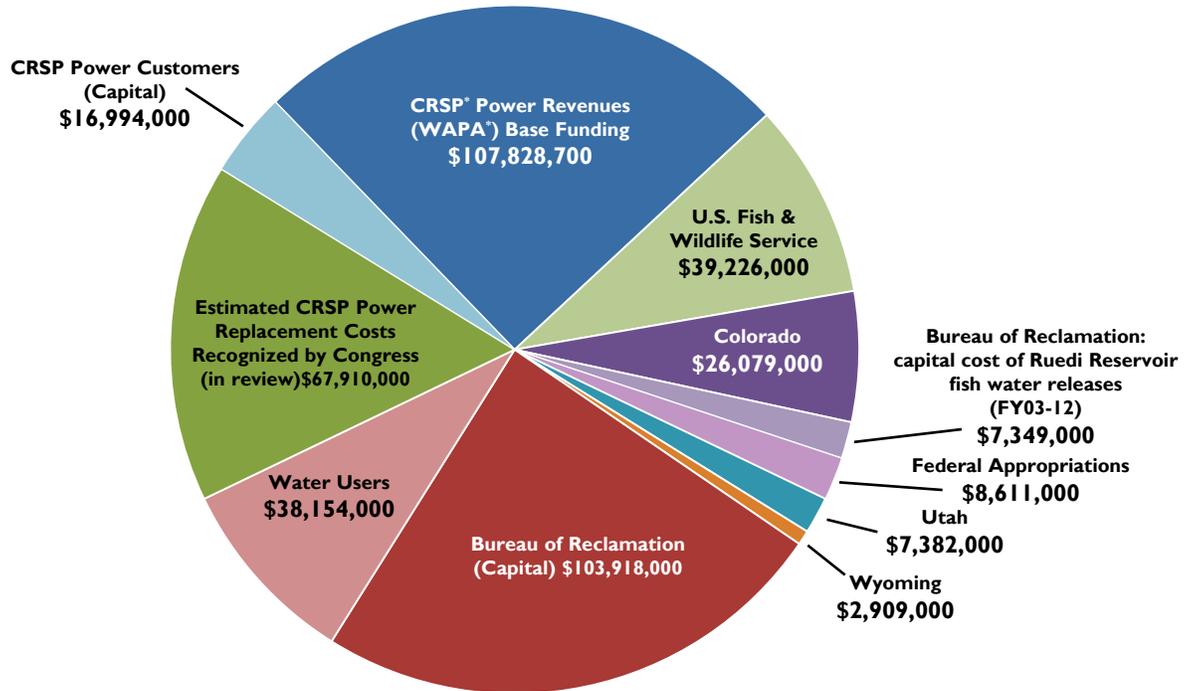
San Juan River Basin Recovery Implementation Program Summary of Endangered Species Act Section 7 Consultations 1/1992 through 12/31/2019

| State | Number of Consultations | Depletions Acre-Feet/Yr |
|--------------|-------------------------|-------------------------|
| New Mexico | 24 | 653,798 |
| Colorado | 317 | 222,385 |
| Utah | 15 | 9,327 |
| Total | 356 | 885,510 |

Expenditures

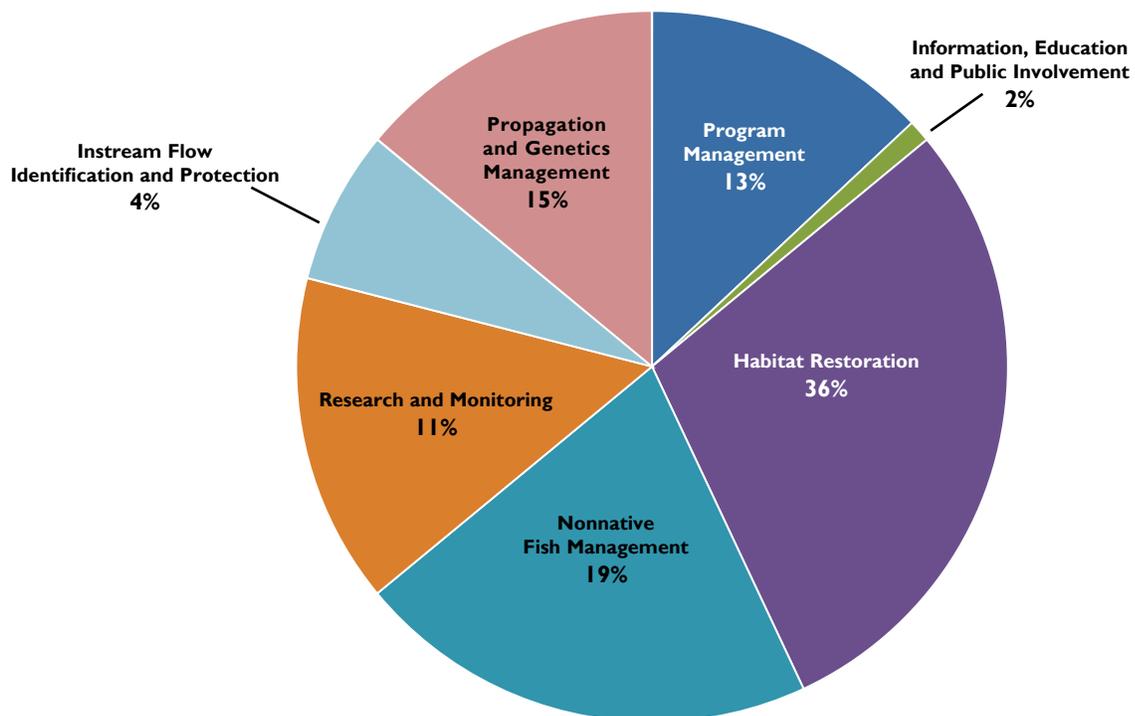
Upper Colorado River Endangered Fish Recovery Program

Total Partner Contributions = \$426,360,000 (FY 1989-2020)



* Colorado River Storage Project (CRSP)
 * Western Area Power Administration (WAPA)

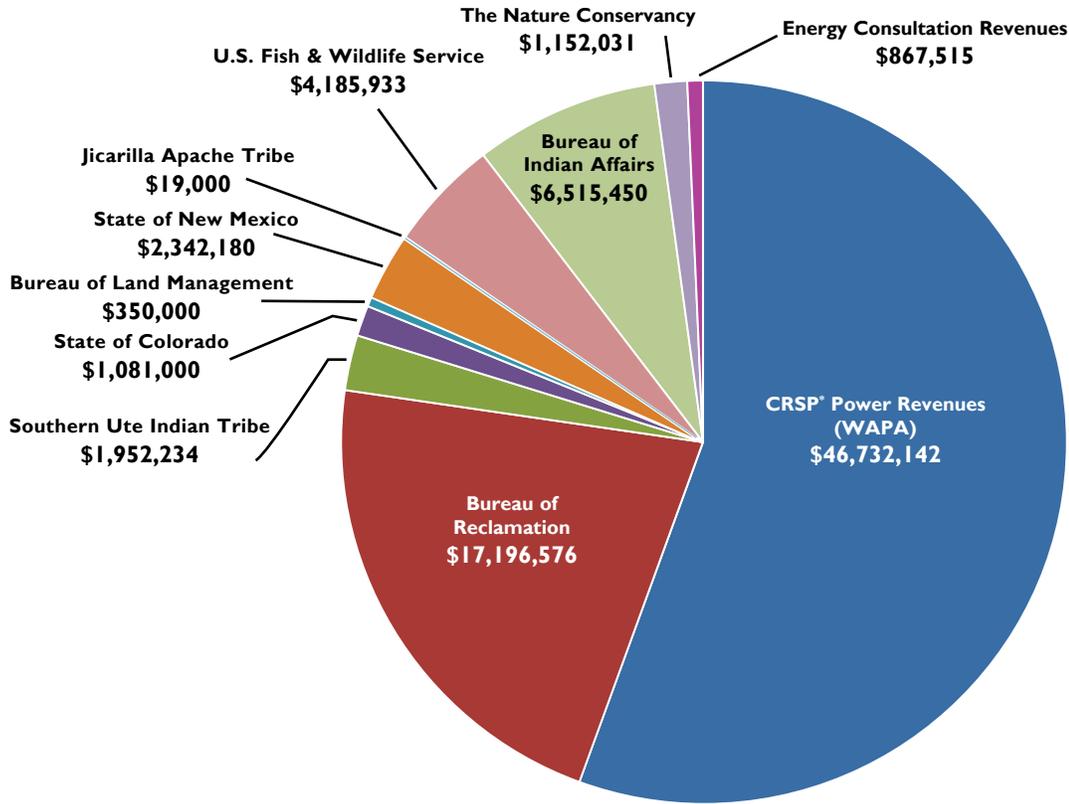
Projected Expenditures by Category (FY 2020 only)



Expenditures

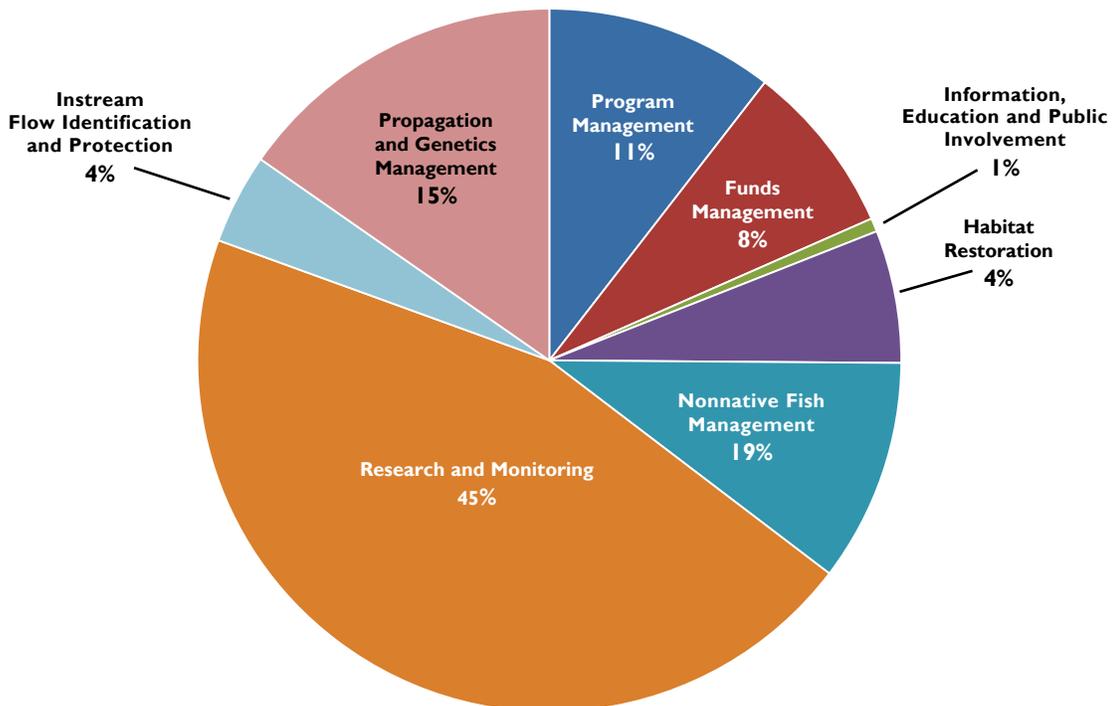
San Juan River Basin Recovery Implementation Program

Total Partner Contributions = \$82,460,061 (FY 1992-2020)
(Not including in-kind contributions)



* Colorado River Storage Project (CRSP)
* Western Area Power Administration (WAPA)

Projected Expenditures by Category (FY 2020 only)



Cost-Sharing Commitments and Power Revenues Support Species Recovery

Continuing the recovery programs' success requires funding to implement recovery actions. Public Law 112-270 (January 2013) extended annual funding at currently authorized levels through FY 2019. Capital funding, authorized through 2023 by PL 111-11, has paid for extensive construction projects built with substantial non-federal cost-sharing (states' funds and Colorado River Storage Project power revenues) and federal appropriations.

ANNUAL FUNDS

Public Law 106-392, as amended, authorized expenditure up to \$6 million of Colorado River Storage Project (CRSP) power revenues per year (adjusted annually for inflation) through fiscal year 2019 for annual funding of the recovery programs. Annual funding was authorized for facility operation and maintenance expenses, endangered fish population and habitat monitoring, and critically important nonnative fish management, public involvement, and program administration. For fiscal year 2019, these funds are provided by appropriation to the Bureau of Reclamation. Legislation has been introduced in Congress to extend this authorization for appropriated funds through fiscal year 2023.

The states, USFWS, water users and CRSP power customers contribute annual funding to both programs each year.

CAPITAL FUNDS

Capital funds have been used to construct hatchery facilities, fish passages and screens; complete water acquisition projects; and restore floodplain habitat.

Power Revenues Cost-Share

\$17M of CRSP power revenues, have been provided by WAPA for capital construction projects. Consistent with P.L. 106-392, as amended, these revenues were treated as a

non-federal contribution assigned to power for repayment under Section 5 of the CRSP Act.

States Cost-Share (\$17 Million)

•Colorado's Legislature created a Native Species Conservation Trust Fund in 2000. Its "Species Conservation Eligibility List" is annually funded by a joint resolution of the State's General Assembly.

•New Mexico's Legislature appropriated funds into the State's "operating reserve," thus making them available at any time and not tied to a specific calendar year. Application of the funds is subject to approval by the New Mexico Interstate Stream Commission.

•Utah's 1997 Legislature created a Species Protection Account within the General Fund which receives Brine Shrimp Royalty Act-created revenue. In 2000, Utah dedicated one-sixteenth of a one cent general sales tax to water development projects and directed funding to the Upper Colorado Program.

•Wyoming's Legislature appropriated its funding share during their 1998 and 1999 sessions.

Capital Construction Cost-Sharing for Upper Colorado and San Juan Programs

| | |
|---|-----------------------|
| Upper Colorado Recovery Program | \$179 million |
| San Juan Recovery Program | \$30 million |
| Total | \$209 million* |

*Sources of Revenue

| Federal | Non-Federal | |
|---------------------------------------|----------------------|----------------------|
| | Power Revenues: | \$17 million |
| | States: | \$17 million |
| | Water and Power: | \$87 million** |
| | | \$121 million |
| Congress (Approps. in USBR's budget): | | \$88 million |
| | Total Revenue | \$209 million |

Capital Project Cost-Sharing by the States

| | Total Amount | Upper Colorado Program | San Juan Program |
|--------------|------------------|------------------------|------------------|
| Colorado | \$9.15 M | \$8.07 M | \$1.08 M |
| New Mexico | 2.74 M | None | 2.74 M |
| Utah | 3.42 M | 3.42 M | None |
| Wyoming | 1.69 M | 1.69 M | None |
| Total | \$17.00 M | \$13.18 M | \$3.82 M |

** Contributions by water and power customers are recognized and credited as cost-sharing towards recovery in Section 3(c)(4) of P.L. 106-392. These costs have included water provided from Wolford Mountain Reservoir and the Elkhead Reservoir enlargement and costs of replacement power purchased due to modifying the operation of Flaming Gorge and Aspinall Unit Dams.



2020 Species Updates

Upper Colorado River Endangered Fish Recovery Program
San Juan River Basin Recovery Implementation Program



U.S. Fish & Wildlife Service Proposes Downlisting Humpback Chub to Threatened

HUMPBAC CHUB (*Gila cypha*)

◆ On January 22, 2020, the U.S. Fish and Wildlife Service (USFWS) proposed to reclassify the humpback chub from endangered to threatened status under the Endangered Species Act (ESA).

◆ Reclassification to threatened status is supported by strong science and decades of collaborative conservation.

