



WILD Kids



Altering the Habitat of Native Fishes of Arizona

Sometimes people wonder if Arizona is anything other than desert. But we who live here can tell them that there is more to Arizona than deserts. Arizona has mountains with lakes, ponderosa pine and Douglas fir, marshes with cattails and willows, rivers and streams with sycamore, black walnut and cottonwoods, and creeks with ash and mesquite. Now, Arizona may not have as many water sources as other states, but it is not all desert. Some waterways are dry most of the year, but before dams and other water diversions, they flowed all or most of the year.

Arizona counts 33 **native** species of freshwater fishes and two species of saltwater fishes. A native fish is one that was originally found in Arizona waterways before development and the introduction of other fishes. Of all these fishes, 15 are currently listed as endangered, seven as threatened, two as **extirpated** in Arizona and two as extinct. (Extirpated means that the species is no longer found in a certain area, but can still be found in another.) This means that 62% of the fishes of Arizona are in trouble. Why?

Fish in Arizona were historically found in springs, streams, rivers, marshes and **tinajas**. (A tinaja is also called a plunge basin - a deep depression caused by the erosive action of waterfalls on the rock layer below.) Natural lakes were rare in Arizona. Lakes along the Mogollon Rim and in the White Mountains were historically fishless. These lakes were excellent habitat for frogs and salamanders. Today all of these lakes are stocked with introduced nonnative fishes and most frogs and salamanders are gone.

Damming major rivers in Arizona resulted in drastically different habitat for native fishes. Prior to damming, rivers like the Colorado were muddy, turbulent with strong currents, fluctuating flows, seasonally changing temperatures and nutrient rich. Fishes adapted to this type of habitat relied on the predictable floods of the summer monsoons and spring snowmelt to bring in additional nutrients. Algae used the nutrients, which became food for fish and insects, which in turn were food for larger fish. Damming changed this cycle. Damming stabilized river flow to some extent, which in turn reduced flooding. Water temperatures were also affected. Instead of being cold in the winter and warm in the summer the reverse occurs. Dammed rivers are now colder in the summer due to colder water being released from the bottom of dams. These rivers are also warm in the winter because the impounded lakes act as a heat sink, warming the water released. Flow is now variable on a daily basis due to electrical power needs instead of seasonally. Nutrients are at lower levels due to the needs of the huge impounded lakes. (The lakes use much of the available nutrients, leaving less for the river below the dam). Finally **turbidity** (cloudiness) of the river is reduced. Silt is trapped behind the dam where it accumulates at the bottom of the lakes. Many of these changes make dammed rivers unsuitable habitat for native fishes. Native fish no longer survive or reproduce in this altered habitat, while the nonnative fishes do. Many nonnative fish eat eggs, young and adult native fishes. The introduced, nonnative fishes have displaced the native fishes.

ARIZONA'S NATIVE FISHES

Gila trout	Virgin River spinedace	razorback sucker	desert pupfish
Apache (Arizona) trout	spikedace	flannelmouth sucker	Monkey Spring pupfish
bonytail chub	woundfin	Little Colorado River	(extinct)
humpback chub	Mexican stoneroller	sucker	Gila topminnow
Gila chub	Colorado River	Gila sucker	Yaqui topminnow
Yaqui chub	squawfish	Yaqui sucker	striped mullet (saltwater)
Sonora chub	longfin dace	Gila mountain sucker	machete (saltwater)
roundtail chub	speckled dace	(a.k.a. desert sucker)	
Virgin chub	loach minnow	bluehead sucker	
Little Colorado River	Yaqui shiner (extinct)	Sonora sucker	
spinedace	beautiful shiner	Yaqui catfish	

Many of the smaller rivers and streams are now dry except during exceptionally wet years due to two primary reasons. First many of the headwaters of these small rivers and streams are impounded or diverted for municipal and/or agricultural uses. Second, ground water pumping for these same purposes has lowered the water table. The water table in some areas is so low that small rivers and streams no longer flow on the surface. Some of these waters still flow, but it is deep under the ground.

