2010 - 2011

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

Innovative Approach Helps Achieve Species Recovery While Water and Hydroelectric Power Use and Development Continues

Highlights 2010-2011

Millions of people in Colorado, New Mexico, Utah, and Wyoming benefit from the foresight of those who, more than two decades ago, envisioned cooperative efforts leading to recovery of four species of endangered Colorado River fishes while effectively managing water and hydroelectric power resources for human uses.

State and federal agencies; water, power, and environmental organizations; and American Indian tribes established the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program.

These programs have a proven track record of conducting scientific research about the endangered fishes; stocking fish; constructing and operating hatcheries, fish passages, and screens; and acquiring and restoring floodplain habitat. The programs also work to resolve conflicts caused by nonnative aquatic species. Federal and non-federal water project operators provide water for endangered fish in accordance with state water law and interstate compacts.

The recovery programs provide Endangered Species Act compliance for more than 2,100 federal, tribal, and non-federal water projects. The programs use adaptive management to continually evaluate and revise management actions as new information becomes available.

***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.*

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Colorado Pikeminnow
- Largest minnow in North America
- Migrates up to 200 miles to spawn

Humpback Chub
- Prefers deep, swift water of canyons
- Unusually shaped with abrupt hump behind head

Bonytail
- Rarest of the four endangered fish species
- Body becomes pencil-thin near its tail

Razorback Sucker
- Sharp-edged "razorback" hump
- Species dates back 3 to 5 million years

Recovering Endangered Fishes in the Upper Colorado and San Juan River Basins

Geographic Scope:

The Upper Colorado River Endangered Fish Recovery Program is recovering humpback chub, bonytail, Colorado pikeminnow, and razorback sucker in the Colorado River and its tributaries in Colorado, Utah, and Wyoming. The Recovery Program was initiated in 1988 with the signing of a cooperative agreement by the Governors of Colorado, Utah, and Wyoming; the Secretary of the Interior; and the Administrator of Western Area Power Administration. In 2009, the cooperative agreement was extended through September 30, 2023.

The San Juan River Basin Recovery Implementation Program is recovering Colorado pikeminnow and razorback sucker in the San Juan River and its tributaries in Colorado, New Mexico, and Utah. The Recovery Program was established in 1992 with the signing of a cooperative agreement by the Governors of Colorado and New Mexico; the Secretary of the Interior; the Southern Ute Indian Tribe; the Ute Mountain Ute Tribe; and the Jicarilla Apache Nation. The Navajo Nation joined the program in 1996. In 2006, the cooperative agreement was extended through September 30, 2023.

Partners' Long-Term Commitment, Collaboration, and Active Participation Key to Recovery Programs' Success

The Upper Colorado River Endangered Fish Recovery and San Juan River Basin Recovery Implementation Programs have a broad range of partners that include state and federal agencies, water development interests, power customers, American Indian tribes, and environmental organizations. Partners have made long-term commitments to work collaboratively to achieve the recovery programs' goals of species recovery while water development occurs.

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

Reaching Out to Local Communities

The recovery programs work proactively to ensure the public is informed about endangered fish recovery actions. This occurs through the news media, public meetings, interpretive exhibits, water festivals, and other events.

Local students learn to identify native and nonnative fishes by helping biologists sort the day's catch at the fish passage at the Public Service Company of New Mexico Weir on the San Juan River.

Visitors to the Glen Canyon Dam's Carl Hayden Visitor Center in Page, Arizona, get a close-up view of endangered fish at this interpretive exhibit.

The recovery programs provide information at major water conferences in Colorado, Nevada, Utah, and Wyoming.

State and Federal Leaders Support Water Development and Species Recovery Goals

For nearly 25 years, state and federal leaders have supported the recovery programs for their cost-effective and collaborative on-the-ground achievements toward meeting the challenges of water development and management by western communities, while working toward recovery of endangered fish species. Based on the programs' successes, they are now models for other endangered species recovery efforts. The Department of the Interior recognized the recovery programs with a Cooperative Conservation Award in 2008.

Leaders in the Four Participating States Value the Recovery Programs' Significant Accomplishments:

"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

"The programs have substantial support from the Upper Basin states of New Mexico, Colorado, Wyoming and Utah, the Navajo Nation, the Jicarilla Apache Nation, the Southern Ute Tribe, and the Ute Mountain Ute Tribe. Other water users, power customers, and environmental organizations are also active participants in the programs…All of the partners contribute significantly to the success of the programs."

Jeff Bingaman, United States Senator, State of New Mexico, 2009

"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

"Since 1988, the Upper Colorado Recovery Program has provided the cooperative mechanism for species conservation and recovery efforts while at the same time allowing cooperating states, of which Wyoming is one, to continue to use and develop Colorado River Basin water resources as apportioned. This program, which includes the states of Utah, Colorado, and Wyoming, power and water users, and environmental groups, represents a longstanding, ongoing successful cooperative agreement."

Matthew H. Mead, Governor, State of Wyoming

The Department of the Interior Recognizes the Recovery Programs are Successful Collaborative Efforts Providing Important Benefits:

"As we chart the future, we can turn around and go back to the ways of river management of the past, where it was too often every state for itself, and every stakeholder only looking out for him or herself. We can re-create the water wars of the last century. Or we can continue to move forward together down the road of long-term, cooperative river management in which the seven [Colorado River] basin states, the federal government, and the many other stakeholders partner to find creative solutions to tough problems…the Upper Colorado Recovery Program is making major strides in protecting the four endangered fish on the Upper Colorado through significant habitat improvements….

Secretary of the Interior Ken Salazar, 2010

"These Programs have been nationally recognized for their cooperative approach to recovering aquatic native fish species, avoiding litigation, and providing Endangered Species Act compliance to federal and non-federal water users."

Commissioner of Reclamation Michael Connor, 2009

"These outstanding partnerships and cooperative efforts represent a fundamental way in which our Department provides stewardship for America with integrity and excellence."

Secretary of the Interior Dirk Kempthorne, 2008

Cost-Sharing Commitments Support Species Recovery

Continuing the successes of the Upper Colorado River and San Juan River recovery programs depends on sufficient funding to implement recovery actions.

CAPITAL FUNDS

Public Law (P.L.) 106-392 (2000), as amended, authorizes the Bureau of Reclamation (Reclamation) to cost-share capital construction projects for both recovery programs. Colorado River Storage Project (CRSP) power customers, water users, and the states of Colorado, New Mexico, Utah, and Wyoming provide non-federal cost-sharing funds.

Capital funds have been spent to construct:

- **Fish passages** allowing native fish to access upstream habitat.
- **Fish screens** preventing fish from entering and being trapped in irrigation diversion canals.
- **Hatchery facilities and grow-out ponds** supporting the Programs' active stocking programs.
- **Floodplain habitat restoration** providing important fish nursery areas with abundant food and decreased predator threats.
- **Water acquisition projects,** including water leases and contracts, enlargement of the existing **Elkhead Reservoir**, and efficiency improvements such as the completed **Grand Valley Water Management Project** *(see page 13)*.
- **Barrier nets and screens** preventing the escapement of nonnative fish while maintaining existing sportfisheries.

