Effect Determination for Atrazine

Appendix C - Status and Life History of the Alabama Sturgeon

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Appendix C
Status and Life History of the Alabama Sturgeon

C.1 Species Listing Status

The Alabama sturgeon (*Scaphirynchus suttkusi*) was listed as an endangered species on May 5, 2000 (65 FR 26437 26461) by the U.S. Fish and Wildlife Service (USFWS, 2000). No critical habitat has been designated for this species. The decline of the Alabama sturgeon is attributed to over-fishing, loss and fragmentation of habitat for foraging and spawning as a result of historical navigation-related development (i.e., dams, channel maintenance, and gravel dredging), and water quality degradation (USFWS, 2000). Current threats primarily result from its reduced range and its small population numbers. The limiting factors in the sturgeon's decline are likely to be the construction of dams, flow regulation, navigation channel development, and other forms of channel modification (personal communication with Jeff Powell of USFWS, 2006). Dams in the Alabama River have reduced the amount of riverine habitat, impeded migration of Alabama sturgeon for feeding and spawning needs, and changed the river's flow patterns (USFWS, 2000). The decline of collection records and anecdotal accounts of captures over the past century coincide with construction of dams and the cumulative loss and fragmentation of riverine habitat in the Mobile River Basin over time. These habitat changes, coupled with what is known about life history requirements and life span of other species of river sturgeon, suggest that the Alabama sturgeon is close to extinction (Powell, personal communication, 2006).

C.2 Description and Taxonomy

The Alabama sturgeon (Figure C.1) is a member of the Class *Osteichthyes* (bony fish). It is a relatively small freshwater fish, with a maximum standard length of about 80 centimeters (cm) or 31 inches. A mature fish weighs 1 to 2 kilograms (kg) (2 to 4 pounds). The head is broad and flattened shovel-like at the snout. There are four barbells (whisker-like appendages used to find food) on the bottom of the snout, in front of the mouth. 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 (USFWS, 2000). Morphological characteristics of young Alabama sturgeon are unknown.

The Alabama sturgeon is distinguished from the closely related shovelnose sturgeon (*Scaphirhynchus platorynchus*) by a larger eye, orange color, differences in plate and fin ray counts, placement of the dorsal and anal fins, and in head morphology (Williams and Clemmer, 1991). The Alabama sturgeon was once called the Alabama shovelnose sturgeon or shovelnose sturgeon. However, references to the shovelnose sturgeon in the Mobile River system are to the Alabama sturgeon, rather than the shovelnose sturgeon, which occurs in the Mississippi River system.

Figure C.1. Alabama Sturgeon

C.3 Population Status and Distribution

The Alabama sturgeon (*Scaphirynchus suttkusi*) is known to survive only in the Alabama River from Millers Ferry Lock and Dam, downstream to the mouth of the Tombigbee River (Figure 2.4). The Alabama sturgeon's historic range included about 1,000 miles of the Mobile River system in Alabama and Mississippi, encompassing major rivers downstream of the Fall Line, including the Alabama, Tombigbee, Black Warrior, Coosa, Tallapoosa, and Cahaba river systems. However, the species currently inhabits only about 15 percent of its historic range and is restricted to a 134-mile reach of the Alabama River below the Miller's Ferry Lock and Dam (USFWS, 2000). Whether the quantity of fluvial (stream) habitat currently available to the species in this river reach is adequate to meet all of the ecological needs of a self-sustaining population is unknown (USFWS, 2000).

Currently, no population estimates exist for the Alabama sturgeon. Despite extensive efforts by the Alabama Division of Wildlife and Freshwater Fisheries, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service to capture Alabama sturgeon over the past two decades, only nine specimens have been collected; eight from the Alabama River, and one from the lower Cahaba River (Powell, personal communication, 2006). The last confirmed records of the Alabama sturgeon were one in the Alabama River in 1999 and one in the Cahaba River in 2000. The inability of commercial fisherman and government agencies to collect the endangered Alabama sturgeon, despite extensive efforts, suggests a population trend of mortality rates exceeding recruitment (Rider and Hartfield, 2006).

