The Alabama sturgeon has been described in the Mobile Bay drainage of Alabama and Mississippi. Shovelnose sturgeons were first reported from the Mobile River basin in an anonymous article in the *Alabama Game and Fish News* in 1930 and in scientific literature by Cheromack in 1955 (Burke and Ramsey 1985). Confirmed records of this species are uncommon. Clemmer (1983) listed 23 specimens in museum collections. In their status survey, Burke and Ramsey (1985) captured only five Alabama sturgeon. Williams and Clemmer (1991) located 32 specimens in museums, universities, and private collections. All verified localities have been large channels of big rivers in the Mobile Bay drainage.

Despite the scarcity of recent records, the Alabama sturgeon was once common in Alabama. In a statistical report to Congress in 1898, the total catch of shovel-nose sturgeon from Alabama was 42,900 pounds. Of this total, 39,500 pounds came from the Alabama River, 2,300 pounds from the Black Warrior River, and 1,100 pounds from the Tennessee River. The shovel-nose sturgeon from the Alabama and Black Warrior Rivers is the same fish that was recently determined to be a distinct species, the Alabama sturgeon. It is apparent from this statistical report that historical records of sturgeon from the Mobile River system are uncommon but that the sturgeon was once abundant.

Since the Burke and Ramsey report (1985), there have been several anecdotal reports of Alabama sturgeon. In a recent interview, a commercial fisherman stated that he catches 8 to 10 small slim sturgeon per year during the colder winter months (pers. comm. 1992). This fisherman nets upstream of Claiborne Lock and Dam and very obviously differentiate between the Alabama sturgeon and the larger Gulf sturgeon. There are two reports of small sturgeon being caught by fishermen in 1992, one from the Cahaba River and one from the Alabama River below Millers Ferry Lock and Dam. Neither fish was measurable for positive confirmation of the species. However, both were described as small and slender, more descriptive of Alabama sturgeon than the Gulf sturgeon. The site of capture for both fish and those captured by the commercial fisherman would also indicate they are Alabama sturgeon, since a Gulf sturgeon would have to pass through or over Claiborne Lock and Dam, a possible though improbable feat.

Biologists from the Alabama Department of Conservation and Natural Resources have conducted periodic electrofishing for sturgeon. A single sturgeon has been observed, but eluded capture. The boat operator (a biotechnician) believed the sturgeon to be *Scaphirhynchus suttkusi* but could not confirm that belief. The most recent firm evidence consists of the capture of five sturgeon in 1985 (Burke and Ramsey 1985), of which two were gravid females and one was a juvenile of about 2 years old. Burke and Ramsey (1985) aged two other Alabama sturgeon at 7 and 10 years of age. The gravid females and juvenile Alabama sturgeon captured by Burke and Ramsey are sufficient evidence that reproduction was occurring during the 1980's and likely continues into the 1990's, since habitat changes have been minimal during the past 7 years. Several studies have aged sturgeon with all of them indicating this group of fish are long lived. Rouch et al. (1990) in a general statement about sturgeon gives 40 years as a life expectancy. Helms (1974) aged shovel-nose sturgeon up to 12 years old and referenced work by Zweilacker (1967) and Fogle (1963) that aged shovel-nose sturgeon at 27 and 10 years respectively. Neither Zweilacker nor Fogle could validate the marks interpreted as annuli (Menz 1978), Durkee et al. (1979) aged shovel-nose sturgeon at 14 years of age. Rueille and Keenlyne (in press) aged three pallid sturgeon, *Scaphirhynchus albus*, at 10, 41, and 37 years of age. It is apparent that captures of 7 years ago are relatively recent for such a species. Based upon the evidence at hand, both confirmed and anecdotal, it is highly probable that Alabama sturgeon continue to exist in the Alabama River system, albeit in low numbers.

