Scientific Name: *Xyrauchuen texanus*
Common Name: Razorback sucker
BISON No.: 010510

Legal Status:

- Arizona, Species of Special Concern
- ESA, Endangered
- ESA, Proposed Endangered
- ESA, Proposed Threatened
- ESA, Threatened
- New Mexico-WCA, Endangered
- New Mexico-WCA, Threatened
- USFS-Region 3, Sensitive
- None

Distribution:

- Endemic to Arizona
- Endemic to Arizona and New Mexico
- Endemic to New Mexico
- Not Restricted to Arizona or New Mexico
- Northern Limit of Range
- Southern Limit of Range
- Western Limit of Range
- Eastern Limit of Range
- Very Local

Major River Drainages:

- Dry Cimmaron River
- Canadian River
- Southern High Plains
- Pecos River
- Estancia Basin
- Tularosa Basin
- Salt Basin
- Rio Grande
- Rio Mimbres
- Zuni River
- Gila River
- Rio Yaqui Basin
- Wilcox Playa
- Rio Magdalena Basin
- Rio Sonoita Basin
- Little Colorado River
- Mainstream Colorado River
- Virgin River Basin
- Hualapai Lake
- Bill Williams Basin

Status/Trends/Threats (narrative):

Federal: Endangered, USFA Sensitive: Region 3, State AZ: Species of concern, State NM: Provides limited protection.

Status

The range of the razorback sucker has been markedly reduced over the years primarily because of man-made alterations of the Colorado River system (McAda and Wydoski 1980). The razorback sucker disappeared from the Gila River basin in the mid-1950's where their distribution was below 4,000 feet elevation (Minckley, 1973). By 1973 the razorback sucker seemed to be nearing extinction in the lower Colorado River, below Lake Mohave (Minckley 1973). After the closure of Navajo Reservoir (Minckley and Carothers, 1979) led investigators to report these species as rare or extirpated in the San Juan River drainage (Tyus et al., 1982; Holden and Wick, 1982). The razorback sucker spawned annually along the shores of Lake

Mohave, but natural recruitment has been undetected since dam closure 40+ years ago (Hines 1994). However, infrequent but consistent captures of adult razorbacks in Lake Mead from the late 1960's indicates reproduction in the lake, since adults being captured would need to be greater than 55 years old to predate significant impoundment (Sjoberg 1994). No records of collections or contract with razorback sucker could be found in available agency field records between 1980 and 1990 (Sjoberg 1994).

The largest remaining population of razorback sucker resides in Lake Mohave, Arizona-Nevada (Hines 1994). A few adult fish remain in the lower Colorado River basin, with perhaps 25,000 fish in Lake Mohave, and 500 fish in Lake Mead (Marsh 1994). The U.S. Fish and Wildlife Service for several years has been coordinating and encouraging the reintroduction of endangered fish species back into historic habitats (Johnson 1981).

Trend

The historical ranges of the four endangered species have been fragmented by construction of dams and water diversions throughout the Basin (Carlson and Muth 1989). A decline in anecdotal observations of adult fish after the mid-1960's correlates with the predicted longevity of the species and indicates a probable loss of the original cohort of adult fish to old age in the 1970's and 1980's (Sjoberg 1994). Observations of the historic population of razorback suckers in Lake Mead appear to closely follow predicted trends for captive populations in lower basin mainstream reservoirs (Sjoberg 1994).

Threats

Development projects in the upper Colorado River basin could further alter river environmental and jeopardize the continued existence of these rare native fishes (Bulkley and Pimentel 1983). With increased damming and diversion of the streams, the razorback suckers apparently declined greatly in numbers, but the species seems to be readjusting itself to life in the modified waters (Hubbs and Miller 1953 personal observations). Declines of these and other native southwestern fishes have been attributed to dewatering; mainstream dams and impoundments; altered stream flow, channel morphology, and water quality; and introduction of exotic fishes (Minckley and Deacon, 1968). Dams and diversions have fragmented former fish habitat by restricting fish movement, and as a result, genetic interchange (emigration and immigration of individuals) between some fish populations is nonexistent (USFWS 1993). In particular it has been suggested that lowered water temperatures associated with hypolimnetic reservoir releases may curtail reproduction since low temperatures reduce and may preclude reproductive success of these fishes, it is useful to examine historic and present-day thermal data from their known habitats in the Colorado River basin (Marsh 1985). Hypolimnetic discharges today result in downstream temperatures in most of these streams that are relatively cool and warm in winter (Marsh 1985).

The species that hybridize with razorback suckers are identified as flannelmouth sucker in the upper Colorado River system and as the Sonora sucker in the Gila River tributary system (Hubbs and Miller 1953). The possibility that the fish interpreted as hybrids may instead represent a distinct species, *uncompahgre*, intermediate between sucker and razorback (Hubbs and Miller 1953). Hubbs and Miller (1953) reported that this fish of this type have been collected only four times, and these collections have been well separated, spatially as well as temporally (1889, 1926, 1947, and 1950). The great decrease in the numbers of the razorback sucker in the presence of an abundant population of the other; flannelmouth sucker has probably been a major cause of increased frequency of hybridization (Hubbs and Miller 1953).