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**	
Congress: **$88 million**	Power Revenues:	$17 million
	States:	$17 million
	Water and Power:	$87 million
		$121 million

Power Revenues

CRSP power revenues, totaling $17 million, have been expended for the Programs' capital construction projects consistent with authorization provided in P.L. 106-392, as amended. These revenues are treated as a non-federal contribution and are reimbursable costs assigned to power for repayment under Section 5 of the CRSP Act.

States Cost-Share ($17 Million) Capital Projects

- **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 to meet the state's cost-share contributions.
- **Utah's** legislature created a Species Protection Account within the General Fund in 1997 which receives Brine Shrimp Royalty Act-created revenue. In 2000, Utah dedicated 1/16th of 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 its 1998 and 1999 sessions.

Capital Project Cost-Sharing by the States

	Total Amount	Upper Colorado Program	San Juan Program
Colorado	$9.146 M	$8.065 M	$1.081 M
New Mexico	2.744 M	0.000 M	2.744 M
Utah	3.422 M	3.422 M	0.000 M
Wyoming	1.688 M	1.688 M	0.000 M
Total	**$17.000 M**	**$13.175 M**	**$3.825 M**

ANNUAL FUNDS

P.L. 106-392 authorized up to $6 million per year (adjusted annually for inflation) of CRSP power revenues for the two programs through fiscal year 2011, subject to reauthorization by the Congress thereafter. That authority annually provides $4 million for the Upper Colorado Program and $2 million for the San Juan Program. The states, U.S. Fish and Wildlife Service, power customers, and water organizations also contribute substantial base funding each year *(see pages 18 and 19)*.

Annual funds are used for operation and maintenance of capital projects; instream flow management; habitat restoration; nonnative fish management; endangered fish propagation and stocking; research, monitoring, and data management; public information; and Program management.

Recovery Programs Rely on Recovery Goals to Manage Actions and Measure Success

The recovery programs rely on species recovery goals to develop and implement management actions and measure success as they work to recover the endangered fishes. The recovery goals provide objective, measurable criteria that the U.S. Fish and Wildlife Service (Service) will use to consider downlisting to "threatened" status and delisting (removal from Endangered Species Act [ESA] protection).

Recovery goals are reviewed and updated as new information becomes available. A review is currently underway with completion slated for 2011.

The Service will consider a change in species' status when the required demographic and genetic standards for self-sustaining populations are reached, and the necessary management actions are achieved to reduce the threats that caused the species to be listed under the ESA.

The table below describes the Service's current position on estimated timelines to achieve recovery. Also provided is a summary of progress specific to achieving downlisting criteria.

ESTIMATED TIMELINES FOR DOWNLISTING/DELISTING: AN UPDATE

Species	Previously Reported Timeline to Downlist/Delist[1]	Are These Timelines Still Relevant?	Critical Information the U.S. Fish and Wildlife Service will Consider and Monitor During its Downlisting Decision-Making Process
Colorado Pikeminnow	2013/ 2020	YES	Threats[2]: 78% of the downlist criteria have been met or partially met. Demographics: **IF**, populations in the Colorado and Green rivers do not decline significantly from current levels **and** 1,000 age-5 fish are present in the San Juan River, there is a **moderate to high likelihood that downlisting in 2013 is possible.**
Humpback Chub	2013/ 2016	**NO (2016/2019 possible, but this represents a best case scenerio)**	Threats[2]: 60% of the Upper Colorado River Basin (Upper Basin) downlist criteria have been met or partially met. Demographics: **IF**, over a 5-year period, one of the five Upper Basin populations rebounds to meet the "core criteria" of 2,100 adults for a period of 5 years, and the other Upper Basin populations increase, there is a **low to moderate likelihood that downlisting could occur in 2016.**
Razorback Sucker	2020/ 2023	YES	Threats[2]: 85% of the Upper Basin downlist criteria have been met or partially met. Demographics: Stocking programs in the Colorado, Green, and San Juan rivers appear to be successful. Although neither recovery program has initiated population estimates, **current information indicates the 2020 timeline is still achievable.**
Bonytail	2020/ 2023	YES	Threats[2]: 72% of the Upper Basin downlist criteria have been met or partially met. Demographics: Stocking programs in the Colorado and Green rivers have been marginally successful. **There is not enough new information to suggest the 2020 deadline should be revised.**

[1]Estimated delisting dates assume that threats to recovery have been addressed.
[2]As presented in the U.S. Fish and Wildlife Service's draft 5-yr reviews. The Service will determine if these percentages are adequate to downlist.

Status of Endangered Fishes

The recovery programs monitor reproduction, growth, survival, and abundance of endangered fish in the wild. Results are used to track progress toward achieving recovery goals and to assess the 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 are likely to 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.

COLORADO PIKEMINNOW *(Ptychocheilus lucius)*

Upper Colorado River 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)*. The Service is re-evaluating recent survival estimates to determine the appropriate numbers of adults needed to downlist. The population in the Colorado River sub-basin is smaller *(Figure 2)*, but appears to be more stable. The Service requires downlisting in the Colorado River sub-basin to be contingent on positive results in the San Juan River sub-basin.

• Researchers caution that despite recent increases in adult numbers in both populations, fluctuations (i.e., a downward turn) will likely occur because of natural population dynamics.

◆ Young of the year (age-0) Colorado pikeminnow are monitored every fall in two reaches of the Green River and one reach of the Colorado River.

• Catch of age-0 in the upper reach of the Green River has been very low and of particular concern to researchers since the mid-1990s. Catches in that reach increased in 2009 and again in 2010 *(Figure 3)*, presumably due to higher flows as well as other recovery actions (e.g., nonnative fish management.)