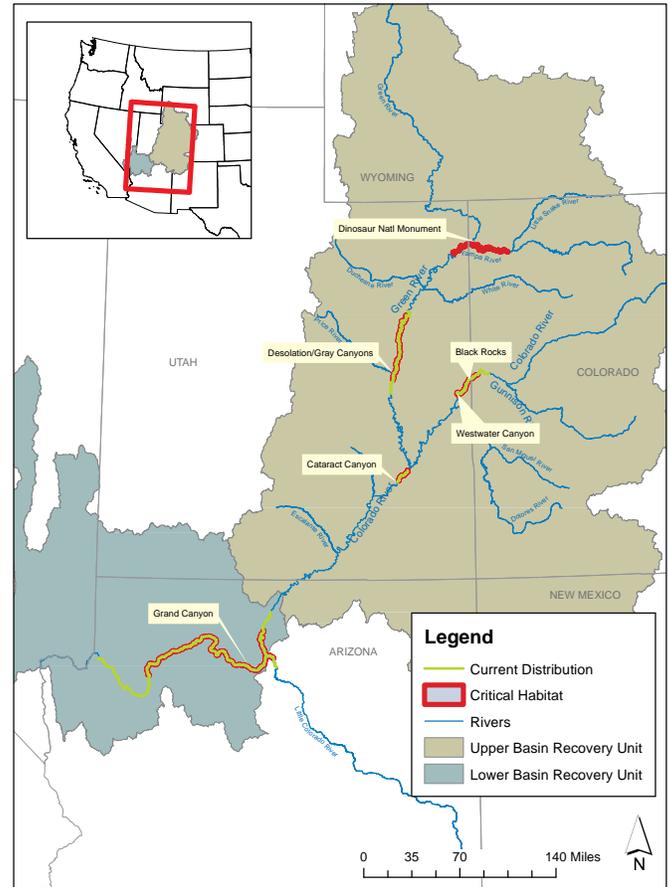
- The best available science for the species is summarized in the Species Status Assessment (SSA).

◆ Partners in the Upper Colorado River Endangered Fish Recovery Program and the Glen Canyon Dam Adaptive Management Program have improved conditions for humpback chub by enacting conservation measures, such as:

- restoring adequate river flow regimes through water release from reservoirs;
- removing non-native predators; and
- long term monitoring that helps us understand natural population variability.

◆ Four populations in the upper basin (See map on right) have remained stable over the last 10-15 years, and the largest population in the Grand Canyon has increased in size.

- One population, in Dinosaur National Monument, is considered extirpated. Partners are investigating re-introducing humpback chub into this habitat because resource conditions (including flow in the Yampa and Green rivers since 2006) may be suitable to support the species.
- Sampling in Desolation and Gray canyons show stable populations and continued recruitment. Both juveniles and sub-adult humpback chub have been captured in recent years.



Locations of humpback chub populations in the Colorado River Basin.



Photo by Travis Francis, USFWS

Humpback chub encountered on the Colorado River.



Photo by Karie Ham, USFWS

Black Rocks, critical habitat of humpback chub.

Signs of Natural Recruitment Increase

RAZORBACK SUCKER (*Xyrauchen texanus*)

Upper Colorado Program

- ◆ In 2018, Service staff, in conjunction with 17 Federal and State agency representatives, completed an SSA for razorback sucker, followed by a 5-year review recommending downlisting of the species to Threatened. The Proposed Rule is currently being reviewed for publication.
- ◆ Populations of stocked fish are expanding in size and range across the upper basin. In 2019, over 3,000 unique razorback sucker were detected on a single spawning bar in the Green River representing 17 different year classes of stocked fish (Figure 1).
- ◆ Most populations in the lower basin are relatively stable and supplemented with hatchery stocks. However, continued declines in Lake Mead, which is currently the only self-sustaining population of razorback sucker are concerning to biologists.
- ◆ Recruitment of razorback sucker continues to be rare, but a new approach to floodplain management in the Green and Colorado rivers has resulted in improved survival to age 2 and age 3.

San Juan Program

- ◆ Similarly, in the San Juan program the numbers of stocked adults has accumulated and large numbers of fish are occupying habitats at the Lake Powell inflow area. A recent research focus has been on determining how much natural recruitment is occurring. Encouragingly, the number of definitive wild fish detected in the San Juan River has increased since 2017 (Figure 2). An important step to establishing a self-sustaining razorback sucker population will be tracking these wild juveniles to adulthood when they can contribute offspring to the San Juan River.



Photo by Travis Duncan, CPW

Closeup of a razorback sucker encountered on Roubideau Creek.

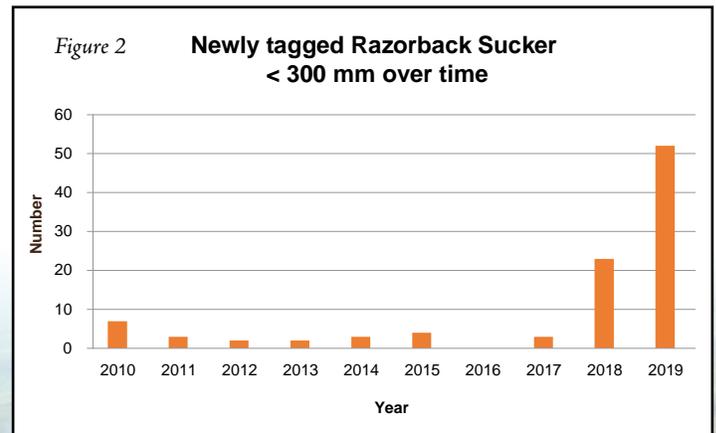
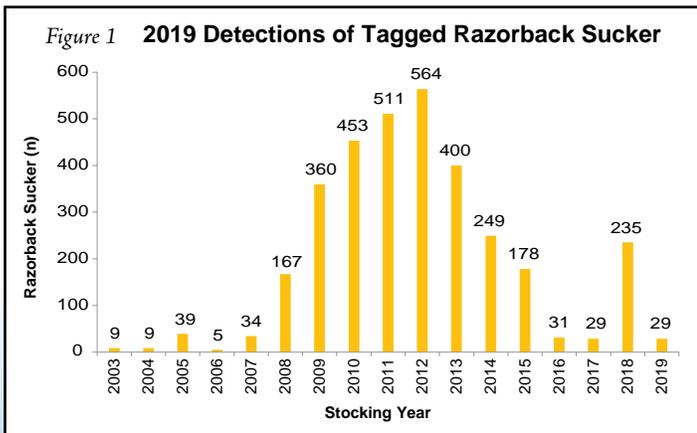


Photo by Lower Colorado River Multi-Species Conservation Program

Mixed Results for Colorado Pikeminnow in Basin

COLORADO PIKEMINNOW (*Ptychocheilus lucius*)

Upper Colorado Program

◆ Wild Colorado pikeminnow populations occur in the Green and Colorado river sub-basins of the Upper Colorado River.

✦ The U.S. Fish & Wildlife Service in Grand Junction reinstated a long standing program to estimate abundance of adult Colorado pikeminnow in the Colorado River in 2019. Recent data indicate a large group of fish spawned in 2015 have survived and are beginning to reach adult size (Figure 3). Researchers believe survival of young fish is a primary factor influencing this species.

✦ Staff from the Upper Colorado River and San Juan River recovery programs collaborated to collect juvenile Colorado pikeminnow in the middle and lower Green River nursery reaches. These fish were taken to the Southwestern Native Aquatic Resources and Recovery Center and will help increase the diversity of fish used to produce pikeminnow for stocking.

✦ Preliminary estimates of Colorado pikeminnow abundance for the Green River show a continued decline for the species in this basin (Figure 4). Partners are experimenting with the timing and magnitude of base flows, as well as continued nonnative fish management, in an effort to increase survival of fish in their first year.



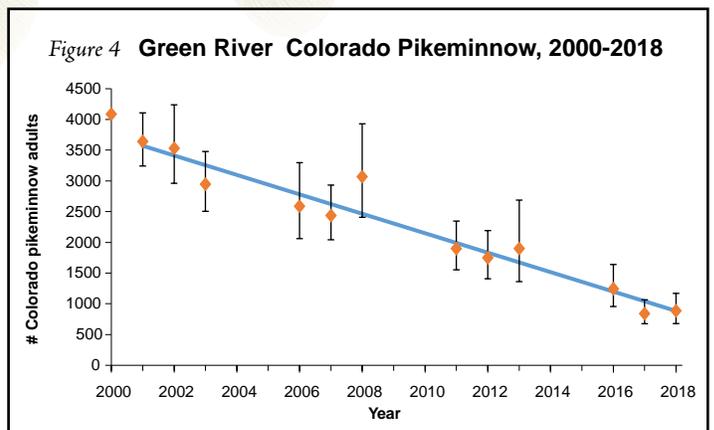
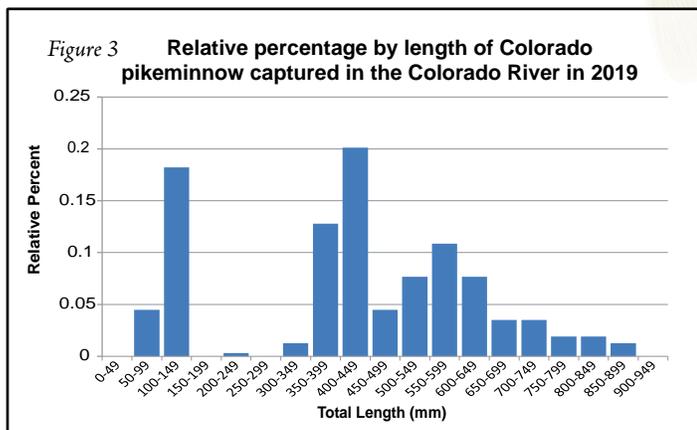
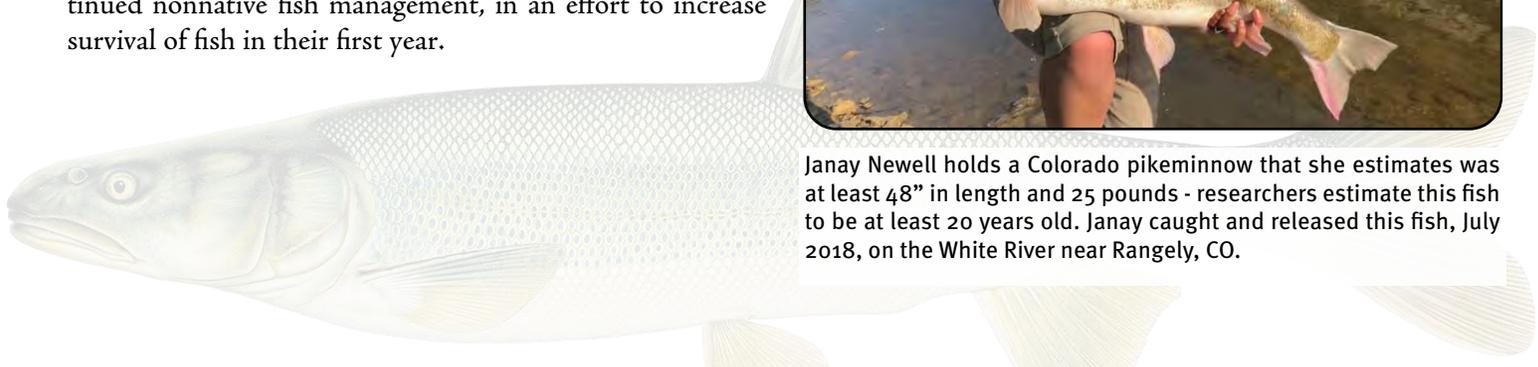
Photo © Charlie Card

Charlie Card, Trout Unlimited, encountered this adult Colorado pikeminnow while flyfishing on the Green River in Utah.



Photo © Mark Newell III

Janay Newell holds a Colorado pikeminnow that she estimates was at least 48" in length and 25 pounds - researchers estimate this fish to be at least 20 years old. Janay caught and released this fish, July 2018, on the White River near Rangely, CO.



COLORADO PIKEMINNOW (*Ptychocheilus lucius*)

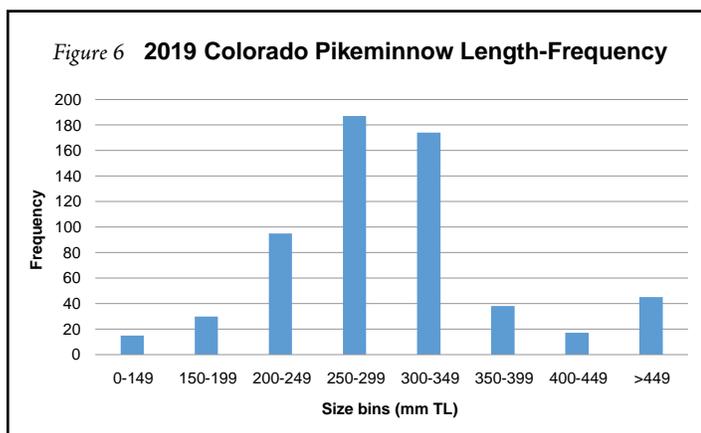
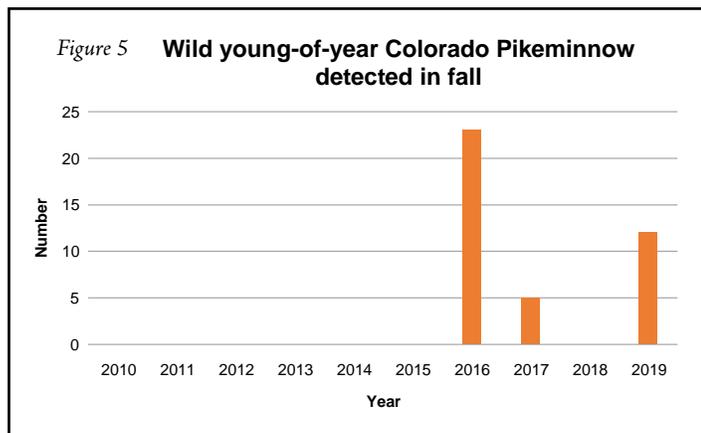
San Juan Program

◆ Colorado pikeminnow are being reestablished in the San Juan River.

✦ 3,342,386 age-0 Colorado pikeminnow have been stocked in the San Juan River between 2011 - 2018. Because of the high expected survival of wild-spawned Colorado pikeminnow, managers withheld stocking age-0 pikeminnow in the fall of 2019 to allow for more effective tracking of the wild cohort produced in 2019 into future years.

✦ Wild-spawned Colorado pikeminnow larvae has been increasing since 2009, with 95% of larvae captured between 2014-2018.

✦ Following high water years and spring releases from Navajo Reservoir, wild young-of-year Colorado pikeminnow were detected during standardized fall monitoring in 2016, 2017, and 2019 (Figure 5). Furthermore, the wild cohorts may have persisted to subsequent life-stages at 250-349 mm length size classes (Figure 6).



Bonytail Diet Study Shows Promise

BONYTAIL (*Gila elegans*)

◆ When the Upper Colorado Program was established, bonytail had disappeared and little was known about their habitat requirements. Hatchery produced fish are stocked in both the Green and Colorado subbasins to determine their life history needs and eventually rebuild self-sustaining populations.

◆ Survival of stocked bonytail remains very low, but more and more are showing up on antennas deployed in rivers.

✦ In 2019, hatchery managers tested out new diets to try to improve survival. Preliminary results indicate that different diets may encourage faster growth and hopefully better survival in the wild (Figure 7).

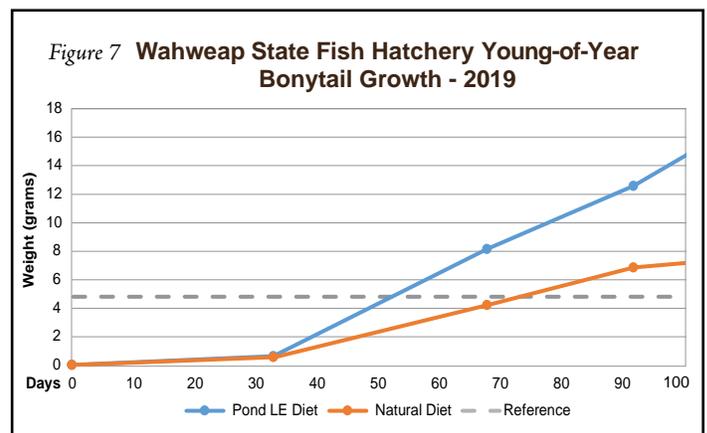


Photo by Dale Ryden, USFWS

When Utah Division of Wildlife Resources stocked this bonytail in the Colorado River near the CO/UT stateline on 11/17/2007 it was one year old and 6.75" in length. USFWS crews recaptured this fish on 5/24/2018 five miles upstream of its stocking location; it had grown 13" during its time in the wild.

