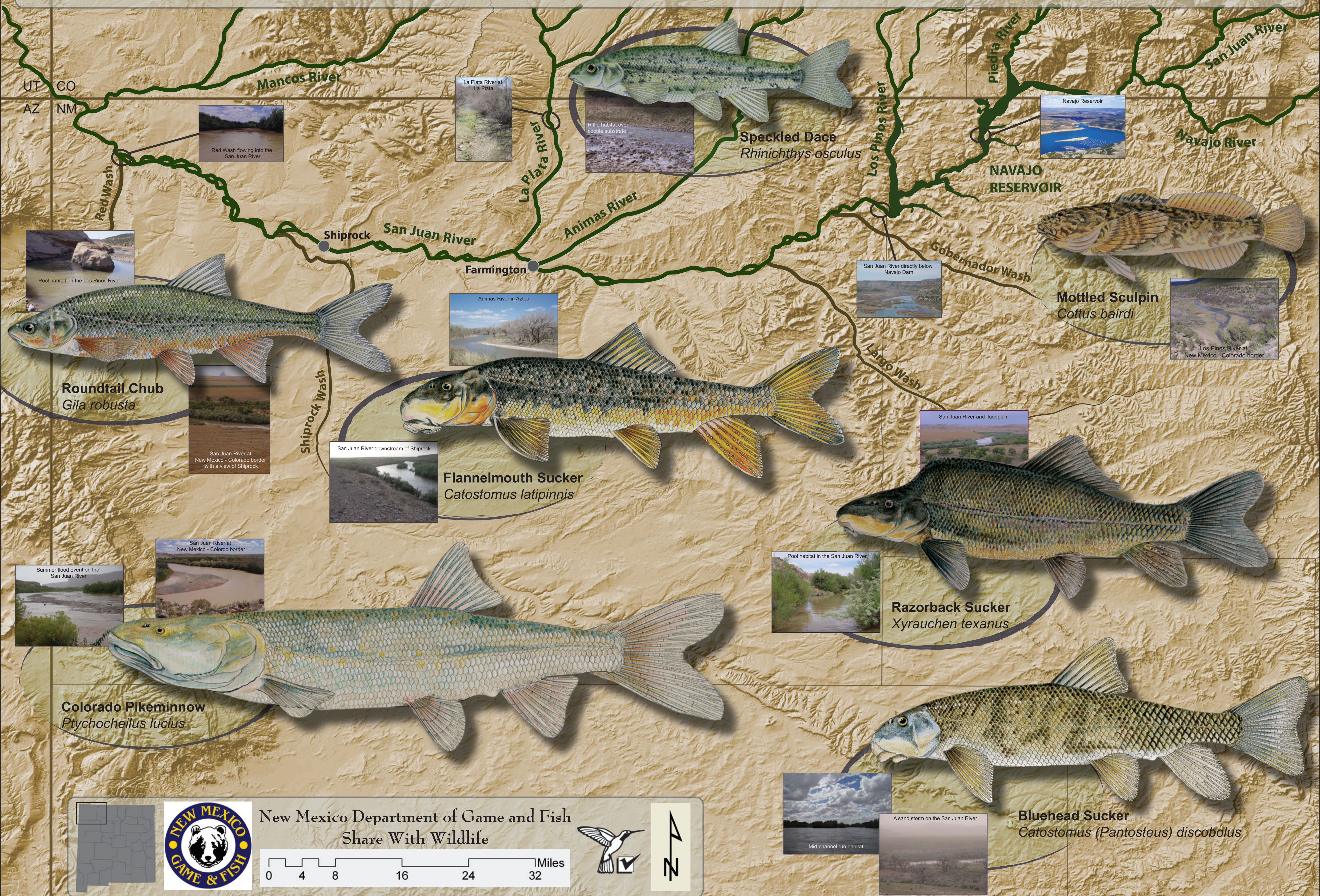


Native fishes of the San Juan River, New Mexico



Dramatic landscapes and big fish

The San Juan River runs for about 100 miles through northwestern New Mexico. It originates in the high elevations of the San Juan Mountains in southwestern Colorado, flows through New Mexico, then cuts through the southwestern corner of Colorado before heading into Utah. It continues for another 120 miles before flowing into Lake Powell and joining the mighty Colorado River.

