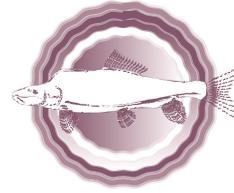




2016 - 2017 Highlights



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 Manage Water and Hydropower Resources While Recovering Endangered Species

Program Highlights

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



Photo by U.S. Fish and Wildlife Service

The historic Roller Dam in Palisade, CO, provides water and electricity to surrounding communities.



Photo by U.S. Fish and Wildlife Service

This adult Colorado pikeminnow was captured at Redlands fish ladder.



Photo by Colorado Parks and Wildlife

Anglers removed over 2,000 smallmouth bass at Ridgway Reservoir fishing tournament.

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 by U.S. Fish and Wildlife Service

Children interact with a rare razorback sucker as part of Colorado’s “Razorback Sucker in the Classroom” school program.

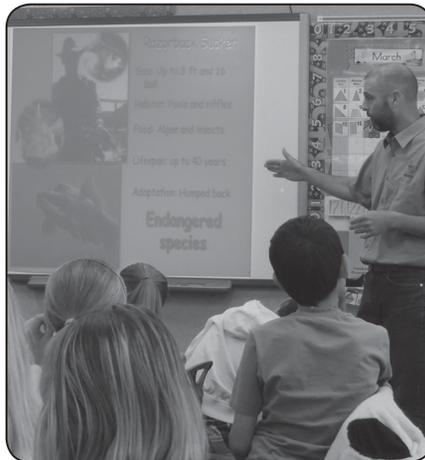


Photo by Utah Division of Wildlife Resources

Robert Schelly, Utah Division of Wildlife Resources biologist, teaches 4th graders about the endangered fishes.

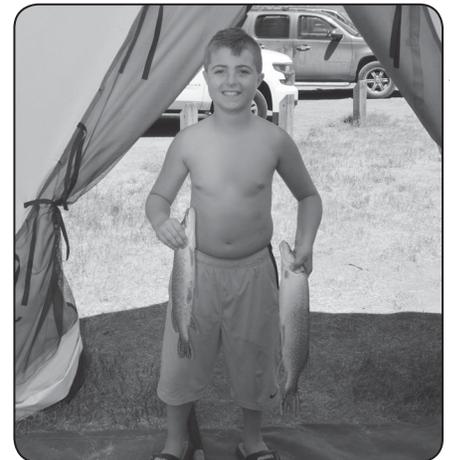


Photo by U.S. Fish and Wildlife Service

Marek Marshall holds northern pike caught at Colorado Parks and Wildlife’s fishing tournament at Elkhead Reservoir. Fishing tournaments help manage non-native fish.

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

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

COLLABORATE

to

MANAGE

water and hydropower resources and

RECOVER

endangered fish populations.

“For its history of successful stakeholder collaboration resolving seemingly intractable water use conflicts, the Upper Colorado River Endangered Fish Recovery Program is granted the Cooperative Conservation Award of the Department of the Interior.”

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

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

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 river's 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 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, Secretary of the Interior, 2014

"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 and San Juan recovery programs continue to provide ESA compliance for a great many Federal and non-Federal water projects while working towards the ultimate objective to recover the listed fish species. Despite persistent drought and the challenges of dealing with invasive nonnative fish, these programs continue to make progress through the collaborative efforts of our partners."

Estevan López, Commissioner of Reclamation, 2016

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 2,470 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 12/31/2016

State	Number of Projects	Historical Depletions	New Depletions	Total
		Acre-Feet/Yr	Acre-Feet/Yr	Acre-Feet/Yr
Colorado	1224	1,915,682	207,195	2,122,877
Utah	250	517,898	97,622	615,520
Wyoming	410	83,498	36,013	119,511
CO/UT/WY	238 ¹	(Regional)	(Regional)	
Total	2,122	2,517,078	340,830	2,857,908

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 12/31/2016

State	Number of Consultations	Depletions Acre-Feet/Yr
New Mexico	23	653,758
Colorado	310	217,930
Utah	15	9,311
Total	348	880,999

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

The overall goal for recovery of the four endangered fishes 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	
<p>Over a 5-year monitoring period:</p> <ul style="list-style-type: none"> •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 	<p>For 7 years beyond downlisting:</p> <ul style="list-style-type: none"> •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	
<p>Over a 5-year monitoring period:</p> <ul style="list-style-type: none"> •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 	<p>For 3 years beyond downlisting:</p> <ul style="list-style-type: none"> •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	
<p>Over a 5-year monitoring period:</p> <ul style="list-style-type: none"> •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 	<p>For 3 years beyond downlisting:</p> <ul style="list-style-type: none"> •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	
<p>Over a 5-year monitoring period:</p> <ul style="list-style-type: none"> •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 	<p>For 3 years beyond downlisting:</p> <ul style="list-style-type: none"> •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	USFWS Pending Recovery Decisions
<p>Colorado pikeminnow</p>  <ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> A Species Status Assessment (SSA)¹ initiated in late 2015 and scheduled for completion in 2017. Recent population declines could delay downlisting.²
<p>Humpback chub</p>  <ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> SSA initiated in early 2016 and scheduled for completion in 2017. Long term stability in most populations could lead to a downlisting decision in the near future.
<p>Razorback sucker</p>  <ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> In the Upper Basin, stocked adults are accumulating in Colorado, Green, and San Juan rivers and in the inflows to Lake Powell. In the Lower Basin, the only wild, self-sustaining population is found in Lake Mead and the lower Grand Canyon. Positive trends for this species are reported throughout the Colorado River. 	<ul style="list-style-type: none"> An SSA for this species is scheduled for completion in 2017. Downlisting could occur when razorback sucker demonstrate the ability to complete life cycles in wild.
<p>Bonytail</p>  <ul style="list-style-type: none"> Listed as Endangered in 1980; recovery is required in both Upper and Lower basins. 	<ul style="list-style-type: none"> Programs throughout the Upper and Lower basins rebuild populations with hatchery fish. Spawning in the wild detected for the first time in Green River floodplains in 2015 (and again in 2016). 	<ul style="list-style-type: none"> When survival of stocked fish improves and bonytail start completing their life cycle in wild, the Service 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 Service decision to reclassify an endangered species as a threatened one based on reduced risk of extinction.

