DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB42

Endangered and Threatened Wildlife and Plants; Proposal To Determine The Razorback Sucker (Xyrauchen texanus) To Be an Endangered Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The Service proposes the razorback sucker (*Xyrauchen texanus*) to be an endangered species under the authority of the Endangered Species Act of 1973, as amended. This native fish is found in limited numbers throughout the Upper and Lower Colorado River Basin. Evidence of natural recruitment has not been found in the past 30 years, and numbers of adult fish captured in the last 10 years demonstrate a downward trend. Significant changes have occurred in razorback sucker habitat through diversion of water, introduction of nonnative fishes, and construction and operation of dams. Further changes are anticipated as these activities continue. Listing the razorback sucker as endangered would afford this species full protection under the Endangered Species Act.

DATES: Comments from all interested parties must be received by July 23, 1990. Public hearing requests must be received by July 6, 1990.

ADDRESSES: Comments and materials concerning this proposal should be sent to the Field Supervisor, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104-5110. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Patricia A. Schrader, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, 529 25½ Road, Suite B-113, Grand Junction, Colorado 81505-6199 (303/243-2778 or FTS 322-0351).

SUPPLEMENTARY INFORMATION:

Background

The razorback sucker was described by Abbott in 1861 from a single mounted specimen captured from the Colorado River. He placed it in the genus *Catostomus* (LaRivers 1962), but Eigenmann and Kirsch, after further study, assigned it to its own genus, *Xyrauchen* (Kirsch 1889). Once known as the humpback sucker, the adult razorback sucker is readily identifiable by the abrupt sharp-edged dorsal ridge behind its head and a large fleshy subterminal mouth that is typical of most suckers. Adult fish are relatively robust, often exceeding 3 kg (6 lbs) in weight and 600 mm (24 in) in length. Younger fish, less than 150 mm (6 in) long, lack the distinct dorsal keel and, therefore, are not easily distinguished from the young of other sucker species.

The razorback sucker was once abundant throughout 5,635 km (3,500 mi) of the Colorado River basin, primarily in the mainstem and major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming; and in the States of Baja California Norte and Sonora of Mexico (Ellis 1914, Minckley 1973). There are many accounts of razorback sucker abundance during early settlement of the lower basin (Gilbert and Scofield 1898, Minckley 1973) and a significant commercial fishery for them existed in southern Arizona in the early 1900's (Hubbs and Miller 1953, Miller 1964). Jordan (1891) reported razorback suckers to be very abundant at Green River, Utah, in 1889. Residents living along the Colorado River near Clifton, Colorado, observed several thousand razorback suckers during spring runoff in the 1930's and early 1940's (Osmundson and Kaeding 1989).

In recent times, razorback sucker distribution has been reduced to about 1,208 km (750 mi) in the upper basin (McAda and Wydoski 1980, Holden and Stalnaker 1975, Ecology Consultants 1978) and to 322 km (200 mi) of the lower Colorado River in the lower basin now impounded by Hoover, Davis, and Parker dams (Minckley 1983). The Colorado River was divided into upper and lower basins at Lee Ferry, Arizona (approximately 14 km (9 mi) below Glen Canyon Dam) by the Colorado River Compact of 1922. Sizeable numbers of adult razorback suckers still occur in Lake Mohave (Minckley 1983), and Lanigan and Tyus (1989) estimated that 758 to 1,138 razorback suckers still inhabit the upper Green River. Observations in other areas are spotty and inconsistent and are generally viewed as incidental captures. No significant recruitment of these populations has been documented in recent years (Tyus 1987a, McCarthy and Minckley 1987).

Information on behavior and habitat needs of the razorback sucker is quite limited. It has not been a major objective of most upper basin investigations and it is rarely collected in fisheries investigations directed at other species. Some information has been accumulated in conjunction with other studies, and specific studies have been carried out by a few investigators throughout the basin.

Adult razorback suckers apparently migrate considerable distances to specific areas to spawn (Tyus 1987a). Spawning occurs in the lower basin from late January through April (Ulmer 1980, Langhorst and Marsh 1986, Mueller 1989). In the upper basin, Tyus (1987a) observed ripe razorback suckers in the vicinity of a suspected spawning area in the Green River from May 3 to June 15 in 1981, 1984, and 1986. Water temperatures during spawning in the lower basin ranged from 11.5-18°C (52.7-64.4°F) (Douglas 1952, Ulmer 1980, Langhorst and Marsh 1986) while temperatures recorded by Tyus in the upper Green River ranged between 10.5 to 18°C (50.9-64.4°F). Spawning is usually accomplished with several males accompanying a single female (Jonez and Sumner 1954, Ulmer 1980) over gravel bars that are swept free of silt by currents. In Lake Mohave and Senator Wash Reservoir, spawning takes place on gravel bars swept clean by wave action (Ulmer 1980, Bozek et al. 1984). Tyus (1987a) collected ripe adults over coarse sand substrates and in the vicinity of gravel or cobble bars. Direct observation of spawning activity was not possible because of high turbidities prevalent during that time of year. In Senator Wash Reservoir and Lake Mohave the eggs apparently settled onto gravel and into interstices swept clean by the spawning activity. Larvae appear to remain in the gravel until swim-up (Ulmer 1980, Mueller 1989).

