2017 - 2018 Highlights

Upper Colorado River Endangered Fish Recovery Program

San Juan River Basin Recovery Implementation Program

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

Implementing Innovative Solutions to Recover Endangered Species

Program Highlights

- The recovery programs use science-based, cost-effective measures such as reoperating federal reservoirs to create and maintain habitat, working with irrigators to improve their water efficiency, and constructing fish passages to assist in endangered fish recovery.

- Predation and competition by nonnative fish species is the primary threat to endangered fish recovery and the most challenging threat to manage. While the recovery programs remove problematic nonnative species, they promote compatible sport fisheries in off-channel reservoirs.

- The recovery programs' actions provide Endangered Species Act compliance for approximately 2,500 water projects providing water for irrigation, cities, industry, recreation, and tribal uses.

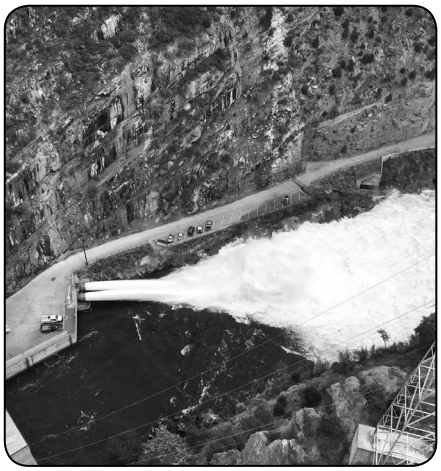

Photo by Larry Crist, USFWS

Ouray National Wildlife Refuge is home to many Green River wetlands. These wetlands provide habitat for both larval razorback sucker and bonytail.

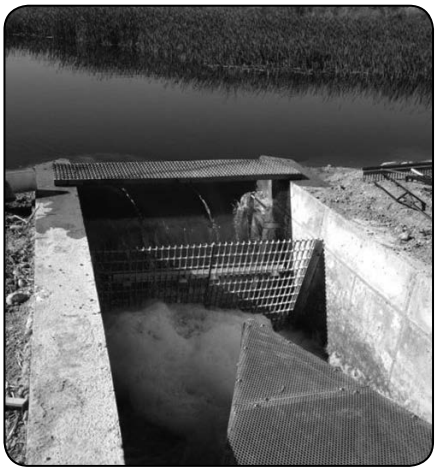

Photo by Sonja Jahrsdoerfer, USFWS

In 2017, a new water control structure and a screen to exclude nonnative fish was constructed at the Sheppard Bottom wetland along the Green River.

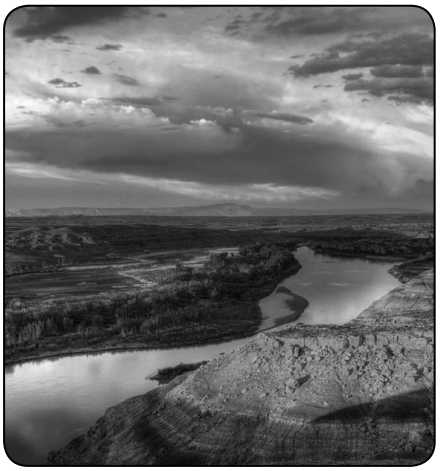

Photo by Kevin McAbee, USFWS

Timed water releases from Flaming Gorge reservoir push larval razorback suckers into restored wetlands along the Green River.

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.*

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Reaching Out to Local Communities

The recovery programs inform the public about endangered fish recovery actions through news and social media, public meetings, interpretive exhibits, water festivals, newsletters, fact sheets, and web sites.

Photo © Gina Tilelli

Lauren Angelo kisses a native sucker as part of Ute Water's Childrens Water Festival in Grand Junction, CO.

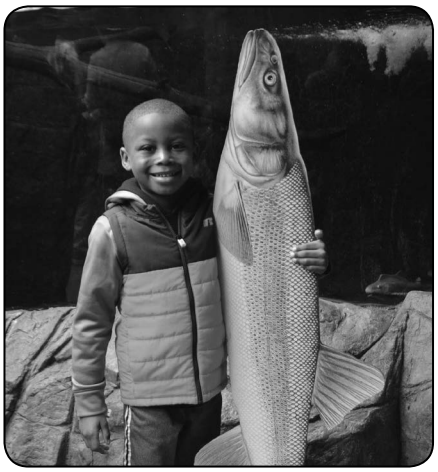


Photo © Terry Batey

Anderson Batey holds a four foot Colorado pikeminnow cutout at the Denver Aquarium.

Photo by CPW

Wesley and Brett Walker release a Colorado pikeminnow encountered while fishing in Grand Junction, CO.

Partners' Long-Term Commitment to Collaboration Drives Recovery Programs' Success

In the upper Colorado River basin, water and power customers, American Indian tribes, conservation groups, and state and federal agencies

COLLABORATE

to

RECOVER

endangered fish species.

Upper Colorado River Endangered Fish Recovery Program

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

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
Bureau of Land Management
Bureau of Reclamation
The Nature Conservancy
U.S. Fish and Wildlife Service
Water Development Interests

Photo by Melanie Fischer, USFWS

OMID Regulating Reservoir

Photo by USBR

Government Highline Canal

Photo by Krissy Wilson, UDWR

Maybell Canal

Improvements in irrigation efficiency in the Grand Valley help redirect water back to the Colorado River to benefit the 15-Mile Reach. This includes Orchard Mesa Irrigation District's (OMID's) new regulating reservoir and other improvements that redirect ~17,000 AF/year. Improvements at the Government Highline Canal (Colorado River mainstem) and Maybell Canal (Yampa River) allow for more precise control of water, improving efficiency, reducing diversions that exceed end-user needs, and enhancing instream flows.

State, Tribal, and Federal Leaders Endorse Recovery Program Accomplishments

State, tribal, and federal leaders have supported the recovery programs for their cost-effective and collaborative on-the-ground achievements. They recognize the challenges of meeting the water development and management needs of western communities, while working toward conservation of endangered fish species.

State Leaders Value Endangered Fish Recovery Programs' Accomplishments:

"The State of New Mexico has a vested interest in the successful outcome of these programs. New Mexico is highly reliant upon continued use of the waters of the San Juan River system for continued economic growth in the state … for power generation, for agricultural purposes, and for municipal and industrial uses …"

Susana Martinez, Governor, State of New Mexico

"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

"Wyoming has been an active participant in the recovery 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, Governor, State of Wyoming

"The endangered fish recovery programs are models of collaborative, grassroots efforts that leverage cooperation from numerous stakeholders to ensure these remarkable ancient fish continue to swim in the Colorado River System. The programs support millions of people who depend on the rivers' water to grow food, generate electricity, and serve the needs of cities and towns."

John W. Hickenlooper, Governor, State of Colorado

Tribal Leaders Stress Recovery Programs' Contributions:

"Jicarilla Apache Nation has been a participant in the San Juan River Basin Recovery Implementation Program since its inception in 1992 … The continuation of the program is of the utmost importance to the Nation and the economic viability of the region."

Levi Pesata, President, Jicarilla Apache Nation

"The Navajo Nation is an active participant in, and strong supporter of, the San Juan River Basin Recovery Implementation Program … These two successful, ongoing cooperative partnership programs involve the States of Colorado, New Mexico, Utah and Wyoming, Indian tribes, federal agencies and water, power, and environmental interests …"

Ben Shelly, President, The Navajo Nation

The Department of the Interior Recognizes the Recovery Programs' Benefits:

"The Upper Colorado program has become a national model for recovering endangered species while addressing the demand for water development to support growing western communities."

Gale Norton, Secretary of the Interior, 2005

"For its many collaborative undertakings demonstrating that endangered species conservation and water development and management can be compatible, the San Juan River Basin Recovery Implementation Program is granted the Cooperative Conservation Award of the Department of Interior."

Dirk Kempthorne, Secretary of the Interior, April 21, 2008

"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

"The strength of the Colorado River recovery programs flows from the commitment and engagement of its partners. Management actions are developed and implemented with the equal participation of each partner, ensuring that those actions contribute effectively to recovery of the river's native fish species and allow for development of critical water projects. The U.S. Fish and Wildlife Service and the Department of the Interior play a key role in supporting these partnerships, and we are committed to strengthening and expanding our support for their vital work."

Dan Ashe, Director of the U.S. Fish and Wildlife Service, 2014

"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," said Commissioner Brenda Burman. "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

Endangered Species Act Compliance Streamlined for Water and Hydropower 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 Endangered Species Act (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-operated dams and projects across the Upper Colorado River Basin. 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 12/31/2017

		Historical Depletions	New Depletions	Total
State	**Number of Projects**	**Acre-Feet/Yr**	**Acre-Feet/Yr**	**Acre-Feet/Yr**
Colorado	1232	1,915,682	207,213	2,122,895
Utah	263	517,898	98,777	616,675
Wyoming	416	83,498	36,574	120,072
CO/UT/WY	238[1]	(Regional)	(Regional)	
Total	**2,149**	**2,517,078**	**342,564**	**2,859,642**

[1]Small 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 12/31/2017

State	Number of Consultations	Depletions Acre-Feet/Yr
New Mexico	23	653,758
Colorado	313	217,986
Utah	15	9,311
Total	**351**	**881,055**

The Programs Rely on Recovery Goals to Guide Recovery Actions and Measure Success

The overall goal for recovery of the four endangered species is to achieve naturally self-sustaining populations and protect the habitat on which those populations depend. Science-based, basin-wide recovery goals for humpback chub, bonytail, Colorado pikeminnow, and razorback sucker were approved by the U.S. Fish and Wildlife Service (USFWS) on August 1, 2002, and are currently in revision to incorporate new information. The Upper Colorado and San Juan recovery programs implement actions to achieve the recovery goals in the Upper Colorado River Basin.