As the San Juan River flows into New Mexico, its waters are captured by Navajo Reservoir, along with waters from three tributary rivers (Los Pinos, Piedra, Navajo). Below Navajo Reservoir, the river flows over cobble in a simplified channel. Cold, clear water released from the reservoir creates a trout fishery in the tail waters of Navajo Dam that is recognized nationally.

West of Navajo Reservoir, the river increases in size as it is joined by the Animas and La Plata rivers in Farmington. Once the river pushes past Shiprock, it breaks out of the narrow channels and becomes more "braided" and occupies multiple channels. The river meanders through the vast open deserts of the Colorado Plateau and carves out a broad floodplain as it passes through the Navajo Nation. In the western reaches, the water is no longer cold and clear; it becomes more turbid as the amount of sediment carried by the river increases. Substrate in the river alternates between cobble and sand as the river flows through riffles, runs and pools. These are the types of habitat in which the native fishes have evolved.

Native fishes

The native fish fauna of the San Juan River is dominated by large-bodied species that live for several decades. The largest of these fish is the Colorado Pikeminnow. It grows up to five feet in length and is the largest minnow in North America. One of the main food sources for the Colorado Pikeminnow is the common, large-bodied native suckers that are distributed throughout the river. Higher densities of Blue-head Sucker usually occur in the cobble-dominated upper portions of the river,

whereas Flannelmouth Sucker and Razorback Sucker are usually more abundant in the warmer, turbid portions of the river. The Razorback Sucker gets its name from the strange hump or keel along its back – the hump may be an adaptation to make it more difficult to fit in a Colorado Pikeminnow's mouth.

Both Colorado Pikeminnow and Razorback Sucker were nearly extirpated (made locally extinct) from the San Juan River and were listed as federally endangered in 1967 and 1991, respectively. Critical habitat in the San Juan River is designated from Farmington, downstream to include the San Juan arm of Lake Powell in Utah.

Threats

Reduction and alterations of river flows, changes to habitat, and the establishment of non-native fish are the primary threats to native fish populations in the San Juan River.

The construction of Navajo Dam in 1963 has dramatically altered the way that water flows in the San Juan River in several ways. Seasonal variability in river flows has been reduced as water is managed for urban and agricultural use. Because there are now fewer high flow events, invasive trees and shrubs have become established along the riverbanks; this increases the stability of the banks and subsequently simplifies the shape of the river and habitats for fish. Also, water from Navajo Reservoir is released from the bottom of the dam. Cold "hypolimnetic" water like this reduces the area of habitat for native fish that prefer warm water. Finally, dam construction has limited the movement and habitat range of native fishes. This reduction in habitat range is particularly significant for fish like the Colorado Pikeminnow that make spawning migrations of hundreds of miles.

Non-native fishes such as Red Shiner and Common Carp compete with the native fish fauna for important habitats and food. Other non-native fishes, like Channel

Catfish, are predatory and can consume native fishes. To reduce competition and predation, non-native fish populations are manually suppressed by removing fish regularly.

Conservation efforts

The San Juan River Basin Recovery Implementation Program (SJRBRIP) was formed in 1990 as a collaboration among Federal and State (NM, CO, and UT) government, tribal entities (Navajo Nation, Southern Ute, Jicarilla Apache) and private groups. The SJRBRIP is funded by revenues from power plants in the region. It is a consortium of biologists, hydrologists, water users (urban and agricultural), and conservation groups who work together to develop and implement recovery activities for the two federally endangered species (Razorback Sucker and Colorado Pikeminnow).