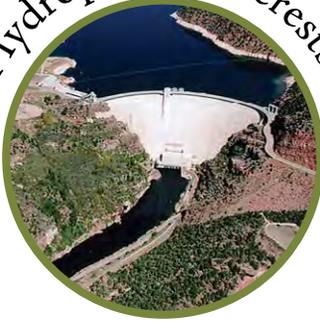
THE PATH TO FISH RECOVERY IN THE UPPER COLORADO RIVER BASIN

Water Users



+

Hydropower Interests



+

American Indian Tribes



Conservation Groups



+

State Agencies



+

Federal Agencies

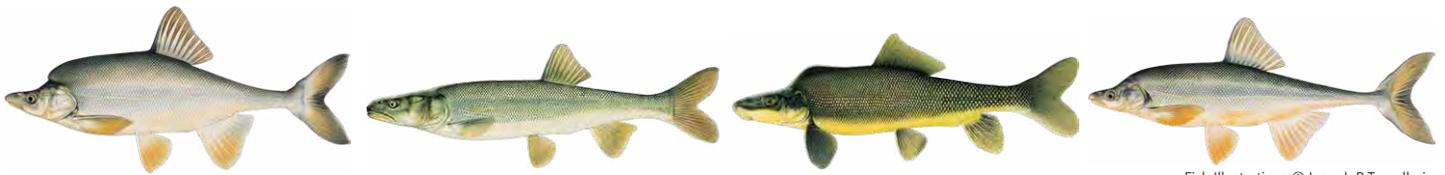


COLLABORATE

to

RECOVER

endangered fish populations.



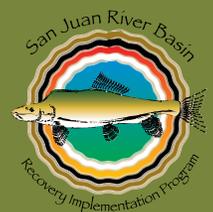
Fish Illustrations © Joseph R Tomelleri

Upper Colorado River



Endangered Fish
Recovery Program

**SPECIES STATUS UPDATE OF THE
ENDANGERED FISHES OF THE COLORADO AND
SAN JUAN RIVERS AND THEIR TRIBUTARIES**



THE PATH: RECOVERY ELEMENTS



INSTREAM FLOW IDENTIFICATION & PROTECTION

The Bureau of Reclamation and Upper Basin water users manage releases from 10 reservoirs to provide spring and base flows to assist with endangered fish recovery in the Yampa, Duchesne, Green, Colorado, Gunnison and San Juan rivers. Endangered fish flow management occurs while respecting all existing water rights. New research has led to special, experimental releases to provide critically important endangered fish habitat on river floodplains.

HABITAT RESTORATION

8 of 10 fish passages have been constructed and 5 of 6 large irrigation canals have been screened or modified to reduce loss of endangered fish. In the Upper Basin, some 2,700 acres of restored floodplain habitat are managed to benefit endangered fish. On the San Juan, 2 out of 3 phases of habitat restoration have occurred to reconnect secondary channels to the river.

8^o_f 10
**FISH
PASSAGES**

have been constructed.



NONNATIVE FISH MANAGEMENT

In the Upper Basin, despite years of significant effort, the nonnative fish threat remains a big problem, but we have a plan. Our control strategy consists of removing nonnative smallmouth bass, northern pike and walleye from over 600 miles of river. Screens have been installed on 3 of 7 reservoir outlets to prevent escapement with 4 more pending. In the San Juan River Basin, an escapement prevention plan has been developed for Ridges Basin Reservoir. Although the magnitude of the nonnative fish threat in the San Juan may be lower than the Upper Basin, channel catfish remain a significant predator and efforts are underway to increase the efficiency of their management.

5^o_f 6
**LARGE
IRRIGATION
CANALS**

have been screened or modified.



PROPAGATION & STOCKING

Hatchery-produced, stocked fish are used to reestablish naturally self-sustaining populations of razorback sucker and bonytail in the upper Colorado River system. The San Juan Program stocks razorback sucker and Colorado pikeminnow. Fish stocked by the recovery programs are genetically diverse as possible. All three stocked species are reproducing in the wild. However, natural recruitment remains low throughout the upper basin.

3^o_f 7
**RESERVOIR
OUTLETS**

have been screened to prevent nonnative fish escapement with 4 more pending.



RESEARCH & MONITORING

The recovery programs conduct research and monitoring to generate information on abundance, reproduction, growth, and survival of endangered fish in the wild. Data is used to evaluate and adjust management actions and recovery strategies through adaptive management. Recent research has highlighted the severity of barriers to seasonal fish migration in the San Juan River at the Piute Farms Waterfall and the selective PNM Fish Passage. Simple changes to the operation of the PNM Fish Passage resulted in record number of razorback sucker passing through this facility during spring spawning movements."

2^o_f 4
FISH SPECIES
recommended for downlisting from endangered to threatened.



3^o_f 3
**RECLAMATION
RESERVOIRS**
reoperated to provide endangered fish flows.

COLORADO RIVER BASIN ENDANGERED FISH STATUS REPORT

COLORADO PIKEMINNOW

Lives 40+ years. Adults migrate 200+miles to specific spawning bars.

STATUS

'Endangered' since 1967. Recovery can occur upstream of Glen Canyon Dam. The largest self-sustaining population in the Green River has declined since 2000.

GOOD NEWS

A successful stocking program occurs in the San Juan River where new tagging technology reveals that juvenile & adult Colorado pikeminnow are spreading into new reaches of river and are tracking a large cohort of age-3 fish. Colorado Pikeminnow continue to successfully produce wild juvenile fish during years with high spring flows.

GREATEST REMAINING THREAT

Persistent high densities of invasive predatory fish, which compete with, and prey on young Colorado pikeminnow are a problem throughout the Upper Basin. Few stocked Colorado pikeminnow reach adulthood in the San Juan River and documented reproduction is limited in the San Juan.

WHAT WE'RE DOING ABOUT IT

Partners have increased invasive fish control efforts over the past decade. Bureau of Reclamation experiments with summer dam releases to improve habitat for young Colorado pikeminnow. Partners are currently collecting brood-stock from the rivers to initiate stocking, if necessary.

CURRENT ESA LISTING ACTION

In 2020, a Species Status Assessment was completed for Colorado pikeminnow based on the Population Viability Analysis published in 2018. Based on the SSA, USFWS is recommending a continuation of endangered status for the Colorado pikeminnow. The decision will be formalized in a 5-year review published in 2020.

WHAT'S NEXT

Revision of the Recovery Goals has been recommended for this species. In coming months, USFWS will reconvene the Colorado Pikeminnow Recovery Team to begin the revision process.



Colorado pikeminnow caught on the White River, Summer 2018.

HUMPBACK CHUB

Lives 40+ years. All life stages found in short stretches of deep canyon habitat.

STATUS

'Endangered' since 1967. Proposed downlisting to 'Threatened' published January, 2020.

GOOD NEWS

Grand Canyon population has rebounded from ~5,000 adults in the year 2000 to nearly 11,000 adults currently. Most Upper Basin populations appear stable.

MAJOR ACCOMPLISHMENTS

Flow and temperature management, and nonnative fish control actions appear to be on target and providing positive results.

GREATEST REMAINING THREATS

Lower Basin: nonnative predation, cold temperatures, and spill contamination. Upper Basin: limitations to survival of young chub.

WHAT WE'RE DOING ABOUT IT

Control nonnative predators to prevent them from impacting humpback chub throughout the Colorado River system. The Bureau of Reclamation adaptively manages dam releases to support the habitat needs of humpback chub.

CURRENT ESA LISTING ACTION

In March 2018, the USFWS Regional Director recommended that humpback chub be downlisted from endangered to threatened. In January 2020, a proposed rule was published in the Federal Register, formalizing the recommendation.

WHAT'S NEXT

USFWS will review information gathered through the public comment period and revise the proposed rule as needed. The USFWS' final decision to downlist humpback chub will also require publication of a final rule.

TIMELINE TO PUBLISH THE FINAL RULE

2020-2021



Photograph above shows all life stages of humpback chub. These fish were captured in the Colorado River during monitoring efforts in Black Rocks, a section of Ruby Horsethief Canyon.

COLORADO RIVER BASIN ENDANGERED FISH STATUS REPORT

RAZORBACK SUCKER

Lives 40+ years. River populations spawn during peak flows in the spring; larval razorback sucker need warm productive floodplain habitat to survive. This species can also complete its life cycle in reservoirs and reservoir inflow areas in Lake Powell.

STATUS

'Endangered' since 1991. Recommended for downlisting to 'Threatened'.

GOOD NEWS

Self-sustaining population in Lake Mead in the Lower Basin. Razorback sucker are reproducing in many Upper Basin rivers and in Lake Powell. Hatchery augmentation has established a large population of Razorback Suckers that has spawned for 22 consecutive years. The detection of Razorback Sucker larvae in the Animas River and confluence of the Animas and San Juan Rivers indicates and upstream expansion of success spawning by over 20 miles.

MAJOR ACCOMPLISHMENTS

Stocked razorback sucker continue to spread across the upper basin, actively spawning and producing viable larvae in many locations. Captures of wild juvenile razorback sucker are increasing throughout the Upper Basin. Lower basin populations are generally stable through active stocking.

GREATEST REMAINING THREAT

Persistent high densities of invasive predatory fish prey on young razorback sucker, limiting recruitment.

WHAT WE'RE DOING ABOUT IT

Managing spring flows; controlling nonnative fish; increasing the number of floodplain wetlands to provide safe nursery habitat to promote self-sustaining populations in the wild.

CURRENT ESA LISTING ACTION

A Species Status Assessment for this species was completed in August 2018. In September 2018, the USFWS Regional Director recommended that razorback sucker be downlisted from endangered to threatened based on the species' continued positive response to management actions. Management actions will continue into the future throughout the Colorado River system.

TIMELINE TO PUBLISH THE PROPOSED RULE

2020.

WHAT'S NEXT

USFWS will review information gathered through the public comment period and revise the proposed rule as needed. The USFWS' final decision to downlist razorback sucker will require publication of a final rule; likely in 2021.



PHOTO COURTESY USFWS

An adult razorback sucker captured on the middle Green River.



PHOTO COURTESY USFWS

An adult razorback sucker from the San Juan River.

BONYTAIL

Lives 40+ years. Very near extinction in the late 1980's, requiring an aggressive stocking program.

STATUS

'Endangered' since 1980.

GOOD NEWS

We are starting to recapture more stocked fish.

MAJOR ACCOMPLISHMENTS

Both Upper and Lower Basin have developed hatcheries and currently stock large numbers of healthy adults. Researchers recently recaptured a bonytail that had survived twelve years in the Colorado River since stocking. In 2015 through 2017, stocked bonytail reproduced in the wild in the Green River subbasin. More fish are being detected on in-stream antennas.

GREATEST REMAINING THREAT

Still unknown. Stocked fish are not surviving well.

WHAT WE'RE DOING ABOUT IT

Continue research to determine the most important limiting factor to survival in the wild.

CURRENT ESA LISTING ACTION

USFWS is not considering a change in listing status at this time.

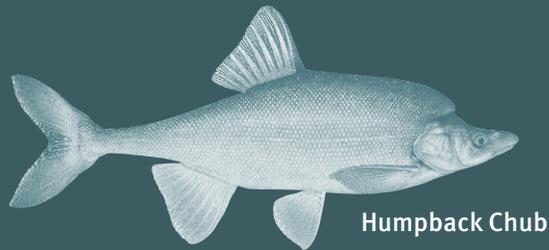
WHAT'S NEXT

Continue to experiment with new hatchery techniques, diets and stocking strategies to improve survival in the wild.



PHOTO COURTESY USFWS

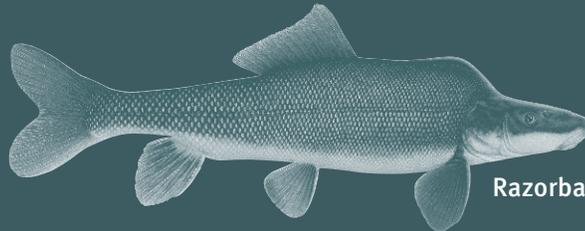
This bonytail was stocked in the Colorado River in 2007 and encountered again in 2018.



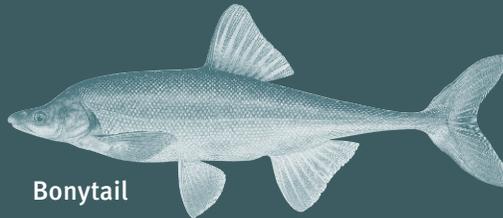
Humpback Chub



Colorado Pikeminnow



Razorback Sucker



Bonytail



Upper Colorado River Endangered Fish Recovery Program

Partners:

- State of Colorado
- State of Utah
- State of Wyoming
- Bureau of Reclamation
- Colorado River Energy Distributors Association
- Colorado Water Congress
- National Park Service
- The Nature Conservancy
- U.S. Fish and Wildlife Service
- Utah Water Users Association
- Western Area Power Administration
- Western Resource Advocates
- Wyoming Water Association

Upper Colorado River Endangered
 Fish Recovery Program
 P.O. Box 25486, DFC
 Denver, CO 80225
 303-236-9881
 303-236-8739 Fax
ColoradoRiverRecovery.org

San Juan River Basin Recovery Implementation Program

Partners:

- State of Colorado
- State of New Mexico
- Jicarilla Apache Nation
- Navajo Nation
- Southern Ute Indian Tribe
- Ute Mountain Ute Tribe
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- The Nature Conservancy
- U.S. Fish and Wildlife Service
- Water Development Interests

San Juan River Basin Recovery
 Implementation Program
 2105 Osuna Rd. NE
 Albuquerque, NM 87113
 505-761-4745
 505-346-2542 Fax
southwest.fws.gov/sjrip

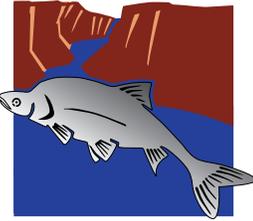
Program Highlights

San Juan River Basin Recovery Implementation Program
Upper Colorado River Endangered Fish Recovery Program

Download our digital edition at
www.coloradriverrecovery.org



Photograph © Wayne Wurtsbaugh - LimnoVision



Upper Colorado River Endangered Fish Recovery Program



and

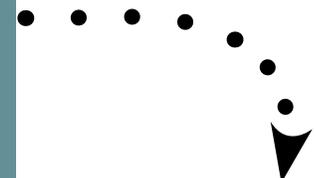


San Juan River Basin Recovery Implementation Program

Recovery Program Basics: Connecting the Dots of Recovery

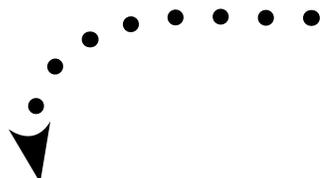
Committed Collaborative Partnerships That Work

Recovery programs' partners are committed to recovering Colorado River endangered native fishes. They participate on managing and technical committees, perform field work, attend meetings, provide funding and present scientific findings. The partners are the recovery programs. [See pages 3-4 to learn more about the partners and how the recovery programs were formed.](#)



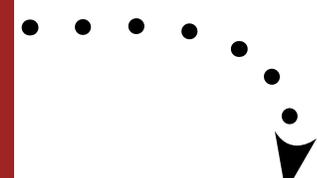
Capital Projects are Groundwork for Recovery Efforts

The recovery programs' partners have invested time and money into projects that reconnect habitat, add screens at diversions to keep native fish out of irrigation canals and screen reservoirs to keep nonnative fish out of the rivers. Predatory nonnative fish in the rivers are the biggest obstacle to recovery. [To learn about the major accomplishments of the recovery programs please see our timeline on pages 22-23. To learn more about the problem of nonnative fish in the rivers please see pages 12-13.](#)



Water Users Provide Flows for the Benefit of People and Fish

By working together, water users are provided legal certainty regarding the Endangered Species Act (ESA) while continuing to develop and manage water. During the growing season on the western slope of Colorado, water users meet weekly to manage flows to provide water for human uses and to benefit endangered fish. These flows benefit agriculture, recreation, fishing and tourism. [To learn more about in-stream flow see pages 8-9](#)