The Alabama sturgeon, *Scaphirhynchus suttkusi* is a relatively small sturgeon, the maximum standard length is about 72 centimeters (cm) or 28 inches. It has an elongate, heavily armored, depressed body and an attenuated caudal peduncle (the area immediately anterior to the tail fin). The tail fin has the long filament on the upper lobe characteristic of the genus. Sexual dimorphism is slight. Morphological characteristics of young Alabama sturgeon are unknown.

The Alabama sturgeon is distinguished from the closely related shovel-nose sturgeon by a larger eye, differences in plate and fin ray counts, placement of the dorsal and anal fins, and in head morphology (Williams and Clemmer 1991). The shovel-nose...
The specific habitat needs of the Alabama sturgeon are largely unknown. One Alabama sturgeon, tracked by telemetry, preferred swift currents in water 25 to 40 feet deep (Burke and Ramsey 1985). Closely related sturgeon species are most common in river channels with strong currents and sand and gravel sediments but may occur over soft substrates. The closely related shovelnose sturgeon often uses channel training devices, i.e., wing walls and closing dams, as habitat (Helms 1974, Hurley and Nickum 1984, Hurley et al. 1987). Sturgeon seem to be tolerant of high turbidity (Plisger 1975). Based upon the limited information available, the Alabama sturgeon seems to prefer unmodified main channels of large rivers as non-spawning habitat (Burke and Ramsey 1985).

Sturgeon swim upstream to spawn. Spawning habitats may be tributaries with hard substrates, main channel areas, or training devices (water diversion structures used in directing currents to maintain channels) in major rivers (Hurley and Nickum 1984). Currents are required for the development of the sturgeon's adhesive eggs, which require 5 to 8 days to hatch (Burke and Ramsey 1985). Spawning of the shovelnose sturgeon in the Mississippi River system apparently occurs from April to early July. The spawning period for sturgeon probably depends upon water temperature and current as it does for numerous other fish species. Pallid and shovelnose sturgeon populations have occurred because of habitat modification (impoundments or channelization) and fishing. Pallid sturgeon, there is renewed interest in this group of fishes. Henry and Ruelle (1992) conducted a study of pallid and shovelnose sturgeon reproduction in the Mississippi River drainage. They concluded that shovelnose sturgeon do not spawn every year and that poor body condition may result in the production of fewer eggs or less frequent spawning. Shovelnose sturgeon in the Mississippi River system feed primarily on aquatic insect larvae and are an important food item (Modde and Schmulbach 1977, Durkee et al. 1979). This change is believed to be the result of channelization reducing the number of shoal areas and deep holes in the river, with sturgeon now moving to sandbar areas and the mouths of fertile tributary streams to forage. The changes in channel configuration and control of flows altered aquatic habitats and produced a uniformly fast current that eliminated or reduced populations of many smaller aquatic species. This caused a decrease in the availability of the food supply for sturgeon and eliminated forage fish as a part of the diet (Henry and Ruelle 1992).

Sturgeon are opportunistic bottom feeders. Shovelnose sturgeon may have become more opportunistic as river channelization reduced the availability of...
of prey organisms resulting in fish of poorer body condition (Henry and Ruelle 1982). Stomach analyses of a few Alabama sturgeon have found aquatic insect larvae to be a major dietary component. Fish eggs, snails, mussels and fish are also taken (Burke and Ramsey 1985).

In Russia, the effect of dams on sturgeon reproductive processes has been studied extensively (Khoroshko 1972, Zakharjan 1972, Veshchev 1982, Veshchev and Novikova 1983). These studies have shown that the Russian sturgeon species are adversely affected by impoundments, and by water discharge fluctuations and altered temperature regimes resulting from them. Among the effects recorded were increased activity and physical injury, increased egg predation, decreased growth rates, increased juvenile mortality, deviation in gonad development, egg resorption, and a decrease in spawning.