The recovery goals describe conditions necessary for downlisting and delisting each of the fish species by:

1) Identifying site-specific management actions* necessary to minimize or remove threats;

2) Establishing objective, measurable criteria that consider demographic and genetic needs for naturally self-sustaining, viable populations *(see Box 1)*;

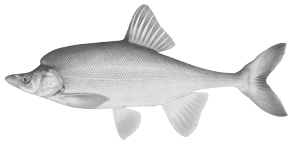
3) Providing estimates of the time to achieve recovery.

Box 1. DEMOGRAPHIC CRITERIA FOR RECOVERY

DOWNLISTING	DELISTING
Colorado pikeminnow	
Over a 5-year monitoring period: •Maintain the Upper Basin metapopulation •Maintain populations in the Green River and Upper Colorado River sub-basins ("no net loss") •Green River sub-basin population >2,600 adults •Upper Colorado River sub-basin population >700 adults •Establish 1,000 age-5+ subadults in the San Juan River sub-basin	**For 7 years beyond downlisting:** •Maintain the Upper Basin metapopulation •Maintain populations in the Green River and Upper Colorado River sub-basins ("no net loss") •Green River sub-basin population >2,600 adults •Upper Colorado River sub-basin population >1,000 adults OR Upper Colorado River sub-basin population >700 adults and San Juan River sub-basin population >800 adults
Bonytail	
Over a 5-year monitoring period: •Maintain reestablished populations in the Green River and Upper Colorado River sub-basins, each >4,400 adults •Maintain established genetic refuge of adults in Lower Basin •Maintain two reestablished populations in the Lower Basin, each >4,400 adults	**For 3 years beyond downlisting:** •Maintain populations in the Green River and Upper Colorado River sub-basins, each >4,400 adults •Maintain genetic refuge of adults in Lower Basin •Maintain two populations in the Lower Basin, each >4,400 adults
Razorback sucker	
Over a 5-year monitoring period: •Maintain reestablished populations in Green River sub-basin and EITHER in Upper Colorado River sub-basin or San Juan River sub-basin, each >5,800 adults •Maintain established genetic refuge of adults in Lake Mohave •Maintain two reestablished populations in Lower Basin, each >5,800 adults	**For 3 years beyond downlisting:** •Maintain established populations in Green River sub-basin and EITHER in Upper Colorado River sub-basin or San Juan River sub-basin, each >5,800 adults •Maintain genetic refuge of adults in Lake Mohave •Maintain two populations in Lower Basin, each >5,800 adults
Humpback chub	
Over a 5-year monitoring period: •Maintain the six populations ("no net loss") •One core population in Upper Basin > 2,100 adults •One core population in Lower Basin > 2,100 adults	**For 3 years beyond downlisting:** •Maintain the six populations ("no net loss") •Two core populations in Upper Basin > 2,100 adults •One core population in Lower Basin > 2,100 adults

*__Habitat Management:__ Identify and provide adequate instream flows; **Habitat Development:** Restore and maintain habitat; **Nonnative Fish and Sportfishing:** Reduce the threat of certain nonnative fish species while maintaining sportfishing opportunities; **Endangered Fish Propagation and Stocking:** Produce genetically diverse fish in hatcheries and stock them in the river systems; and, **Research, Monitoring, and Data Management:** Provide data on life-history requirements of the endangered fishes, and monitor progress toward recovery.

Recovery Progress Report

Species	Population Status	USWFS Pending Recovery Decisions
Colorado pikeminnow • Listed as Endangered in 1967; recovery can occur in the Upper Basin. • Wild, self-sustaining populations are managed in Green and Colorado rivers. • Colorado pikeminnow produced in hatcheries are stocked in the San Juan River.	• Adults in the Colorado and Green rivers have declined in the past decade, requiring increased effort to: a) reduce nonnative predators; and b) improve base flow management to increase survival of young Colorado pikeminnow. • Hatchery fish are accumulating and spawning in the San Juan River.	• A Species Status Assessment (SSA)[1] was initiated in late 2015 and is scheduled for completion in 2018. • Recent population declines could delay downlisting.[2]
Humpback chub  • Listed as Endangered in 1967; recovery is required in both Upper and Lower basins. • Wild, self-sustaining populations are managed in multiple locations in the Upper and Lower basin.	• 4 of 5 Upper Basin populations have stabilized after declines were detected in the late 1990's. The fifth population (Yampa River) appears to have been lost. • In the Lower Basin, a population near the Little Colorado River is doing very well.	• The USFWS approved the final SSA in December 2017. • Long term stability in most populations may support a five-year status review that recommends downlisting. If that is the recommendation, USFWS will move to a rulemaking action reclassifying to threatened by 2019.
Razorback sucker • Listed as Endangered in 1991; recovery is required in both Upper and Lower basins. • A wild, self-sustaining population resides in Lake Mead; hatchery fish are stocked in other Lower Basin locations. • Razorback sucker raised in hatcheries are stocked in many Upper Basin rivers.	• In the Upper Basin, stocked adults are accumulating in Colorado, Green, and San Juan rivers and in the inflows to Lake Powell. • The Lower Basin is home to the only wild, self-sustaining population which is found in Lake Mead and the lower Grand Canyon. • Positive trends for this species are reported throughout the Colorado River.	• An SSA for this species is scheduled for completion in 2018 which the USFWS will use to complete a five-year status review of whether the species should be recommended for downlisting or delisting.
Bonytail • Listed as Endangered in 1980; recovery is required in both Upper and Lower basins.	• Programs throughout the Upper and Lower basins rebuild populations with hatchery fish. • Spawning in the wild was detected for the first time in Green River floodplains in 2015, 2016, and 2017.	• When survival of stocked fish improves, the USFWS will initiate an SSA.

[1] Species Status Assessments (SSA) comprise the best available information on species needs, current condition, and viability. The Service uses SSAs as the foundation for various ESA actions (e.g., changes in listing status).

[2] "Downlisting" refers to a USFWS decision to reclassify an endangered species as a threatened one.

Fish Illustrations © Joseph R. Tomelleri

Hatcheries Reestablish Endangered Fish Populations

Genetically-diverse, hatchery-produced fish are stocked to reestablish naturally self-sustaining populations of razorback sucker and bonytail in the Upper Colorado River system and razorback sucker and Colorado pikeminnow in the San Juan River. Stocked fish will contribute* to meeting the demographic criteria of the recovery goals. The recovery programs monitor survival and reproduction of stocked fish to evaluate and improve stocking strategies. In most cases, the facilities are exceeding their annual production targets *(see pages 19 and 20)*. Humpback chub are not stocked in the Upper Colorado River basin.

Facility, Location (Target Number)	River, # Stocked and Average Size in 2017		
	Green	Colorado	San Juan
Bonytail: average size 10 inches			
J.W. Mumma Native Aquatic Species Restoration Facility, Alamosa, CO (5,000)	**2,321; 12.3"**	**2,851; 12.3"**	
Wahweap State Fish Hatchery, Big Water, UT (10,000)	**11,046; 10.0"**		
Ouray National Fish Hatchery – Randlett Unit, Vernal, UT (10,000)	**12,802; 9.0"**		
Ouray National Fish Hatchery – Grand Valley Unit, Grand Junction, CO (10,000)		**10,501; 9.8"**	
Razorback sucker: average size 14 inches			
Ouray National Fish Hatchery – Randlett Unit, Vernal, UT (6,000)	**8,186; 13.4"**		
Ouray National Fish Hatchery – Grand Valley Unit, Grand Junction, CO (6,000)		**7,420; 15.2"**	
Ouray National Fish Hatchery-Horsethief Canyon Native Fish Facility, Fruita, CO (2,000-3,000)			**4,102; 13.9"**
Navajo Agricultural Products Industry (NAPI) Ponds, Farmington, NM (6,000-8,000)			**4,315; 14.2"**
Southwest Native Aquatic Resources and Recovery Center, Dexter, NM (11,000)			**1,891; 13.4"**
Colorado pikeminnow: fingerlings, 45+ mm total length			
Southwest Native Aquatic Resources and Recovery Center, Dexter, NM (400,000)			**200,736; 1.7+"**

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.

Photo by Zane Olsen, UDWR

Waheap State Fish Hatchery in Big Water Utah raises bonytail.

*All four species of endangered fish are long-lived (up to 40 years). The U.S. Fish and Wildlife Service will include hatchery-produced fish in population estimates after those populations have been determined to be "self-sustaining."