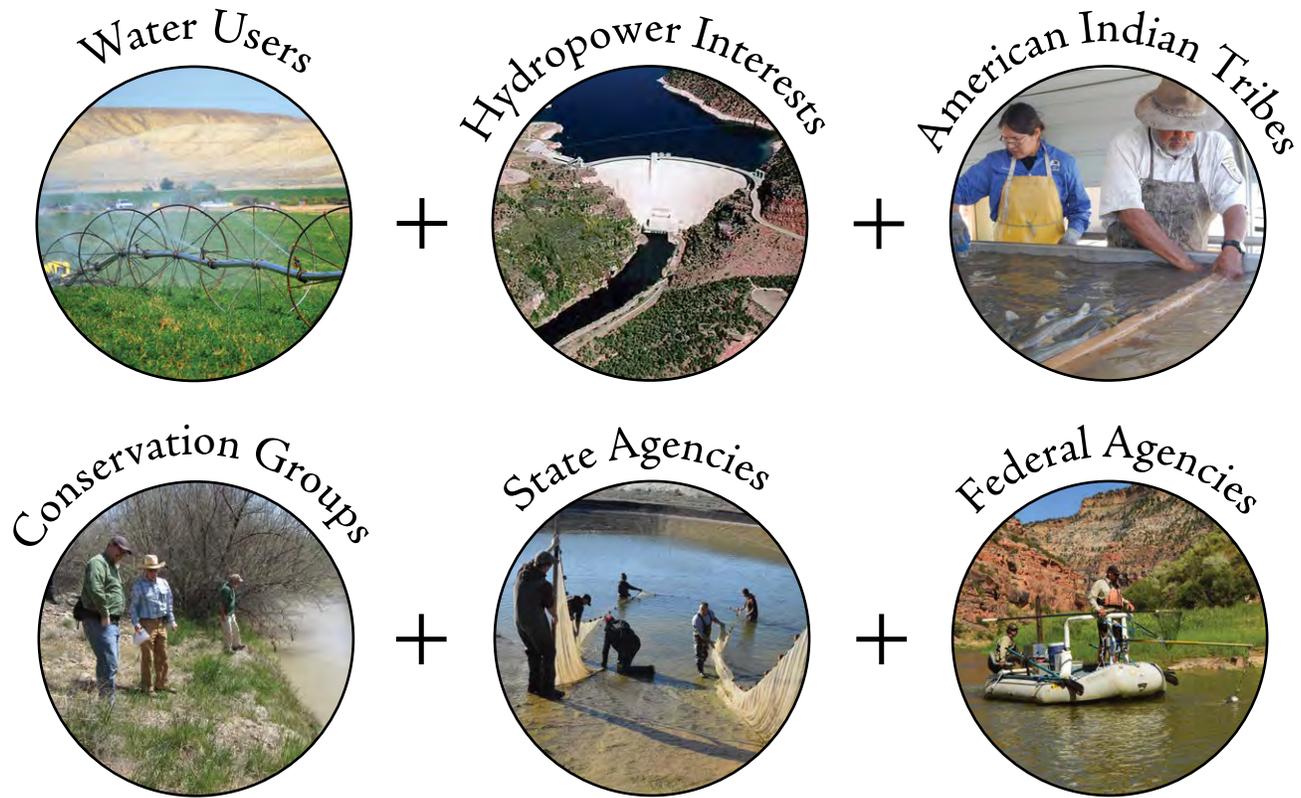


Recovery Actions are Science-Based and Adaptive

Field biologists study the fishes in the rivers to determine the best way to support recovery. The Colorado River's rare native fishes are large-bodied and can live 30-50 years. Using the elements of recovery, biologists provide information that is used to fine-tune management actions (adaptive management). [To learn more about the 4 fishes see pages 5-6. To learn more about the elements of recovery see pages 7-21.](#)

Program Highlights is produced annually to summarize the recovery programs' progress toward recovery of the endangered fishes. This document is not a publication of the U.S. Department of the Interior or its agencies. All uncredited photographs are courtesy of the recovery programs.

Partners Collaborate to Recover Rare Native Fishes



“The Upper Colorado River and San Juan River Basin Recovery Implementation Programs are models for Endangered Species Act implementation and help provide water reliability for approximately 2,500 municipal, industrial, and agricultural water projects throughout the Upper Colorado Basin. These programs were established under cooperative agreements between federal, state, tribal and non-government agencies who are working collaboratively to ensure the future of the endangered fish while meeting the water delivery requirements of communities within the basin.”

Brenda Burman, Commissioner of Reclamation, 2018

Upper Colorado River Endangered Fish Recovery Program

- State of Colorado
- State of Utah
- State of Wyoming
- U.S. Bureau of Reclamation (USBR)
- Colorado River Energy Distributors Association (CREDA)
- Colorado Water Congress
- National Park Service (NPS)
- The Nature Conservancy (TNC)
- U.S. Fish and Wildlife Service (USFWS)
- Utah Water Users Association
- Western Area Power Administration (WAPA)
- Western Resource Advocates
- Wyoming Water Association

San Juan River Basin Recovery Implementation Program

- State of Colorado
- State of New Mexico
- Jicarilla Apache Nation
- Navajo Nation
- Southern Ute Indian Tribe
- Ute Mountain Ute Tribe
- Bureau of Indian Affairs (BIA)
- Bureau of Land Management (BLM)
- U.S. Bureau of Reclamation
- The Nature Conservancy
- U.S. Fish and Wildlife Service
- Water Development Interests

Powerful Partnerships Drive Recovery Programs' Success

Upper Colorado River



Endangered Fish Recovery Program

On January 22, 1988, the Upper Colorado River Endangered Fish Recovery Program (Upper Colorado Program) was established via a Cooperative Agreement signed by the governors of Colorado, Utah, and Wyoming, the Secretary of the Interior, and the Administrator of the Western Area Power Administration. Water users, power customers, and environmental interests participate in the Program as well. The goal of the Upper Colorado Program is to recover four native fish species of the Colorado River basin that have been listed as endangered under the Endangered Species Act (ESA) while water development and management activities proceed in accordance with state and federal law.

The Upper Colorado Program has taken actions to benefit the endangered species and their status has improved. Two of the species are being considered for downlisting from endangered to threatened in 2020. As of December 31, 2019, 2,169 water projects rely on a successful Recovery Program for ESA compliance.

Progress to Recovery

8⁰ of 10 FISH PASSAGES

have been constructed.

5⁰ of 6 LARGE IRRIGATION CANALS

have been screened or modified.

3⁰ of 7 RESERVOIR OUTLETS

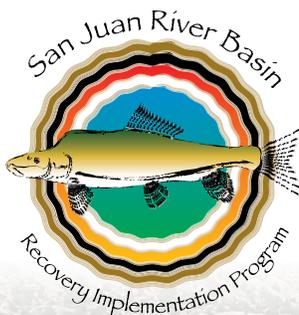
have been screened to prevent nonnative fish escapement with 4 more pending.

2⁰ of 4 FISH SPECIES

recommended for downlisting from endangered to threatened.

3⁰ of 3 RECLAMATION RESERVOIRS

reoperated to provide endangered fish flows.



In 1991, an ESA consultation on the Bureau of Reclamation's Animas-La Plata Project determined that the project would jeopardize the endangered Colorado pikeminnow and razorback sucker in the San Juan River Basin. The San Juan River Basin Recovery Implementation Program was established in October 1992 as the ESA compliance vehicle for the project and all other water projects in the San Juan basin. Participants include the states of Colorado and New Mexico, Jicarilla Apache Nation, Navajo Nation, Southern Ute Indian Tribe, Ute Mountain Ute Tribe, BIA, BLM, USBR, USFWS, water users, and environmental interests.

The Upper Colorado and San Juan recovery programs work collaboratively with states, tribes, agencies, environmental interests, water users, land owners, and recreational fishing interests to achieve recovery of the listed species.



The Rare Native Fishes of the Colorado River Basin

The four federally listed species represent more than a quarter of all native species in the Colorado River basin and are essential indicators of ecosystem health. All Colorado River fishes evolved 3-5 million years ago in flashy, desert rivers.

If you encounter any of these fish please return them unharmed to the river.

Photo © Mark Newell III



Colorado pikeminnow (*Ptychocheilus lucius*)

The Colorado pikeminnow is the largest minnow in North America. Called the “white salmon” by early settlers, the Colorado pikeminnow has a torpedo-shaped body which allows for long migrations of more than 200 miles in late spring and early summer to reach spawning grounds.

Colorado pikeminnow can live as long as 40 years and were historically known to grow to nearly 6 feet long and weigh 80 pounds. Today, researchers see adult Colorado pikeminnow up to 4 feet in length. Young Colorado pikeminnow feed on insects and plankton, whereas adults feed mostly on fish.

The Colorado pikeminnow was a valued food source by early settlers. In the early 1900s, it was a top line predator and has been

known to take anglers’ bait in the form of mice, birds, and even small rabbits, despite its only “teeth” are found on a bony, circular structure located deep within its throat. This fish also readily strikes lures and live bait used to catch sportfish or nonnative fish.



Bonytail (*Gila elegans*)

Bonytail is the rarest of the native fish of the Colorado River, with large fins and a streamlined body that is pencil-thin near its tail. Bonytail are members of the “chub” group of minnows and typically have gray or olive-colored backs, silver sides, and white bellies.

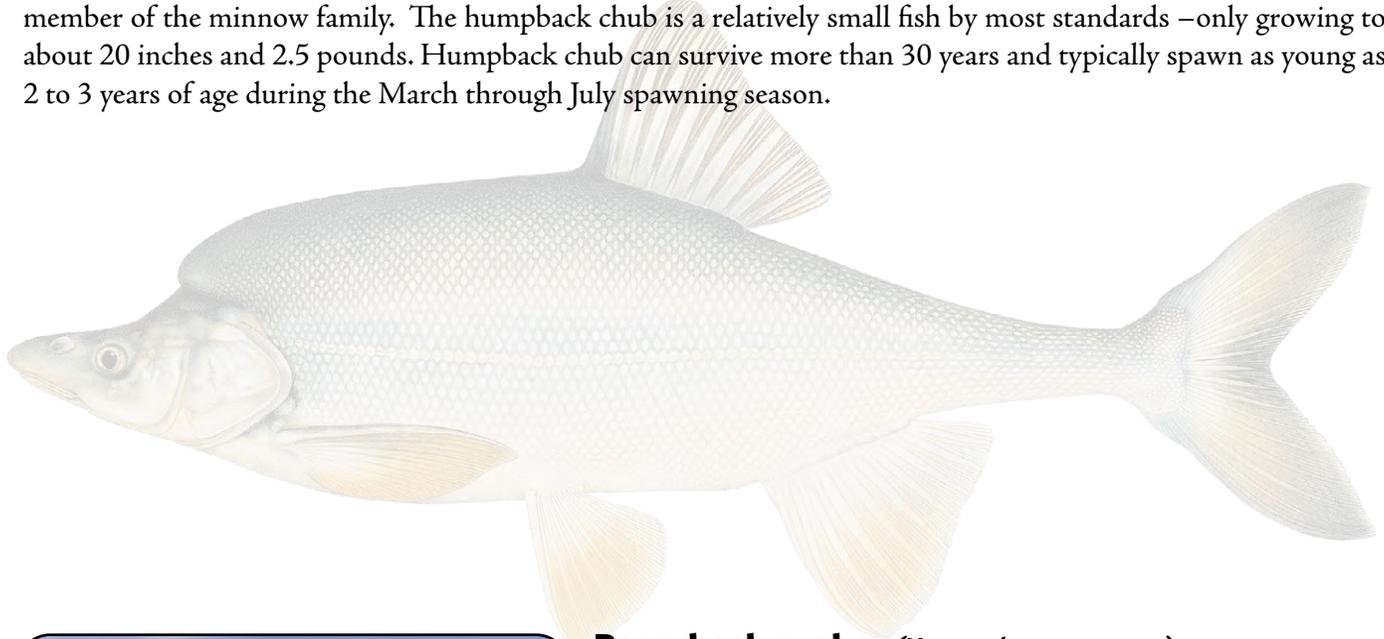
Bonytail can grow to 22 inches or more and have been known to live up to 50 years. As the rarest of the four species, little is known about what environmental conditions the bonytail prefer. Bonytail are thought to spawn at 2 to 3 years of age during late June and early July and eat insects, plankton, and plant matter.



Humpback chub (*Gila cypha*)

The humpback chub has a pronounced muscular hump behind its head, giving this fish a striking, unusual appearance. Unlike the other three species, humpback chub stay in deep canyon habitat for their entire lives. The hump that gives this fish its name acts as a stabilizer that helps it maintain position in whitewater conditions. The humpback chub uses its large fins to “glide” through slow-moving areas, feeding on insects that become trapped in water pockets.

Humpback chub has an olive-colored back, silver sides, a white belly, small eyes and a long snout that overhangs its jaw. Like the Colorado pikeminnow and bonytail, the humpback chub is a member of the minnow family. The humpback chub is a relatively small fish by most standards –only growing to about 20 inches and 2.5 pounds. Humpback chub can survive more than 30 years and typically spawn as young as 2 to 3 years of age during the March through July spawning season.



Razorback sucker (*Xyrauchen texanus*)

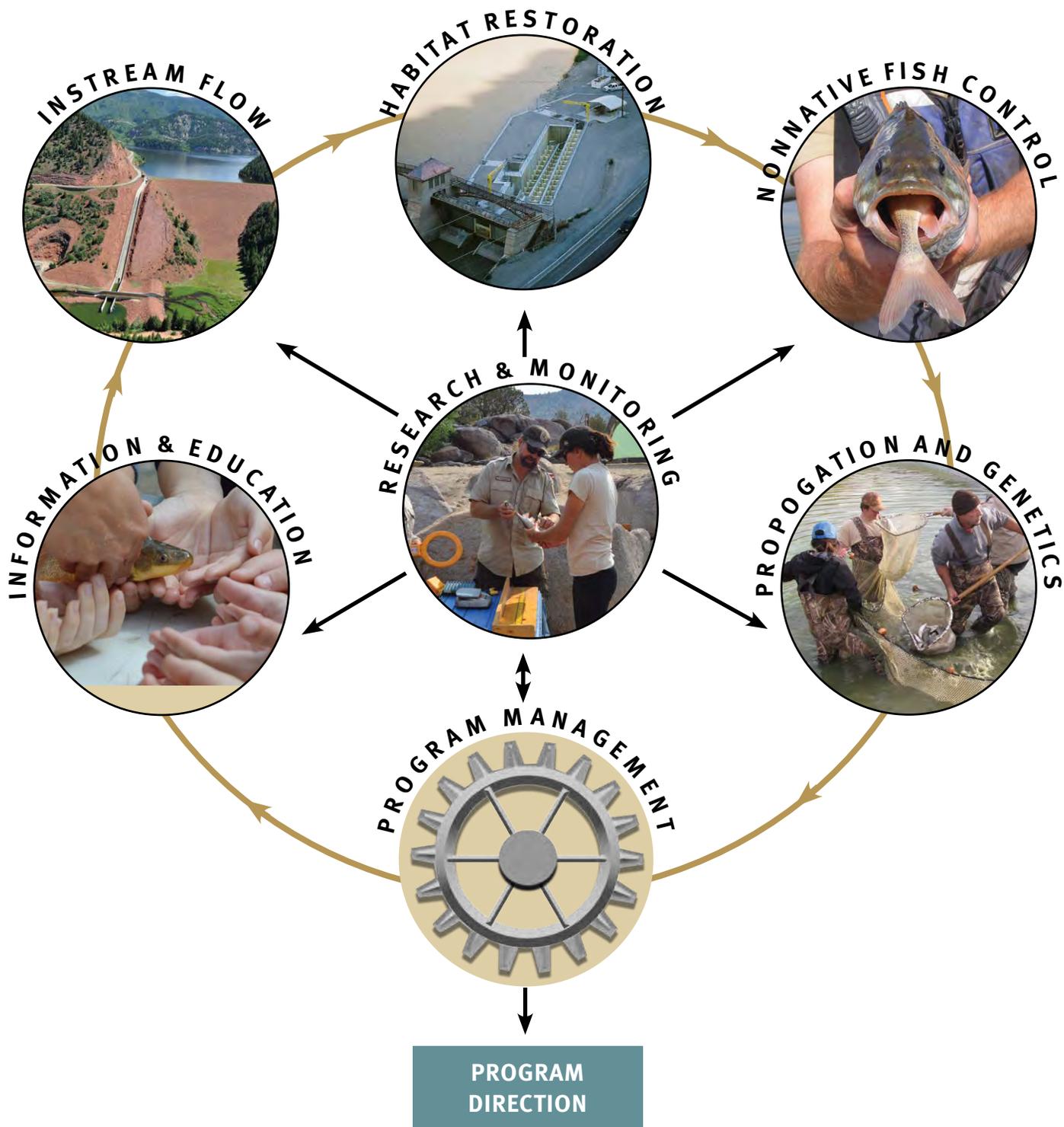
Three to 5 million years ago, a unique-looking fish with a sharp-edged keel “razorback” behind its head swam the Colorado River and its tributaries. The razorback sucker is most closely related to “lake suckers” and is the only member of the genus *Xyrauchen*. One of the largest suckers in North America, the razorback sucker can grow to 3 feet in length and can live for more than 40 years. Razorback sucker eat insects, plankton, and plant matter on the bottom of the river using their soft sucker mouth.