The apparent extirpation of Alabama sturgeon in the Alabama River system upstream of Robert F. Henry Lock and Dam does not mean the remaining population is not adversely affected by upstream reservoirs. As discussed earlier, water flow fluctuations can be adverse to sturgeon. To a large extent, the amount of water available for release through R.E. Bob Woodruff Lake, William Bill Dannelly Reservoir, and Claiborne Lake is a function of the inflows from upstream reservoirs. Therefore, flow regulation by all the reservoirs in the Mobile River drainage must be considered a threat, even when the nearest known sturgeon population is many river miles downstream. However, the Service believes that coordination of hydropower production between the various entities can provide the necessary water for minimum flows without increasing the cost of electricity.

Flow regulation is affected by the amount of water available. With increasing demands for water by municipalities, industry, and agriculture, the maintenance of minimum flows will be more difficult. There are plans to construct reservoirs and divert water for municipal purposes in Georgia and in Birmingham, Alabama. Undoubtedly, other interests will look toward the Mobile River system for water as the demand increases. This water depletion will adversely impact the river fauna, including the Alabama sturgeon, if the amount of water falls below that necessary to maintain adequate flows. Until more is known about the Alabama sturgeon’s life history, the Service expects that continuous minimum flows of approximately 3,000 cubic feet per second (cfs) will be required below Robert F. Henry Lock and Dam and Millers Ferry Lock and Dam on the lower Alabama River. This amount of continuous flow should have negligible impact to water levels in the respective reservoirs since there is a minimum flow into the Alabama River of 3,400 cfs already required from the Coosa and Tallapoosa Rivers, and there is a substantial contribution of water from other tributary streams to the Alabama River in this area. Evaluation of the impact of these minimum flows on the river over a period of time may require some level of adjustment that can only be determined by monitoring continuous minimum flows combined with actual flow conditions. Minimum flows below Claiborne Lock and Dam are already maintained at approximately 5,000 cfs to provide for cooling water intake of downstream industry. This amount of continuous flow should also benefit the Alabama sturgeon and other aquatic organisms in the lower Alabama River.

Channel maintenance for navigation may be a threat to the sturgeon. This threat can be minimized by using methods that reduce dredging of the channel. Dredging removes gravel and sand bars essential for spawning and habitat for prey. Reduction of dredging while still maintaining a navigation channel has been accomplished in the Apalachicola, Mississippi, and Missouri Rivers by installation of channel training devices, i.e., training dikes, wing walls, and closing dams (Wells 1982, Cobb and Magoun 1985, Sigrest and Cobb 1987, U.S. Army Corps of Engineers 1987). Channel training devices are structures that direct water flows to improve sediment transportation capabilities of the river as a means of maintaining a navigation channel. Dikes on the Apalachicola River were constructed in the 1960’s and were found to be effective in eliminating 95 percent of the dredging requirements within the effective range of the dikes (U.S. Army Corps of Engineers 1987). In that report, the Corps states, “This is known to be a conservative value because of changes in maintenance dredging practices since the dikes were constructed and therefore the Alabama River dikes were assumed to be slightly more effective at 60 percent.” This same document predicts that with channel training devices in place, dredge disposal areas will be reduced by more than half and that quantities dredged will be reduced by over 400,000 cubic yards at a savings of over $500,000. The report further concludes that under existing conditions of 8450 cfs, the addition of training devices saves a total of over $900,000 per year in transportation delays and damages and in reduced dredging.

In the lower Alabama River, the Corps of Engineers has constructed over 60 channel training works since 1988 that are intended to reduce the need for dredging. Installation of these structures is too recent to fully evaluate their effectiveness at reducing dredging in the Alabama River. However, the more training devices reduce the need to dredge, the more the Alabama sturgeon and other aquatic species will benefit from stabilization of the river bed. Based upon the Corps’ demonstrated desire to use methods of channel maintenance that reduce the need to dredge, the Service expects the Corps to be able to maintain the navigation channel in the Alabama River while reducing the threat to the Alabama sturgeon’s existence. Where dredging is required for channel maintenance, the placement of dredge disposal will likely be accomplished in such a way that deep water areas around channel training devices are maintained. This should allow for a greater amount of stable substrate than occurred prior to installation of channel training devices, especially in the deep water areas near the training devices. This should also maintain deep water refugia for the Alabama sturgeon.