Cooperative Water Management Provides Flows for Endangered Fishes

Green River: Releases from Flaming Gorge Reservoir 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 *(see table, top right)* and irrigation efficiencies augment flows, PBO Dec. 1999

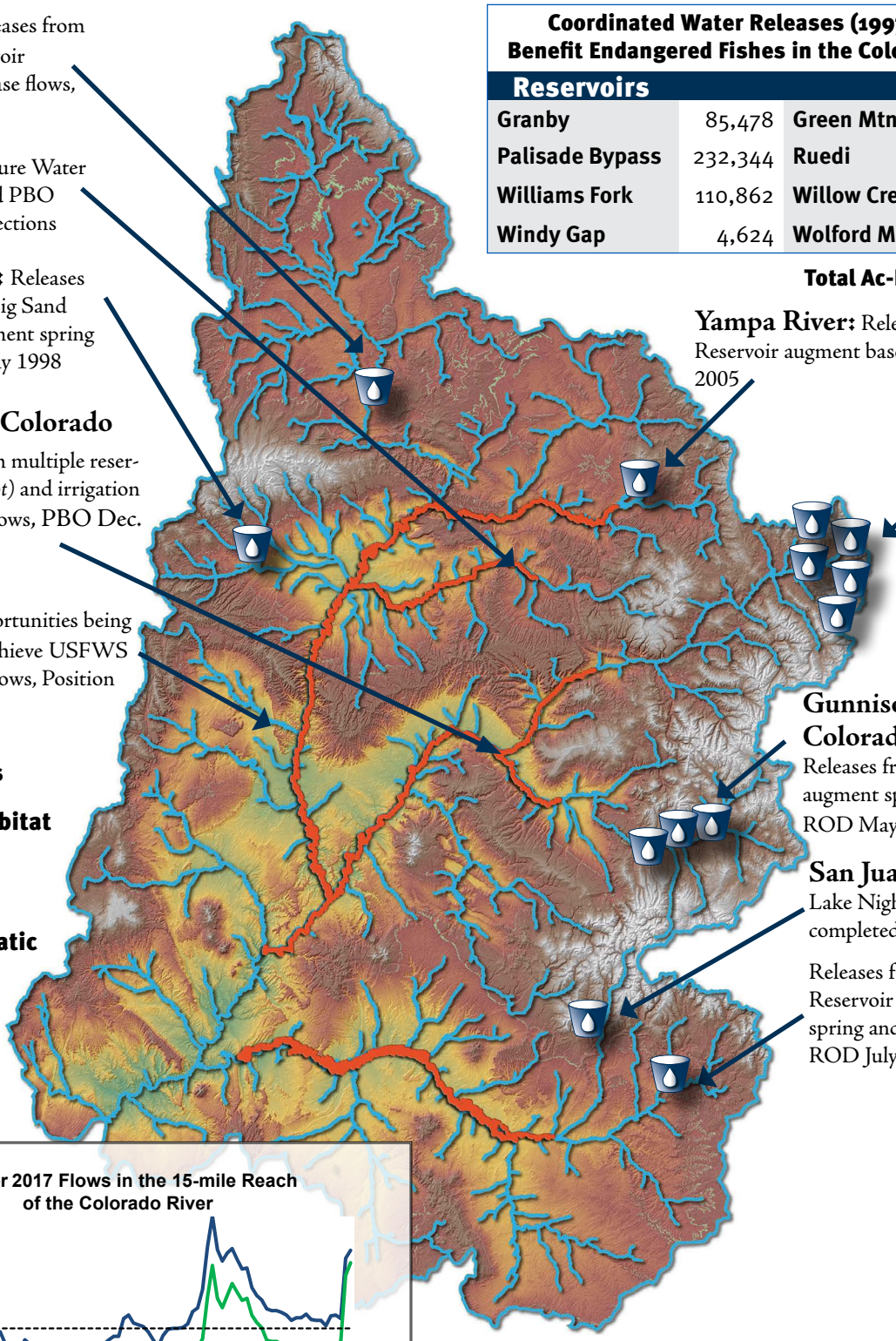
Price River: Opportunities being investigated to help achieve USFWS suggested minimum flows, Position Paper May 2012

Coordinated Water Releases (1997-2017)
Benefit Endangered Fishes in the Colorado River

Reservoirs	Acre-Feet		Acre-Feet
Granby	85,478	Green Mtn	829,607
Palisade Bypass	232,344	Ruedi	427,419
Williams Fork	110,862	Willow Creek	25,124
Windy Gap	4,624	Wolford Mtn	179,703

Total Ac-Ft: 1,895,161

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

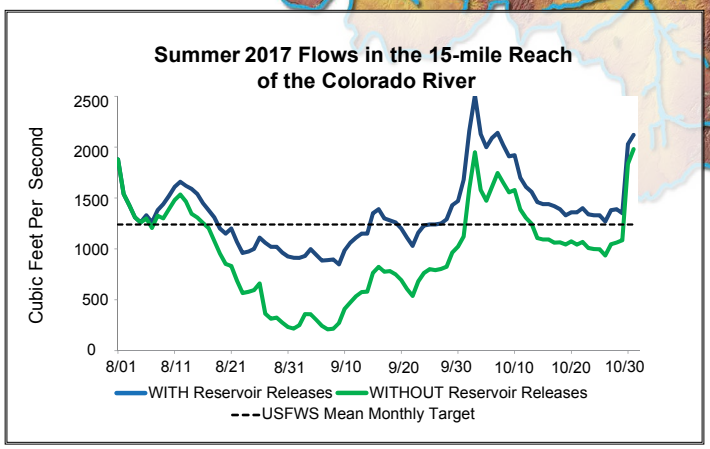
Reservoirs

Critical Habitat

BO = Biological Opinion

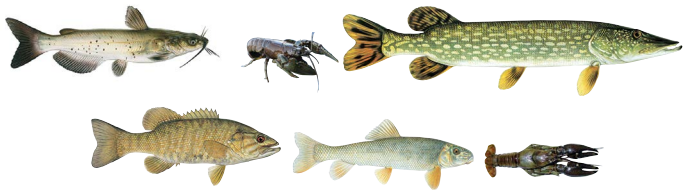
PBO = Programmatic Biological Opinion

ROD = Record of Decision



Nonnative Predators Delay Recovery in the Upper Colorado River

Predation or competition by nonnative fish species is the primary threat to endangered fish recovery and the most challenging threat to manage. One hundred years ago only 13 native fish species swam in the Upper Colorado River and its tributaries – today they have been joined by more than 50 nonnative species. The graphic below depicts the spread of a few of the most predaceous and invasive species through the life of the Upper Colorado and San Juan Programs.

River	Presence of Invasive Species	
	Program Inception	Today
Colorado		
Gunnison		
Green		
White		
Yampa		
San Juan		

Rusty crayfish photo courtesy of the United States Geological Survey
Virile Crayfish photo courtesy D. Gordon E. Robertson
Fish Illustrations © Joseph R. Tomelleri

Legend

Channel catfish	Gizzard Shad	Northern pike	Rusty crayfish	Smallmouth bass	Virile crayfish	Walleye	White sucker

Invasive Predators of Greatest Concern

Smallmouth Bass

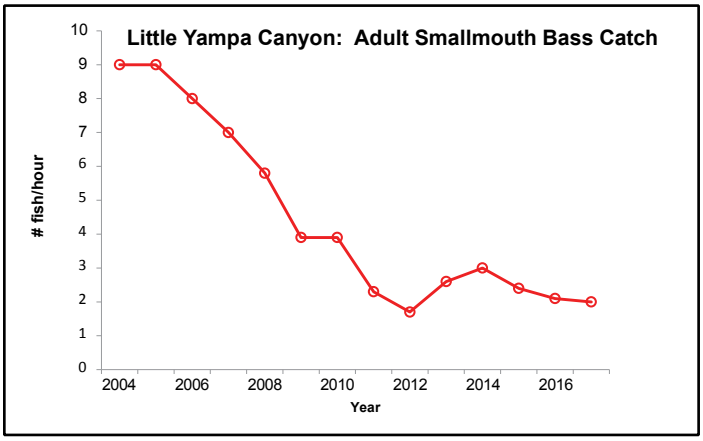
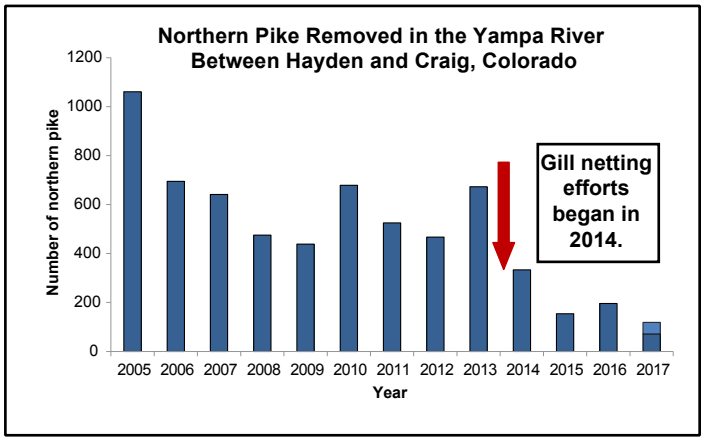