Figure 1

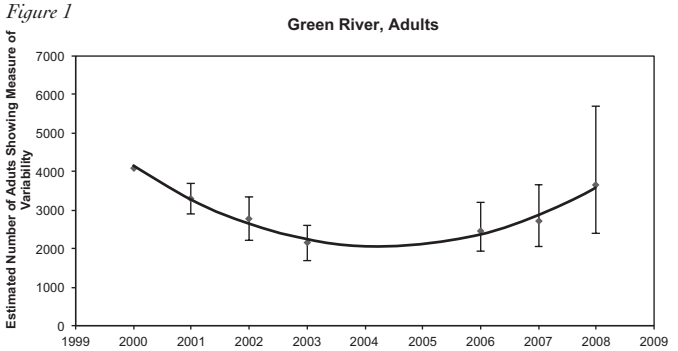


Figure 2

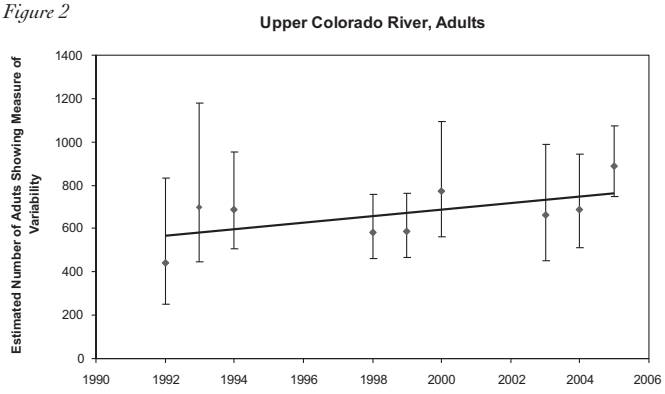
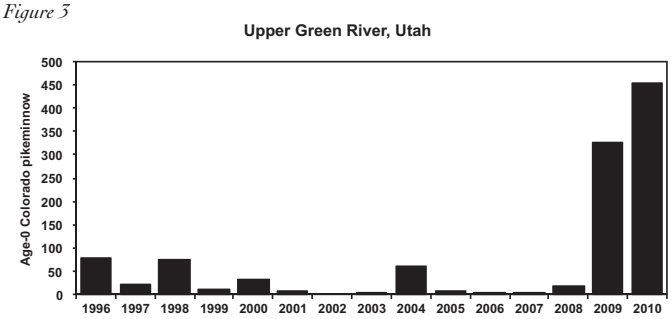


Figure 3



San Juan River Program

◆ Stocking efforts in the San Juan River continue to achieve the recovery goals.

• Catch rates of juvenile and adult Colorado pikeminnow from an annual monitoring pass have increased over the past decade, showing a successful stocking program *(Figure 4)*.

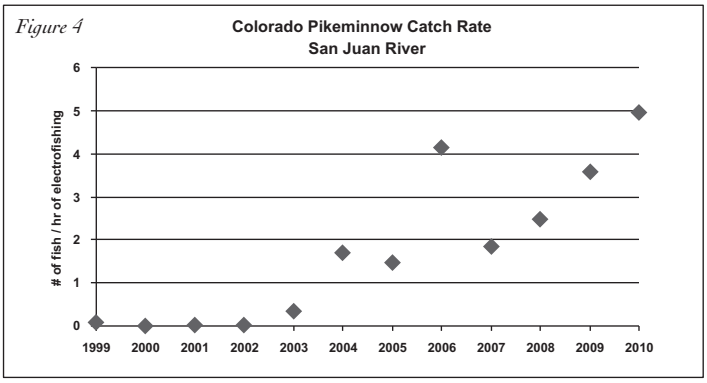
• Augmentation goals for Colorado pikeminnow were exceeded by 2% and 18% over the last five years for age-0 and juvenile fish, respectively.

Continued on page 9

COLORADO PIKEMINNOW *(Ptychocheilus lucius)*

San Juan River Program *(continued)*

• Colorado pikeminnow larvae have been detected in the San Juan River in very low numbers since 1993. Larval fish caught in 2004, 2007, 2009, and 2010 indicate hatchery-produced fish are reproducing in the wild.



Service Biologist Bobby Duran holds the fourth largest endangered Colorado pikeminnow captured in the San Juan River since 1991. The 30.3-inch, 9.1 pound fish was captured during fall 2010 about 16 miles downstream of Shiprock, New Mexico.

BONYTAIL *(Gila elegans)*

Upper Colorado River Program

◆ Stocking continues to reestablish populations in the Upper Colorado River Basin. When the Upper Colorado Program was established, the 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.

• To date, fewer stocked bonytail have been recaptured than razorback sucker. Researchers continue to experiment with pre-release conditioning as well as exploring alternative release sites to improve their survival.

• All stocked fish species receive an internal microchip tag before being released in the wild. In 2009 and 2010, an increasing number of bonytail have been detected at several locations throughout the Upper Colorado River Basin where stationary tag-reading antennas are used.

Utah Division of Wildlife Resources Wahweap Fish Hatchery Manager Zane Olsen holds an adult bonytail. Hatchery-raised bonytail are stocked in the Colorado and Green rivers in Colorado and Utah.

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

	Green River		Colorado River
	Middle	Lower	
2006	95	61	104
2007	101	101	105
2008	143	100	111
2009	101	100	95
2010	53[1]	100	46[1]

Shaded cells indicate years when stocking goal was not met (i.e., <100%)

[1]Approximately half of these bonytail scheduled for stocking in 2010 were held in the hatchery to ensure they were disease-free. Subsequent testing has cleared these fish for release in 2011.

◆ 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. Clearly, hatchery-produced fish would be needed to reestablish the species in the wild and preferred habitat would need to be restored via flow management and floodplain protection.

• Fish stocked in the Green, Colorado, and San Juan rivers are recaptured in reproductive condition and often in spawning groups. Captures of larvae in the Green *(Figure 5)*, Gunnison, Colorado, and San Juan rivers document reproduction.

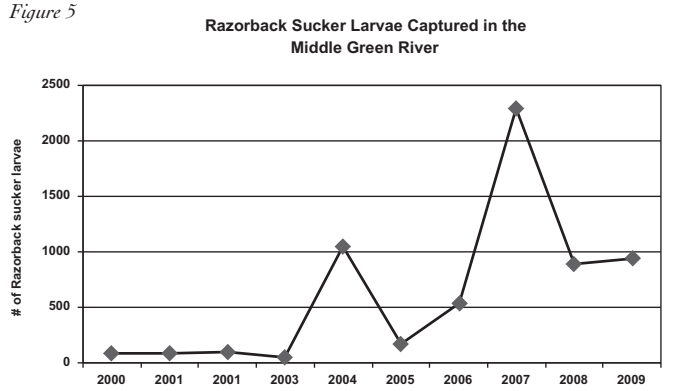
• Survival of larvae through their first year remains rare, but occurs evidenced by occasional captures of juveniles in the Green, Gunnison, and San Juan rivers.

Programs' Performance to Meet Annual Razorback Sucker Stocking Goals (%)

	Green River		Colorado/Gunnison Rivers	San Juan River
	Middle	Lower		
2006	102	104	116	165
2007	111	86	102	200
2008	118	102	130	39[1]
2009	151	51[2]	181[2]	109
2010	110	101	100	250

Shaded cells indicate years when stocking goal was not met (i.e., <100%)
[1]A portion of these fish were held over at Uvalde National Fish Hatchery to determine if survival could be improved by stocking larger fish in 2009 and 2010.
[2]Permit not in place for Grand Valley to stock at Green River, Utah; therefore, fish were stocked into Colorado and Gunnison rivers.

Figure 5



• A recent analysis of long-term razorback sucker recapture information indicates that autumn is the best time of year to stock and that hatchery produced fish should be at least 12" in length before release for best survival.

• A synthesis of floodplain information [in draft] in the Upper Colorado Program indicates releases from Flaming Gorge Dam can be timed better to assist in razorback sucker recovery in the Green River.

Utah Division of Wildlife Resources Technician Rose Fedelleck captured this razorback sucker from the Green River near Jensen, Utah, in 2010.

A waterfall formed at the mouth of the San Juan River and Lake Powell in 2003 when lake levels dropped. While beneficial because it prevents nonnative fish from moving upstream, there is concern that native fish are being lost from the system. Sampling will begin in 2011 to locate razorback sucker and other fish species of interest.