Numerous recovery efforts are being implemented. One important effort is to mimic the natural pattern of river flow during the spring, so that the frequency and duration of spring run-off is similar to that of the river before Navajo Dam was built.

Another important effort is habitat restoration. In the New Mexico portion of the San Juan River, there have been efforts to reconnect old river channels. This habitat restoration has increased habitat complexity and provided additional habitat for different ages of the native fish fauna. Diversion dams have been removed or altered to allow fish passage and reduce fragmentation of the river.

Other recovery efforts include stocking the river with the endangered fishes to help bolster their populations, and suppressing populations of non-native fishes that compete with and prey upon native fishes.

The efforts of the SJRBRIP have been successful. The range and distribution of the endangered fishes has increased dramatically. Stocked fish are reproducing in the

wild and population sizes have increased. Importantly, long term monitoring of the native fish fauna contributes to the development of scientific knowledge about the life history of these amazing native fishes.

Information on this poster

On this poster, you will find distribution maps for each fish species and a graph illustrating the amount of water flowing in the river (discharge). These are divided into three periods that are important phases in the recent history of the San Juan River.

Historical - Discharge was highly variable. Flows could be extremely high in summer and much lower in winter. There were few fish collections recorded before Navajo Dam was completed in 1963, but anecdotal reports indicate that the endangered fishes were more widespread than they are currently.

Post-dam - After the dam was built, discharge became more predictable and less variable. The amount of water in the river during summer decreased, but winter discharge increased. In fish surveys during this period, very few Colorado Pikeminnow were collected and no Razorback Sucker were collected at all.

Research - The research period began in 1991. River discharge was deliberately manipulated to increase flow in spring and summer while balancing the needs of fish and human use. Regular monitoring of fish populations indicates that Colorado Pikeminnow and Razorback Sucker are making positive signs of recovery.

Find out more:







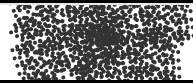

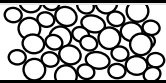
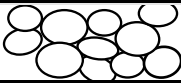








New Mexico Department of Game and Fish
Share With Wildlife

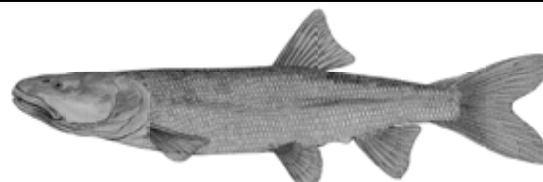

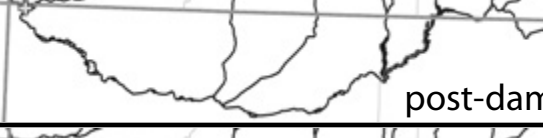

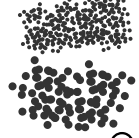
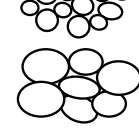




This project was funded by the New Mexico Department of Game and Fish, Share with Wildlife Program. Share with Wildlife is a non-profit program that was created to “provide additional wildlife funds to perpetuate the renewable wildlife resource of New Mexico that gives so much pleasure to all New Mexicans.”






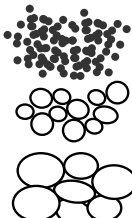










Illustrations: W.H. Brandenburg • Poster design and photographs: Latere Lines (A.S. Burdett and W.H. Brandenburg) • Review: Jason E. Davis (USFWS), Chuck Hayes and Eliza I. Gilbert (NMDFG), Michael A. Farrington (ASIR) • Distribution records: Museum of Southwestern Biology (University of New Mexico), University of New Mexico, University of Texas at Austin, University of Wisconsin, Smithsonian National Museum of Natural History, San Juan River Basin Recovery Implementation Program • For access to fish distribution records, thanks go to Dale W. Ryden (USFWS), Dr William J. Miller (Miller Ecological Services representing Southern Ute), Eliza I. Gilbert (NMDFG), Scott L. Durst and David Campbell (ASIR), Dr Thomas F. Turner and Alexandra M. Smith (University of Nevada), Dr. Andrew Pernick (ICR) • Additional support: Steven P. Platania and Donald Helfrich (ASIR).