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 2016		
	Green	Colorado	San Juan
Bonytail: average size 10 inches			
J.W. Mumma Native Aquatic Species Restoration Facility, Alamosa, CO (5,000)	2,796; 12.9"	3,231; 12.9"	
Wahweap State Fish Hatchery, Big Water, UT (10,000)	4,227; 9.9"	3,981; 9.9"	
Ouray National Fish Hatchery – Randlett Unit, Vernal, UT (10,000)	11,202; 10.6"		
Ouray National Fish Hatchery – Grand Valley Unit, Grand Junction, CO (10,000)		10,324; 10.4"	
Razorback sucker: average size 14 inches			
Ouray National Fish Hatchery – Randlett Unit, Vernal, UT (6,000)	2,322; 13.0"		
Ouray National Fish Hatchery – Grand Valley Unit, Grand Junction, CO (6,000)		5,617; 15.0"	
Ouray National Fish Hatchery-Horsethief Canyon Native Fish Facility, Fruita, CO (2,000-3,000)			4,102; 15.2"
Navajo Agricultural Products Industry (NAPI) Ponds, Farmington, NM (6,000-8,000)			2,510; 15.0"
Southwest Native Aquatic Resources and Recovery Center, Dexter, NM (11,000)			1,063; 12.8"
Colorado pikeminnow: fingerlings, 45+ mm total length			
Southwest Native Aquatic Resources and Recovery Center, Dexter, NM (400,000)			433,580; 1.7"



Photo by U.S. Fish and Wildlife Service

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



Photo by U.S. Fish and Wildlife Service

Southwestern Native Aquatic Resources and Recovery Center raises rare Colorado pikeminnow for release into the San Juan River.

* 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 provide spring and base flows, ROD Feb. 2006

White River: Future Water Management Plan, PBO

Duchesne River: provides spring and base flows, BO July 1998

15-Mile Reach–Colorado River: Flows managed with reservoir pools and irrigation efficiency (see table, top right), PBO Dec. 1999

Price River: minimum flows, Position Paper May 2012

-  **Reservoirs**
-  **Critical Habitat**
- BO = Biological Opinion**
- PBO = Programmatic Biological Opinion**
- ROD = Record of Decision**

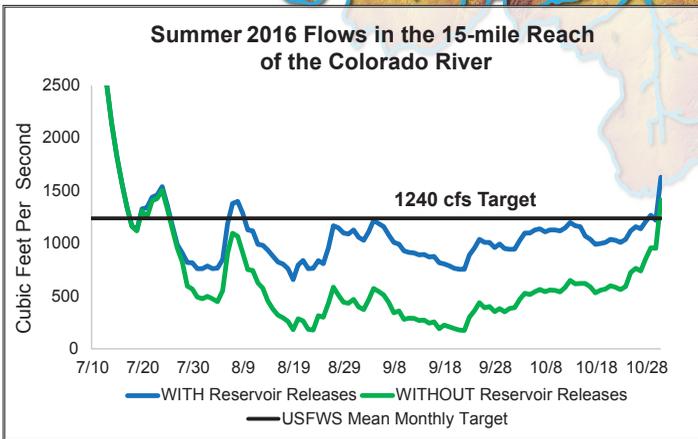
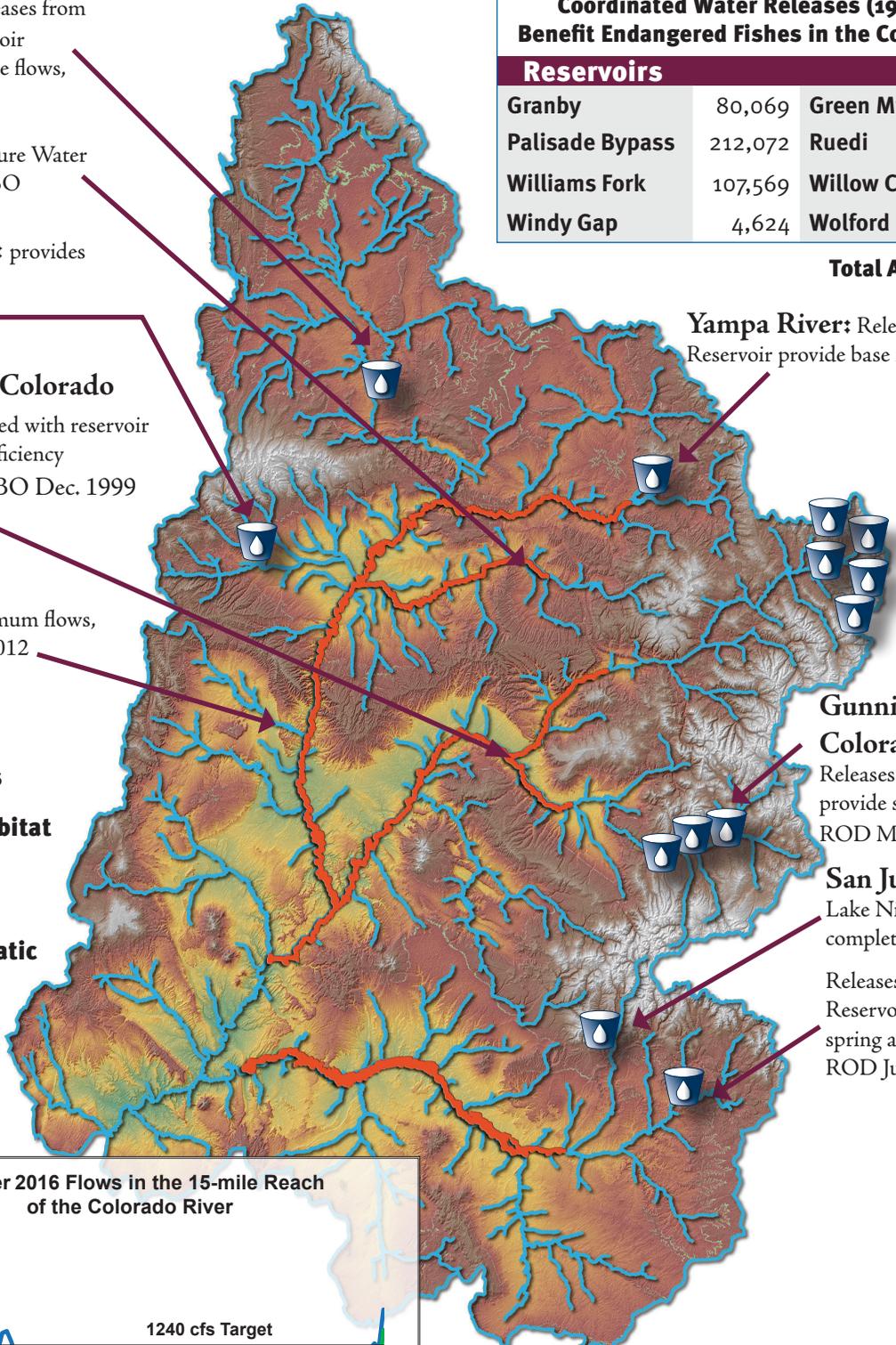
Coordinated Water Releases (1997-2016) Benefit Endangered Fishes in the Colorado River			
Reservoirs		Acre-Feet	
Granby	80,069	Green Mtn	768,980
Palisade Bypass	212,072	Ruedi	401,504
Williams Fork	107,569	Willow Creek	17,918
Windy Gap	4,624	Wolford Mtn	169,458