◆ Five wild populations inhabit canyon-bound sections of the Colorado, Green, and Yampa rivers. Downward trends in some populations (particularly Yampa Canyon and Desolation Canyon in the Green River) have been attributed to increased abundance of nonnative fish and habitat changes associated with dry weather and low river flows.

• Concern over downward trends in the Yampa and Desolation Canyon populations caused the Upper Colorado Program to secure individuals from both these populations in the hatchery system.

• The strongest population in the Upper Colorado River Basin comprises two groups in Black Rocks and Westwater canyons *(Figures 6 and 7)*. Both populations experienced declines about 10 years ago and have remained relatively stable since.

• Observations of successful native chub reproduction have been reported in 2008-2010. This may be due to a return to average hydrologic conditions and ongoing nonnative fish management.

• The humpback chub population in Cataract Canyon is small, but appears to be stable. The Service will require sustained improvement (over the course of at least five years) in the other four Upper Basin populations before it will consider downlisting *(see page 7)*.

Figure 6

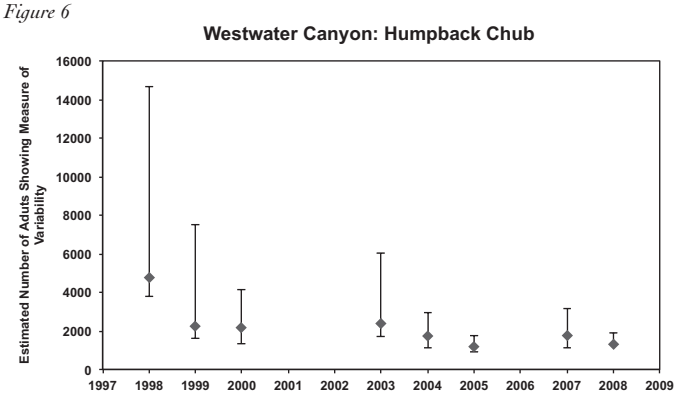
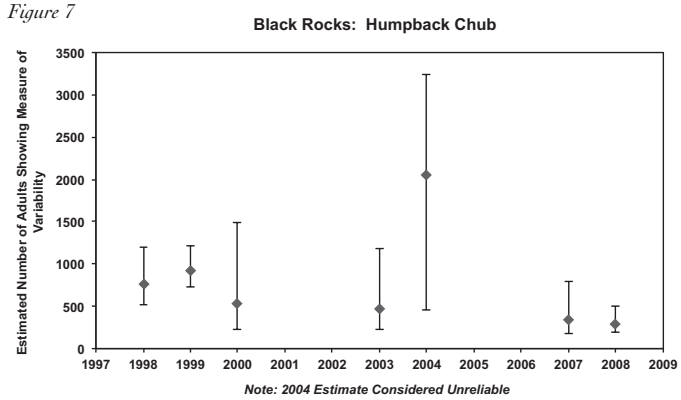
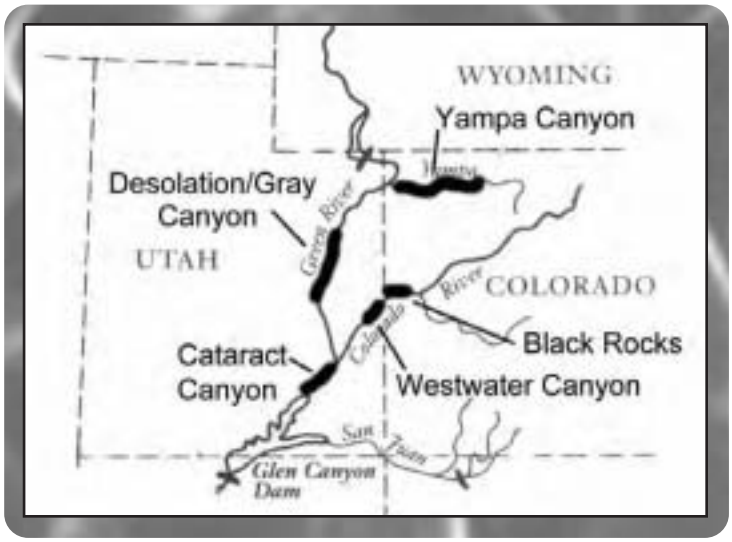


Figure 7





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

Utah Division of Wildlife Resources Biologist Ron Brunson with an adult humpback chub collected in Westwater Canyon on the Colorado River in Utah.

State, Federal, and Tribal Facilities Help 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 to achieve 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 9 and 10)*.

Wahweap State Fish Hatchery
Big Water, Utah

1

Species: Bonytail
Target: 10,660, 8-inch
Stocked: Colorado, Middle, and Lower Green rivers

J.W. Mumma Native Aquatic Species Restoration Facility / Alamosa, Colorado

2

Species: Bonytail
Target: 5,330, 8-inch
Stocked: Middle Green, Colorado, and Gunnison rivers

Uvalde National Fish Hatchery
Uvalde, Texas

3

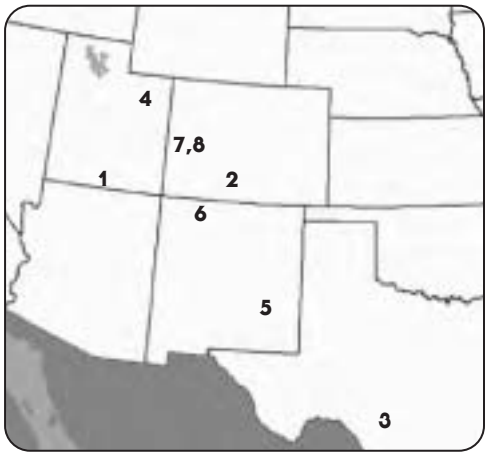
Species: Razorback sucker
Target: 11,400, 12-inch
Stocked: San Juan River

Ouray National Fish Hatchery-Randlett Unit / Vernal, Utah

4

Species: Razorback sucker
Target: 14,895, 12-inch
Stocked: Middle and Lower Green rivers

Species: Humpback chub
Goal: Maintain individual fish from two populations to preserve genetic diversity.



Dexter National Fish Hatchery & Technology Center / Dexter, New Mexico

5

Species: Colorado pikeminnow, razorback sucker, bonytail
Target: Varies by species
Stocked: All Upper Basin rivers

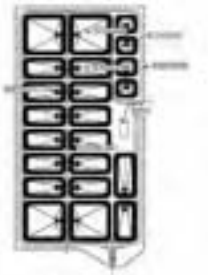
Navajo Agricultural Products Industry (NAPI) Ponds/ near Farmington, New Mexico

6

Species: Razorback sucker
Target: 6,000, 12-inch
Stocked: San Juan River

Horsethief Canyon Native Fish Facility (Coming Soon)
Grand Junction, Colorado

7



Construction of 22 grow-out ponds for endangered razorback sucker is proposed to begin in 2011 with ponds becoming operational in 2012. The ponds will improve the efficiency of raising the numbers and sizes of fish needed to meet stocking targets for both recovery programs.