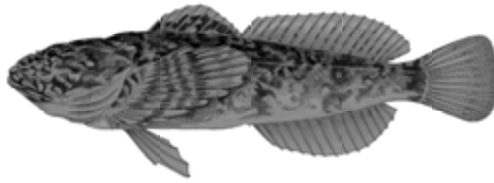




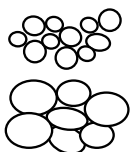


DEFINITIONS OF TERMS AND SYMBOLS



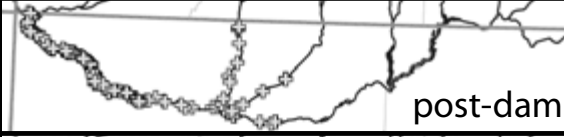
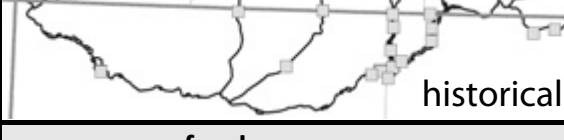
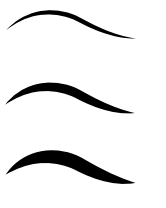

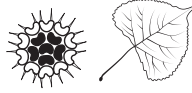

max. length				
TL:	Total length (tip of snout to end of caudal fin)			
stream type				
				
intermittent	small	intermediate	large	
substrate				
				
silt	sand	gravel	cobble	
food resources				
fish		zooplankton		
insects		algae		
		aquatic vegetation		
non-insects		detritus		
habitat				
backwater	off channel, zero velocity habitat			
pool	deep, low velocity habitat			
run	moderate depth, moderate velocity habitat			
riffle	shallow, cobbled, high velocity habitat			
glide	shallow, low velocity habitat			


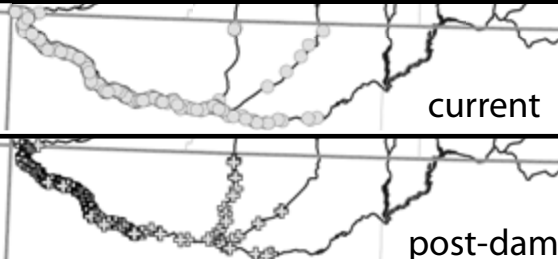

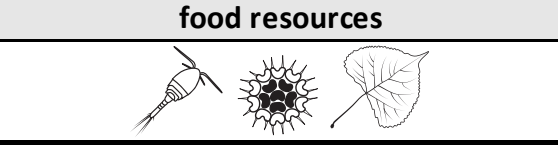




Colorado Pikeminnow			
Ptychocheilus lucius			
max. length	lifespan		
1000mm TL	40 years		
federal status	state status	 current	
endangered	endangered		
stream type	substrate		
 	 	 post-dam	
			 historical
	food resources		
habitat		young fish found in backwaters and pools; adults occupy rivers with complex habitat	
spawning period		 J F M A M J J A S O N D	
life history		adults migrate great distances upstream to spawn on cobble bars; larvae drift	
threats		non-native fish hybridization habitat change ✗ N/A ✗	
conservation efforts		stock young fish in critical habitat; mimic natural flow of the river; create fish passage through diversion dams; suppression of non-native fishes; movements tracked using electronic tags	



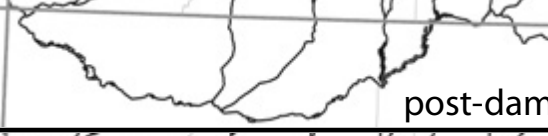





Roundtail Chub		
<i>Gila robusta</i>		
max. length	lifespan	
550 mm TL	12-15 years	
federal status	state status	
candidate	endangered	
stream type	substrate	
		
		food resources
		
habitat	prefers pools with cover (e.g. boulders, root wads, undercut banks)	
spawning period		
life history	adhesive eggs laid in gravel or cobble substrates; spawn in riffles or pools	
threats	non-native fish	hybridization
		N/A
		
conservation efforts	listed in the "Three Species Agreement"; stocking by state and tribal agencies in tributaries; benefits from conservation activities for the endangered fishes	