Spawning occurs at age 2-3 during high spring flows when razorback sucker migrate to cobble bars to lay their eggs. Larvae drift from the spawning areas and enter backwaters or floodplain

wetlands that provide a nursery environment with quiet, warm, and shallow water. These protected environments allow young razorback sucker to grow beyond fingerling size, dramatically increasing their chance for survival. As they mature, razorback sucker leave the wetlands in search of deep eddies and backwaters where they remain relatively sedentary, staying mostly in quiet water near the shore. In the spring, razorback sucker commonly swim long distances to return to where they were spawned.

Program Elements Are Adaptive

Both recovery programs focus on seven elements of recovery: instream flow, habitat restoration, nonnative fish control, information and education, propagation and genetics, research and monitoring, and program management. Each element contributes uniquely to stronger fish populations and healthier ecosystems to benefit people and fish. The programs are adaptive, so feedback from each element affects actions in the other elements. Research and monitoring provides the scientific basis to guide decision making in the other elements to ensure that program funds are spent effectively. For specific examples of how research and monitoring guide the other elements, see pages 18-19.



To learn more about how the recovery programs are managed adaptively, please see pages 20-21

Recovery Program Elements

Instream Flow: Identification & Protection

1

Instream flows are the foundation for all fish habitat and provide water for people, recreation and fishing. Program partners use scientifically based flow recommendations to drive management decisions to ensure endangered fish are protected as water is used to grow crops and supply homes and businesses with clean, reliable water.

Partners Work Together to Coordinate Water Releases

Green River: Releases from Flaming Gorge Dam augment spring and base flows, ROD Feb. 2006

White River: Future Water Management Plan and PBO will identify flow protections

Duchesne River: Releases from Starvation and Big Sand Wash Reservoirs augment spring and base flows, BO July 1998

15-Mile Reach–Colorado River: Releases from multiple reservoirs and irrigation efficiencies augment flows, PBO Dec. 1999

Price River: Opportunities being investigated to help achieve USFWS suggested minimum flows, Position Paper May 2012

 **Reservoirs**

 **Critical Habitat**

BO = Biological Opinion

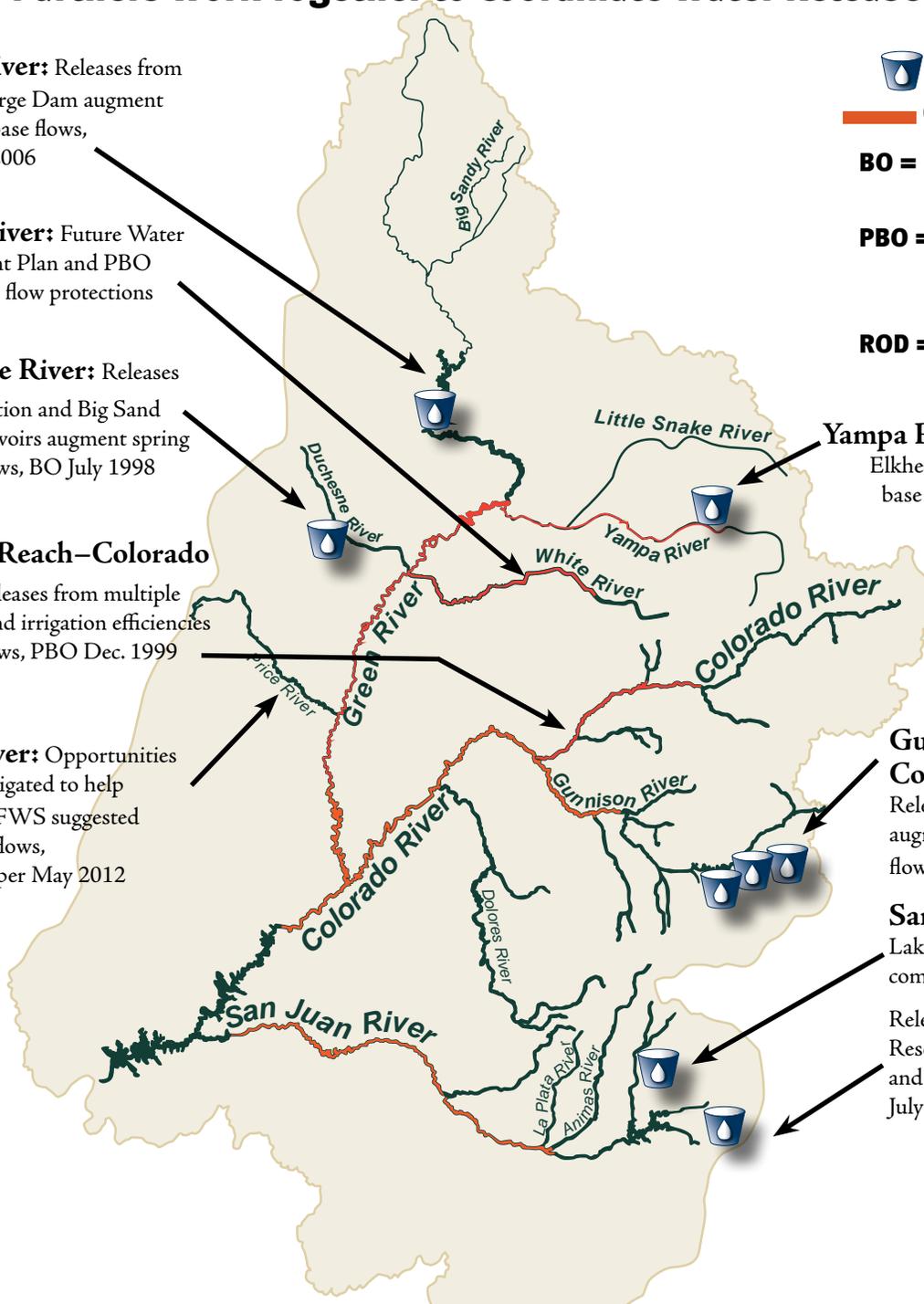
PBO = Programmatic Biological Opinion

ROD = Record of Decision

Yampa River: Releases from Elkhead Reservoir augment base flows, PBO Jan. 2005

Gunnison & Colorado Rivers: Releases from Aspinall Unit augment spring and base flows, ROD May 2012

San Juan River: Lake Nighthorse, completed in 2011
Releases from Navajo Reservoir augment spring and base flows, ROD July 2006



The recovery programs currently provide ESA compliance for 2,500 water projects using more than 3.7 million acre-feet per year.

No lawsuits have been filed on ESA compliance for any of these water projects.

Partners Collaborate to Provide Water for People and Fish

Numerous water interests on Colorado's West Slope collaborate with the Upper Colorado Program to augment streamflows for endangered fish. Every irrigation season, weekly calls are held with reservoir managers and water users in the Yampa and Colorado River basins to coordinate operations that best meet the needs of irrigators, power generators, recreationists and municipalities as well as the fish. Programmatic Biological Opinions (PBO) for each of the rivers establish agreements that allow program collaborators to promote recovery of the four species while ensuring that water users can continue developing water resources and exercising water rights in compliance with the Endangered Species Act (see Milestones in Recovery on pages 22-23).

The drought year of 2018 is a good example of what makes this collaboration so valuable. Disappointing winter snowpack was followed by hot and dry conditions that set in early and persisted for most of the irrigation season. The 2017-2018 Water Year was the warmest in 124 years of recorded Colorado history, and the second-driest. River flows dwindled and reservoirs were drawn down to alarmingly low levels.

Drought conditions threaten endangered fish recovery too. Low river flows and high water temperatures in early summer stress native fish by reducing their food base and forcing them to seek refuge in scarce pools and backwaters. Problematic nonnative species like smallmouth bass get a jump-start under warm conditions. They eat young endangered fish, and grow to a size that promotes over-winter survival, allowing them to wreak more havoc in subsequent years.

The Upper Colorado Program accesses substantial amounts of water from reservoirs annually to boost flows for endangered fish during low-flow periods of the year. However, in years when augmentation water

is most crucial, less is available. Thousands of acre-feet accessible in a "normal" year from West Slope reservoirs like Green Mountain and Ruedi are unavailable in very dry years. As a result, flow conditions for endangered fish grew particularly dire in 2018, especially in the lower Yampa River and in the '15-Mile Reach' of the Colorado River above the Gunnison River confluence.

The good news: Upper Colorado Program partners stepped up to provide extraordinary support for maintaining instream flows in 2018. In the Yampa River basin, the Colorado River Water Conservation District (CRWCD) leased water from Elkhead Reservoir to help prevent the dismally low flow conditions in the lower Yampa from becoming worse. In the Colorado River above the 15-Mile Reach, multiple partners stepped up and voluntarily provided desperately needed water. The CRWCD advantageously timed their maintenance releases from Wolford Reservoir to provide maximum benefits for endangered fish. The Ute Water Conservancy District of Grand Junction leased their unused water in Ruedi Reservoir to support flows. ExxonMobil subsidiary XTO Energy released their hold on 5,000 acre-feet of contract water in Ruedi Reservoir, enabling an equivalent amount to be released for endangered fish. Note that without these collaborative efforts, the 15-Mile Reach likely would have gone completely dry for approximately 12 days in late September and early October. Not good.

Others making these water deliveries possible included the Colorado Water Conservation Board, the U.S. Bureau of Reclamation, the Colorado State Engineer's Office, and agricultural water users like the Grand Valley Water Users Association, Grand Valley Irrigation Co., and Orchard Mesa Irrigation District in Palisade, Colorado. The Upper Colorado Program is fortunate to count these entities among its partners.

"The Colorado River recovery programs have become a national model for implementing the Endangered Species Act while addressing the demand for water development to support growing western communities. In one of the nation's fastest growing areas, Interior agencies work collaboratively with a broad array of partners to secure the future of the river's endangered native fishes, while meeting the water needs of communities across the river's watershed and preserving the natural heritage in the Colorado River basin."

Timothy Petty, Assistant Secretary of the Interior, 2018

Recovery Program Elements

Habitat Restoration

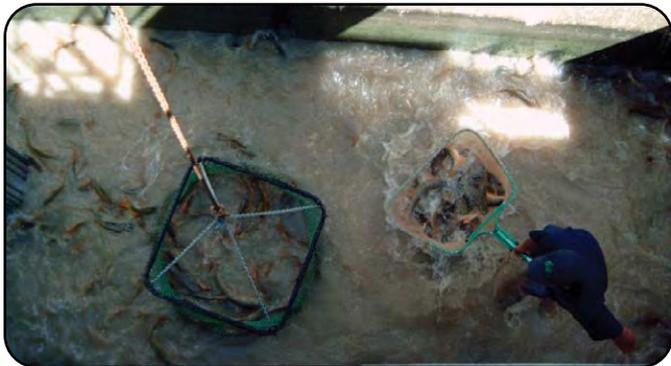
2 Each of the protected species has different habitat preferences that often change as the fish mature. Program partners work cooperatively to provide passage across diversion dams, access to warm, food-rich nursery habitat and to protect fish from entering canals where they could end up on a farmer's field instead of in the river.



Managed wetlands provide nursery habitats which help rare native fish survival. A picket weir gate allows biologists to slowly release wetland water back into the river while fish are counted and PIT-tagged. PIT-tagging allows biologists to track the young fish once released into the river.



Young-of-year razorback sucker have a greater chance of survival the larger they are when returning to the river.



When fish enter a selective fish ladder, a biologist will sort the rare fish, PIT-tag them and release them back into the river on the other side of the dam. Predatory nonnative fish are removed.



From 1996-2018 a total of 161,538 native fish have passed through the Redlands Diversion Dam fish passage. Passage is also provided for Colorado pikeminnow and razorback sucker, which can migrate hundreds of miles to spawn in the stretch of river where they were born.



Photo © Linda Whitman, TNC

Recovery programs' partners, The Nature Conservancy and UDWR, have blended science and engineering at the Matheson Wetland Preserve in Utah. By widening the existing channel from the Colorado River to the preserve's central pond, more water inflow is possible to give larval razorback sucker a secure place to grow.



Capital construction funds allow us to create fish ladders that provide passage over dams and other structures for rare native fish. For more information about completed capital projects see Milestones in Recovery pages 22-23.

Managed Wetlands Provide Nursery Habitat for Rare Native Fish

Over the last decade, floodplain wetlands have become an essential part of endangered species management. It has long been suspected that warm, food-rich floodplain wetlands were key to certain life stages of razorback sucker. Larval, or baby, fish in the wetland are protected from large-bodied predators and have plenty of food to eat. Floodplain wetlands are only accessible by fish during the spring runoff period when the river swells with snowmelt and floods the wetlands. Since the construction of Flaming Gorge Dam, an on-channel reservoir located on the Utah-Wyoming border, the Green River experienced fewer years when wetlands connected to the river. In an attempt to reconnect these habitats for endangered fish, the Bureau of Reclamation released flows out of Flaming Gorge Dam to match the peak of the Yampa River, but fish were still not routinely found in those wetlands. That changed in 2012 with the Larval Trigger Study Plan (see Milestones in Recovery on pages 22-23). Using annual monitoring data, scientists developed a hypothesis that flows were not being released at the right time because razorback sucker larvae were not yet present in the river when flows increased.

Dam releases are now delayed until razorback sucker larvae are found in the river channel. This simple change has produced dramatic results. Stewart Lake, managed by Utah Division of Wildlife Resources (UDWR), became the first gated wetland to regularly produce fingerling razorback sucker. Over the last few years, UDWR biologists have documented the survival of four Stewart-raised razorback sucker to three years of age – the first documentation of natural recruitment to an adult life stage in the upper Colorado River basin. The floodplains also seem to benefit other endangered species. In 2015, bonytail spawned in Stewart Lake, the first documented occurrence of reproduction for that species in the Basin. Prior to 2015, wild reproduction of bonytail had not been documented for decades. Bonytail reproduction has been observed in wetlands four more times since 2015.

After the success at Stewart, the Upper Colorado Program continues to develop floodplain wetlands that are gated and screened to make sure that we can manage both flow and nonnative predators. Capital construction funds are essential to build the gate structures that keep out large-bodied fish and keep water in the wetlands. There are currently four such wetlands in operation along the banks of the Green River, including: Johnson Bottom, Old Charley, and Sheppard Bottom. The Nature Conservancy and UDWR just completed construction on Matheson Wetland, the first wetland of this kind on the Colorado River. In addition, there are several more wetlands along the Green River that can provide habitat, but are not intensively managed.

“Wyoming has been an active participant in the Upper Colorado Program, ensuring the recovery of four endangered fish species while allowing for the development of the Compact appropriations. It is imperative that the recovery program remains viable and continues to provide reasonable and practical alternatives to assure ESA compliance.”

Matthew H. Mead, Former Governor, State of Wyoming



Recovery Program Elements

Nonnative Fish Control

3 Nonnative fish have been introduced across the basin, for many years and for many reasons. Predation by nonnative fish species is a serious threat to endangered fishes and perhaps the most challenging to manage. Program partners are using a diverse range of solutions to address this threat, but novel solutions are needed.



The Seven Elements of Recovery

Legend



The fish pictured in the green rectangle represent nonnative fish introduced into the Colorado River Basin through various means: escapement, illegal introductions and previous stocking. These nonnative fish do not have a serious impact to the native fish.



The blue circle represents the native fish of the Colorado River.



The 3 nonnative fish (smallmouth bass, northern pike and walleye) pictured in the red rectangle are the biggest obstacle to the recovery of rare native fish in the rivers. They eat native fish and compete for habitat and resources.