A number of investigators have collected viable fertilized eggs and larvae in the areas of observed spawning activity (Bozek et al. 1984, Ulmer 1980, Marsh and Langhorst 1988, Tyus 1987a), but few have collected larvae larger than 14 mm (0.6 inches) in the wild. This indicates little or no successful recruitment of wild razorback suckers (Tyus 1987a). Marsh and Langhorst (1988) recovered larvae up to 20 mm (0.8 inches) total length in an isolated backwater in Lake Mohave where predators had been previously eradicated. However, these fish disappeared within a month following reinvasion of the backwater by predators. Most investigators have reported concentrations of carp (*Cyprinus carpio*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), and largemouth bass (*Micropterus salmoides*) in razorback sucker spawning areas (Jonez and

Sumner 1954, Marsh and Langhorst 1988, Ulmer 1980, Bozek et al. 1984). Larvae and larger razorback suckers have been found in stomachs of predatory fishes such as green sunfish, warmouth (*Lepomis gulosus*), channel catfish, flathead catfish (*Pylodictis olivaris*), and threadfin shad (*Dorosoma petenense*) (Marsh and Langhorst 1988, Langhorst 1989, Brooks 1986).

Habitat needs of young and juvenile razorback suckers in the wild are largely unknown because they have rarely been encountered by researchers, particularly in native riverine habitats (Tyus 1987a). Marsh and Langhorst (1988) observed that larval razorback suckers in Lake Mohave remained near shore after hatching but either disappeared or migrated to depths in excess of 15 m (49 ft.) within a few weeks. Most young and juveniles have been collected from irrigation canals in southern California and Arizona (Marsh and Minckley 1989). Substantial numbers of razorback suckers have been reared through the juvenile and adult stages in hatcheries (Toney 1974, Hamman 1985) and in isolated ponds (Langhorst 1989), providing some information on growth rates and food habits.

Food habits of razorback sucker larvae have been studied in Lake Mohave (Marsh and Langhorst 1988) and under experimental conditions (Papoulis 1986). Larvae from reservoirs selected *Bosmina* spp. (Cladocera) and avoided Copepoda, while larvae from backwaters of Lake Mohave selected Bosimina and avoided Rotifera (Marsh and Langhorst 1988). Information is not available on food habits of razorback sucker larvae from natural riverine habitats.

Only limited information has been accumulated on the food habits of adult razorback suckers, primarily due to their rarity and protected status under State law. Marsh (1987) examined the stomachs of 34 adult specimens from Lake Mohave and determined that their food selection included benthic fauna and flora and inorganic materials from the bottom. Jonez and Sumner (1954) reported algae as the most common food item found in razorback sucker stomachs from Lake Mead, followed by plankton, insects, and decaying organic matter. Chironomids were the most prominent food item in razorback suckers from Lake Mohave. Vanicek (1967) examined eight adult razorback sucker stomachs from the Green River and found them packed with mud or clay containing chironomid larvae, plant stems and leaves. These studies and direct observations confirm what one would expect of a fish with the razorback sucker's morphology—a bottom feeding plankton consumer (Minckley 1973, Jonez and Sumner 1954).

Using scales, Minckley (1983) estimated annual growth rates in the wild Lake Mohave population to be less than 10 mm (0.4 inches) per year after their seventh year of life. Recently, researchers have demonstrated the inadequacies of using scales to determine the age of razorback suckers and have shown that most razorback suckers captured in recent times are much older than their scales would indicate (McCarthy and Minckley 1987). McCarthy and Minckley (1987) computed the ages of Lake Mohave razorback suckers collected in 1981–83 to be 24 to 44 years. Eighty-nine percent of the 70 fish sampled were estimated to have hatched prior to impoundment. Disappearance of razorback suckers from lower basin reservoirs 40 to 50 years after impoundment was documented by Minckley (1983). McCarthy and Minckley (1987) predict the Lake Mohave population is following this trend and may be extirpated before the year 2000. Tyus (1987a) concluded that razorback suckers in the Green River were substantially smaller and younger than those found in the lower basin, but no recent recruitment to the adult population was evident.