Speckled Dace		
Rhinichthys osculus		
max. length	lifespan	
70mm TL	3 years	
federal status	state status	
not listed	not listed	
stream type	substrate	
		
		current post-dam historical
		food resources
		
habitat		riffles and runs with swift flowing water and cobble or gravel substrate
spawning period		J F M A M J J A S O N D
life history		mostly feed at night; spawn on gravel beds; eggs adhere to gravel nests
threats		non-native fish hybridization habitat change N/A N/A N/A
conservation efforts		benefits from river restoration efforts including non-native species removal, the mimicry of natural river flow and the improvement of habitat complexity

Mottled Sculpin								
<i>Cottus bairdi</i>								
max. length	lifespan							
95 mm TL	3-4 years							
federal status	state status							
not listed	not listed							
stream type	substrate							
								
		food resources						
								
habitat		prefer riffles in cold water streams; lives between and underneath cobble						
spawning period								
life history		build rock burrows; females lay up to 950 eggs which are guarded by males						
threats		<table border="0"> <tr> <td>non-native fish</td> <td>hybridization</td> <td>habitat change</td> </tr> <tr> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> </table>	non-native fish	hybridization	habitat change	N/A	N/A	N/A
non-native fish	hybridization	habitat change						
N/A	N/A	N/A						
conservation efforts		found upstream of the critical habitat for the endangered fishes; this species may benefit from habitat conservation for the other native species						

Bluehead Sucker		
<i>Catostomus (Pantosteus) discobolus</i>		
max. length	lifespan	
450 mm TL	15-20 years	
federal status	state status	
not listed	species of concern	
stream type	substrate	
		
		food resources
		
habitat		occupy higher elevations; juveniles found in glides; adults occupy riffles and runs
spawning period		
life history		spawn on clean cobble bars during day time. females lay 8,000 eggs; larvae drift
threats		non-native fish hybridization habitat change N/A N/A N/A
conservation efforts		monitored by multiple state agencies under the "Three Species Agreement"; benefits from the conservation efforts for the endangered fishes

Flannemouth Sucker		
<i>Catostomus latipinnis</i>		
max. length	lifespan	
500mm TL	30 years	
federal status	state status	
not listed	species of concern	
stream type	substrate	
		
habitat		food resources
young fish prefer backwater; adults found in main channel runs and pools		
spawning period		
life history	J F M A M J J A S O N D females can produce 40,000 eggs; larvae drift downstream; mature at seven years	
threats	non-native fish hybridization habitat change X X X	
conservation efforts	listed in the "Three Species Agreement" and benefit from general conservation activities; hybridization with White Sucker occurs infrequently and does not require direct conservation intervention	

Razorback Sucker								
<i>Xyrauchen texanus</i>								
max. length	lifespan							
600 mm TL	35 years							
federal status	state status							
endangered	endangered							
stream type	substrate							
								
		food resources						
								
habitat		young occupy backwaters; adults found in runs and pools; populations in reservoirs						
spawning period								
life history		mature at age four; spawn on cobble bars; female lay up to 144,000 eggs						
threats		<table border="1"> <tr> <td>non-native fish</td> <td>hybridization</td> <td>habitat change</td> </tr> <tr> <td>✗</td> <td>N/A</td> <td>✗</td> </tr> </table>	non-native fish	hybridization	habitat change	✗	N/A	✗
non-native fish	hybridization	habitat change						
✗	N/A	✗						
conservation efforts		augmentation program stocks adult fish in critical habitat; suppression of non-native fishes; river management to mimic historical discharge; habitat restoration; track movement with electronic tags						