Total Ac-Ft: 1,762,194

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

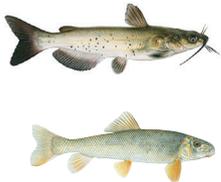
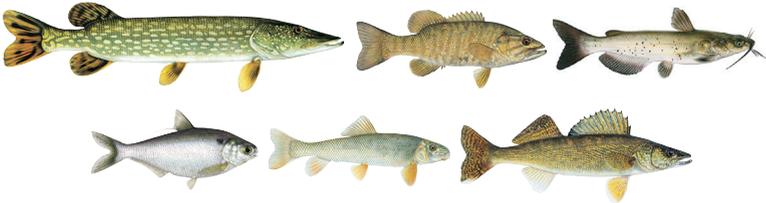
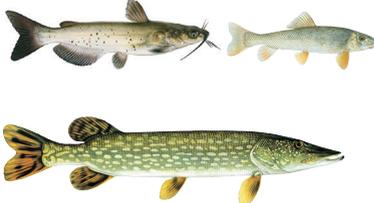
Gunnison & Colorado Rivers: Releases from Aspinall Unit provide spring and base flows, ROD May 2012

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



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
							



In 2014, biologists began gill netting connected backwaters in the upper Yampa River, to remove northern pike before they could spawn.

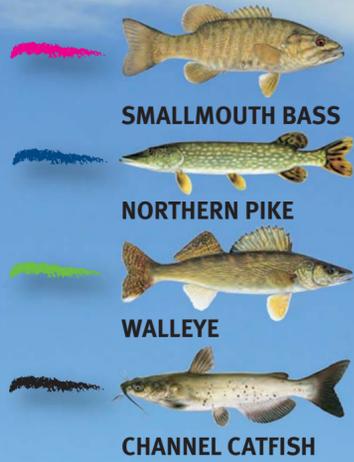


In 2016, Upper Colorado Program partners installed a 9mm mesh net in the Elkhead Reservoir spillway channel to prevent nonnative northern pike and smallmouth bass escaping to the Yampa River while maintaining an important regional sport fishery.



Multi-agency crews coordinate smallmouth bass removal efforts in the Yampa, White, Green, and Colorado rivers timed specifically to target spawning adults.

IN RIVER REMOVAL

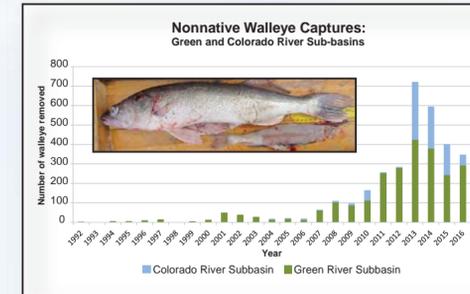


RESERVOIR SOURCES OF NONNATIVE FISH

- ★ CONTAINED
- ★ PARTIALLY CONTAINED
- ★ NOT CONTAINED
- ★ CANNOT BE CONTAINED



Utah Division of Wildlife chemically treated Red Fleet Reservoir in 2015 to remove an illegally introduced population of walleye that was escaping to the Green River.



Distribution and abundance of nonnative walleye has increased dramatically in the past 8 years throughout the Upper Colorado River Basin. Inset photo – the remains of an endangered Colorado pikeminnow removed from the stomach of a walleye.



San Juan River researchers report declines in both juvenile and adult nonnative channel catfish in river reaches where the greatest amount of removal occurs.

WHY ARE CERTAIN NONNATIVE FISH A PROBLEM?

PREDATION AND COMPETITION



HIGH REPRODUCTION POTENTIAL



High Reproduction Leading to Competition

Predators in Shared Habitats

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 Diggs-Wald, 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.

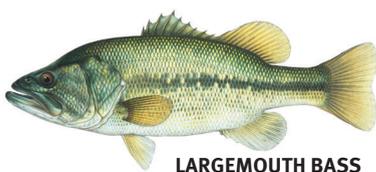
Providing angling opportunities compatible with endangered species recovery. Families can enjoy compatible sportfishing year round.



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



LARGEMOUTH BASS



BLACK CRAPPIE



YELLOW PERCH



BLUEGILL



BROWN TROUT



KOKANEE



RAINBOW TROUT



HYBRID STRIPPED BASS (STERILE FISH)



WALLEYE (STERILE FISH)

...and many others!

NO - Incompatible sportfish cannot be stocked in reservoirs



SMALLMOUTH BASS



WALLEYE (FERTILE FISH)



NORTHERN PIKE



BURBOT

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

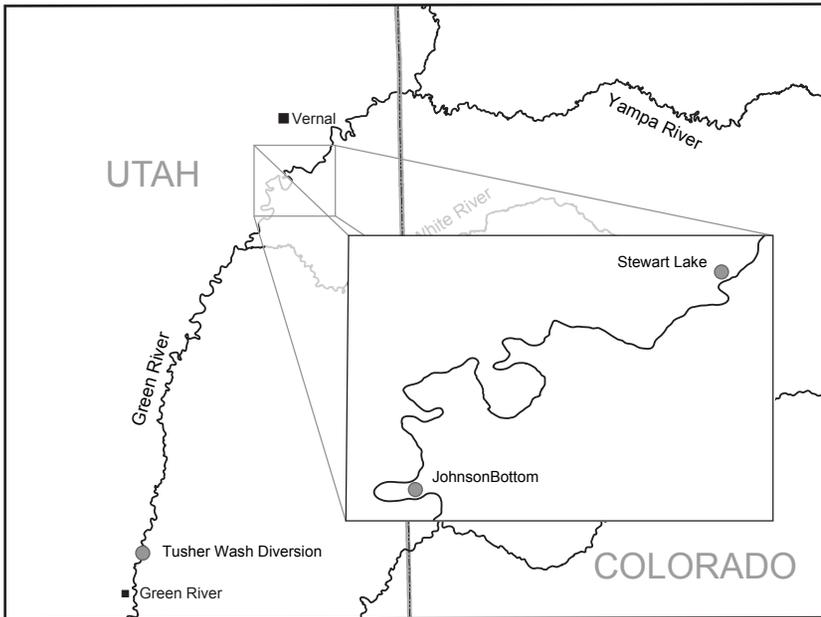
Grand Valley Project Fish Screen, 2007

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.