Adult razorback suckers are more vulnerable to capture during the spawning season. Tyus (1987b) reported them to be 10 times more prevalent in standardized electrofishing collections during the spring than during the remainder of the year. During spawning season razorback suckers have been found in runs with coarse sand, gravel, and cobble substrate; flooded bottomlands and gravel pits; and large eddies formed by flooded mouths of tributary streams and drainage ditches (Tyus 1987a, Osmundson and Kaeding 1989). Tyus (1987a) reported on six radio-telemetered adult razorback suckers that he tracked from April to November over a 2-year period. He observed that, outside breeding season, they utilized the main channel of the Green and Duchesne rivers, in depths of 0.6 to 3.4 m (1.7 to 11.0 ft) over sand or silt substrates with velocities of 0.1 to 0.6 m per second (0.33 to 2.0 ft per second). Razorback suckers selected near-shore runs during the spring and shifted to relatively shallow waters off mid-channel sandbars during the summer months. Except for spawning migrations, it appeared that the razorback suckers were relatively sedentary, moving only a few kilometers over several months. Valdez and Masslich (1989) tracked 17 razorback suckers throughout the winter on the Green River. They found that most of the radio-telemetered fish moved less than 5 km (3 mi) throughout the winter. They also reported localized diel movement patterns that increased with fluctuating flows which they attributed to changes in velocities. The radio-telemetered razorback suckers used slow run habitats, slack waters and eddies. They selected depths of 0.6 to 1.4 m (2.0 to 4.5 ft) and velocities of 0.03 to 0.33 m per second (0.1 to 1.1 ft per second).

The razorback sucker was proposed for listing as a threatened species on April 23, 1978, in the **Federal Register** (43 FR 17375). The proposal was withdrawn on May 27, 1980, in accordance with provisions of the 1978 amendments to the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). These provisions required the Service to include critical habitat in the listing of most species and to complete the listing process within 2 years or withdraw the proposal from further consideration.

A petition dated March 14, 1989, was received from the Sierra Club, National Audubon Society, the Wilderness Society, Colorado Environmental Coalition, Southern Utah Wilderness Alliance, and Northwest Rivers Alliance on March 15, 1989. The petition requested the Service to list the razorback sucker as an endangered species. A positive finding on this petition was made in June 1989 and subsequently published by the Service in the **Federal Register** on August 15, 1989 (54 FR 33586). This notice also stated that a status review was in progress and that the Service was seeking information until December 15, 1989. This proposal constitutes the final finding for the petitioned action.

Summary of Factors Affecting the Species

Section 4(a)(1) of the Endangered Species Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal Lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the razorback sucker (*Xyrauchen texanus*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* Once abundantly distributed throughout the Colorado River basin, the razorback sucker now inhabits approximately 25 percent of its

original range. It is considered by most researchers to be one of the rarest endemic species in the Colorado River basin, second only to the bonytail chub (*Gila elegans*) (McAda 1987). In the Lower Colorado River Basin, the razorback sucker occurs in significant numbers only in Lake Mohave, Arizona, and Nevada. These fish probably represent the largest remaining population in the basin (Minckley 1983). Small numbers of razorback suckers also are present in Lake Mead and Senator Wash Reservoir but are rare in the mainstem and other reservoirs of the lower basin. In the Upper Colorado River Basin, razorback suckers are found only rarely in the upper Green River, Utah; lower Yampa River, Colorado (Tyus 1987a, Tyus and Karp 1989); and mainstem Colorado River near Grand Junction, Colorado (Kaeding and Osmundson 1989). The razorback sucker is very rare throughout the remaining warmwater reaches of the Green, San Juan, and upper Colorado Rivers. Small populations also occur in the Colorado, Dirty Devil, and San Juan arms of Lake Powell (Persons and Bulkley 1982, McAda 1987, Roberts and Moretti 1989).

Since 1910, 15 dams have been constructed on the lower Colorado River and its major tributaries, the Gila and Salt Rivers. These dams have dewatered, cooled, or impounded nearly the entire lower basin system so that little natural riverine habitat exists today. Spawning has been observed in several reservoirs in the lower basin (Jonez and Sumner 1954, Loudermilk 1985) and razorback sucker larvae have been collected in Lake Mohave (Bozek et al. 1984, Marsh and Langhorst 1988). However, there have been no young razorback suckers collected from Lake Mohave longer than 15 mm (0.6 in.) total length, which indicates a lack of recruitment to the population in recent years (McCarthy and Minckley 1987). In the upper basin, Lake Powell and Flaming Gorge Reservoir have impounded 500 km (310 mi) of razorback sucker habitat and lowered water temperatures in another 105 km (65 mi) of the Colorado and Green Rivers. Other upper basin reservoirs also have altered natural flow and temperature regimes.