Ouray National Fish Hatchery-Grand Valley Unit
Grand Junction, Colorado

8

Species: Razorback sucker
Target: 11,895 12-inch
Stocked: Gunnison, Colorado, and Lower Green rivers

Bureau of Reclamation and Non-Federal Water Users Provide Flows for Endangered Fish

Actions identify and provide instream flows needed to recover the endangered fishes consistent with state water law and interstate compacts. The recovery programs use research, monitoring, and adaptive management to identify, evaluate, and revise flow recommendations to meet the flow-related life-history and habitat requirements of the endangered fishes.

Innovative solutions provide instream flows for the endangered fishes while meeting water needs of growing western communities. Program partners cooperatively manage water in accordance with state law, individual water rights, and interstate compacts. This is accomplished through water leases and contracts, coordinated water releases from upstream reservoirs, efficiency improvements to irrigation systems, and re-operation of federal dams and reservoirs.

The Bureau of Reclamation operates New Mexico's Navajo Dam under a Record of Decision signed in 2006 to meet San Juan River flow recommendations to help guide recovery efforts by providing and protecting instream flows to benefit endangered fishes.

Coordinated Water Releases (1997-2010) Benefit Endangered Fish in the Colorado River

Reservoirs	Acre-Feet
Windy Gap	3,718
Willow Creek	9,853
Granby	39,914
Palisade Bypass	72,572
Williams Fork	84,471
Wolford Mountain	129,465
Ruedi	258,180
Green Mountain	500,120
Total	**1,098,293**

From 1997 through 2010, operators of these Colorado reservoirs have coordinated releases to provide more than one million acre-feet of water to enhance spring and summer flows in the Colorado River to improve habitat for the endangered fishes.

Since 2002, improvements to the Grand Valley Project canal system in western Colorado have increased canal efficiency and conserved water in the Colorado River. Located nearby, Orchard Mesa Irrigation District plans to make similar improvements over the next few years. Conserved water benefits endangered fishes while meeting irrigation demands.

The Bureau of Reclamation operates Flaming Gorge Dam in northeastern Utah under a Record of Decision signed in 2006 to meet flow and temperature recommendations to help recover the endangered fishes. Year-round operations provide habitat for endangered fishes in the Green River in Utah.

A 13,000 acre-foot enlargement of Elkhead Reservoir in northwest Colorado completed in 2006 makes 5,000 acre-feet of permanent water and 2,000 acre-feet of leased water available each year to enhance summer base flows for endangered fishes in the lower Yampa River.

Capital Projects Important to Restoring Endangered Fish Populations

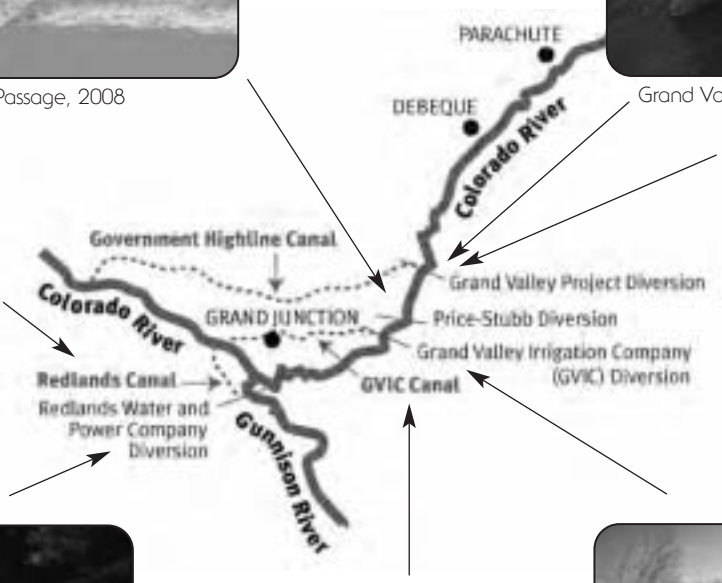
The recovery programs work cooperatively with American Indian tribes, water and power customers, and local landowners to improve endangered fish habitat. Habitat restoration and maintenance includes "undoing" habitat fragmentation through construction and operation of fish passages at irrigation diversion 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

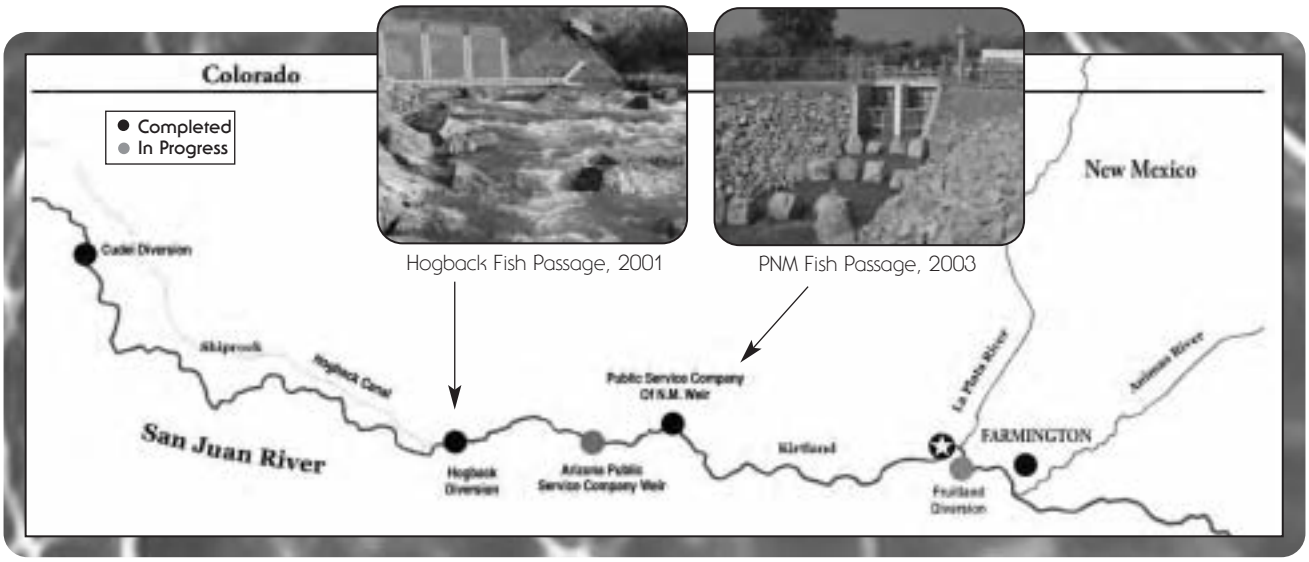
GVIC Fish Screen, 2002

GVIC Fish Passage, 1998

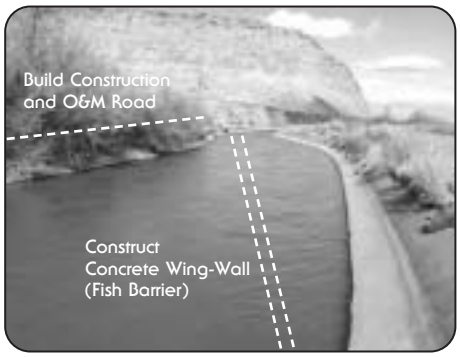
Ninety percent of the Upper Colorado Program's construction projects needed to assist in recovery of the endangered fishes are complete. These include fish passages and screens at the Redlands Water and Power Company, Grand Valley Irrigation Company, Grand Valley Project, and Price-Stubb irrigation diversions in western Colorado. These fish passages contribute to unimpeded access to about 340 miles of designated critical habitat for the endangered fishes in the Colorado and Gunnison rivers.