Photo by Melanie Fischer, USFWS

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 Tory 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

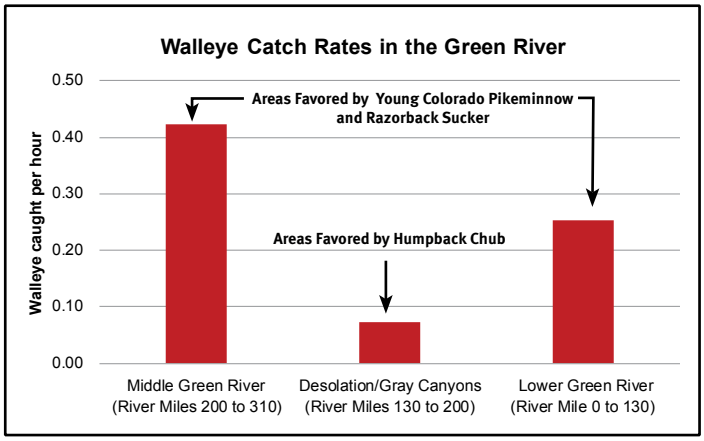


Photo by Michael Partlow, UDWR

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.

IN-RIVER REMOVAL

SMALLMOUTH BASS

NORTHERN PIKE

WALLEYE

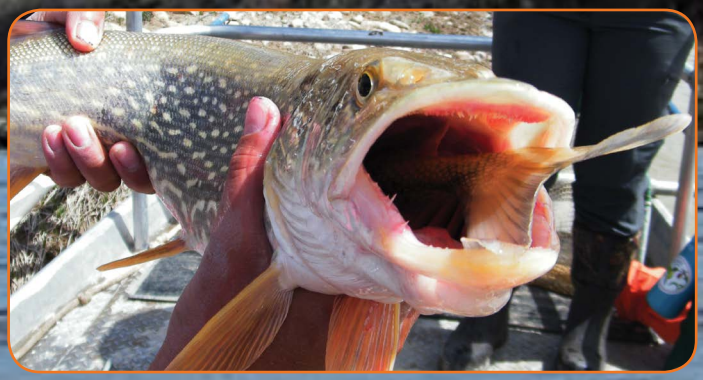
CHANNEL CATFISH

RESERVOIR SOURCES OF NONNATIVE FISH

CONTAINED | PARTIALLY CONTAINED | NOT CONTAINED | CANNOT BE CONTAINED

Background Photo by Tildon Jones, USFWS

WHY ARE CERTAIN NONNATIVE FISH A PROBLEM?



PREDATION & COMPETITION

HIGH REPRODUCTION POTENTIAL

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 UDWR

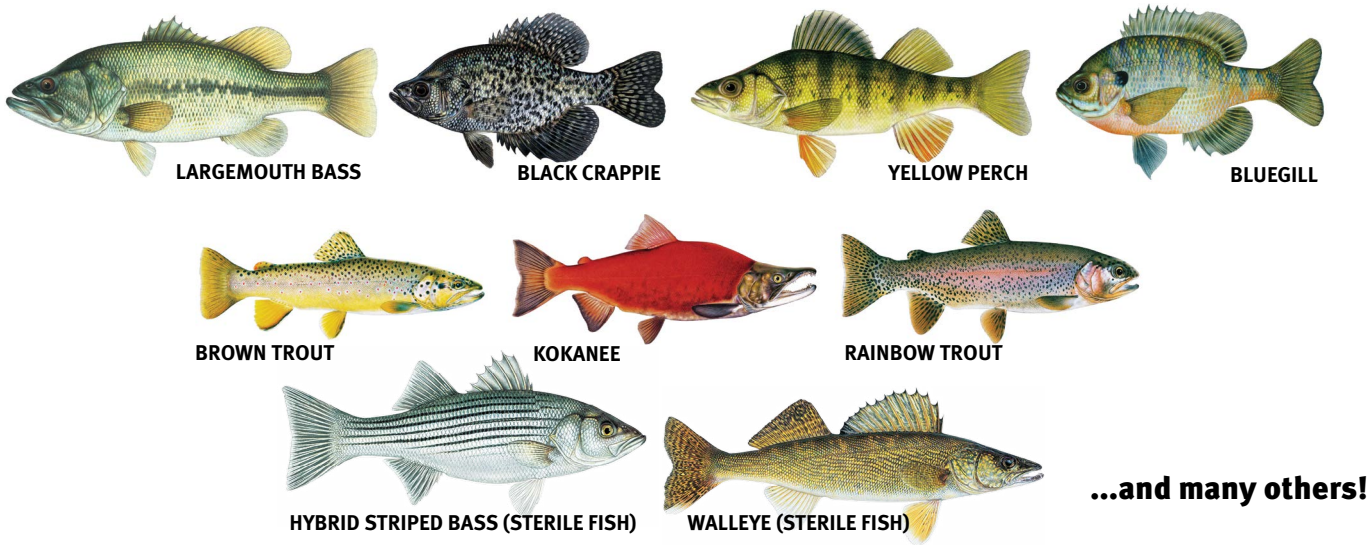
Sterile versions of popular sportfish like walleye provide angler opportunity while reducing risk to downstream endangered fish.

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

Photo by Travis Francis, USFWS

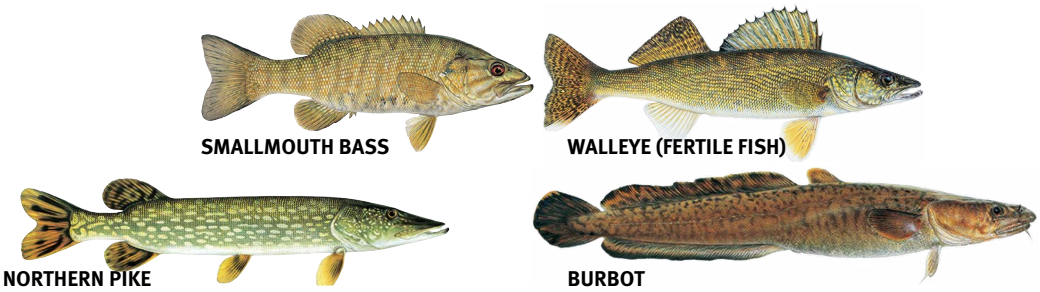
Popular sport fish that are compatible with endangered species recovery, such as largemouth bass, are offered to anglers in place of problematic species (see below).

YES - Compatible sportfish can be stocked in reservoirs



...and many others!

NO - Incompatible sportfish cannot be stocked in reservoirs



Preventing Nonnative Fish Escapement in Reservoirs

Photo by CPW

Rifle Gap Fish Screen

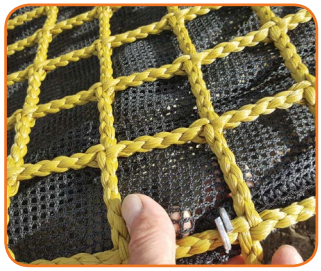


Photo © John Hawkins, CSU

Elkhead Dynema Net

Photo by USFWS

Catamount Spillway

Photo by Phil Ipsom, USBR

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 Reservoir and Lake Catamount. Ridgway Reservoir is the highest priority for the program because the downstream Gunnison River has no smallmouth bass, but does have a healthy native fish community.

High Quality Fishing Opportunities in Reservoirs

Photo by UDWR

Black Crappie in Red Fleet Reservoir

Photo by CPW

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

Photo by Joe Lewandowski, CPW

2017 Ridgway Fishing Tournament Delivered Large Smallmouth Bass

Photo by Melanie Fischer, USFWS

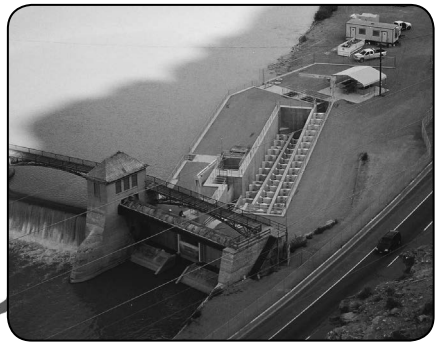
Largest Northern Pike "Catch of the Day" at the 2017 Elkhead Classic

In 2017 anglers removed over 2,000 smallmouth bass during the Ridgway Smallmouth Bass Classic, some as long as 17 inches! Monitoring estimates that anglers removed over 50% of fish larger than 6 inches. In 2017, almost 400 northern pike were removed during the Elkhead tournament, up from around 50 in 2016. The majority of these fish were large adults, some 3+ feet!

Capital Projects Restore Endangered Fish Habitat

The recovery programs work cooperatively with American Indian tribes, water and power customers, and local landowners to improve endangered fish habitat. Habitat restoration and maintenance includes reconnecting fragmented river reaches through construction and operation of fish passages at irrigation diversion dams; preventing fish from entering and becoming trapped in irrigation diversion canals through construction and operation of fish screens; and acquisition, restoration, and management of floodplain habitat to serve primarily as fish nursery areas.