C.4 Habitat

The Alabama sturgeon is found in the main stems of the Alabama River. Observations by Burke and Ramsey (1985) indicate that the species prefers relatively stable substrates of gravel and sand in river channels with swift currents. Verified captures of Alabama sturgeon have primarily occurred in large channels of big rivers; in moderate to swift current at depths of 6-14 m (Williams and Clemmer, 1991). Alabama sturgeon appear to require strong currents in deep waters over relatively stable substrates for feeding and spawning, and they are not generally associated with unconsolidated substrates that settle in slower current areas (USFWS, 2000). In general, riverine (flowing water) habitats are required by the Alabama sturgeon to successfully complete its life cycle. Most other river sturgeons (*Scaphirhynchus* spp.) require extensive areas of flowing water habitats to complete their life cycle.

C.5 Diet

The Alabama sturgeon is a benthic omnivore. Examination of stomach contents of museum and captured specimens show that the Alabama sturgeon are opportunistic bottom feeders, preying primarily on aquatic insect larvae (Mayden and Kahajda, 1996). Other dietary items may include oligochaetes, mollusks, fish eggs, and small fish (Williams and Clemmer, 1991; USFWS, 2000). A recent study of the gut contents of 12 Alabama sturgeon specimens from the University of Alabama Ichthyological Collection shows that the aquatic larval insect families comprised the bulk of the stomach contents (Haynes et al., 2005). In terms of frequency, the most commonly found aquatic insect families were the following: Ceratopogonidae (biting midges), Heptageniidae (flathead mayflies), Chironomidae (midges), Gomphidae (damselflies and dragonflies), and Hydropsychidae (common netspinners), and Plecoptera (stoneflies). Based on the family assemblage present in the specimens examined, the feeding habitats of these individual sturgeon specimens shortly before they were captured are likely to have included relatively shallow, sandy bottom (low silt), moderate current areas, as well as deep swift water areas with a stable substrate (Haynes et al., 2005). Information on potential dietary preference variability between adult and juvenile Alabama sturgeon is not known.

C.6 Reproduction

Little is known of its life history, although the available data indicate that Alabama sturgeon are likely to migrate upstream during late winter and spring to spawn (Keenlyne, 1997). The capture of 12 individuals (including several gravid females) during a single collection trip near the mouth of the Cahaba River on March 21, 1969 suggests directional movements during the spawning season (Williams and Clemmer, 1991). Gravid Alabama sturgeon females with ripe eggs have also been collected during late March, April, and early May, which may indicate prolonged spring spawning or yearly variations in the occurrence of preferred spawning temperatures (Powell, personal communication, 2006). Actual timing of spawning during this period may also vary depending on temperature and river discharge.

Currents are required for the development of the sturgeon's adhesive eggs, which require 5 to 8 days to hatch (Burke and Ramsey 1985). Although specific locations have not been identified, eggs are presumably deposited on hard bottom substrates such as bedrock, armored gravel, or channel training devices in deep water areas, and possibly in some larger tributaries (Powell, personal communication, 2006).

C.7 Life Span and Growth

Sexual maturity of the Alabama sturgeon is believed to occur at 5 to 7 years of age. Spawning frequency of both sexes is influenced by food supply and fish condition, and may occur every 1 to 3 years. Age at first spawning in Alabama sturgeon is delayed in comparison to many other fish, and female sturgeons may not spawn for intervals of several years (Wallus et al., 1990). A recent attempt to propagate Alabama sturgeon at the Marion State Fish Hatchery indicates that males may also not spawn annually (USFWS, 2000). Therefore, the number of adult males and females capable of reproducing in a given year is much smaller than the actual numbers of adult sturgeon present.

Scaphirhynchus species larvae require highly oxygenated, flowing water for development. Sturgeon larvae are planktonic, drifting with river currents for 12-13 days after hatching, and exhibit a swim-up and drift behavior while floating in currents (Kynard et al., 2005). Research indicates that pallid sturgeon larvae (*S. albus*) can drift more than 125 miles during the first 11 days of the larval life stage, depending on water velocities, before settling to a benthic existence (Braaten and Fuller, 2005). This information suggests that Alabama sturgeon may require some minimum distance of flowing river conditions for development of larval to juvenile stage, and for sustainable recruitment of the species (Powell, personal communication, 2006).

The life span of the Alabama sturgeon is unknown. Although few individuals probably exceed 12-15 years of age (Mayden and Kuhajda, 1996), it is possible the species may life longer (USFWS, 2000).

C.8 References

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