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 © NEIL GERBER

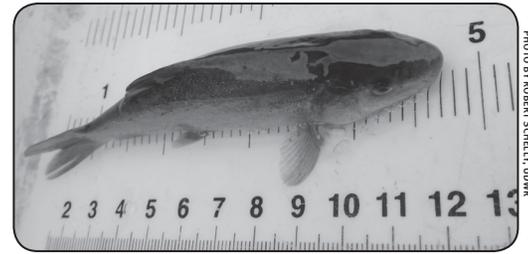


PHOTO BY ROBERT SCHELLY, UNWR

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



PHOTO BY U.S. FISH AND WILDLIFE SERVICE

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

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.

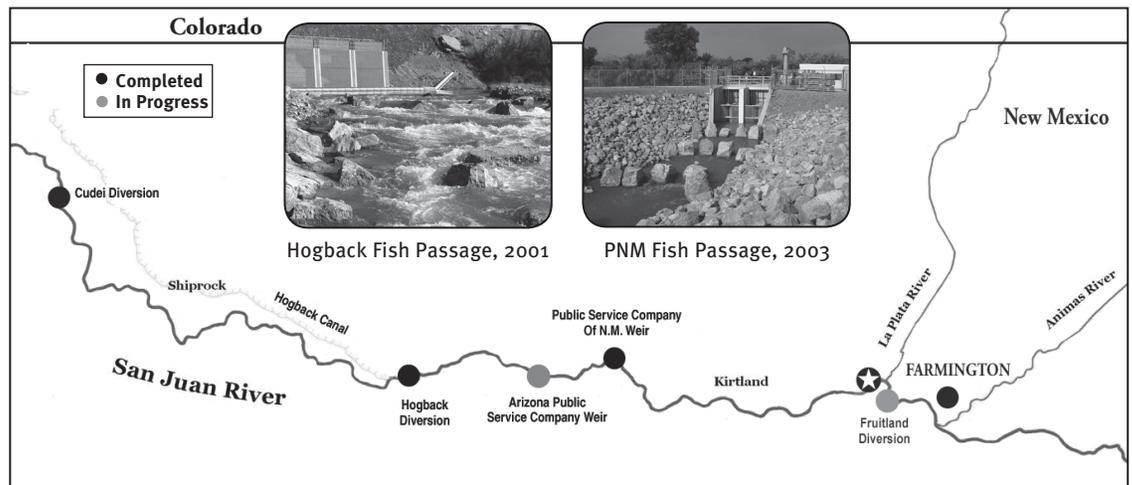


PHOTO BY U.S. FISH AND WILDLIFE SERVICE

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 U.S. Fish and Wildlife Service

Sam Hultberg, USFWS, holds a Colorado pikeminnow captured on the Colorado River near Grand Junction, CO.

Upper Colorado Program

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

✦ The population in the Green River is the largest (*Figure 1; estimates for 2013–2015 are preliminary*). The Service’s current downlisting criteria for this sub-basin is 2,600 adults, but the Service is re-evaluating recent survival estimates to determine if revision of that criteria is necessary.

✦ The adult population in the Colorado River sub-basin is smaller than the Green River population (*Figure 2; estimates for 2011–2015 are preliminary*).

✦ In 2015, 1,331 young-of-year (YOY) were collected from Colorado River backwaters. This was the highest catch in this reach of river in 30 years. In 2016, catch in the Colorado and lower Green remained above average, but dropped in the middle Green River.

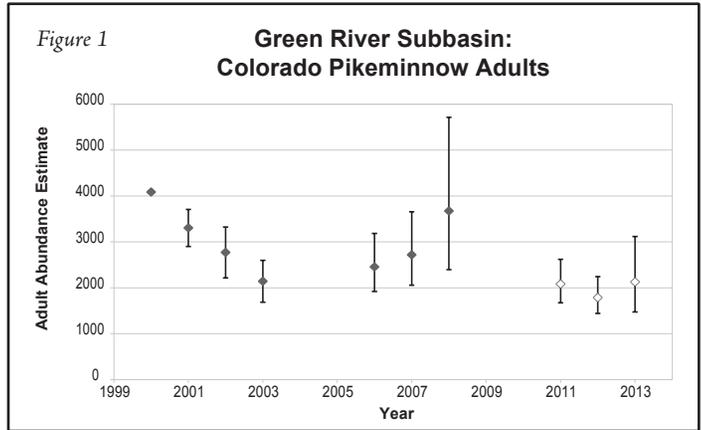
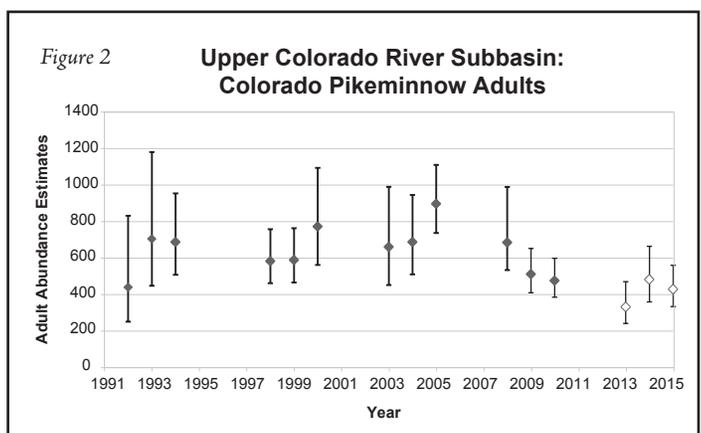


Photo by Charlie Card

Colorado pikeminnow collected on the Green River.