Price-Stubb Fish Passage, 2008

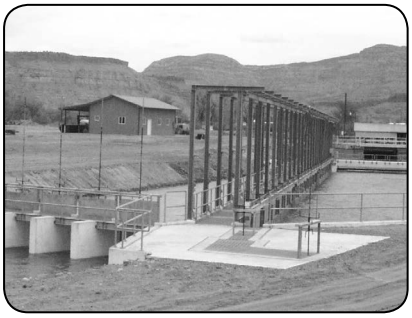


Grand Valley Project Fish Passage, 2004

Redlands Fish Screen, 2005

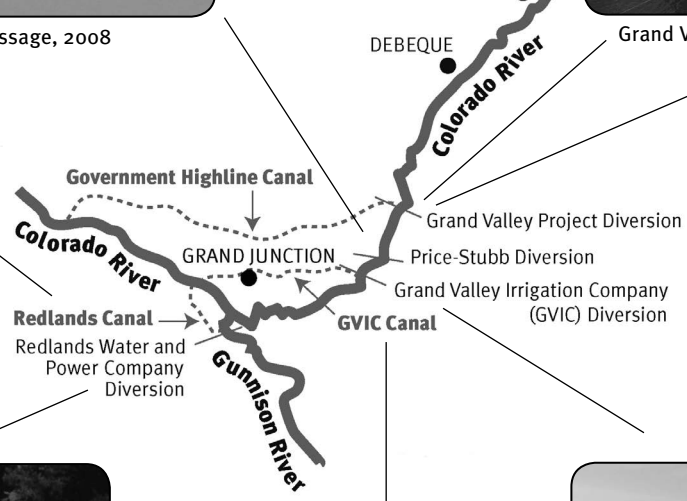
Grand Valley Project Fish Screen, 2007

Redlands Fish Passage, 1996



GVIC Fish Screen, 2002

GVIC Fish Passage, 1998



The majority of the Upper Colorado Program's construction projects needed to recover the endangered fishes are complete *(dates shown above)*. Located in western Colorado, these fish passages and screens contribute to unimpeded access to approximately 340 miles of designated critical habitat in the Colorado and Gunnison rivers.

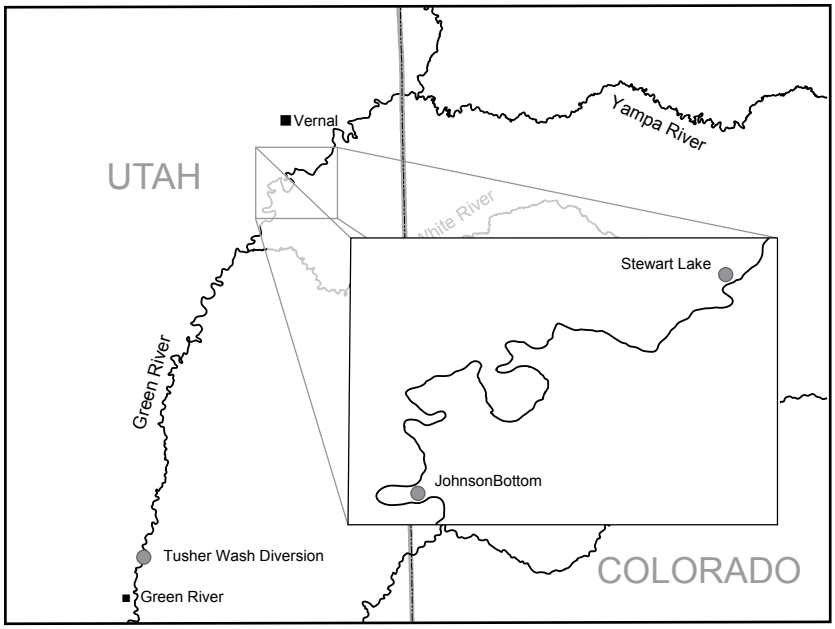


Photo by R. Schelly, UDWR

Juvenile razorback sucker produced in Stewart Lake: a managed off-channel wetland that provides warm, food-rich habitats important to the recovery of three of the four endangered fish species.

Photo by USFWS

Johnson Bottom Wetland Enhancement Project: This kettle collects fish as the wetland drains, allowing biologists to sample all exiting fish. In 2016, biologists captured 41 stocked bonytail and 5 young-of-year that were spawned in the wetland.

Natural Resource Conservation Service and local water users rebuilt Tusher Wash Diversion in 2016. It has downstream passage for fish and boats and a fish ladder for upstream passage.

Photo © Kjell Gerber

Planned renovations to the Fruitland Diversion will include upstream and downstream fish passage and a weir to prevent fish entrainment. The need for additional fish passages and weirs at other diversions along the San Juan and Animas rivers is being evaluated.

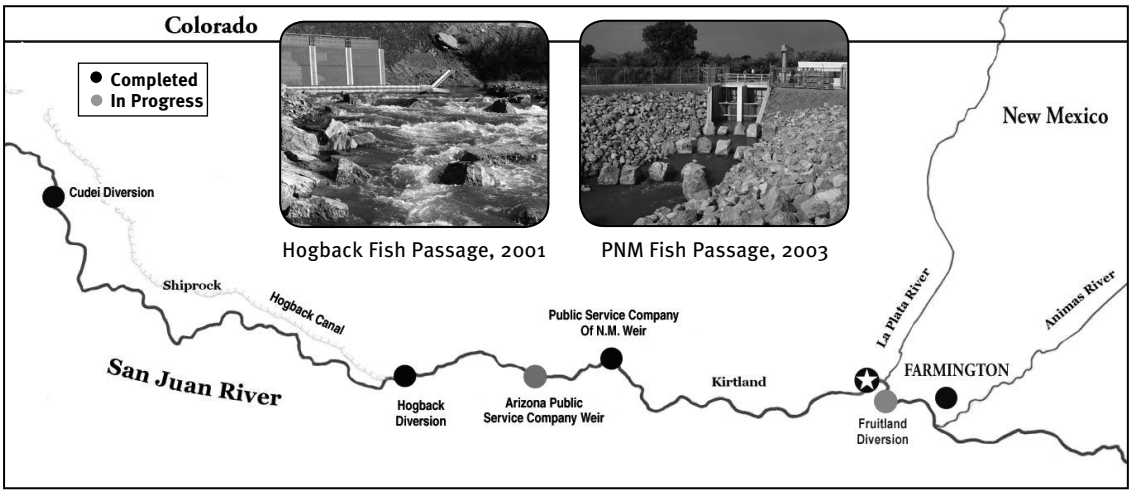


Photo by USFWS

Hogback Fish Weir – In 2013, a weir wall was installed in the Hogback Diversion Canal off the San Juan River near Shiprock, NM to prevent endangered fish from being entrained in the canal.

Photo by the Nature Conservancy

Habitat Restoration – The Nature Conservancy, with assistance from the San Juan Program, restored several backwaters and side channels in 2011 and 2014 and now is planning a third phase of restoration.

Status of Endangered Fishes

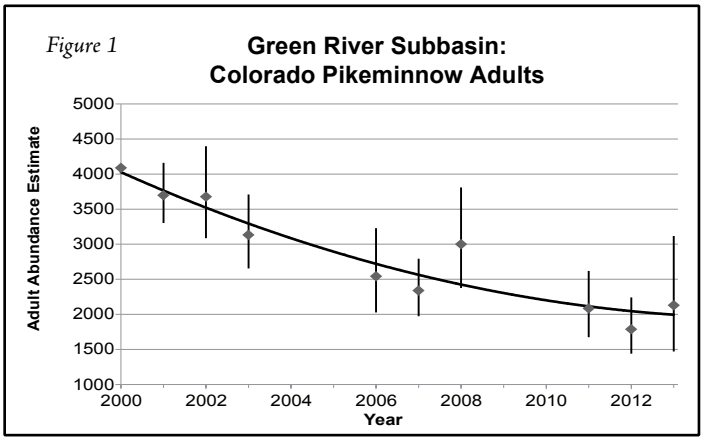
The recovery programs monitor reproduction, growth, survival, and abundance of endangered fishes in the wild. Results are used to track progress toward achieving recovery and assess effectiveness of management actions.

The core of the U.S. Fish and Wildlife Service's recovery goals for each species is achieving a sufficient number and size of self-sustaining populations that will persist. To achieve this, wild or re-introduced adults must survive and reproduce. Recruitment of young fish into the adult population must then maintain the minimum population level (demographic criteria) identified in the recovery goals *(see page 6)*.

COLORADO PIKEMINNOW *(Ptychocheilus lucius)*

Photo by Dale Ryden, USFWS

Ben Schleicher, USFWS holds a 28" long Colorado pikeminnow collected at the Grand Valley Project fish ladder near Palisade, CO.