It is not expected that channel training devices will be effective on the lower Tombigbee River since there is practically no slope to the river bed. Since this river stretch has not been demonstrated as preferred habitat for the Alabama sturgeon and is only considered as potentially suitable for eventual recovery, it is not expected that any changes to the channel maintenance program in the lower Tombigbee River will be required, relative to the Alabama sturgeon, within the next several years. If the population of this species becomes more numerous and there is evidence that it is using the lower Tombigbee River, there may be a need to consider modification of the channel maintenance program.

There is evidence that sturgeon may use training devices for egg deposition, and they do use them as preferred habitat at various water flows (Helms 1974, Hurley and Nickum 1984, Hurley et al. 1987, Curtis 1990). Shovelnose sturgeon have been observed to use areas with a primarily sand bottom (Curtis 1990). Alternative channel maintenance methods that allow gravel and sand bar formation and reduce spoil deposition on gravel bars reduce the threat to, and might actually benefit, the...
sturgeon. While alternate methods are not expected to eliminate the need for dredging, they should reduce that need and possibly allow only site specific dredging to maintain navigation while benefiting the Alabama sturgeon and its riverine habitat. Gravel mining destroys gravel and sand bars that provide habitat for food organisms, spawning substrate, and stability to sturgeon habitat. Current methods that remove gravel and sand have an adverse impact on the Alabama sturgeon. If the Alabama sturgeon is to survive, instream gravel and sand mining within certain areas of proposed critical habitat will probably have to cease. However, in the impounded areas proposed as critical habitat, where sand and gravel is covered by thick layers of sediment, it is possible that commercial dredging of these deposits can continue without adversely affecting the Alabama sturgeon.

Since the Alabama sturgeon occurs in the larger channel areas, the impact of water quality degradation by point discharges is somewhat minimized by dilution. However, there is an increasing demand to use the Mobile River system for point discharges. As an example, in the Cahaba River basin, there are 10 municipal wastewater treatment plants, 35 surface mining areas, and 67 other permitted discharges (Alabama Department of Environmental Management, in litt. 1990) and there is considerable interest in methane gas extraction with the release of produced water into the Cahaba River and subsequent movement downstream. The potential impact of these wastewaters on fish or the prey organisms on which they depend is unknown. There is some indication that invertebrates may be more sensitive to chlorides from methane-produced water and sewage treatment plants than are vertebrates. If that is the case, permits may seem to protect the fish while allowing the discharge of substances that would eliminate the food base. Of course, this would indirectly affect the survival of the fish. The threat that methane-produced water presents to the Cahaba River system may not materialize due to local opposition. The methane drilling industry is seeking other ways to dispose of the produced water (Dennis Latham, Coaled Mathane Association of Alabama, pers. comm. 1991). The Alabama sturgeon may be more susceptible to water quality degradation in smaller rivers, e.g., Cahaba River, that are used for spawning, because the dilution capability is substantially less than in large rivers. Until there is evidence that current water quality standards are inadequate, it is expected the existing fish and wildlife standards of the Clean Water Act are sufficient to protect the Alabama sturgeon, provided they are enforced. Violation of these water quality standards is a violation of the Clean Water Act, and listing the Alabama sturgeon may increase the penalty for non-compliance, but would not increase the standards.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

This uncommon species is occasionally taken by commercial fishermen on trot lines or with other fishing gear. Alabama State law requires the immediate release of any incidentally caught sturgeon. As a result, the sturgeon is neither commercially nor recreationally valuable, and is not pursued by humans. The effort required to capture this species would make overutilization very difficult.

C. Disease or Predation

There is no known threat from disease or natural predators. To the extent that disease or predation occurs, it becomes a more important consideration as the total population decreases in number.