San Juan Program

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

✦ Over the last six years, 2,707,927 age-0 Colorado pikeminnow have been stocked into the San Juan River.

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

✦ A record high number (n=312) of wild-produced Colorado pikeminnow larvae were captured in 2014. In September 2016, 23 wild young-of-year Colorado pikeminnow (~ 2" in length) were collected, which represents critically important survival beyond the larval life stage.

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

BONYTAIL (*Gila elegans*)

Upper Colorado Program

◆ Stocking continues to reestablish populations in the Upper Colorado River Basin. When the Upper Colorado Program was established, bonytail had essentially disappeared and little was known of its habitat requirements. Key to bonytail recovery is research and monitoring of stocked fish to determine life history needs.

✦ Survival of stocked bonytail is low. Biologists are testing different stocking times and growing hatchery fish larger.

✦ Bonytail adults entered flooded wetlands in 2015 and 2016, spawned and produced juveniles that returned to the river in the fall as the wetland drained.



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

Photo by U.S. Fish and Wildlife Service

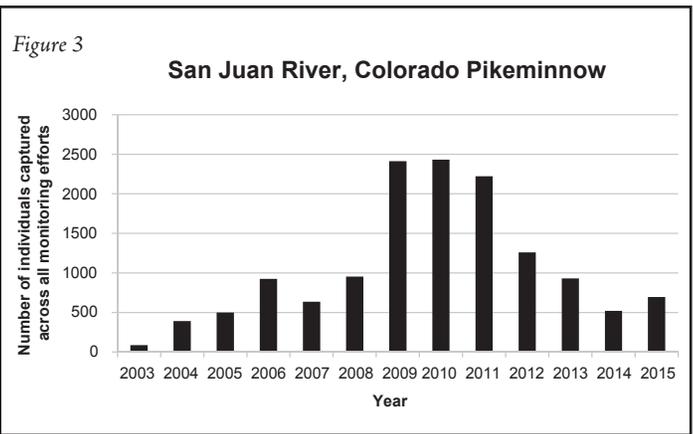


Photo by U.S. Fish and Wildlife Service

Bobby Duran, USFWS, holds a healthy adult Colorado pikeminnow caught in the San Juan River.

Upper Colorado Program's Performance to Meet Annual Bonytail Stocking Goals (%)

	Green River	Colorado/Gunnison River
2012	52% ¹	102%
2013	30% ²	108%
2014	127%	138%
2015	145%	122%
2016	104%	100%

Shaded cells indicate years when the stocking goal was not met.

¹ This 2012 group of fish were <10 inches total length and were transferred to Ouray National Fish Hatchery – Randlett Unit, to grow over winter and were stocked in 2013.

² In 2013 some bonytail were held in a hatchery longer to achieve the 10-inch size.

RAZORBACK SUCKER (*Xyrauchen texanus*)

◆ When the recovery programs were established, numbers of 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 are revising 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.

	Green River	Colorado/Gunnison Rivers	San Juan River
2012	108%	106%	118%
2013	53% ¹	101%	135%
2014	110%	109%	54% ³
2015	98%	53% ²	35% ³
2016	39% ⁴	94%	67% ³

Shaded cells indicate years when stocking goal was not met.
¹ The Upper Basin stocking strategy is being changed to shift some production from razorback sucker to bonytail.
² Parasitic outbreak limited production.
³ Annual stocking target of 11,400 was not met 2014-2016 but the long-term target of 91,200 from 2009-2016 was exceeded.
⁴ In 2015, a tiger salamander outbreak in the production ponds reduced the numbers of fish to be stocked in 2016.

✦ Fish stocked in the Green, Colorado, and San Juan rivers (Figure 4) are recaptured in reproductive condition and often in spawning groups. Captures of wild-produced larvae in the Green, Gunnison, Colorado, and San Juan rivers document that the stocked fish are spawning.

✦ Antennas placed on a known spawning bar in the middle Green River in Dinosaur National Monument in northeast Utah detected 584 razorback sucker in 2015, and 958 in 2016. Most of these fish were stocked in 2010–2012, but a few were stocked as long ago as 2004. Submersible antennas used near the Green and Yampa River confluence detected 10 razorback sucker, more than captured in the Yampa River in the past 20 years.

✦ 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 (Figure 5) to connect floodplains — important nursery habitat for larval razorback sucker. In September, Utah researchers released a record high catch of 2,110 young of the year razorback sucker from Stewart Lake (Figure 6) into the Green River — some had grown more than 6 inches over the summer.

✦ Hundreds of razorback sucker are using transitional habitats at the inflows of both the Colorado and San Juan rivers into Lake Powell.

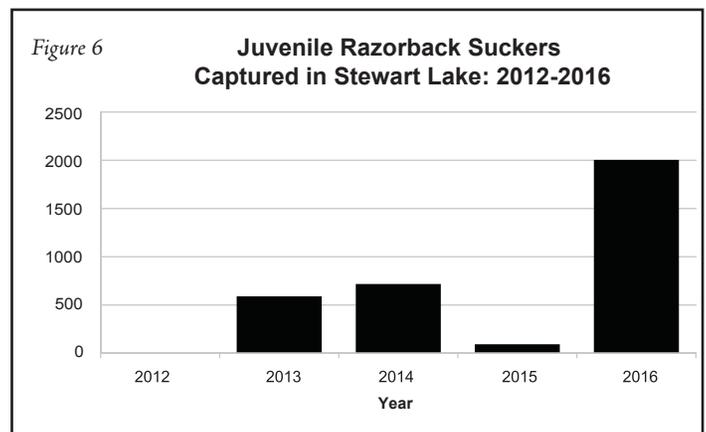
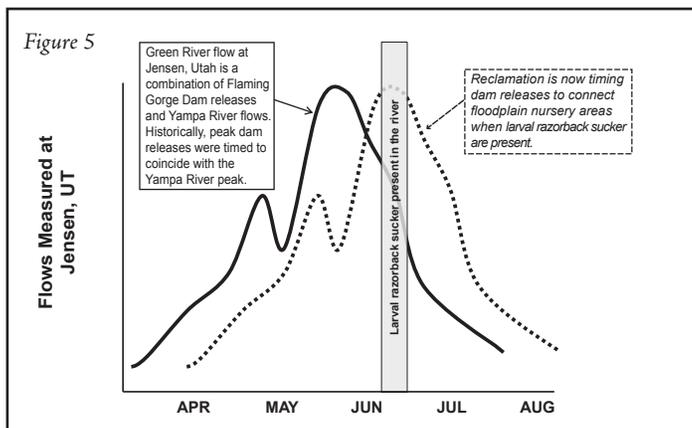
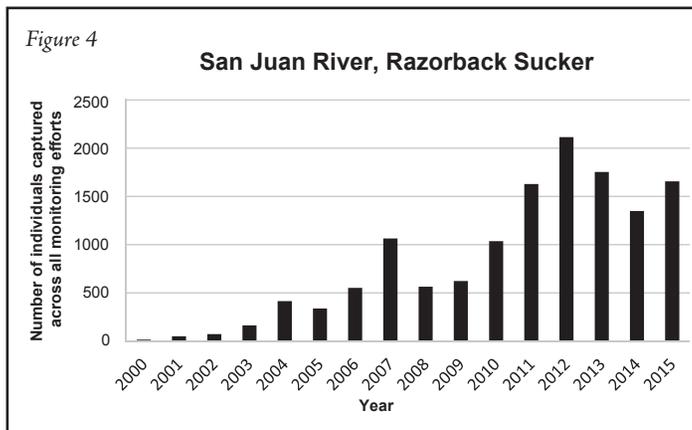