Upper Colorado River Major Threat: Invasive Species

Over the last 150 years, people have brought many species of fish into western rivers. Some were brought to start fisheries for anglers, others were accidentally introduced as bait fish. Most of the introduced species came from places with high levels of biodiversity and they adapted to be able to compete. Some have big teeth, some have spines or barbs, others use parental care strategies to ensure higher survival of offspring. Fish native to the Colorado River adapted in a different system, where the primary threats were drought and large flood events. Few species of fish managed to survive the desert gauntlet; the ones that did are long-lived and tolerant of poor water quality conditions. They are not robust to outside competition.

Over the life of the programs, a lot has been learned about nonnative species. Many species valued as sportfish are not substantial threats to Colorado River native fishes and therefore have been designated as Compatible Species. That list includes cutthroat, rainbow, brook and brown trout, kokanee, largemouth bass, black crappie, bluegill and yellow perch. These species are routinely stocked into reservoirs across the upper basin to provide angling opportunities.

Other species, however, pose a substantial risk to native fish, primarily because they are effective at establishing reproducing populations in rivers. The three most problematic species are northern pike, smallmouth bass and walleye. All three have high concentrations in river systems across the basin despite extensive removal efforts, creating a gauntlet of predatory mouths for native species.

Changing Paradigms

In 2009, the U.S. Fish and Wildlife Service, Utah, Colorado and Wyoming agreed that only compatible species would be stocked in the Upper Colorado basin to support endangered species recovery. Over the last decade, Utah and Wyoming have issued must-kill regulations for all three of the most problematic species. Colorado has unlimited bag limits for northern pike, smallmouth bass and walleye in rivers and reservoirs across the western slope. Colorado Parks and Wildlife currently holds fishing tournaments targeting smallmouth bass and northern pike, encouraging anglers to catch and remove these species where they are found. Water organizations across the basin pay bounties for northern pike caught and removed.

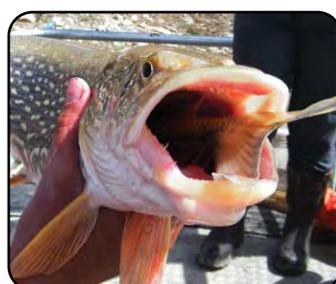
Despite these efforts, these species keep spreading. Individuals have illegally introduced problematic species into new reservoirs at least 15 times in the past 12 years in the upper basin. Moving fish is illegal in all three upper basin states because introducing fish to new waters can have negative consequences for water users, anglers, agencies and ecosystems. Illegal introductions have caused state wildlife management agencies to reset fisheries, stop stocking desirable species like rainbow trout, and spend time on removal efforts instead of fishery development. Without a paradigm shift and help from the public, management of these three problematic species will continue to be the largest hurdle to endangered fish recovery.

Grab a fishing pole today!

Please see the Utah, Colorado and Wyoming fishing guides for relevant regulations.

“The success of the Upper Colorado River and San Juan River Endangered Species recovery programs is vital for Utah’s continued use and development of Utah’s Colorado River apportionment as part of our state’s continued progress in providing for the needs of the citizens of Utah.”

Gary R. Herbert, Governor, State of Utah



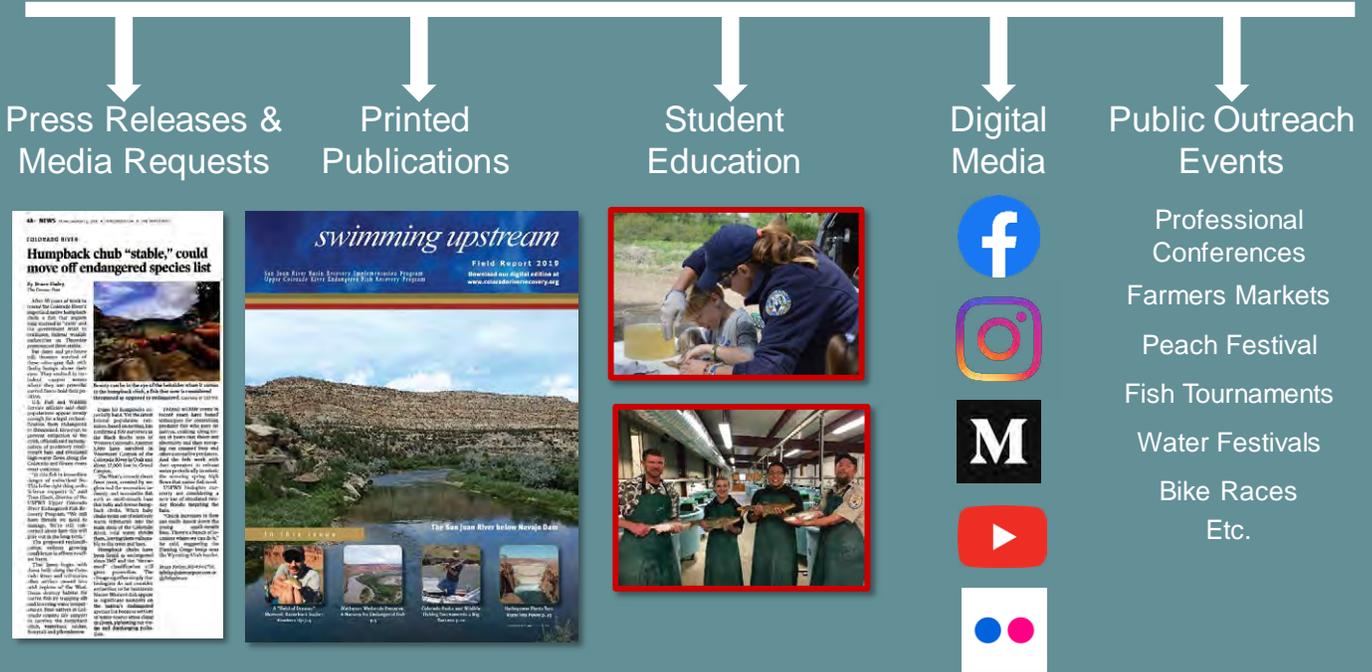
Photos by Recovery Program partners.

Recovery Program Elements

Information & Education

4 Public support is essential to recover the endangered fishes, now and in the future. Program partners visit schools, attend community events, engage anglers and boaters along the rivers, present at professional meetings, and develop a variety of printed materials and educational items that inform people about the value of endangered fish in their communities. Partners are especially passionate about engaging students of all ages. There are programs like “Razorback Sucker in the Classroom” for fourth graders and a high school hatchery project in Palisade, CO. Both of these programs use native fish as the basis for STEM activities in science, technology, engineering and math. The recovery programs participate at water festivals, close to critical habitat, where kids handle native fish and learn about river ecosystems.

Increase Public Awareness and Support



Students Raise Native Fish in the Classroom

Not too long ago, native fish were commonly referred to as the trash fish of the river. Misunderstood from the start, the native fish were seen as not as good to eat or as fun to catch as introduced sportfish. Thanks to the many dedicated efforts of program partners, that attitude is starting to change. People across the basin are coming to value the history, ecological importance, and uniqueness of native fish in the Colorado River basin.

Many of these efforts target students with hands-on experiences that develop bonds with these species. Teachers across the basin raise a few hatchery razorback sucker in fish tanks that are then released into the wild. They integrate the fish into lesson plans, writing and reading about the species and learning about their biology.

In 2019, educational efforts hit a new high with the construction of a fish hatchery at Palisade High School, Palisade, Colorado. Thanks to the efforts of Pat Steele, a science teacher at the high school and Michael Gross, a fish culturist at USFWS Grand Valley Hatchery, students are developing real-world skills in their own school. The hatchery will receive fingerling razorback sucker and bonytail to be raised by the students until they are ready for river release. Students will use water quality testing to learn about chemistry, collect biometrics to learn about biology, and use the fish as the subject of writing assignments around environmental conditions, biodiversity and climate change. Students raised money to make the hatchery possible, applying for grants, selling peaches and even donating scholarship money they received. They developed and executed planning documents that considered how a hatchery is built. They teach elementary school students about endangered species at the Ute Children's Water Festival. Students are using their own interest areas to develop marketable skills and experience, make a difference in their community and assist in the recovery of these species.

"The passion behind this project originates with education and environmental protection. To have the ability to encompass both in a single venture is an outstanding feat that has made me so proud to be a part of this community."

Dyllon Hoaglund, PHS student



Isabelle Haderlie and Kaleb Hawkins, former Palisade High School (PHS) students, sell peaches to raise money for the PHS Fish Hatchery project. They raised \$1,500 by selling peaches and donating scholarship money.



Pictured from left to right: Patrick Steele, PHS science teacher, Levi Van Pelt and James Soria, PHS students, and Mike Gross, USFWS, hold four endangered fish raised at the Ouray National Fish Hatchery, Grand Junction, CO

Recovery Program Elements

Propagation & Genetics

- 5** Hatchery-produced fish are stocked into rivers and streams when populations fall below self-sustainability. Program partners work together to maximize genetic diversity and continuously improve techniques so stocked fish are more likely to survive in the wild.

“The Colorado River recovery programs have become a national model for collaborative species recovery efforts. Here in one of the nation’s fastest growing areas, we continue to work successfully with a broad array of partners to secure the future of the river’s endangered native fishes, while meeting the water needs of communities across the river’s watershed. As the impacts of a changing climate and human populations continue to grow, these partnerships will become increasingly vital to sustaining our natural heritage in the Colorado River basin.”

Sally Jewell, Former Secretary of the Interior, 2014

Hatchery personnel work with geneticists to insure that the captive broodstocks are as genetically diverse as the wild populations.

Visit a hatchery to learn more about the science of propagation and genetics.

Make a Reservation to Tour a Hatchery Facility

| |
|--|
| J.W. Mumma Native Aquatic Species Restoration Facility, Alamosa, CO (719) 587-3392 See bonytail here |
| Wahweap State Fish Hatchery, Big Water, UT, (435) 675-3714 See bonytail here |
| Ouray National Fish Hatchery – Randlett Unit, Vernal, UT, (435) 789-0351 See bonytail and razorback sucker here |
| Ouray National Fish Hatchery – Grand Valley Unit, Grand Junction, CO, (970)245-9236 See bonytail and razorback sucker here |
| Southwest Native Aquatic Resources and Recovery Center, Dexter, NM 575-734-5910 extension 119 See Colorado pikeminnow here |



Photo by Melanie Fischer, USFWS



Photo by Zane Olsen, UDWR

Bonytail are raised in grow-out ponds and harvested using seine nets. They are measured, tagged, transported to the river, and released.

Waheap State Fish Hatchery in Big Water Utah raises bonytail.

Effective Stocking Programs Bring Razorback Sucker Back from the Brink of Extinction

The razorback sucker has advanced far along its path to recovery since being listed as endangered under the Endangered Species Act in 1991. In the nearly 30 years since, the razorback sucker has gone from the brink of extinction to proposed downlisting to threatened status.

This comeback story wouldn't be possible without the efforts of hatchery programs. Since 1996, about 200,000 razorback sucker have been stocked in the Upper Colorado River system, and since 1994, over 100,000 razorback sucker have been stocked in the San Juan River. Stocking efforts allowed the species to persist despite the odds, with populations expanding throughout the Green, San Juan, and Colorado River basins. Stocked razorback sucker have been observed reproducing at spawning sites in the Green, Colorado, and San Juan rivers and, based on captures of larval fish, are reproducing in the wild in the Green, Gunnison, Colorado, and San Juan rivers. Recently, record numbers of age-0 and age-1 razorback sucker have been found in the San Juan River.

While hatchery programs have been successful in their role toward recovery, raising endangered fishes in a hatchery isn't easy. Hatchery staff have had to identify and resolve a number of issues. At the Ouray-Randlett Hatchery, high levels of the mineral manganese were causing fish mortality. Hatchery managers added special water filters. After high levels of bird predation, Ouray-Randlett used netting to cover ponds, which kept the herons and cormorants away. At the Ouray-Grand Valley hatchery, managers noticed stressed fish during the harvesting process. They redesigned their ponds to incorporate kettle basins and now use cranes to move fish quickly and gently. Southwestern Native Aquatic Resource and Recovery Center developed protocols to minimize stress so managers knew how to handle and release fish in the best way possible.

For other issues, hatchery staff worked collaboratively to find solutions. A razorback sucker-specific diet was developed by the USFWS Bozeman Fish Technology Center in 2011, aiding in the growth and survival of hatchery-reared fish. Based on the recommendations of program biologists, integrated stocking plans for the Upper Colorado and San Juan Programs were developed in 2003, resulting in more fish surviving their first year in the wild (see Milestones in Recovery pages 22-23). In the Upper Colorado Program, a 2015 revision recommended innovative techniques like flow training at Mumma Native Aquatic Species Restoration Facility, which prepares fish before they are released into a rushing river. Health Condition Profiles (HCP) initiated at Wahweap State Fish Hatchery were also implemented at all facilities, providing valuable information to assess health of the fish before they are released.

The success of the endangered fish stocking programs is made possible by numerous integrated management actions, including education and outreach; habitat and flow management; research and monitoring; and non-native fish removal. Together, the recovery programs' efforts will help ensure that these unique fishes continue to be an integral part of the Upper Colorado River system's fish community for generations to come.



Photo by Matthew Fry, USFWS

Recovery Program Elements

Research & Monitoring

6

Research and monitoring produce information to evaluate progress to recovery and guide management efforts. Program partners provide the science to support decision making regarding recovery actions, to see what is working and what isn't, and make adaptive improvements.



Releases from Flaming Gorge Dam provide flows that benefit larval razorback sucker in the Green River.



This razorback sucker was captured on the San Juan River. It was tagged, weighed and measured, then released back into the wild.



Netting for invasive northern pike happens in the early spring prior to spawning. By removing these fish before they spawn, it reduces the populations in the river.



Casey Pennock (rowing), and Nate Cathcart (netting) capture native and nonnative fish in the eddy below the Piute Farms Waterfall. The waterfall is located below Mexican Hat, Utah.

Monitoring Uses Science to Produce Data that Influence Adaptive Management Decisions

The programs use a wide variety of tools to monitor fish populations and environmental conditions, including nets, electrofishing, passive antennas, observational data and even hydrophones. The accumulated data (many datasets span multiple decades) inform future decision making. Because monitoring supports the other program elements, each of the examples below touches on another element of recovery.

Larval Trigger Study Plan (LTSP)

The Larval Trigger Study Plan (LTSP) was developed after years of monitoring showed that we could improve the timing of spring releases from Flaming Gorge Dam to push more larval razorback sucker out of the cold main channel into warm and food-rich floodplain wetlands along the Green River in northeastern Utah. The original flow recommendations for Flaming Gorge guided dam managers to release the spring peak to coincide with the natural flow peak in the Yampa River, a tributary to the Green River. However, our long term monitoring program told us that the Yampa River often peaked before the newly hatched larval razorback sucker had emerged from Green River spawning bars. So instead of relying so much on the Yampa River flows, we relied more on our larval razorback monitoring program to guide Flaming Gorge Dam operations. Now, when larval razorback sucker are detected in the Green River, a request is made to the Bureau of Reclamation at Flaming Gorge dam to increase releases. The year 2019 marked the 8th year in a row that razorback sucker larvae were captured in one or more productive floodplain wetlands under these modified operational plans.

Bigger Razorback Sucker

Each time an endangered species is stocked or captured in the river, it is weighed and measured. Those data are tracked in a database that identifies each unique fish by an implanted PIT tag number. Analyzing those data for razorback sucker led to a dramatic change in how fish were produced from hatcheries. In 2010, Koreen Zelasko from Colorado State University published a study indicating that first year survival was related to size at stocking and that larger fish were more likely to survive. Based on her results, the hatcheries began stocking fewer, but larger fish, resulting in higher overall survival.

Netting Backwaters for Northern Pike

Unlike many other residents of the upper Colorado River basin, invasive northern pike migrate into flooded sloughs and the mouths of small tributaries soon after ice-out in the spring to spawn. After years of in-river removal our monitoring data indicated little decline in overall populations. Colorado Parks and Wildlife biologists suggested focusing greater attention on the spawning adults by blocking the entrance to those spawning habitats with gill-nets. This technique has resulted in greater efficiency; CPW is capturing more adult northern pike before they spawn with less effort. Studies are currently underway to see whether the effort has affected overall northern pike population numbers.