About 2,700 acres of restored floodplain habitat in the Upper Colorado River Basin are managed for all life stages of endangered fish.

Once a fish screen is constructed at the Tusher Wash Diversion Canal on the Green River in eastern Utah, all major diversion canals identified in the recovery goals for the upper Colorado River system will be screened.



Fish access has been restored to an additional 36 miles of critical habitat on the San Juan River with the construction of passages at the Public Service Company of New Mexico (PNM) Weir and the Hogback Diversion Dam, and removal of the Cudei Diversion Dam.
✪ Capital funds will be used to repair unstable rock formations (see photo and caption below).



Construction of a weir wall to prevent fish from entering the Hogback Irrigation Canal is expected to begin in 2011. Fish passages are being considered at the Arizona Public Service Company Weir and the Fruitland Diversion Dam.

Enacted in 2009, Public Law 111-11 authorized $7 million to permanently repair Farmers Mutual Ditch near Farmington, New Mexico. Heavy equipment in the San Juan River needed to repair damage to the ditch from reoccurring slides threatens critical habitat.

The Nature Conservancy will begin work in 2011 to restore backwater and side channel habitat along the San Juan River to benefit endangered fishes. The project is funded by a River Ecosystem Restoration Initiative grant from the New Mexico Environment Department.

Programs Balance Endangered Fish Recovery with Nonnative Fish Management

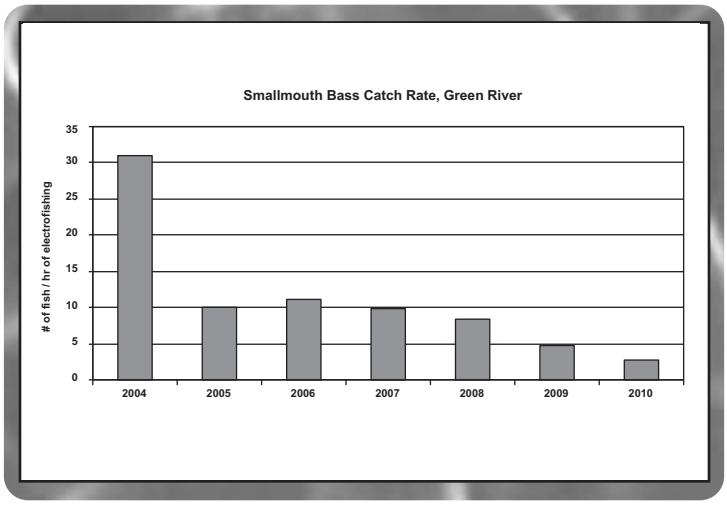
Predation or competition by nonnative fish species is a serious threat to the endangered fishes and perhaps the most challenging to manage. Currently, nonnative smallmouth bass and northern pike are the principal target species for management in the Green and upper Colorado River systems. Nonnative channel catfish and common carp are targeted in the San Juan River.

Smallmouth bass were introduced in the Upper Colorado River Basin during the 1970s. Populations exploded in the late 1990s and early 2000s. Intensive removal began in 2004.

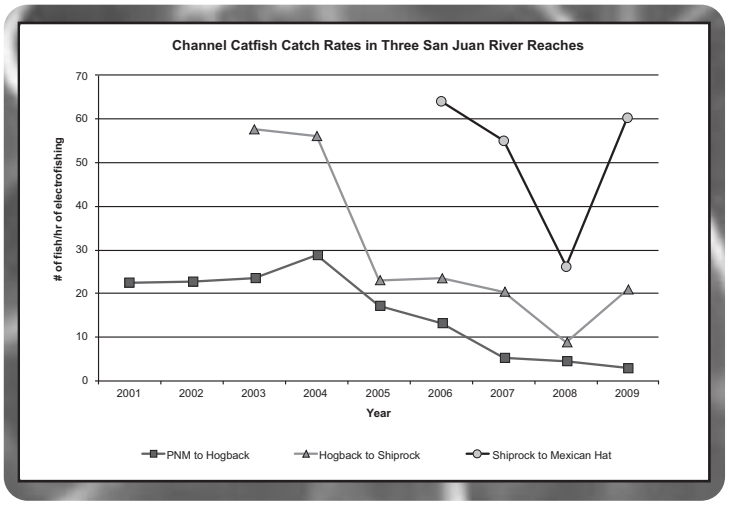
Nonnative removal efforts have reduced the abundance of adult channel catfish in high-priority upper and lower sections of the San Juan River where their numbers were highest.

Progress to reduce the abundance of the target nonnative fish species since 2000 is summarized below.

River	Species	History and Current Status
Colorado (112 miles)	Smallmouth bass	•Increases in abundance first observed in 2003; removal began in 2004 and efforts increased in 2007. •Abundance steadily declined from 2004–2009. •Largemouth bass are an emerging problem; catch of young fish has increased since 2004 but adult fish are rare.
Green (198 miles)	Smallmouth bass	•Increases in abundance first observed in 2003; removal began in 2004. •Densities in the Green River are generally in decline *(see graph next page)*. •Preliminary results of a basin-wide synthesis of data strongly suggest that higher flows in 2008 and 2009 may explain the majority of the observed decreases.
	Northern pike	•Since removal began in 2001, abundance has been greatly reduced.
Yampa (134 miles)	Smallmouth bass	•Increases in abundance first observed in 2001; removal began in 2004. •Researchers believe the majority of smallmouth bass reproduction in the Green River sub-basin occurs here. •Modest declines in the adult population have been documented. •Native fish remain scarce, but appear to be on the rebound.
	Northern pike	•Abundance steadily increased during the 1980s and 1990s; removal began in 1999. •Ongoing removal efforts have shifted the size to smaller individuals. •Future action – increased control efforts at upstream sources.
San Juan (164 miles)	Channel catfish	•Removal since 2001 has shifted channel catfish distribution and population structure. The population is now dominated by juveniles.
	Common carp	•Removal since 2001 has reduced abundance to a level where Colorado pikeminnow and razorback sucker now outnumber common carp.



A declining catch rate for nonnative smallmouth bass (larger than 4 inches) from an intensively sampled, 24-mile reach of the Green River in Utah, 2004-2010.



Catch rates for channel catfish remained low in two of three reaches of the San Juan River in 2009. The sharp increase in the Shiprock, New Mexico, to Mexican Hat, Utah, reach was attributed to a strong presence of juvenile channel catfish last year.