Dams and diversions also obstruct razorback sucker migration. Although little is known of the location of razorback sucker spawning areas prior to the construction of these facilities, it is believed that they have cut off access to, or impounded, once important spawning areas. Early investigators frequently referred to spawning concentrations in small tributaries in the lower basin (Jordan 1891, Hubbs and Miller 1953). More recently Tyus (1987a and 1987b) observed concentrations of razorback suckers near three suspected spawning areas in the upper Green River and lower Yampa River. Ulmer (1980) also observed spawning in Senator Wash Reservoir and Mueller (1989) did so in the tailwaters of Hoover Dam. Spawning has been observed in Lake Mead and Lake Mohave (Jonez and Sumner 1954, Minckley 1983, Langhorst and Marsh 1986). Radio tracking and recapture of tagged razorback suckers demonstrates that some fish migrate considerable distances to spawn. Tyus (1987a) recaptured 21 adult razorback suckers in suspected spawning areas that had been previously tagged in other locations over a period of 8 years. One razorback sucker was recaptured in the Green River 208 km (129 mi) downstream from its original capture site, a spawning area in the lower Yampa River. Ulmer (1980), utilizing SCUBA gear, followed five adult razorback suckers fitted with sonic transmitters from dispersed areas of Senator Wash Reservoir to two specific areas where congregations of spawning razorback suckers were observed from shore and underwater.

Storage and diversion of natural flows have resulted in an 18 percent reduction in mean annual discharge at the Green and Colorado River confluence 26 km (16 mi.) upstream of Lake Powell (U.S. Geological Survey [USGS] flow records, 1906–1982). Storage of high flows during the spring and releases of more water during the remainder of the year have reduced spring runoff by 28 percent in the Green River and 37 percent in the Colorado River during May and June (USGS flow records, 1906–1982). Reduction of these high spring flows has altered the natural flooding cycle essential to the maintenance of off-stream habitats used by razorback suckers (McAda 1977). Flooding of bottomland during spring runoff may be important to adults and rearing of young (Tyus and Karp 1989). The apparent lack of recruitment of razorback suckers may be associated with reduced availability of these inundated habitats (Osmundson and Kaeding 1989, Tyus and Karp 1989).

Dam operations also can cause changes in daily flow regimes. Peaking power operations at Flaming Gorge produced a 400 percent increase in daily fluctuations in flow at Jenson, Utah (USGS flow records, 1906–1982). Tyus and Karp (1989) recommend low, stable flows for razorback suckers during summer, fall, and winter. They found low, stable flows are necessary for growth and survival of young native fishes and stable flows through ice breakup are important for overwinter survival of young and adult native fishes.

Cooler water temperatures, as a result of dam operations, are theorized to have excluded the razorback sucker from portions of its original range (Vanicek 1967). Research by Bulkley and Pimentel (1983) on adult razorback sucker temperature preference and avoidance characteristics showed a preference range of 22–25 °C (71.6–77 °F) and an avoidance of temperatures below 14.7 °C (58.5 °F) and above 27.4 °C (81.3 °F). While winter temperatures drop well below the razorback sucker's reported range of preference throughout most of their range, summer temperatures are generally within the preferred limits. Riverine temperatures can vary greatly diurnally and between off-stream and mainstream habitats. Grabowski and Hiebert (1989) recorded water temperatures in backwaters of the Green River to be 2.5 to 3.8 °C (4.5 to 6.8 °F) warmer than the mainstream. While water temperature is a dynamic parameter, influenced by a multitude of variables, there are several reaches of the Green and Colorado rivers where spring and summer temperatures are clearly below the preferential range of the razorback sucker. These reaches occur directly below Flaming Gorge Reservoir for 105 km (65 mi.) where summer temperatures average less than 15 °C (59 °F) (U.S. Geological Survey Water Resource Data), and below Lake Powell for 384 km (238 mi.) where summer water temperatures rarely exceed 15 °C (59 °F) (Carothers and Minckley 1981). Razorback suckers have rarely been captured in these reaches since the completion of these dams (Vanicek 1967, Carothers and Minckley 1981).

The alteration of temperatures caused by the construction and operation of dams also may have an effect on the incubation time and survival of razorback sucker eggs. Incubation time to hatching varies inversely with water temperature, with longer hatching times required at lower temperatures. Gustafson (1975) reported that 5.5 days were required at 20 °C (68 °F) while Bozek et al. (1984) reported the following incubation periods: 19.4 days at 10 °C (50 °F); 11.1 days at 15 °C (59 °F); and 6.8 days at 20 °C (68 °F). Marsh (1985) found it required 9 days for larvae to hatch at 15 °C (59 °F) and 3.5 days at 25 °C (77 °F). Most investigators reported a poor hatching success at temperatures below 15 °C (59 °F) and total mortality of eggs below 10 °C (50 °F). Bozek et al. (1984) noted only slightly lower survival rates

at 10 °C (50 °F) than at 15 and 20 °C (59 and 68 °F).

Alteration of razorback sucker habitat is likely to continue with several major reservoirs and water diversions in the planning process or under construction (e.g., Animas-La Plata Project, Muddy Creek Reservoir, Sandstone Reservoir, Two Forks Reservoir, Central Utah Project). Other, less direct, influences such as decreased flow, alteration in stream hydrology, increased dissolved solids, and altered temperatures may adversely affect the razorback sucker by reducing its habitat, interrupting spawning, and increasing competition for food and space.