Upper Colorado Program

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

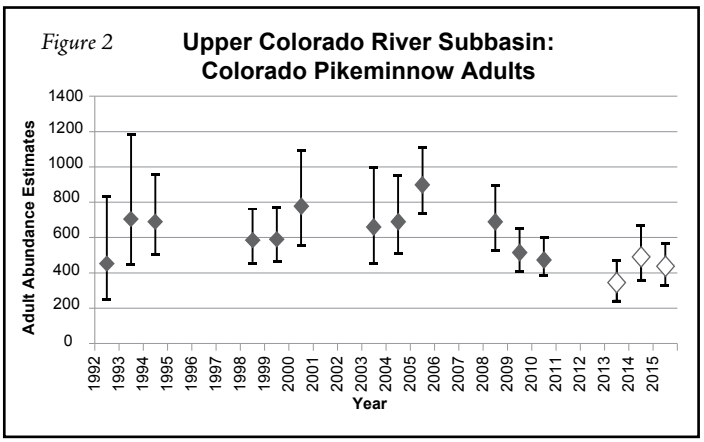
- The population of adult (8+ years old) Colorado pikeminnow in the Green River has varied from a high of approximately 4,000 individuals to about 2,000 currently *(Figure 1)*. Another round of abundance estimation is ongoing (2016 – 2018). The Service's downlisting criterion for this sub-basin is 2,600 adults.

- Estimates of adult Colorado pikeminnow abundance in the Colorado River sub-basin began in 1992 *(Figure 2; estimates for 2013 – 2015 are preliminary)*. The population has fluctuated from a low of about 400 adults (current) to more than 800 adults in 2005. The Service's downlisting criterion for this sub-basin is 700 adults.

- Survival of wild produced Colorado pikeminnow young of the year (YOY) varies greatly from year to year. Catch of YOY in the upper Colorado River basin was very good in 2015, slightly above average in 2016, and poor in 2017. Continued control of invasive predatory fish and improvements in summer base flow management are expected to improve YOY survival.

Photo © Charlie Card

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



San Juan Program

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

- Over the last seven years, 2,909,663 YOY Colorado pikeminnow have been stocked in the San Juan River.

- Annual monitoring efforts document that stocked fish are persisting in the San Juan River *(Figure 3)*.

- Of the 937 total wild-produced Colorado pikeminnow larvae captured since 1993, most (94%) have been collected in 2014-2016 indicating Colorado pikeminnow spawning success is improving.

- The San Juan Program is restoring secondary channels along the river to increase the amount of low velocity nursery habitat for young pikeminnow. Nonnative vegetation along the shoreline is removed so that these habitats can function naturally and persist into the future.

Figure 3 **San Juan River, Colorado Pikeminnow**

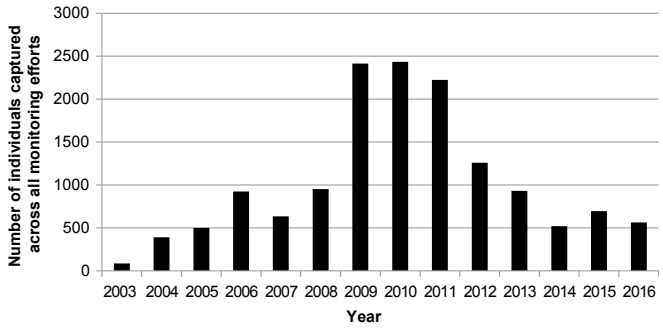


Photo by USFWS

Ernie Teller, USFWS, holds a healthy adult Colorado pikeminnow caught in the San Juan River.

BONYTAIL *(Gila elegans)*

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

- Survival of stocked bonytail appears to be very low. Biologists continue to experiment with new hatchery techniques to produce healthier fish and new stocking strategies (e.g., different habitats and times of the year) to improve survival in the wild.

- For the first time in 2015 (and each year since), hatchery produced bonytail spawned successfully in flooded wetlands along the Green River, which represents an unexpected use of this habitat type by this species.

Summary of Recent Bonytail Stocking in the Upper Colorado River Basin

	# of Bonytail Stocked in the Green and Colorado rivers (combined)
2013	11,487
2014	45,837
2015	40,645
2016	35,761
2017	39,521

Photo by Melanie Fischer, USFWS

More than 30,000 bonytail are stocked each year in the Green and Colorado rivers.

Photo by Zane Olsen, UDWR

◆ When the recovery programs were established, wild razorback sucker had diminished to a few hundred adults in the Green River system and were considered lost from the Upper Colorado and San Juan rivers. Hatchery produced fish are being stocked to reestablish the species in the wild. Preferred habitat is being restored via flow and floodplain management, and nonnative predator control.

- The recovery programs have revised stocking strategies to incorporate recent stocked fish survival information. New data indicates that fall is the best time to stock and that fish should be at least 12 inches in length.

- Fish stocked in the Green *(Figure 4)*, Colorado, and San Juan rivers *(Figure 5)* are recaptured in reproductive condition and often in spawning groups. In 2013, the abundance of stocked razorback sucker in the Green River subbasin was estimated at approximately 30,000 individuals.

- Captures of wild produced larvae in the Green, Gunnison, Colorado, and San Juan rivers document that the stocked fish are spawning.

- Wild produced juveniles were captured for the first time in the Green and Colorado rivers in 2013 and in the San Juan River in 2014.

- The Upper Colorado Program and the Bureau of Reclamation continue to adjust the timing of spring releases from Flaming Gorge Dam to connect floodplains — important nursery habitat for larval razorback sucker — coincident with larval presence. In September 2016, a record high catch of 2,110 young of the year (YOY) razorback sucker from Stewart Lake *(Figure 6)* was released into the Green River. Some of the YOY had grown more than 6 inches over the summer.

- In 2017 San Juan researchers transported razorback sucker upstream of a waterfall that formed at the Lake Powell inflow.

Summary of Recent Razorback Sucker Stocking in the Upper Colorado River Basin

	# of Razorback Sucker (RBS) Stocked in the Green, Colorado and Gunnison Rivers (combined)	San Juan River*
2013	20,667	15,341
2014	12,663	6,165
2015	9,057	3,963
2016	7,939	7,675
2017	15,606	10,326

*Annual stocking target of 11,400 was not met 2014-2016, but the long-term target of 91,200 from 2009-2016 was exceeded.

Figure 4

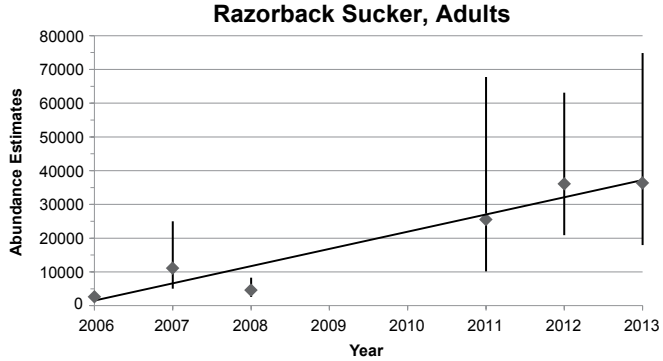


Figure 5

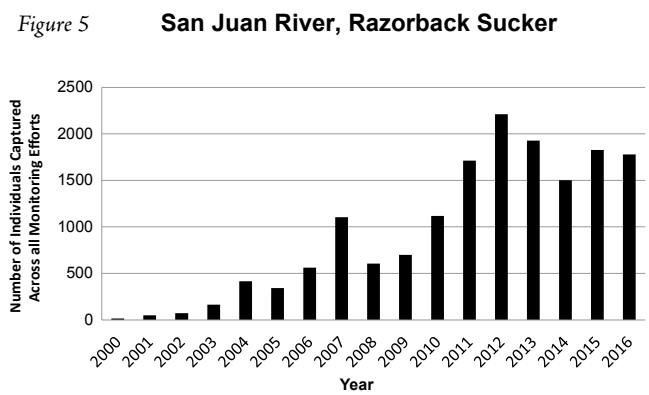
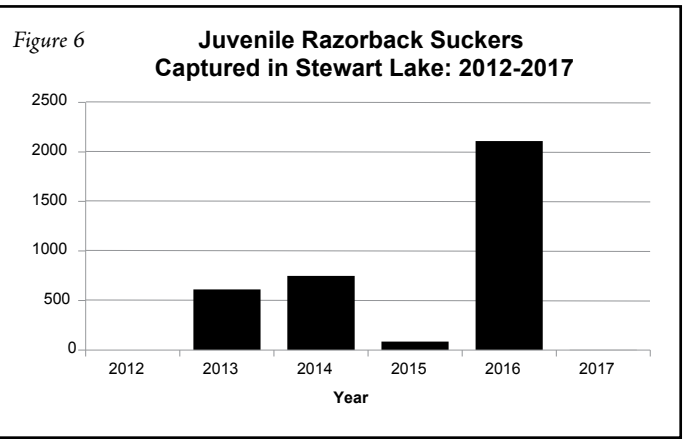


Photo by USFWS

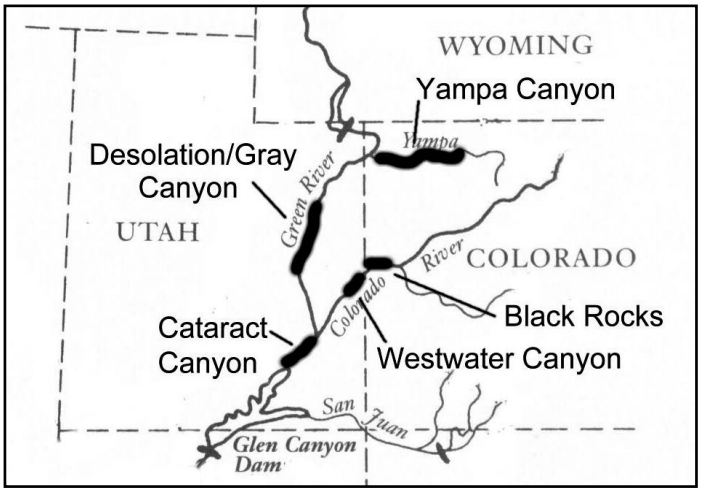
Adult untagged razorback sucker encountered below the waterfall on the San Juan River.