Photo by U.S. Fish and Wildlife Service

Eileen Henry holds a razorback sucker captured on the San Juan River.

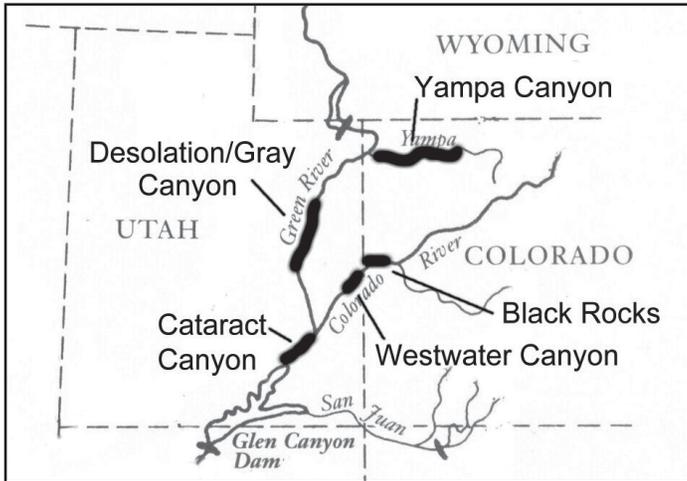


Photo by U.S. Fish and Wildlife Service

Angela James, USFWS, with a razorback sucker captured during endangered fish monitoring.

HUMPBACK CHUB (*Gila cypha*)

◆ Five wild populations inhabit canyon-bound sections of the Colorado, Green, and Yampa rivers. Downward trends in some populations (particularly Yampa Canyon) have been attributed to increased abundance of nonnative fish and habitat changes associated with extended periods of drought.



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

✦ In 2014, biologists resumed humpback chub population estimation in Desolation and Gray canyons in the Green River (Figure 7; estimates for 2014–2015 are preliminary). These contiguous canyons provide ~45 river miles of occupied habitat. Biologists sample <10% of the available habitat each sampling season and extrapolate results to estimate overall population size. Although adult humpback chub survival and catch rates appear relatively stable for the past 15 years, juvenile survival rates are low.

✦ The strongest population in the Upper Colorado River Basin consists of two groups in Black Rocks and nearby Westwater Canyon. Both populations experienced declines about 15 years ago, but have remained relatively stable since.

✦ The humpback chub population in Cataract Canyon is small, but appears to be stable.

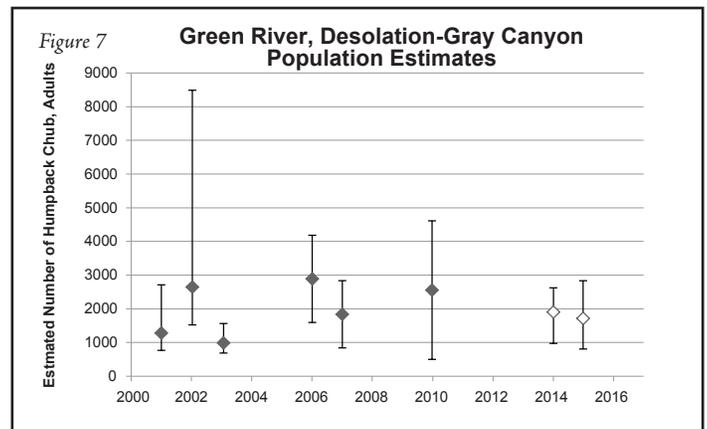
✦ Humpback chub in Yampa Canyon have never been common, but now are extremely rare. The Upper Colorado Program is developing an Upper Basin humpback chub brood stock to augment the population in Yampa Canyon if deemed necessary in the future.

✦ The U.S. Fish and Wildlife Service is conducting a species status assessment on humpback chub to determine long-term viability.