Predation by nonnative fish seems likely to account for razorback sucker recruitment failure in the upper Colorado River (Johnson and Hines 1999).

Distribution (narrative):

In the past the razorback sucker was endemic to the large rivers of Colorado River basin (Lee et al 1981). The historic ranges of the razorback sucker included larger rivers throughout the Colorado River basin or middle and upper Colorado and Green Rivers, however, present distributions are severely limited, and razorback suckers are found only above Grand Canyon and in lakes Mead, Mohave, and Havasu on the lower above Grand Canyon (Jonez and Sumner 1954, Marsh 1985). Holden and Stalnaker (1975) reported the endemic razorback sucker was collected only in the middle and lower sections of the study area in a quiet, cutoff channel at the mouth of Yampa River in early March and late November 1970. They were also concentrated in flooded mouths of washes in Canyonlands National Park area during high water. McAda and Wydoski (1980) reported razorback suckers in relatively large concentrations, though in small numbers, at two restricted locations; the mouth of the Yampa River at Echo Park during early spring, and the Colorado River at Walker Wildlife Area throughout the year. The razorback sucker was thought to be historic residents of the San Juan drainage in Colorado, New Mexico (Platania et al 1991), however, the species is currently extirpated in New Mexico (Propst et al. 1987). The presence of razorback in the mainstream of the San Juan River 147 km upstream of Lake Powell verified its status as a member of the fish fauna of the San Juan River (Platania et al 1991).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative):

Razorback suckers spawned in April and May (McAda and Wydoski 1980). Razorback suckers begin spawning in December in Lake Mohave much earlier than any other native or introduced fish (Minckley et al. 1991). Spawning in reservoirs usually lasts from January or February to April or May (Minckley et al. 1991). Several males attend each female, however, no nest is built and no parental care is given (Sublette et al 1990). Minckley et al. (1991) reported the razorback sucker spawning over mixed substrates that range from silt to cobble, and at water temperatures ranging from 10.5 to 21^{o} C. The first report of razorback sucker breeding behavior is attributed to Douglas (1952). In his report he observed the spawning behavior as follows; “six fish 15 feet from shore, in about 18 inches of water were noted revolving clockwise at a slow rate in four-foot diameter circles. It appeared that the fish, presumably males, were exerting pressure on one fish, presumably a female. The two most proximate males were pressing against the sides of the female with their heads just behind her hump. The ensuing violent motion raised bottom silt so that further observations were prohibited”. The eggs are deposited in spaces between gravels (Minckley 1991). Fertilized ova of razorback sucker are transparent and adhesive for 3 to 4 hours after fertilization, and hatching occurred from 5.2 to 5.5 days after fertilization. The hatched larvae were from 6.8 to 7.3 mm TL, and the percentage hatch of razorback sucker was dependant on incubation temperature with greatest success at 20ºC (Minckley and Gustafson 1982). After hatching the larvae move to the shoreline for a time (Minckley 1991). Despite successful reproduction, there is no evidence for successful recruitment for young fish into the Lake Mohave population for more than two decades (Minckley 1991). Minckley (1973) has suggested Lake Mohave fish may be 30-45 years old.

McAda and Wydoski (1980) reported razorback suckers from the Colorado River to be significantly larger than those of the same estimated age from the Green and Yampa rivers. The faster growth rate of fish in the Colorado River could be partly due to higher water temperatures. Before the construction of large dams, razorback suckers made extensive spawning migrations in early spring, but after the damming of the rivers in the lower basin, these migrations were blocked, but apparently the suckers then spawned in reservoirs (McAda and Wydoski 1980). Based largely upon field observations, spawning temperatures have been inferred to be 6-20ºC for razorback sucker (McAda and Wydoski, 1980).

Habitat (narrative)**:**

The razorback sucker is found in strong current of large rivers and in backwaters 1.2-3.0 m deep as well as in reservoirs (Sublette et al 1990), however, Holden and Stalnaker (1975) collected razorback suckers almost exclusively in stagnant or quiet-water areas. Minckley (1991) reported razorback suckers tended to occupy strong, uniform currents over sandy bottoms, but they also lived in eddies and backwaters lateral to the river channels, sometimes concentrating in deep places near cut banks or fallen trees. Lee et al (1981) reported razorback suckers were generally found in slow areas, backwaters and eddies. Preliminary results indicate backwater mean depth was the most important habitat characteristic followed by perimeter. In general, razorback suckers prefer large backwaters with greater mean depth and long and wide entrance points. Backwaters are important to adult razorback suckers throughout the year (Gurtin and Bradford 1999).

Estimates of the upper (acute) avoidance temperature ranged from about 27 to 32 C among acclimation groups, and averaged 28.6 overall. Lower avoidance temperature estimates averaged 11.8 C and ranged from 8 to about 15 C with the preferred temperatures of razorback suckers range between 22.9-24.8ºC (Bulkley and Pimental 1983).