Development activities that most threaten the razorback sucker occur in the upper basin where most of the remaining riverine habitats occur. Since 1980 the U.S. Fish and Wildlife Service has conducted consultations under section 7 of the Endangered Species Act on over 100 federally funded or regulated projects in the upper basin that involved water depletions. Several transbasin diversions are being planned or are under construction. The two most prominent are the Central Utah Project which will divert 165,000 ac. ft. of water from the Green River to the Bonneville Basin, and the Two Forks Project, which will divert an additional 45,000 ac. ft. from the Colorado River to the East Slope of the Rocky Mountains.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Though once extensively used as a food fish when available in large numbers, the razorback sucker is no longer abundant and no markets are currently available for such enterprises. In the lower basin there were once enough razorback suckers to support a commercial fishery (Hubbs and Miller 1953). All States within the species' current range now have laws that protect the razorback sucker from harvest (Minckley et al. in press). Therefore, overutilization is not considered to be a threat today.

C. *Disease or Predation.* There is no evidence that disease is a significant factor in the current status of the razorback sucker. However, Minckley (1983) reported many old individuals captured in Lake Mohave were blind in one or both eyes and showed other signs of disease or injury. Several investigators have recently isolated pathogens from razorback suckers, but none have concluded that they were a serious threat to the existing stocks (Mpoame and Rinne 1983, Flagg 1982).

Several researchers have observed predation of razorback sucker eggs and larvae by carp, channel catfish, smallmouth bass (*Micropterus dolomieui*), largemouth bass, bluegill, green sunfish, and redear sunfish (*Lepomis microlophus*) (Marsh and Langhorst 1988, Jonez and Sumner 1954, Langhorst 1989, Ulmer 1980). The researchers hypothesized that predation is a major cause underlying the lack of recruitment to the adult razorback sucker population throughout the basin (McAda and Wydoski 1980, Minckley 1983, Tyus 1987a). Loudermilk (1985) observed that young razorback sucker larvae inhabited the upper water column for the first few days after swim-up and exhibited no defensive behavior from potential predators. Marsh and Langhorst (1988) found larval razorback suckers in Lake Mohave survived longer and grew larger in the absence of predators. Marsh and Brooks (1989) concluded that channel catfish and flathead catfish were major predators of razorback suckers stocked into the Gila River. They concluded that predation by these fish resulted in total loss of those stocks. Langhorst (1989) reported channel catfish and largemouth bass predation on juvenile razorback suckers averaging 171 mm (6.7 in.) total length stocked in isolated coves along the Colorado River in California. Two additional predaceous species, the walleye (*Stizostedion vitreum*) and northern pike (*Esox lucius*) have recently become prominent inhabitants of the Green River (Tyus and Beard 1990).

Though nonnative fish species were and are introduced by man, the ability of these nonnative fish to survive and become established in the Colorado River basin is, in part, due to the alteration of natural riverine habitat described under Factor A. Alteration of historic flow regimes and construction of reservoirs has created favorable conditions for some nonnative fishes (Seethaler 1978, McAda and Kaeding 1989, Minckley 1983). Thus the threat of predation is associated with habitat modification.

D. *The inadequacy of existing regulatory mechanisms.* As discussed in Factors A and C, the razorback sucker has declined substantially in the past 80 years because of major alterations in their habitats, dissection of the river system with dams, and the introduction of many new species to their ecosystem. Although they have been included on the protected list of all Colorado basin States, except Wyoming (where they are extirpated) and New Mexico (where no records of razorback sucker exist) (Marsh et al. in press), they have continued to decline. They are presently one of the most endangered fishes in the Colorado River basin (Deacon et al. 1979, Minckley 1983, Tyus 1987a).

Most State regulations protect the razorback sucker from take and possession. They do not, however, address the major problems of habitat destruction nor the introduction of competitive and predaceous species. All States prohibit the transportation and stocking of any fish species without prior consent of the respective State agencies. State agencies do, however, introduce new species which may compete with or prey upon the endangered Colorado River fishes. The Service has an informal agreement with the State of Colorado to review all stocking proposals in the Colorado River within Colorado. The Service is attempting to arrange similar coordination with the State of Utah. However, Service agreements with other States in occupied habitat of the razorback sucker have not been formulated. The Service can, to some extent, influence State stocking actions by not contributing Federal funds or fish from Federal hatcheries to stocking proposals with the potential to adversely impact the razorback sucker.

State water quality and streamflow regulations do not assign stringent criteria to waters inhabited by the razorback sucker. Regulations permit desilting and cooling because such water quality changes are generally deemed beneficial. However, the razorback sucker and other native fish species are adapted to the Colorado River's highly turbid, turbulent, and warm conditions. Most Federal regulations also consider water clarity, low temperatures, and "purity" desirable water quality standards. They assign criteria that enhance or preserve these conditions even though they may not provide the best conditions for native ecosystems.