The Piute Farms Waterfall

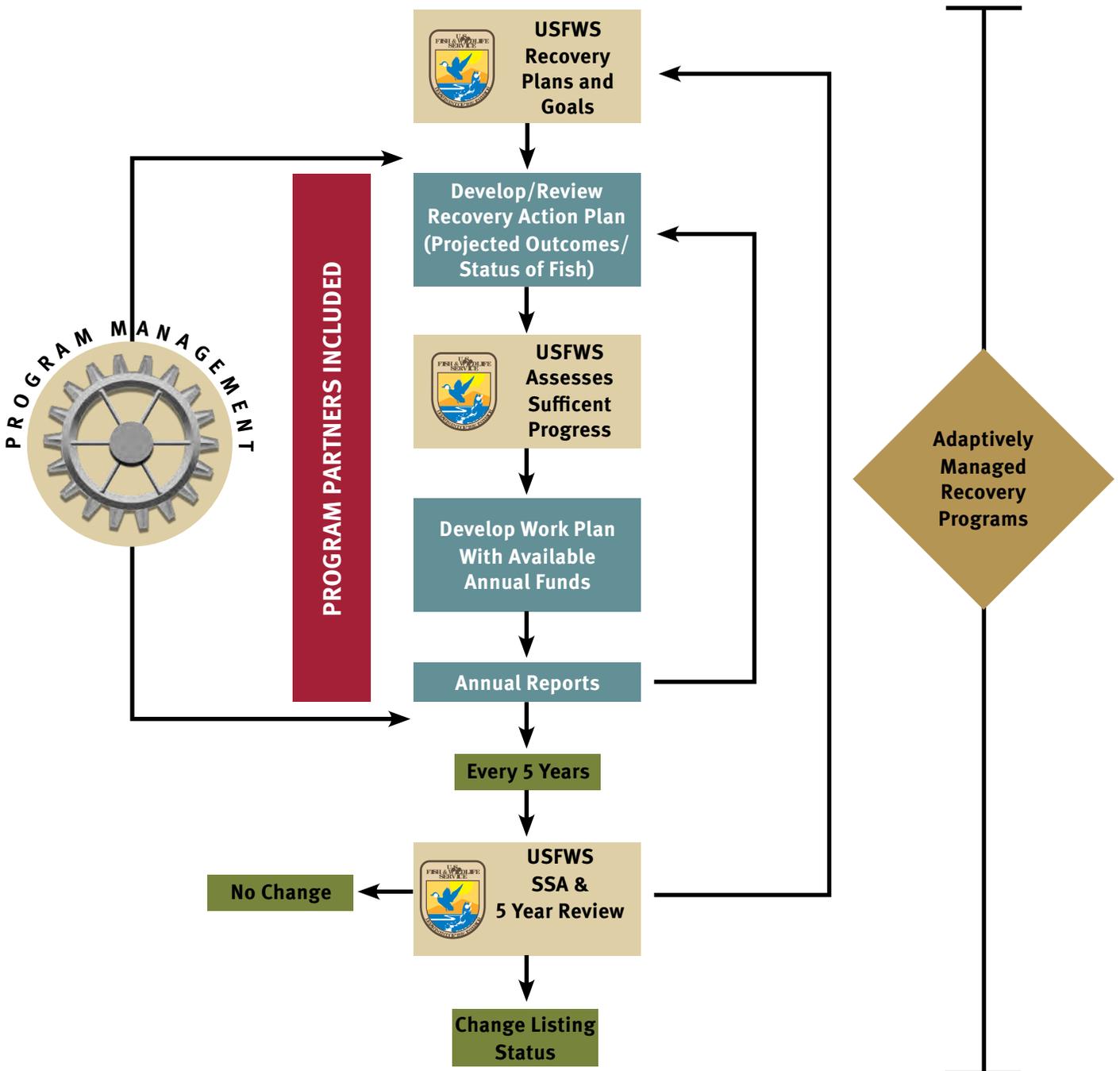
Since about 2001, a natural waterfall on the San Juan River has been preventing upstream movement of both native and nonnative species. As long-distance migrations are common for both razorback sucker and Colorado pikeminnow, biologists needed to determine whether the problem was big enough to cause population-level effects. Using submersible PIT tag antennas, over 1,600 individual fish were detected gathering at the base of the waterfall, presumably attempting to migrate back into the system. Additional monitoring efforts are underway to determine the best mechanism to provide these fish with access to all the habitat present in the San Juan River.

Monitoring is expensive, time consuming, and essential to making sure the programs are using the best available science to implement the best possible management. As the recovery programs move into the future, we will continue monitoring to assess and redirect our actions through adaptive management.

Recovery Program Elements

Program Management

7 The programs are adaptive by nature, and each has an annual review process (shown in the figure below) designed to incorporate information from the previous year into the next year's plan. The recovery programs are managed by the USFWS to ensure compliance with the ESA. Information from these programs and others is used in USFWS processes like Species Status Assessments (SSA) and 5-year reviews which provide the best available science. Program partners routinely come together to discuss the best path forward, and have done so in a cooperative, collaborative manner for over 30 years.



Program Management

The Upper Colorado River and San Juan River recovery programs were created out of necessity – but have since become a model for how diverse stakeholders can work together to make progress in complex systems.

About 30 years ago, the programs were created as mechanisms to provide Endangered Species Act compliance for ongoing water development in the Rocky Mountain West. Today, they provide compliance for over 2,500 unique water projects and have not prevented or slowed development of a single one. Since inception, the programs have integrated stakeholder perspectives into the adaptive management process to benefit populations of endangered fishes across the upper Colorado River basin.

Program Management, the seventh element of recovery, serves as the foundation of the adaptive processes, ensuring that all perspectives are heard and incorporated into the next year's action plan. Since our programs were created, we have not lost a single stakeholder. In fact, the programs continue to grow; the San Juan Program is currently working to add the State of Utah as a partner.

Recovery Programs Sunset in 2023

The mechanisms used to adaptively manage were established 30 years ago when the programs were new, smaller, and more simple. Today, because the scope of our actions has grown, our annual Recovery Implementation Plan – Recovery Action Plan (RIPRAP) in the Upper Colorado River Program is exhaustively reviewed with program partners before it is finalized. We have an opportunity to create a more efficient process when our authorizing legislation is renewed in 2023.

We can consider a collaborative path forward because of the trust developed between our partners. During discussions of our post-2023 future, our partners have unfailingly committed to continuing to support recovery into the future. They have expressed confidence in the program offices to lead those efforts and are recommending that management of the programs remain with the USFWS into the future. In return, the program offices are working to develop a new generation of adaptive management processes – processes that rely more on scientific modeling. Adaptive management models build on the best available scientific information and support quick decision making in response to changing environmental conditions, allowing resources to be redirected to their most efficient use. Modeling also allows for transparency, supporting and enhancing the trust that has been built over the last 30 years. The Cooperative Agreements that implement both programs will sunset in 2023. In an effort to sustain the programs post 2023, and as outlined in PL 116-9, program partners are committed to work with the Secretary of Interior to submit a Report to Congress by the end of fiscal year (FY) 2021.

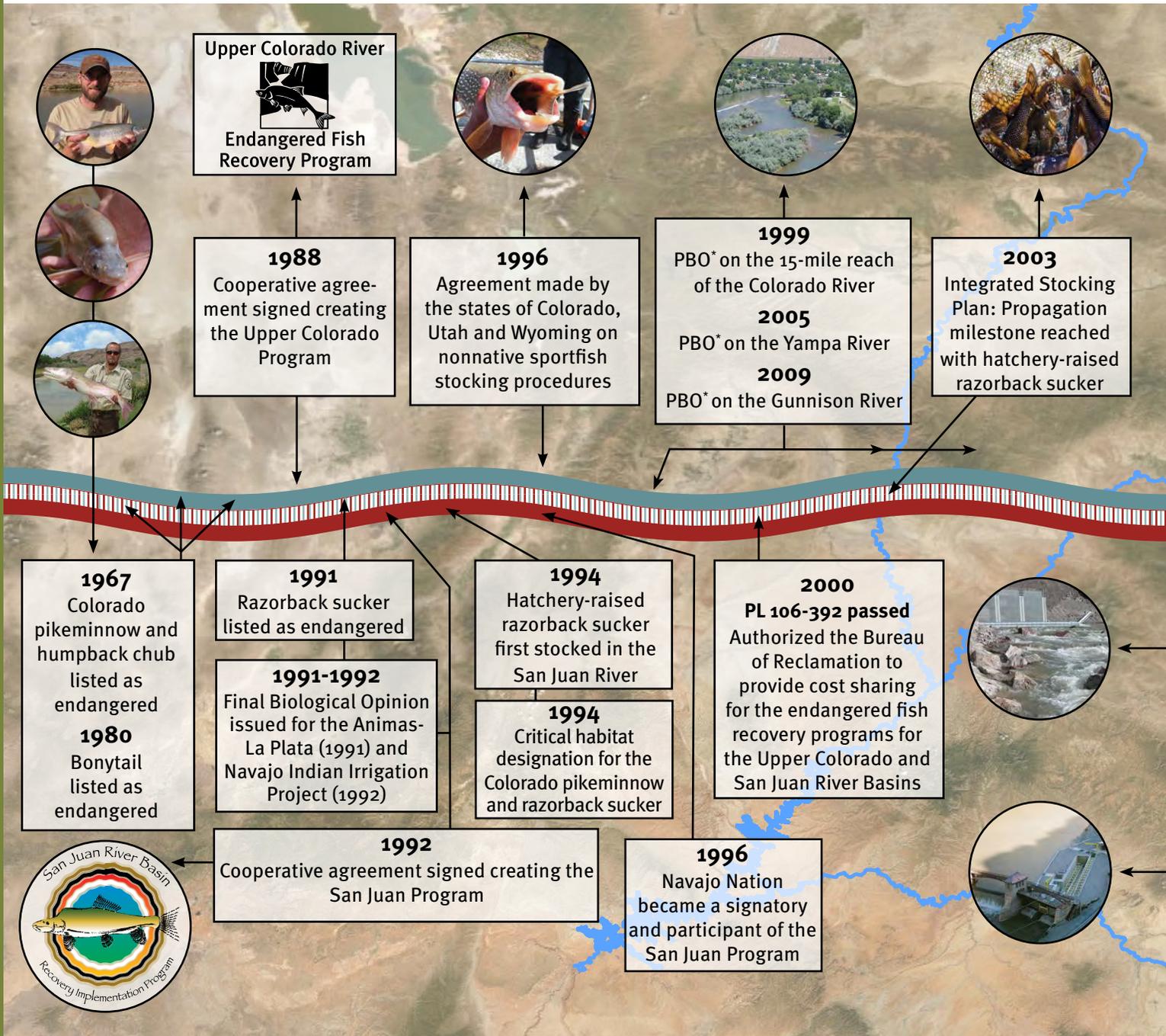
The Report to Congress Will Contain:

- ✦ A description of the programs' accomplishments
- ✦ Current listing status of the four listed species and their projected status in 2023
- ✦ Total programs' expenditures (by funding source) through FY 2021 and projected expenditures through 2023
- ✦ Identification of recovery activities and projected costs by the programs beyond 2023

Status Report – Technical and managerial representatives from both programs have identified and prioritized post 2023 activities and developed estimates of associated annual and capital costs. Program partners will submit a draft Report to Congress to DOI bureaus in Headquarters by the end of FY 2020 to meet our end of FY2021 deadline.

Milestones in Recovery

Over the past 30 years, the recovery programs have made substantial strides towards recovery, resulting in proposed downlisting status for two species. The timeline below outlines some of the largest successes in flow management, nonnative fish management, capital construction projects and more.

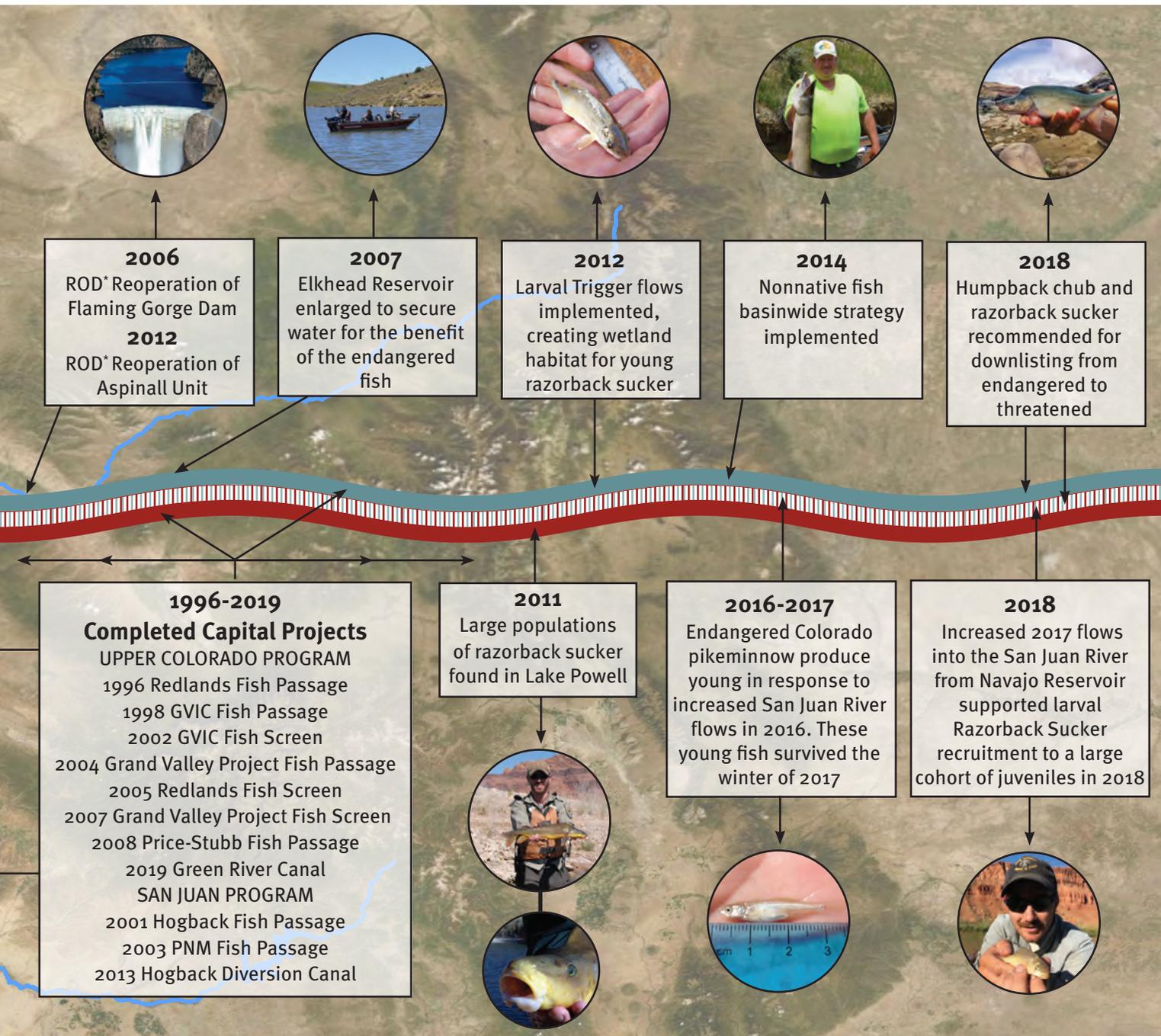


Upper Colorado River Endangered Fish Recovery Program Timeline
 San Juan River Basin Recovery Implementation Program Timeline
 Timeline that impacts both recovery programs

PBO*: A biological opinion from the USFWS identifies whether a federal action is likely to jeopardize the continued existence of listed species. A programmatic biological opinion (PBO) considers multiple actions and activities, often over a broad area (e.g., a river watershed), and frequently includes many small projects similar in nature (e.g., multiple diversions that deplete river flow). Typically, various conservation actions are required within the PBO to help ensure that the listed species survives.

Collaborative Conservation

Both recovery programs are managed by partner committees, with decisions made by consensus. All partners may have a seat at the table on managing and technical committees. Both recovery programs use science-based, cooperative actions to assist in endangered fish recovery, such as to reoperate federal reservoirs to create and maintain habitat, work with irrigators to improve their water efficiency, construct fish passages, remove invasive predatory fish and provide information and education to the public.