The surface waters of these smaller rivers and streams once supported the lush riparian vegetation of **cieneegas**. (A cienega is a marshy area of a small river or stream that has a broad shallow basin and slow moving water.) Cottonwoods, willows, sycamores, grasses and shrubs were found in close proximity to the **cieneegas**. These areas were further enhanced by the presence of beavers and their small dams. Beaver dams and the riparian vegetation moderated flooding by impeding flow and allowing the water to spread out over a wide region. As the human population increased its pressures on water, vegetation died due to the lack of surface water. Beavers were trapped to extirpation. Flooding deeply cut the banks of the rivers and streams, altering the habitat for native fishes.

All of these changes have altered the habitats of native fishes. Some native fishes have been able to adapt to the changes. Some have not. Unfortunately, Arizona has already lost some species of native fishes forever. Others are endangered, but Arizona has breeding stocks of some of these fishes in fish hatcheries. Hopefully some day Arizona will be able to release these native fishes into suitable habitat. And then the cycle can continue.

Activity I: Waterdown History

Pick a major river or stream in your area. Research the history of this river or stream as it relates to humans and wildlife. Some questions to answer in your research include: Did native peoples use this river/stream? How and for how long? When did white settlers ‘discover’ the river/stream? Who were they, where did they come from and why were they there? What native fishes occurred in the river/stream? When were these native fishes first negatively impacted by humans? Have nonnative fishes been introduced into the river/stream? If so, when and what kind of nonnative fishes were introduced? What is the current state of the river/stream? Report your finding to the class.

Activity II: Seek and Find

Find the names of many of the rivers, streams, creeks and major springs that are found in Arizona **and** either currently or at one time contained native fish. Names can be found forward, backward or diagonally. (Hint: There are 22 rivers, 33 creeks and 2 springs in this puzzle.) What sentence do the leftover letters spell out?

L	H	A	S	S	A	Y	U	M	P	A	O	T	H
I	I	E	S	N	I	G	R	I	V	A	W	E	N
S	E	T	I	H	W	O	F	E	K	F	I	C	E
S	A	L	T	I	A	I	R	F	A	U	G	A	E
O	K	C	A	L	B	D	A	H	A	V	A	S	U
F	I	S	H	R	E	E	D	E	L	S	M	T	Q
E	I	A	N	P	A	C	H	E	T	A	T	U	C
A	R	S	K	O	E	E	O	T	I	A	I	F	O
S	A	I	A	A	L	U	S	L	N	T	D	H	L
T	M	S	I	N	P	E	L	T	O	A	S	O	O
V	O	N	A	C	S	I	V	B	U	R	R	O	R
E	C	C	O	N	W	I	A	E	E	R	A	G	A
R	O	A	A	L	C	Q	M	V	H	A	K	D	D
D	B	S	L	M	U	A	R	O	A	C	V	E	O
E	A	I	A	I	P	A	R	I	N	R	H	E	Y
Y	B	N	T	N	G	B	C	L	H	U	A	S	R
O	A	O	P	E	P	A	E	C	O	B	H	C	E
C	O	O	N	A	R	E	L	L	L	S	A	I	O
S	L	E	S	O	E	L	D	U	L	N	C	B	T
I	I	E	A	L	H	I	E	R	Y	B	L	E	N
C	E	D	A	T	P	A	H	O	O	H	L	C	O
N	C	E	A	R	O	S	N	A	T	R	O	U	T
A	B	H	P	A	T	T	C	A	I	I	H	E	E
R	A	E	E	O	S	R	A	R	V	G	N	I	Z
F	N	S	P	R	I	N	G	O	N	A	L	O	A
N	A	T	R	A	R	A	V	A	C	A	J	E	B
A	K	O	U	T	H	Y	S	A	B	I	N	O	R
S	A	N	T	A	C	R	U	Z	S	A	N	D	Y