The presence of any one or all of the other listed Colorado River fishes in the same reaches as the razorback sucker does not necessarily lend adequate protection to the razorback sucker since its life history and habitat requirements contrast quite significantly with those of the other species. And, while all Federal agencies are mandated to consider the other listed fishes relative to their actions, they are not so mandated for the razorback sucker. Therefore, those agencies may take actions and implement programs which avoid jeopardy to the endangered fishes while adversely affecting the razorback sucker.

The Colorado River Endangered Fishes Recovery Implementation Program (Recovery Program) has a goal of managing the razorback sucker so that it does not need the protection of

the Endangered Species Act. The management goal adopted by the Recovery Program for the razorback sucker is to establish and protect self-sustaining populations and natural habitat. Substantial funds and resources have been provided by the Recovery Program to meet the goals for this and other listed Colorado River fishes. Although actions by the Recovery Program will provide benefits to the razorback sucker, these actions alone do not provide adequate protection because the Recovery Program is not a regulatory mechanism. Instead, it is a cooperative effort agreed to by public and private entities that have an interest in how the Upper Colorado River Basin and its resources are managed. The Cooperative Agreement that binds these parties may be amended or terminated by agreement of the parties, or any party may withdraw upon written notice. Section 7 of the Endangered Species Act requires that all Federal agencies insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any threatened or endangered species. The Recovery Program does not have the force and effect of law to mandate that the effect of any Federal action on the razorback sucker be considered. And finally, the Recovery Program only applies to the upper basin (excluding the San Juan River), and therefore does not protect the species throughout its range.

E. *Other natural or manmade factors affecting its continued existence.* Of great concern is the fact that significant recruitment of young fish to these populations has not been evident for 30 years. There is considerable evidence that existing populations are composed primarily of old individuals that are slowly dying off (McCarthy and Minckley 1987, Tyus 1987a). A few naturally reproduced juveniles have been reported from the Colorado River and off-stream canal systems downstream of Lake Mohave (Marsh and Minckley 1989) and from the Green River (Holden 1978) in the past 15 years.

Marsh and Langhorst (1988) studied food availability and consumption by larval razorback suckers in Lake Mohave and found that larval razorback suckers consumed a variety of the zooplankters available in the area. Papoulias (1986) found, under experimental conditions, that food items needed to be present at a density of 10 organisms per liter within 10 days of absorption of the yolk sac. Death occurred at about 20–30 days of age if insufficient numbers of zooplankton were present. Marsh and Langhorst's (1988) research on Lake Mohave showed an average of 1.5 zooplankters per liter, and they reported the disappearance of larvae at about 20 days of age. Taken in conjunction with Papoulias' (1986) work, this suggests that the low availability of food organisms may be a factor in the apparent lack of recruitment of razorback suckers to the adult population in Lake Mohave.

The introduction and establishment of nonnative fish species into the Colorado River system is believed by many researchers to have negatively impacted the razorback sucker. Tyus et al. (1982) recorded 42 species that have become established in the Upper Colorado River Basin, and Minckley (1979) listed 37 nonnative species in the lower basin. Many of these may be innocuous or inhabit areas not occupied by razorback suckers, but several are considered serious competitors or predators (Minckley 1983, Loudermilk 1985). In addition to direct predation (see Factor C), competition may result in negative impacts to the razorback sucker, but impacts from competition are more difficult to detect than predation impacts. Populations of red shiner (*Notropis lutrensis*), common carp, and channel catfish share and presumably compete for food and space with razorback suckers (Karp and Tyus 1990, Tyus and Nikirk in press). Although these interactions are not fully understood, they are hypothesized to impact the razorback sucker due to their considerable numbers, the sharing of common foods, and occupation of the same habitats (Jonez and Sumner 1954, Jacobi and Jacobi 1982).

The threat of competition continues as nonnative species continue to be introduced and their ranges continue to expand. Since the reports by Minckley (1979) and Tyus et al. (1982), the northern pike has increased its range and invaded the mainstream of the Green River (Tyus and Beard 1990). The smallmouth bass has been introduced into Lake Powell, and the triploid grass carp (*Ctenopharyngodon idella*) has been legalized for importation into California and Arizona. In the lower basin, two tilapia species (*Tilapia* spp.) have become established, and, along with the flathead catfish, they have become the dominant fish species in the lower Colorado River (William Minckley, Arizona State University, pers. comm. 1989). The rainbow smelt (*Osmerus mordax*) has been recently proposed for introduction into Lake Powell.