Young razorback suckers appear to travel in large schools along the margins of streams or reservoirs (Minckley 1973). Under natural conditions in streams, young fish must have occupied shorelines, then moved with growth into habitats similar to those just described for young squawfish (Minckley 1991).

Historically, adult and larval razorback sucker likely utilized turbid habitats (Hines 1994). In laboratory tests, young razorback suckers selected clear water over that of suspended sediment. In clear water, however, young razorback suckers were extremely susceptible to predation. As turbidity increases, razorback sucker predator avoidance improved (Johnson and Hines 1999).

Seasonal Activity (narrative)**:**
Razorback suckers apparently leave the mouth of the Yampa River in late spring or early summer as streamflow decreases and water temperature increases (McAda and Wydoski 1980). Jonez and Sumner (1954) reported razorbacks as abundant and widespread throughout the lake with particular seasonal occurrence in inflow and potential spawning areas.

Breeding Season:

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Panel breeding season comments:

Aquatic Habitats:

Large Scale:

- Rivers
- Streams
- Springs
- Spring runs
- Lakes
- Ponds
- Sinkholes
- Cienegas
- Unknown
- Variable

Small Scale:

- Runs
- Riffles
- Pools
- Open Water
- Shorelines

Panel comments on aquatic habitats:

Important Habitat Features (Water characteristics):

Current
- Fast (> 75 cm/sec)
- Intermediate (10-75 cm/sec)
- Slow (< 10 cm/sec)
- None
- Unknown
- Variable

Gradient
- High gradient (>1%)
- Intermediate Gradient (0.25-1%)
- Low Gradient (<0.25%)
- None
- Unknown
- Variable

Water Depth
- Very Deep (> 1 m)
- Deep (0.25-1 m)
- Intermediate (0.1-0.25 m)
- Shallow (< 0.1 m)
- Unknown
- Variable

Panel comments on water characteristics:

Important Habitat Features (Water Chemistry)

Temperature (general)
- Cold Water (4-15°C)
- Cool Water (10-21°C)
- Warm Water (15-27°C)
- Unknown
- Variable

Turbidity
- High
- Intermediate
- Low
- Unknown
- Variable

Conductivity
- Very High (> 2000 µS/cm)
- High (750-2000 µS/cm)
- Intermediate (250-750 µS/cm)
- Low (< 250 µS/cm)
- Unknown
- Variable

Panel comments on water chemistry:

Important Habitat Features (Structural elements):

Substrate
- Bedrock
- Silt/Clay
- Detritus
- Sand
- Gravel
- Cobble
- Boulders
- Unknown
- Variable

Cover
- Rocks, boulders
- Undercut banks
- Woody debris
- Aquatic vegetation
- Rootwads
- Not important
- Overhanging vegetation
- Unknown
- Variable

Panel comments on structural elements:

Diet (narrative)**:**
Foods eaten by razorback suckers in the lower Colorado River include algae and dipteran larvae (Jonez & Sumner 1954). Planktonic crustaceans, rotifers, diatoms, detritus, and filamentous algae occurred in at least 44% of digestive tracts (Marsh 1987). Freshwater amphipods occurred in all tracts and were the most abundant item (Marsh 1987). Marsh (1987) found nearly 90% of the alimentary tracts contained plants and diatoms and filamentous green algae were in 44% of all fish while detritus and amorphous organic matter occurred in 56% of tracts. Inorganic materials occurred in 16% of fish. Marsh (1987) observed the feeding behavior of razorback suckers and described as follows; "the fish excavates softer substrates, actively taking large volumes of sediment and passing material out through the opercula while presumably retaining foodstuffs". Razorbacks feed mostly from the bottom, but have elongated, "fuzzy" gillrakers and a subterminal mouth both characteristic of planktonic or detrital feeding habits (Minckley 1991).

Diet category (list):
- Planktivore
- Herbivore
- Insectivore
- Piscivore (Fish)
- Omnivore
- Detritivore

Grazing Effects (narrative):
Since the razorback sucker is found in strong currents of large rivers and in backwaters 1.2-3.0 m deep as well as in reservoirs (Sublette et al 1990) livestock grazing does not negatively impact this fish species.

Panel limiting habitat component relative to grazing and comments:
Panel assessment: Is this species a priority for selecting a grazing strategy? Throughout the species' distribution in New Mexico and Arizona YES NO UNKNOWN In key management area(s) YES NO UNKNOWN

Principle Mechanisms Through Which Grazing Impacts This Species (list):

May be Revised

- Alteration of bank structures
- Alteration of substrate
- Alteration of water regimes
- Altered stream channel characteristics
- Altered aquatic vegetation composition
- Altered bank vegetation structure
- Change in food availability
- Change in water temperature
- Change in water quality
- Habitat fragmentation
- Increased turbidity
- Other biotic factors
- Parasites or pathogens
- Population genetic structure loss
- Range improvements
- Trampling, scratching
- Unknown

Panel causal mechanisms comments:

Authors

- **Draft:** Magaña, H.A.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

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