Photo by U.S. Fish and Wildlife Service

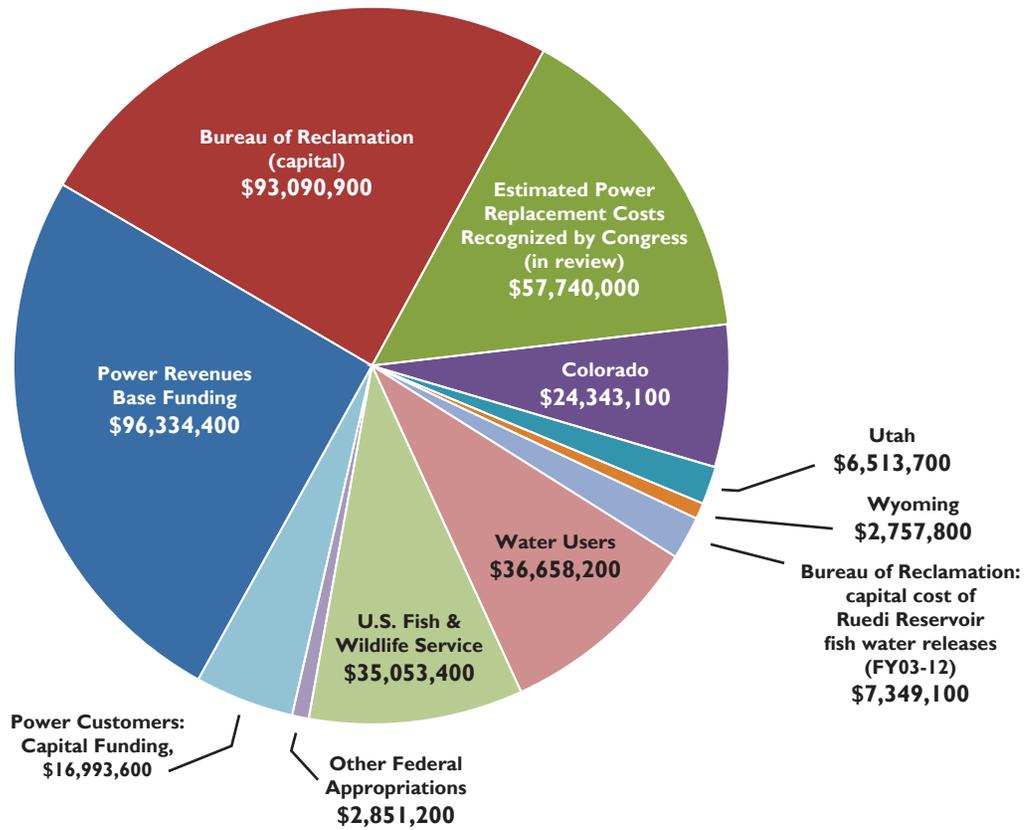
Humpback chub caught in the Black Rocks section of the Colorado River.



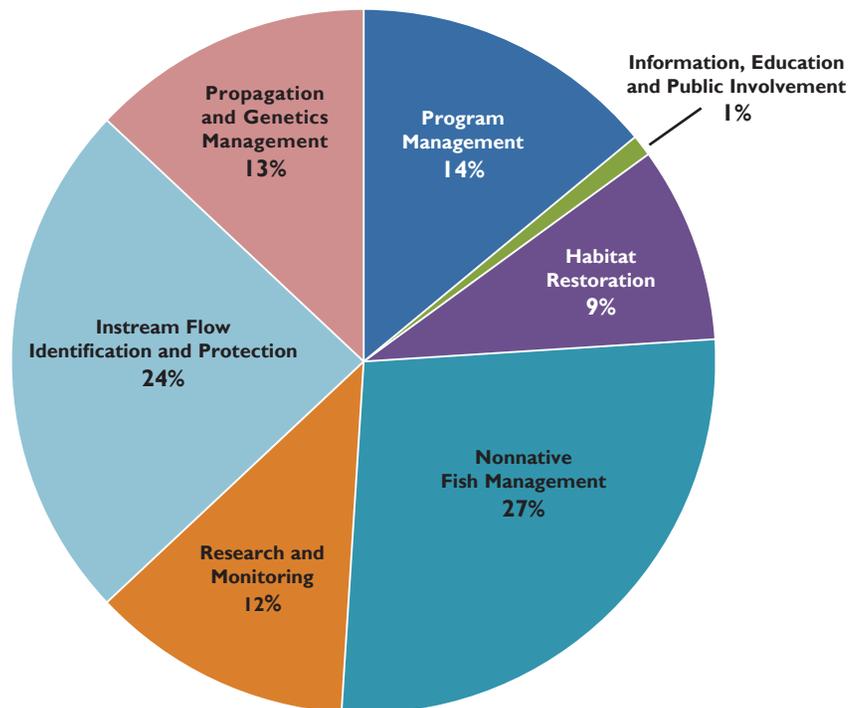
Expenditures

Upper Colorado River Endangered Fish Recovery Program

Total Partner Contributions = \$379,685,400 (FY 1989-2017)



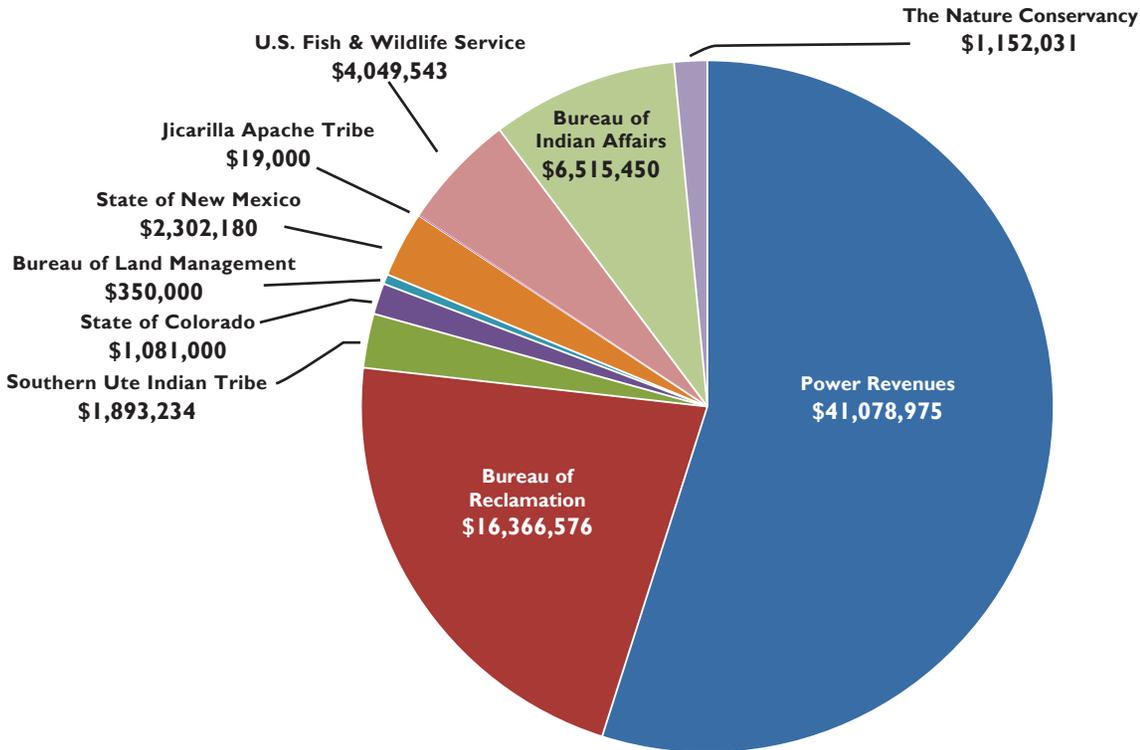
Projected Expenditures by Category (FY 2017 only)