Hybridization between razorback suckers and flannelmouth suckers has been reported by a number of investigators. Vanicek et al. (1970) and Holden (1973) reported a high incidence of hybridization between razorback and flannelmouth suckers in the upper basin. They found ratios of 16 hybrids to 73 razorback suckers and 40 hybrids to 53 razorback suckers, respectively. McAda and Wydoski (1980) reported eight razorback sucker x flannelmouth sucker hybrids collected with 95 razorback suckers in the upper basin. This suggests major alterations in the natural river system may have forced populations into close spatial and temporal proximity during spawning. Recent electrophoretic analyses of Lake Mohave razorback suckers revealed less than a 5 percent incidence of flannelmouth sucker genes. Buth et al. (1987) considered this level of introgression insignificant.

A pre-impoundment poisoning project in the Green River where Flaming Gorge Reservoir is now located is often cited as at least a partial cause for the loss of native fishes immediately downstream of the reservoir. While many razorback suckers were undoubtedly lost, a comparison of fish species present in Dinosaur National Monument before and after the program (Binns et al. 1963, Vanicek and Kramer 1969, Vanicek et al. 1970) supports the premise that the effect of the poisoning was of a short-term nature and not responsible for the current status of the razorback sucker. A similar pre-impoundment study and treatment program also were conducted on the San Juan River in New Mexico where Navajo Reservoir is located. No records of razorback suckers were documented before or after the treatment program.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the razorback sucker in determining to propose this rule. Based on this evaluation, the preferred action is to list the razorback sucker as endangered. Endangered status, which means that the species is in danger of extinction throughout all or a significant portion of its range, is appropriate for the razorback sucker because of its greatly reduced range, the extensive partitioning of its range by dams, the extensive alteration of its natural habitats through impoundment and altered flow and temperature regimes, its apparent inability to recruit successfully in the wild, and the introduction of nonnative fish species. A decision to take no action would constitute failure to properly classify the razorback sucker pursuant to the Endangered Species Act and would exclude the razorback sucker from

protection provided by the Act. A decision to propose only threatened status, which means a species is likely to become endangered within the foreseeable future, would not adequately reflect the status of the razorback sucker. The limited numbers of old fish that currently represent the nonrecruiting population indicate the razorback sucker is in danger of extinction throughout its range. Critical habitat is not being proposed for the reasons stated below.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that, to the maximum extent prudent and determinable, the Secretary propose critical habitat at the time the species is proposed to be listed as endangered or threatened. The Service finds that designation of critical habitat is not determinable or prudent at this time for the razorback sucker.

As noted earlier, there is limited information on the specific habitat needs of the razorback sucker. Though habitat occupied by the razorback sucker has been identified and spawning has been documented in several areas, it is questionable as to whether these areas are adequately meeting the life history needs of the razorback if there has been little or no recruitment. The razorback sucker cannot perpetuate itself in the wild if there is little or no recruitment of young fish into the population. It would not be in the best interest of the species to identify or use the characteristics of existing habitats as the basis for critical habitat when we are unable to identify those specific areas needed to bring about recruitment. Hence, the Service finds that critical habitat is not determinable at this time.

Even if critical habitat were determinable, it is unlikely that there would be a net benefit to the species from designation of critical habitat. First of all, designation of critical habitat would not protect the razorback sucker from predation or competition by nonnative fishes as described under "Background" and under Factors C and E. It would not protect the razorback sucker from predation or competition from nonnative fish species already in the Colorado River basin, nor would it deter future stocking of nonnative fishes beyond any deterrent resulting by listing the species as endangered. Therefore, designation of critical habitat would not abate the major threat posed by nonnative fish species.

Second, designation of critical habitat is not likely to provide additional protection benefits to the species' habitat beyond those attained through listing the species as endangered and resultant section 7 consultations. Much of the razorback sucker's habitat is located in areas under Federal jurisdiction, as noted below. In addition, existing Federal reservoirs on the Colorado River and its tributaries are major regulators of river flows and may be used to benefit razorback sucker habitat in accordance with section 7 of the Act. It is not necessary to designate critical habitat to achieve these protective or recovery benefits for the species.

Third, there are unlikely to be any additional notification benefits that would accrue from critical habitat designation. For the most part, Federal agencies (land management agencies, agencies responsible for water resource management, and agencies responsible for impacts to waters of the United States) are already aware of the presence of razorback sucker in areas under their jurisdiction. For example, the National Park Service addresses the razorback sucker in its resource management plans for Dinosaur National Monument, Canyonlands National Park, Glen Canyon National Recreation Area, Grand Canyon National Park, and Lake Mead National Recreation Area. The National Park Service also has a representative presently chairing the Colorado River Fishes Recovery Team. The Bureau of Land Management addresses the razorback sucker in resource management plans where habitat for razorback sucker occurs. The Bureau of Reclamation has a representative on the Recovery Team and is an active participant in the Recovery Program. The Western Area Power Administration also is a participant in the Recovery Program. The U.S. Army Corps of Engineers and the Environmental Protection Agency have jurisdiction over activities requiring the placement of dredge or fill material into all waters occupied by the razorback sucker. Designation of critical habitat is not expected to enhance the level of Federal awareness beyond that resulting from species listing.