Figure 6



HUMPBACK CHUB *(Gila cypha)*

◆ Humpback chub have inhabited five canyon-bound sections of the Colorado, Green, and Yampa rivers in recent times. In the past decade, the population in Yampa River canyon has declined below levels of detection. Downward trends in some populations have been attributed to periods of extreme low flow (particularly Yampa Canyon) and occasional invasions by invasive predatory smallmouth bass and walleye (particularly in Desolation and Gray canyons). Humpback chub populations in Black Rocks, Westwater and Cataract Canyon appear stable.



Locations of the five humpback chub populations in the Upper Basin.

- Of the four endangered species, humpback chub appear to be least affected by invasive predatory species. The canyon habitats preferred by humpback chub do not appear to be favored by the invasives.

- Westwater Canyon and Black Rocks — Adult population abundance monitoring resumed in these Colorado River canyons in 2016 and 2017. Preliminary results from Westwater Canyon (*Figure 7*) indicate the population has stabilized and could be rebounding.

- Desolation Canyon — This population has been monitored since 1985. Although there are indications of long term stability, Utah researchers are concerned with relatively low survival of adult humpback chub and periodic influxes of invasive predators.

- Cataract Canyon — This is the smallest population of humpback chub in the upper basin, but Utah researchers report that it may be the most stable. Humpback chub catch rates in 2017 were the highest since monitoring began in 1991.

- Yampa Canyon — The abundance of humpback chub in the lower Yampa Canyon has dropped below level of detection for the past decade. The Upper Colorado Program is investigating a strategy to stock humpback chub back into the Yampa River and / or into the Green River near their confluence in Dinosaur National Monument. A permanent pool of water (5000 ac-ft) in Elkhead Reservoir in the upper Yampa River drainage was established in 2007 and is used to augment periods of low summer flow. Low summer flows (particularly during the droughts of the early 2000's) are presumed to have contributed to decline of humpback chub at this location.

- A Species Status Assessment (SSA) for humpback chub was completed in December 2017. The Service will use the SSA to determine if downlisting this species is appropriate.

Photo by Melanie Fischer, USFWS

Adult, juvenile, and young of year chubs sampled in hoop nets in Black Rocks Canyon, September, 2017.

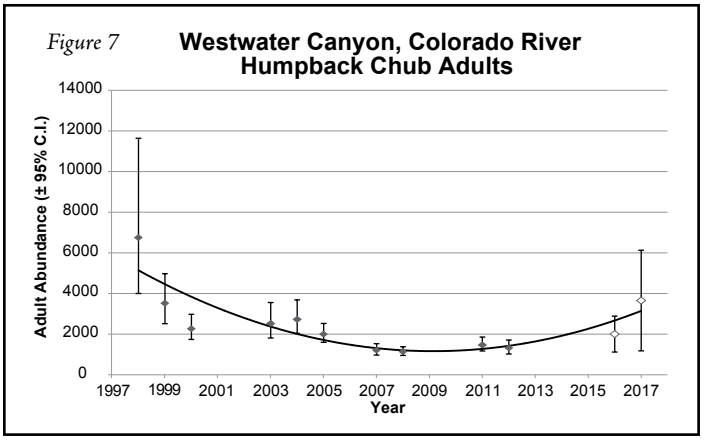
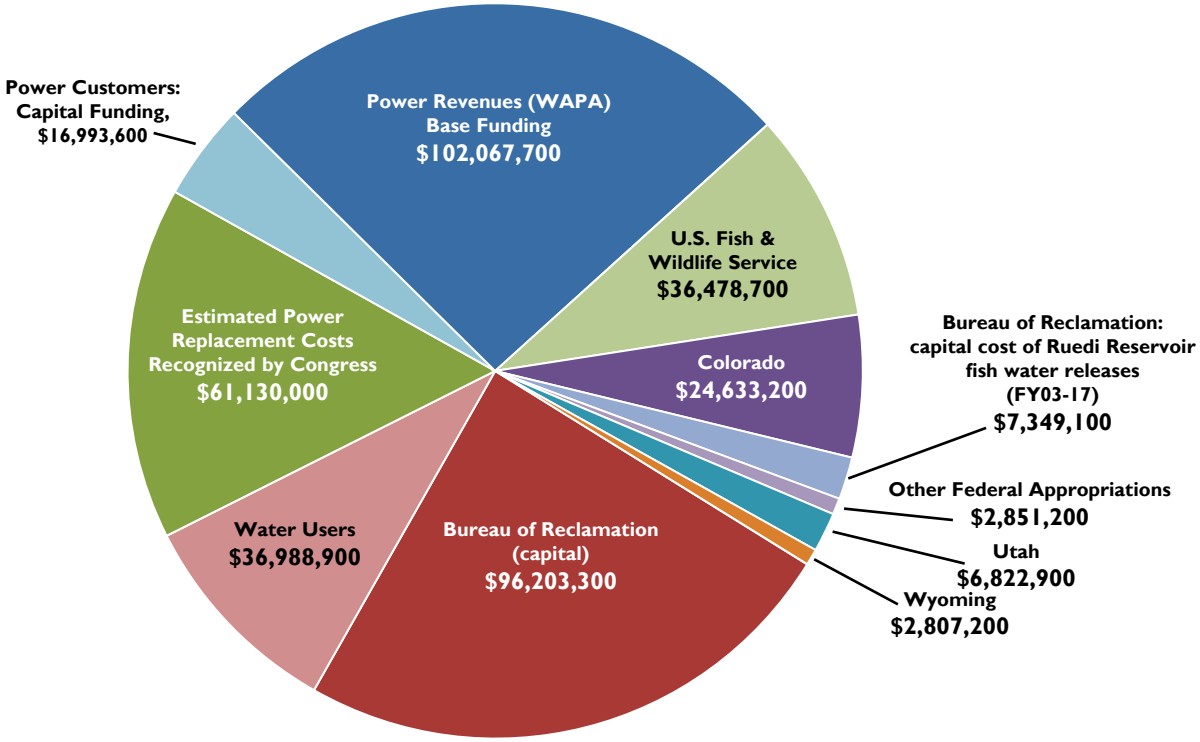


Photo by Brian Hines, UDWR

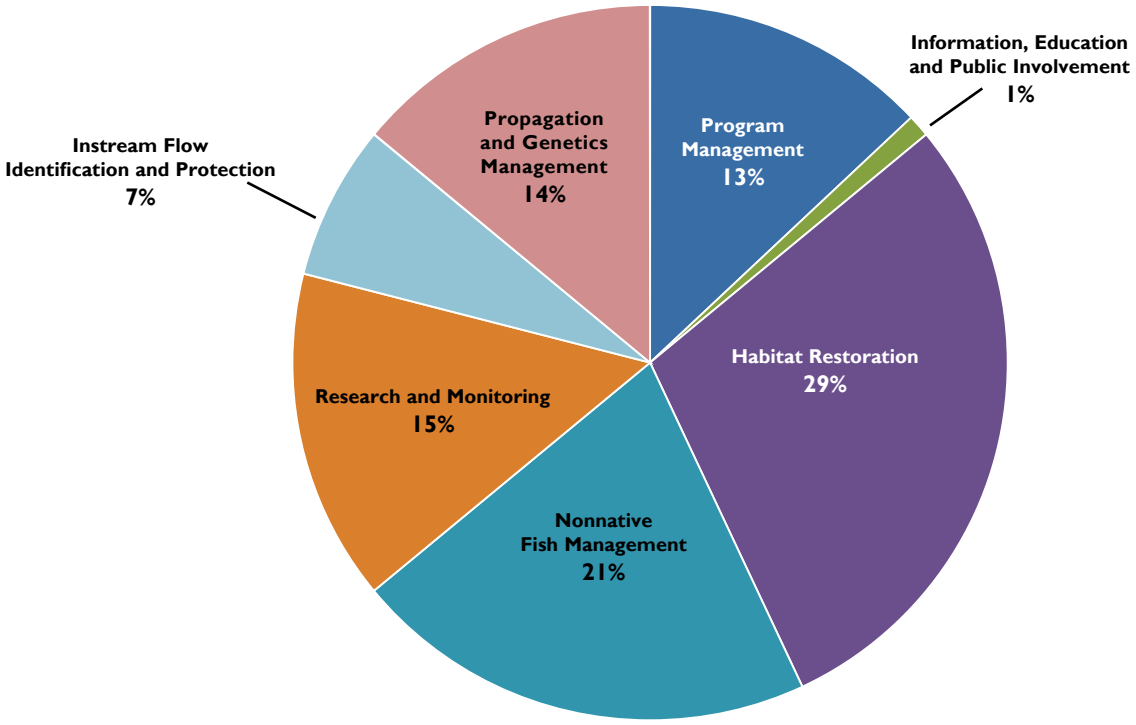
Adult, humpback chub encountered in Westwater Canyon, Utah.