Nonnative fish management actions of the recovery programs recognize the dual responsibilities of state and federal wildlife agencies to conserve native fish species while providing sportfishing opportunities. In 2010, the programs focused on the importance of developing a long-term commitment to **prevention** in their Nonnative Fish Management Strategies as well as a re-commitment to focusing **control** actions at the sources (spawning areas) of these problematic nonnative fish species.

A strategy based on prevention includes:

◆ **Nonnative Fish Stocking Procedures –** This agreement, revised in 2009, commits the Upper Colorado River Basin states and the U.S. Fish and Wildlife Service to stock and manage nonnative sportfish in a manner that supports endangered fish recovery.

• **Example –** In 2010, Utah placed a "no tolerance" regulation on walleye at Red Fleet Reservoir, located on a tributary to the Green River, in reaction to the illegal introduction of nonnative walleye. The regulation removes limits, prohibits catch and release, and requires that all walleye be killed.

◆ **Recognition that some nonnative species are invasive or aquatic nuisances –** species that cause economic or environmental harm.

• **Example –** Utah enlists the help of anglers by instituting a "must kill" policy on nonnative smallmouth bass and the recently invasive burbot if these species are caught in the Green River in Utah.

• **Example –** In 2010, Colorado initiated a policy that prohibits live transport of nonnative crayfish (a favored food item for nonnative smallmouth bass) collected in waters that drain to the upper Colorado River. All crayfish are nonnative to the Colorado River.

◆ **Increased penalties for illegally stocking nonnative fish.**

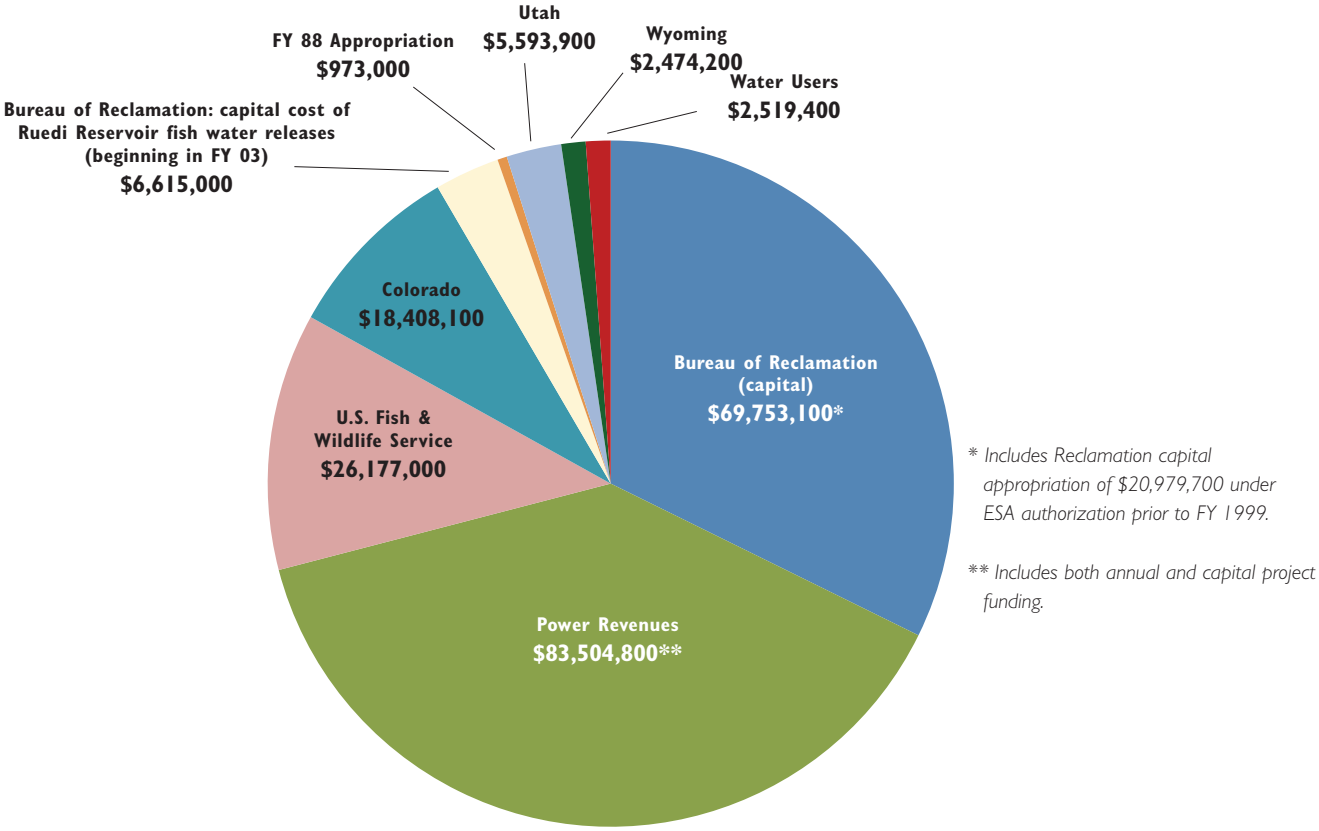
• **Example –** In 2010, Wyoming increased the penalty for "stocking fish without consent" to $10,000 and the loss of fishing and hunting privileges for life. This action sends a strong message to the public of the impacts of these illegal introductions.

Burbot – an eel-shaped fish and member of the cod family native to fresh waters of northern North America and Eurasia – were illegally introduced into the Upper Green River. Burbot were discovered in critical habitat below Flaming Gorge Reservoir in 2010. Adult burbot prey almost exclusively on other fish and pose a significant threat to native fish wherever they are found.

Expenditures

Upper Colorado River Endangered Fish Recovery Program

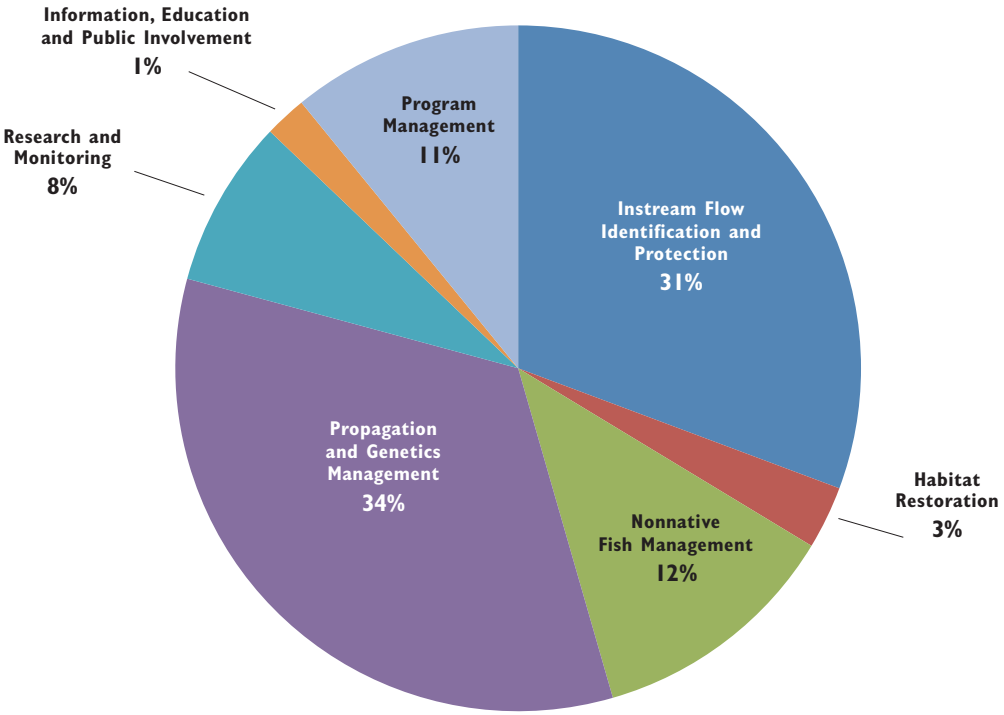
Total Partner Contributions = $216,018,500 (FY 1989-2011)