ROD*: A Record of Decision (ROD) is a short public document that records a federal agency's decision(s) concerning implementing a proposed action for which the agency has prepared an environmental impact statement (EIS).

EIS: An Environmental Impact Statement (EIS) is a report evaluating the potential effects on the environment of a proposed project or action. These statements are required by Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA) for federal activities determined to significantly affect the environment.

HELP PREVENT THE SPREAD OF NONNATIVE SPECIES



KNOW THE LAW



SMALLMOUTH BASS



NORTHERN PIKE



WALLEYE

UTAH AND WYOMING HAVE
CATCH & KEEP
REGULATIONS IN CERTAIN RIVER
REACHES. IT IS ILLEGAL TO
RETURN THESE FISH TO THE RIVER.

One hundred years ago only 13 native species swam in the Upper Colorado River and its tributaries—today they have been joined by more than 50 nonnative species. Introduction and establishment of problematic nonnative predators affect native fishes, the Upper Colorado Recovery Program, anglers, and local communities with high environmental and

economic costs. Removing illegally introduced species is expensive and time-consuming. We must all join forces to prevent the spread of these problematic nonnative predators to preserve native fish in the river and desirable sportfisheries in reservoirs.

Review your state fishing regulations. State regulations may vary based on river mile and are the **LAW**. Regulations on the river may be **very different** than in reservoirs. **KNOW THE LAW.**

<https://cpw.state.co.us/Documents/RulesRegs/Brochure/fishing.pdf>

<https://wildlife.utah.gov/fishing/fishing-regulations.html>

<https://wgfd.wyo.gov/Fishing-and-Boating/Fishing-Regulations>

<http://www.wildlife.state.nm.us/fishing/game-fish/>

Nonnative Fish Impact

San Juan River Basin Recovery Implementation Program
Upper Colorado River Endangered Fish Recovery Program

Download our digital edition at
www.coloradoriverrecovery.org



Photo by Melanie Fischer, USFWS

Moving Fish is Illegal And Causes Negative Impacts for Everyone

In 2018, Colorado Parks and Wildlife (CPW) confirmed northern pike had been introduced in Kenney Reservoir near Rangely, Colorado; CPW determined the species was likely introduced illegally by a member of the public. This represents the most recent known introduction of a problematic predator in the upper Colorado River basin (see Table 1).

Each time one of these species is introduced into a new location where it could escape downstream and impact endangered fish, Upper Colorado River Endangered Fish Recovery Program (Recovery Program) stakeholders must respond with additional actions. Over the past decade, many additional recovery actions have been required, increasing the time and money needed to recover endangered fish. Each of the case studies shown here demonstrates the problems that illegal fish introductions cause to various stakeholder groups and how the Recovery Program is responding to this problem.

Table 1

| Water Body | Species | Year | Stakeholder Response |
|------------------------|----------------------------|--------------|--|
| UTAH | | | |
| Red Fleet Reservoir | Walleye | 2006 | Complete reset of fishery; stocking of sterile walleye; screen to prevent escapement |
| Big Sandwash Reservoir | Smallmouth Bass Walleye | 2012 | Stocking of sterile walleye |
| COLORADO | | | |
| Stagecoach Reservoir | Walleye Northern Pike | 2003 1994 | Fishing tournament; mechanical removal |
| Crawford Reservoir | Northern Pike | 2000 | Mechanical removal |
| Chapman Reservoir | Northern Pike | 2009 | Complete reset of fishery |
| Paonia Reservoir | Northern Pike | 2011 | Complete reset of fishery |
| Miramonte Reservoir | Smallmouth Bass | 2012 | Complete reset of fishery |
| Ridgway Reservoir | Smallmouth Bass | 2013 | Fishing tournament; screen to prevent escapement |
| Pastorius Reservoir | Northern Pike | 2015 | Draining of reservoir to reset fishery |
| Kenney Reservoir | Northern Pike | 2018 | Fishing tournament; mechanical removal |

Moving fish is illegal in all three upper basin states because introducing fish to new waters can have negative consequences for water users, anglers, agencies, and ecosystems.

Ridgway Reservoir: Illegal smallmouth bass introduction constrains water users' operations

When smallmouth bass were confirmed as illegally introduced in Ridgway Reservoir in 2013, Recovery Program stakeholders immediately began working to prevent this species from escaping downstream and reaching the Uncompahgre and Gunnison rivers. The initial way to prevent the species from moving downstream was to ask the Tri-County Water Conservancy District (WCD) to not spill water, and thus smallmouth bass, over the dam. Tri-County WCD has worked diligently to abide by this request and has not spilled the reservoir since, even in years with above average snowpack. While Tri-County WCD is adjusting its operations, CPW and the Recovery Program are working on other solutions, including fishing tournaments and a screen on the spillway.

Stagecoach Reservoir: Illegal northern pike introduction limits anglers' ability to catch trout

When northern pike were illegally introduced into Stagecoach Reservoir in the early 1990s, the responsible party probably thought they were adding another fun fish for everyone to catch. Instead, trout fishing opportunities for families and campers crashed, and the taxpayers of Colorado had to pay more money to keep the reservoir fishable. That is because the introduced pike grew large and ate trout stocked for summer shoreline fishing, decimating the population. Without quality trout fishing, campgrounds were empty. In order to provide the trout fishery, CPW had to stock bigger trout, which cost more to raise. Stagecoach Reservoir is perfect example of how one person's selfish action negatively impacted everyone else's ability to enjoy a common resource.

Stakeholders Respond to Illegal Introductions with a Variety of Solutions

Recovery Program research has shown that fish escaping from reservoirs reduces our ability to control nonnative predators in the river downstream. Therefore, each time a problematic predator is illegally introduced into an upstream reservoir, the Recovery Program must enact a solution to prevent those fish from escaping downstream. Recovery Program stakeholders are implementing a variety of solutions that include installing physical structures, eradicating all fish in the reservoir, mechanically removing fish, and providing angler incentives to harvest the fish. Each of these solutions have different costs, benefits, and constraints, so stakeholders must choose the solution that is right for the water body. However, one thing is certain, with each new location that a species is illegally introduced, the stakeholders must commit more time, money, and effort to solving this problem, thus slowing the progress to recovery.

Red Fleet Reservoir re-establishes a fishery that works for everyone



Photo by UDWR

One of the only ways to truly eradicate an illegal introduction is to use the fish toxicant rotenone to completely eradicate every fish. The Utah Division of Wildlife Resources (UDWR) responded to illegally introduced walleye in Red Fleet Reservoir by completing an eradication project in 2015, creating a reservoir that could be restocked with fish approved by UDWR. To provide a satisfactory fishery, UDWR asked a team of anglers what fish they would like to see in Red Fleet. When the team voiced their desire to still be able to fish for walleye, UDWR responded with an elegant compromise – UDWR would stock sterile (not able to reproduce) walleye in the reservoir and build a downstream screen. The screen would limit walleye

escapement into endangered fish habitat and sterile walleye would not be able to create new populations if they moved to another location. This solution demonstrates that seeking angler input and finding compromises can produce viable angling experiences and be compatible with endangered fish recovery.

Recovery Program builds physical structures to stop escapement from reservoirs



Photo by Ray Tenney, CRWCD

Although eradication is the best response to illegal introductions, in many locations it is not a feasible solution. In these locations, slower removal efforts are implemented, such as netting or fishing for the introduced fish. While those solutions are being implemented, the Recovery Program must prevent the remaining fish from escaping. To do so, stakeholders have installed many physical structures which allow water to pass through, but not fish. These structures include fiber nets and metal screens, which are expensive (e.g. \$4M for a solution at Ridgway Reservoir) and need to be replaced at some point in the future. However, through partnership funding and innovative design, stakeholders have installed four structures in the past decade and

have plans for two more in the next year. Unfortunately, we continue to need to build more structures in response to more introductions, which uses funds that could otherwise go to projects such as endangered fish habitat.

IN-RIVER REMOVAL



SMALLMOUTH BASS



NORTHERN PIKE



WALLEYE



CHANNEL CATFISH



RESERVOIR SOURCES OF NONNATIVE FISH

- ★ CONTAINED
- ★ CONTAINMENT BEING BUILT
- ★ NOT YET CONTAINED
- ★ CONTAINMENT NOT PLANNED

WHY ARE CERTAIN NONNATIVE FISH A PROBLEM?



PREDATION & COMPETITION



HIGH REPRODUCTION POTENTIAL

Controlling Invasive Predators of Greatest Concern

Smallmouth Bass

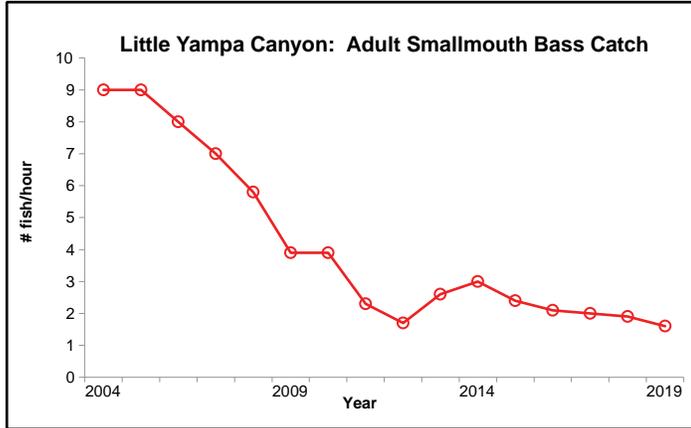


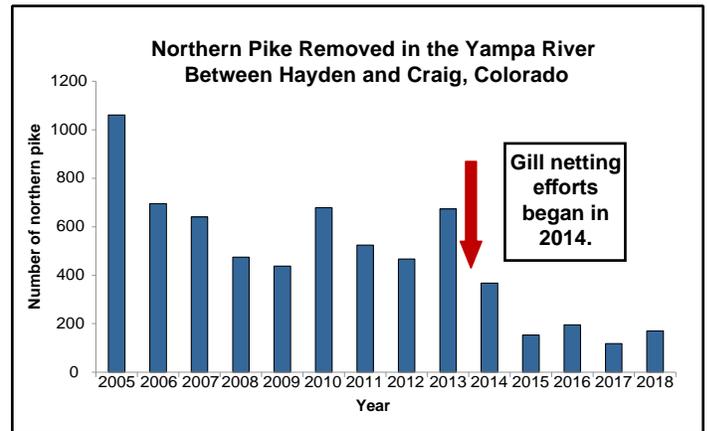
Photo by Melanie Fischer, USFWS

Multi-agency crews coordinate smallmouth bass removal efforts in the Yampa, White, Green, and Colorado rivers timed specifically to target spawning adults. This effort has dramatically decreased the number of adult smallmouth bass.

Northern Pike



Photo by Tony Eyre, CPW



Gill netting backwaters in late winter is a cost-effective and efficient way to remove large numbers of northern pike before they can spawn. This removal method began in 2014, and has resulted in reduced numbers of northern pike caught in the nearby Yampa River.

Walleye

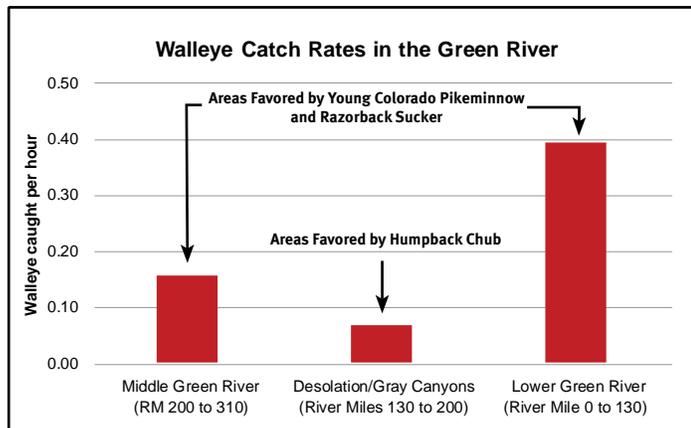


Photo by Michael Partlow, UDWR

Nonnative walleye have increased dramatically over the last decade in the upper Colorado River basin. The threat from walleye is highest in areas favored by young Colorado pikeminnow and razorback sucker, but low in areas inhabited by humpback chub. This trend is similar in the upper Colorado River, where walleye have been documented to prey on young Colorado pikeminnow.

Preventing Nonnative Fish Escapement From Reservoirs



Rifle Gap Fish Screen



Elkhead Dynema Net



Catamount Spillway



Ridgway Spillway

Reservoir escapement of incompatible species such as smallmouth bass, northern pike, and walleye impairs Recovery Program removal efforts downstream. In order to prevent this escapement, Recovery Program partners have installed barriers such as screens or nets at Rifle Gap Reservoir, Elkhead Reservoir, and others, but still need to install structures at Ridgway and Red Fleet reservoirs. Ridgway Reservoir is the highest priority for the Recovery Program because the downstream Gunnison River has no smallmouth bass, but does have a healthy native fish community.

High Quality Fishing Opportunities in Reservoirs



Black Crappie in Red Fleet Reservoir



Stocking Sterile Walleye Fry

It is important to the Recovery Program that communities retain high quality fishing opportunities as reservoirs are managed with endangered species considerations. Transitioning reservoir fisheries from incompatible northern pike, walleye, and smallmouth bass to compatible species, such as black crappie and largemouth bass is a key aspect of reservoir management. In Utah, Red Fleet Reservoir has been stocked with black crappie and sterile walleye after removing an illicitly introduced fertile walleye population. In Colorado, CPW stocks sterile walleye to replace fertile walleye, and largemouth bass to replace smallmouth bass.

Fishing Tournaments



Ridgway Fishing Tournament Delivered Large Smallmouth Bass



Large Northern Pike can be caught at the Elkhead Classic

Angler participation in fishing tournaments helps to reduce adult populations of smallmouth bass and northern pike. Prizes were given out for tagged fish, largest and smallest fish of the day, and most fish caught. Visit Colorado Parks and Wildlife website (cpw.state.co.us) for more information regarding dates and rules of fishing tournaments.

Providing Angler Opportunity and Satisfaction is a Critical Part of Nonnative Fish Management

The Upper Colorado River Endangered Fish Recovery Program and the States of Colorado, Utah, and Wyoming strive to provide angler satisfaction by:

Seeking angler input in management decisions:
Angler input provides public support and sportfishing satisfaction.



Photo by Mike Porras, CPW

Public meetings are held to determine what compatible species anglers would like to fish for in upper basin reservoirs.

Enacting appropriate fishing regulations:
Liberalized fishing regulations make anglers part of the solution.



Photo by Lucy Diggins-Wold, WGF

Tournaments with prizes for catching problematic species promote interest in species removal.

Researching and using new technologies:
Stocking fish that cannot reproduce (sterile fish) offers angling opportunity.



Photo by UDMR

Sterile versions of popular sportfish like walleye provide angler opportunity while reducing risk to downstream endangered fish.

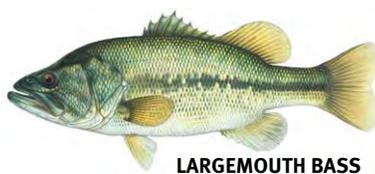
Providing angling opportunities compatible with endangered species recovery:
Families can enjoy compatible sportfishing year round.



Photo by Travis Francis, USFWS

Popular sport fish that are compatible with endangered species recovery, such as largemouth bass, are offered to anglers in place of problematic species (see below).

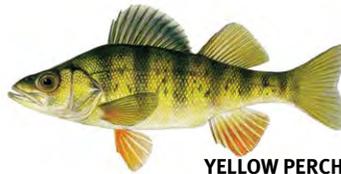
YES - Compatible sportfish can be stocked in reservoirs



LARGEMOUTH BASS



BLACK CRAPPIE



YELLOW PERCH



BLUEGILL



BROWN TROUT



KOKANEE



RAINBOW TROUT



HYBRID STRIPED BASS (STERILE FISH)



WALLEYE (STERILE FISH)

...and many others!

NO - Incompatible sportfish cannot be stocked in reservoirs



SMALLMOUTH BASS



WALLEYE (FERTILE FISH)



NORTHERN PIKE