Expenditures
Upper Colorado River Endangered Fish Recovery Program

Total Partner Contributions = $394,325,800 (FY 1989-2018)

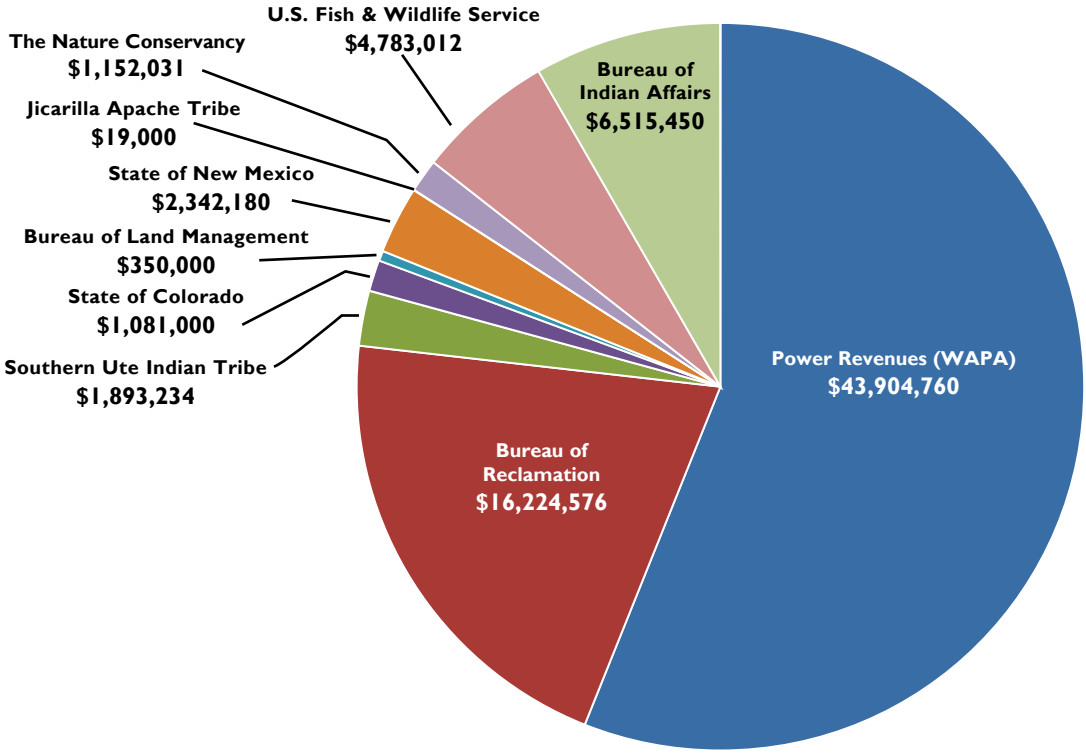


Projected Expenditures by Category (FY 2018 only)

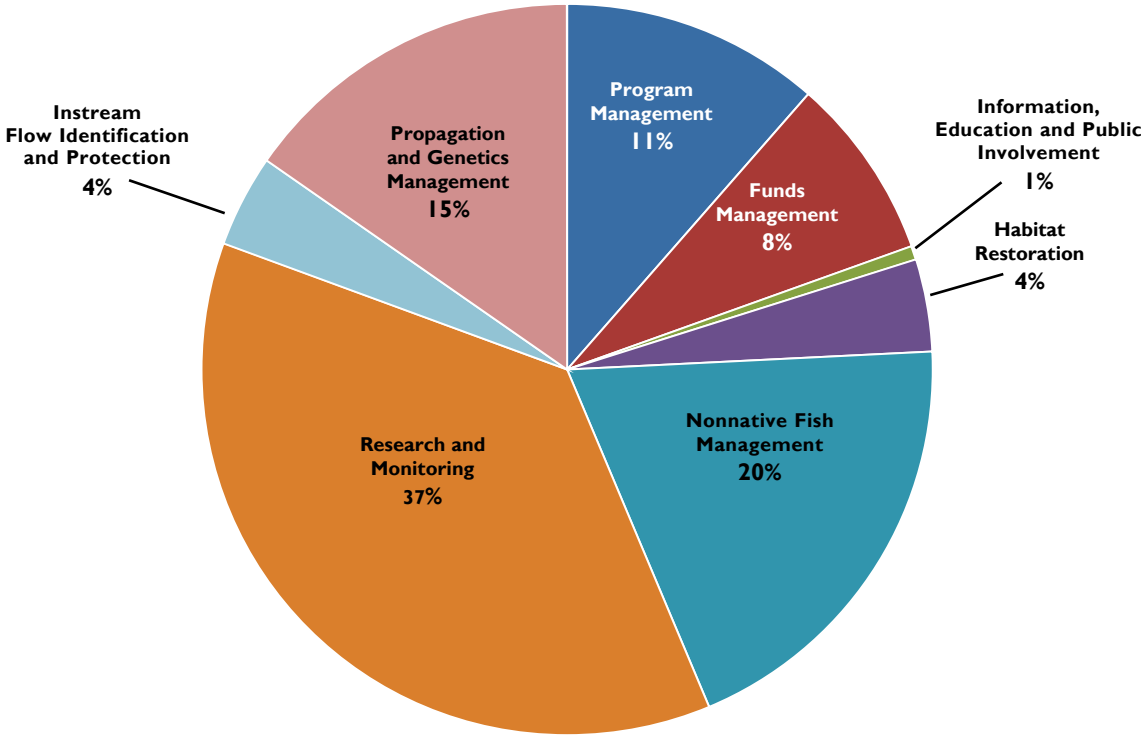


Expenditures
San Juan River Basin Recovery Implementation Program

Total Partner Contributions = $78,291,243 (FY 1992-2018)
(Not including in-kind contributions)



Projected Expenditures by Category (FY 2018 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

P.L. 112-270 extended the funding authorization through fiscal year 2019. The programs may expend up to $6 million of Colorado River Storage Project (CRSP) power revenues per year (adjusted annually for inflation) for facility operation and maintenance expenses, endangered fish population and habitat monitoring, and critically important nonnative fish management, public involvement, and program administration.

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 *(see page 8)***, fish passages and screens** *(see pages 16-17)***; complete water acquisition projects** *(see page 9)***; 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 and as non-reimbursable costs 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**

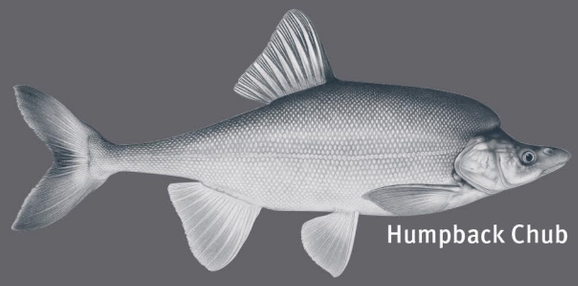
Federal	**Non-Federal**	
	Power Revenues:	$17 million
	States:	$17 million
	Water and Power:	$87 million**
		$121 million
Congress (Approps. in USBR's budget):		**$88 million**
	Total Revenue	**$209 million**

Capital Project Cost-Sharing by the States

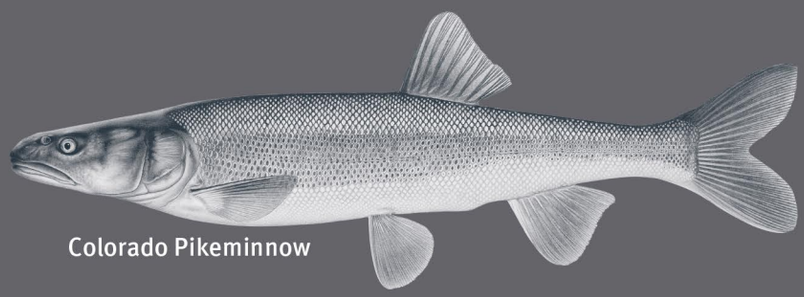
	Total Amount	Upper Colorado Program	San Juan Program
Colorado	$9.15 M	$8.07 M	$1.08 M
New Mexico	2.74 M	None	2.74 M
Utah	3.42 M	3.42 M	None
Wyoming	1.69 M	1.69 M	None
Total	**$17.00 M**	**$13.18 M**	**$3.82 M**

** 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 the Colorado River Storage Project.

ColoradoRiverRecovery.org



southwest.fws.gov/sjrip



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

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