* *Includes Reclamation capital appropriation of $20,979,700 under ESA authorization prior to FY 1999.*

** *Includes both annual and capital project funding.*

Projected Expenditures by Category (FY 2011 only)

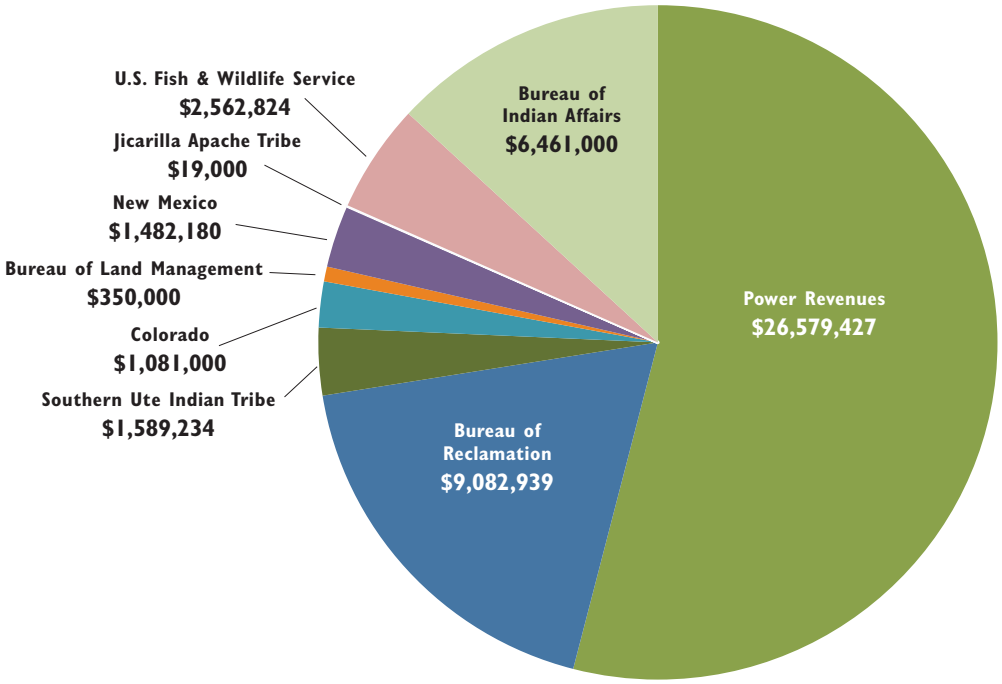


Expenditures

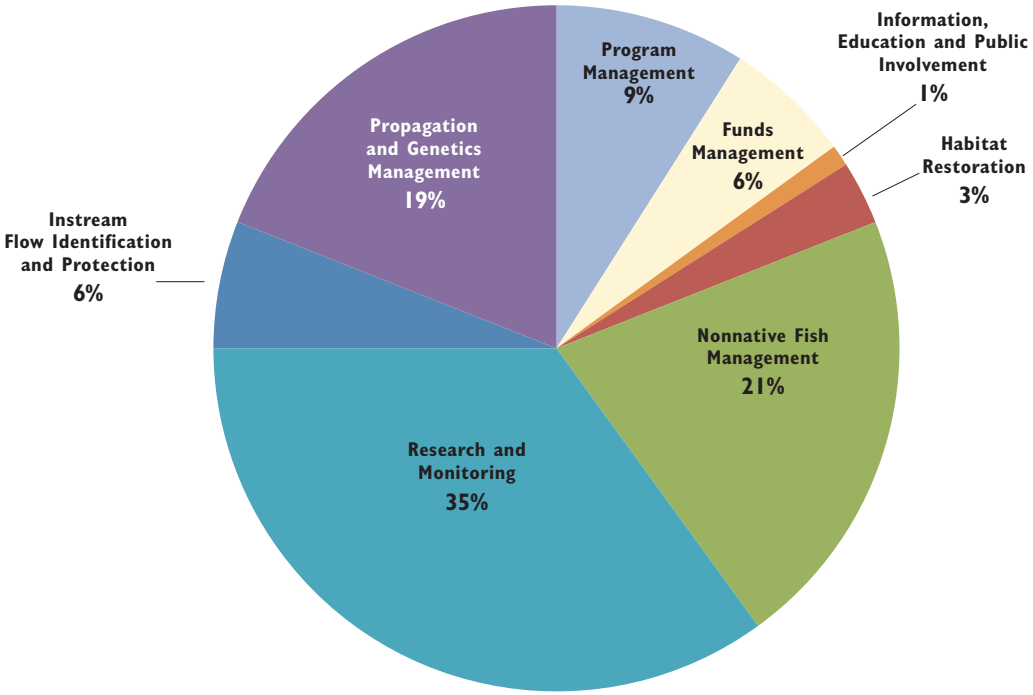
San Juan River Basin Recovery Implementation Program

Total Partner Contributions = $49,207,604 (FY 1992-2011)

(Not including in-kind contributions)



Projected Expenditures by Category (FY 2011 only)



Endangered Species Act Compliance Streamlined for Water and Hydroelectric Power 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 reservoirs and projects in the Upper Colorado River Basin. Responsibilities to offset water project depletion impacts do not fall on individual projects or their proponents.

The recovery programs provide ESA compliance for 2,162 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 12/31/2010)

		Historic Depletions	New Depletions	Totals
State	Number of Projects	Acre-feet/yr	Acre-feet/yr	Acre-feet/yr
Colorado	1,141	1,915,682	205,266	2,121,948
Utah	205	517,670	89,721	607,390
Wyoming	262	83,498	33,924	117,423
Regional	238	(regional)	(regional)	0
Total	**1,846**	**2,516,850**	**329,911**	**2,846,761**

San Juan River Basin Recovery Implementation Program
Summary of Endangered Species Act Section 7 Consultations
(1/1992 through 12/31/2010)

State	Number of Projects	Depletions Acre-feet/yr
New Mexico	20	653,146
Colorado	282	217,788
Utah	14	9,146
Total	**316**	**880,080**

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
303-969-7322
303-969-7327 Fax
ColoradoRiverRecovery.org

San Juan River Basin Recovery Implementation Program
Partners:

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

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