D. The Inadequacy of Existing Regulatory Mechanisms

Existing State law precludes the possession of and requires the release of all sturgeon caught by any gear, whether dead or alive (Burke and Ramsey 1985, F. Harders, Alabama Department of Conservation and Natural Resources, pers. comm. 1991). There are no regulations that require the consideration of the Alabama sturgeon within the scope of other environmental laws.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

In addition to impacts discussed under Factor A, the Alabama sturgeon’s reproductive capability is likely adversely impacted by low numbers of mature individuals. As the sturgeon’s range and population are reduced, populations become more scattered and isolated. This isolation probably reduces levels of successful reproduction and also reduces gene flow among populations. As genetic diversity is reduced, the ability of the sturgeon to adapt to adversity may be reduced. Reduction of reproductive success will exacerbate the problems impacting this species.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to propose this rule. Based on this evaluation, the preferred action is to list the Alabama sturgeon as endangered, defined under the Act as being in danger of extinction throughout all or a significant portion of its range. This preferred habitat is chosen due to the restricted range, continued adverse impacts to its habitat, low numbers, unusual biological traits, and possible water quality and quality problems. Critical habitat is designated for reasons discussed in that section.

Critical Habitat

Critical habitat, as defined by Section 3 of the Act means: (i) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features: (1) Essential to the conservation of the species and (ii) that may require special management considerations or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 4(a)(3) of the Act requires that critical habitat be designated to the maximum extent prudent and determinable concurrently with the determination that a species is endangered or threatened. Critical habitat is being proposed for the Alabama sturgeon to include lower portions of the Alabama, Cahaba, and Tombigbee Rivers. These areas are precisely delineated below in the “Proposed Regulations Promulgation” section.

The three designated river portions contain the entire known range of the Alabama sturgeon, plus the free flowing portion of the Tombigbee River that may, or could, provide habitat for this species. The continued existence of the Alabama sturgeon in the lower Alabama River and Cahaba River indicates that life history requirements for food, water quantity, breeding sites, reproduction, and rearing of offspring exist in some portions of these areas to some extent. The continued decline of this species in recent years indicates that some life history requirements are marginal or lacking. These could be sufficient space to induce increased population growth, sufficient breeding and spawning habitat, water quantity or quality, some unknown factors or any combination of factors. It is for this reason the Service is proposing to include the lower free-flowing portion of the Tombigbee River in its designation of critical habitat, despite...
the lack of recent records of Alabama sturgeon.

Section 4(b)(6) requires, for any proposed or final regulation that designates critical habitat, a brief description and evaluation of the activities (public or private) that may adversely modify such habitat or may be affected by such designation. Activities that could adversely affect the habitat include dredging for channel maintenance, mining of sand and gravel, water flow regulation, and water quality degradation from point discharges. Activities that may be affected by the designation of critical habitat include: (1) Those by the Corps of Engineers involving channel maintenance, permit regulation programs, and the regulation of water flows from reservoirs; (2) the permitting of effluents under the authority of the Environmental Protection Agency; and (3) relicensing of hydropower plants by the Federal Energy Regulatory Commission.

Section 4(b)(2) of the Act requires the Service to consider economic and other impacts of designating a particular area as critical habitat. The Service will consider the critical habitat designation in light of all additional relevant information obtained before making a decision on whether to issue a final rule.

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 harming are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its 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 that is 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 ensure 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. Federal actions potentially affected are discussed under the “Critical Habitat” section above.

The Act and implementing regulations found at 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 to 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 for incidental take in connection with otherwise lawful activities.

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 other 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 this species;
(2) The location of any additional populations of this species and the 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 this species;
(4) Current or planned activities in the subject area and their possible impacts on this species; and,
(5) Any foreseeable economic and other impacts resulting from the proposed designation of critical habitat.

Final promulgation of the regulations on this species 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 (see ADDRESSES section).

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 49224).

References Cited


U.S. Army Corps of Engineers. 1987. Supplement to design memorandum no. 2 channel improvement and design memorandum no. 5 channel stabilization structures. Report of the Mobile District, Corps of Engineers, Mobile, Alabama. 50 pp. + appendices.