And finally, the Recovery Program has established an information and education program to inform the public and non-Federal agencies about the Colorado River rare fish, including the razorback sucker, in the Upper Colorado River Basin, excluding the San Juan River. This program, and the programs of Federal agencies discussed above, would help notify the public and non-Federal agencies of the location of razorback sucker habitat.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to proposed or listed species or with respect to critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer informally with the Service on any action likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

The Green and Colorado Rivers have been extensively developed through several Federal programs for power generation, flood control, salinity control, and irrigation. As a result, many Federal agencies are involved with activities which may affect the razorback sucker. Flow conditions in the Green and Colorado Rivers are influenced by power generation and flood control at several Bureau of Reclamation projects. Power generated by the Colorado River Storage Project reservoirs is marketed by the Western Area Power Administration, whose marketing program has considerable influence on discharges from those reservoirs. Other Bureau of Reclamation projects involving diversions and storage for irrigation or municipal and industrial uses and salinity control are

in various stages of planning, construction, or operation. The Soil Conservation Service has salinity control programs which affect flows and water quality in the Colorado River system. The Corps of Engineers would consider the razorback sucker in their administration of section 404 of the Clean Water Act, and the Environmental Protection Agency also would consider the fish in administration of the Clean Water Act, the National Environmental Policy Act, and other pollution and pesticide control programs. Several Federal land and resource management agencies including the National Park Service, the U.S. Forest Service, and the Bureau of Land Management would have to consider the needs of the razorback sucker in programs under their jurisdiction.

The interagency Colorado River Endangered Fishes Recovery Implementation Committee has been organized to coordinate the recovery of currently listed species (Colorado squawfish, humpback chub, and bonytail chub) and the management of the razorback sucker in the upper basin, excluding the San Juan River. This committee considers the razorback sucker an imperiled species that may require listing in the future unless programs are implemented to reverse its downward population trend. Listing the razorback sucker as endangered will give it equal status with the other three listed species in the committee's recovery efforts.

Listing the razorback sucker as endangered would influence the stocking of nonnative fish species and the management of recreational sportfishing in a similar manner as with the other three listed fish species in the Colorado River basin. If stocking or sportfishing programs involve Federal funds or permits, or receive fish from Federal hatcheries, the action would be reviewed under section 7 of the Act. In addition, control of nonnative fishes is an element of the Recovery Program. This program would confine stocking of nonnative fishes to areas where absence of potential conflict with rare or endangered fishes can be demonstrated. Where feasible and effective, nonnative fishes would be selectively removed from areas considered essential to listed species. Participants of the Recovery Program also would review State sportfishing practices and regulations for compliance with Federal law and impacts on rare and endangered fish species. As noted previously, the Service has an informal agreement with the State of Colorado to review all stocking proposals, and is seeking a similar arrangement with the State of Utah.

The Act, and its implementing regulations in 50 CFR 17.21, set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. In some instances, permits may be issued for a specified time to relieve undue economic hardship that would be suffered if such relief were not available. With respect to the razorback sucker, it is anticipated that few, if any, trade permits would ever be sought or issued, since the species is not in trade or common in the wild.

Public Comments Solicited

The Service intends that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any interested party concerning this proposed rule are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to the razorback sucker;

(2) The location of any additional populations of the razorback sucker and reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional information concerning the range, distribution and population size of the razorback sucker; and

(4) Current or planned activities in the subject area and their possible impacts on the razorback sucker.

Final promulgation of the regulation on the razorback sucker will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final regulation that differs from this proposal.

The Endangered Species Act provides for a public hearing on this proposal, if requested. Requests must be received within 45 days of the date of publication of the proposal. Such requests must be made in writing and addressed to the Field Supervisor, U.S. Fish and Wildlife Service, 2078 Administration Building, 1745 West 1700 South, Salt Lake City, Utah 84104–5110.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein, as well as others, is available upon request from the Service's Utah State Office (see **ADDRESSES** above).

Authors

This rule was prepared by D.L. Archer and P.A. Schrader, U.S. Fish and Wildlife Service (see **ADDRESSES** above).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Fish, Marine mammals, Plants (agriculture).

Proposed Regulation Promulgation

Accordingly, it is hereby proposed to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1543; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

2. It is proposed to amend § 17.11(h) by adding the following, in alphabetical

order under "FISHES," to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

(h) * * *

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Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
FISHES							
*	*	*	*	*	*	*	
Sucker, razorback	*Xyrauchen texanus*	U.S.A. (AZ, CA, CO, NM, NV, UT, WY) Mexico	Entire	E		NA	NA.
*	*	*	*	*		*	

Dated: May 9, 1990.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

[FR Doc. 90-11796 Filed 5-21-90; 8:45 am]

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