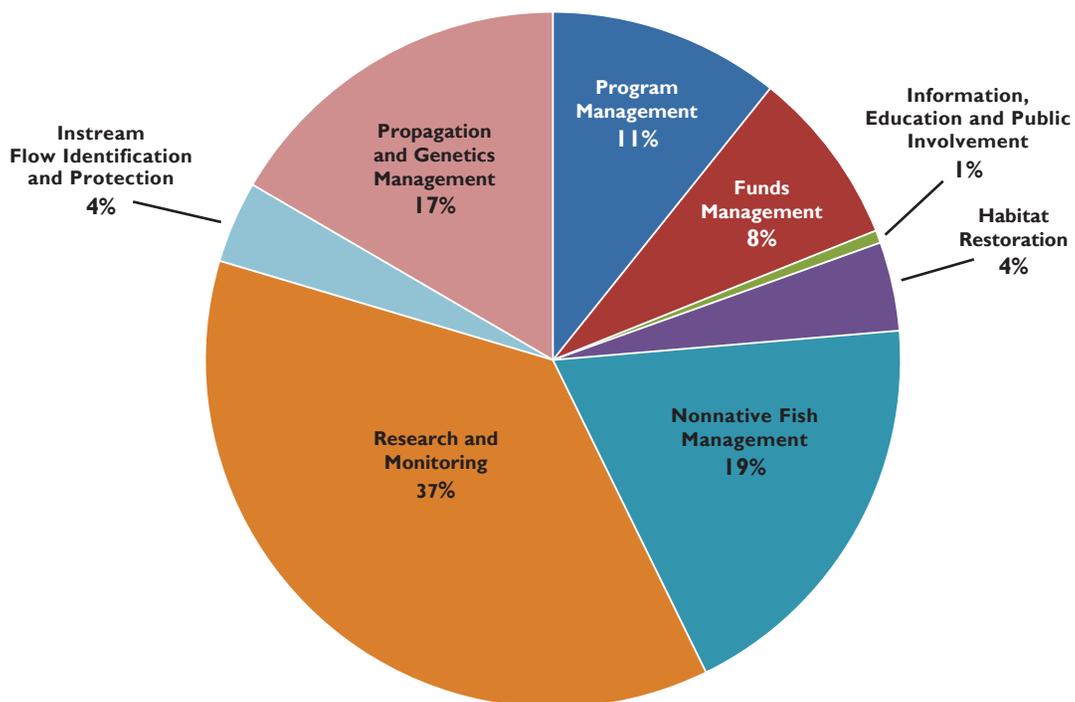
Expenditures

San Juan River Basin Recovery Implementation Program

Total Partner Contributions = \$74,807,989 (FY 1992-2017)
(Not including in-kind contributions)



Projected Expenditures by Category (FY 2017 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 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

P.L. 106-392, as amended, authorizes the Bureau of Reclamation to cost-share capital construction projects. Water users, CRSP power customers, and the states of Colorado, New Mexico, Utah, and Wyoming have provided significant non-federal cost-sharing 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

\$17 million of CRSP power revenues have been expended

for capital construction projects. Consistent with P.L. 106-392, as amended, these revenues were treated as a non-federal contribution and as 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

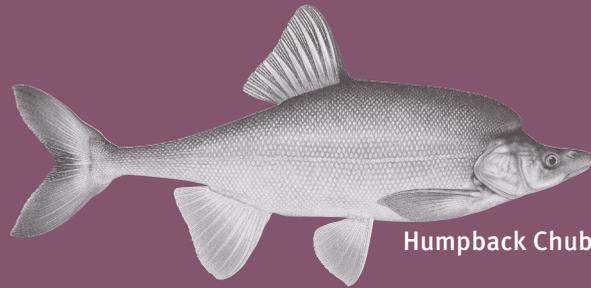
Capital Project Cost-Sharing by the States

	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.



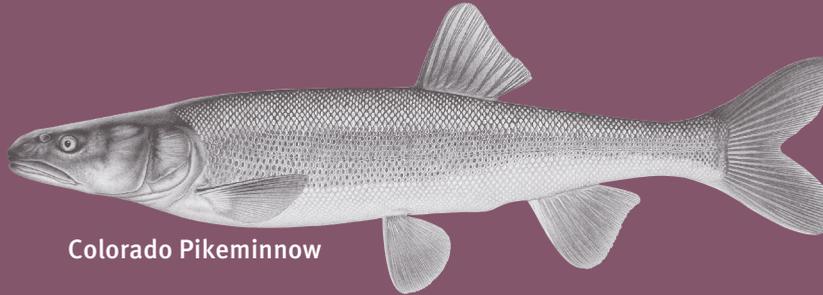
ColoradoRiverRecovery.org



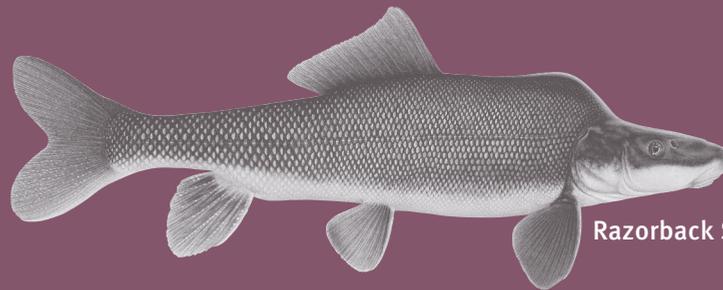
Humpback Chub



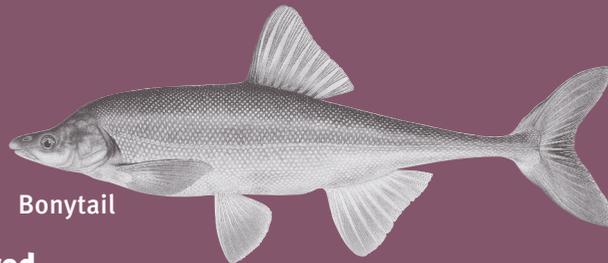
southwest.fws.gov/sjrip



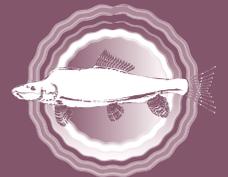
Colorado Pikeminnow



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
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 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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