



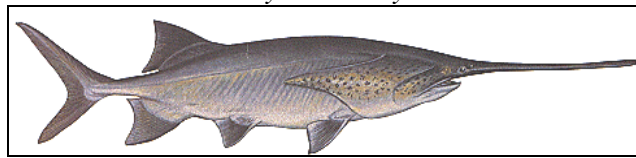
Life in the Rocks



The Newsletter of the Arkansas Game and Fish Commission Nongame Aquatics Program

Paddlefish

By Bill Posey



Polyodon spathula (Walbaum, 1792)

The American paddlefish (*Polyodon spathula*) and the Chinese paddlefish (*Psephurus gladius*) are the only living members of the family Polyodontidae. American paddlefish are native to the United States where they inhabit the Mississippi River and large rivers and associated oxbows connected to the Mississippi River.

In Arkansas, they are found in the Ouachita, White, Arkansas, St. Francis, Little, Sulphur and Red rivers and their larger tributaries like Roc Roe Bayou. It was first discovered in the 1500's by the Spanish explorer, Hernando De Soto. The Chinese paddlefish is only found in the Yangtze River in China.



Arkansas Game and Fish Commission Biologists release a paddlefish after recording biological data.

Photo by Keith Sutton.

The paddlefish faintly resembles a shark based on its tail structure, skin color, and lack of bones, but is more closely related to sturgeons than sharks. Other features of the paddlefish include a paddle-like snout and a gill cover that extends greatly toward the rear of the fish. The paddle was first believed to serve as a tool to disturb the bottom substrate or aquatic vegetation and allow the fish to capture organisms as they were dislodged. However, it was later discovered that the paddle was used as a sensory organ, enabling the fish to seek out zooplankton, tiny crustaceans found in the water column that are a preferred food source especially when they are young. As the fish swims through concentrations of zooplankton with their open mouth, zooplankton are funneled along the gill arches of the fish where the gill rakers filter out the plankton and move them toward the throat. Young paddlefish do not have the ability to filter feed and therefore use their paddle to locate individual zooplankton. It is interesting to note that many fish with damaged or missing paddles are as healthy as their counterparts with intact paddles. Because the skin resembles a catfish, fishermen in Arkansas often refer them to as "spoonbill catfish" although they are not at all related to catfish. Paddlefish must swim or stay in moving water to breathe (ram ventilation). Paddlefish are one of the largest North American fish and can reach lengths of over five feet and weigh more than 200 pounds.

The life expectancy of a paddlefish is greater than 15 years and has been reported up to 30 years. Most females in Arkansas do not develop eggs until they are 8-10 years of age but some may develop eggs at a younger age. Males produce sperm at a younger age and may spawn every year while females typically spawn every two to three years.

Arkansas paddlefish spawn in April-May when females move from the deeper pools to gravel bars in the rivers. The spawn usually follows heavy, spring rains that increase the flow and level of a river. Typically, several males swim beside a female and fertilize her eggs while swimming over the gravel bars. A female will continue passing over the gravel bars until she has no more eggs.

Once the eggs are fertilized, they become very sticky and adhere to hard surfaces, usually gravel, upon contact. Clean gravel and swift current are important for survival and hatching of eggs, which hatch in about seven days. The attached egg aids in hatching since the young are able to wriggle free of the egg. Hatchlings from unattached eggs have a harder time leaving the egg and many die. The mouthparts develop in 3-5 days and the paddle is usually developed after two weeks.

Paddlefish have been an important commercial fish in Arkansas over the last 100 years. The firm flesh lacks bones and the roe (eggs) have become important to the caviar industry since sturgeon populations have declined in the Caspian Sea of Russia and Iran. Commercial fishermen that purchase a special permit to capture and sell paddlefish meat and eggs may be paid \$30.00 per pound or more for eggs harvested from these fish. Since January 2001, over 20 tons of eggs valued at over \$1,000,000 have been harvested from Arkansas for use in the caviar industry. Sport fishermen are allowed to catch two paddlefish per day but are not allowed to sell the fish or any part of the fish including eggs. The Arkansas River is one of the most important rivers in the United States for the commercial harvest of paddlefish.

While several states have flourishing paddlefish populations, some paddlefish populations are declining in others. The major reason for these declines is likely dams that were placed on big rivers. These dams block annual migrations to spawning grounds, change the water quality and deposit silt over gravel bars where females once laid their eggs. Another reason for the decline may be overharvest during the late 1800's and early 1900's. Many states on the edge of the range of paddlefish had their populations wiped out by commercial ventures. Since paddlefish are no longer able to migrate into those waters due to dams, the populations have never recovered. Recent stocking efforts are returning paddlefish to their historic homes, but it is a slow process to return this fish to its former glory in some of those states.

The mission of the Nongame Aquatics Program is "... to wisely manage all native aquatic fauna of Arkansas in order to maintain viable populations and their habitats, while enhancing public appreciation of this resource."

Changing of the Seasons

By Kelly Irwin

Days are getting shorter; a chill is in the evening air; the leaves have taken on varied hues of yellow, red, orange, and brown; and lacy wisps of cirrus cloud drift amidst a crystalline blue sky. Fall has arrived. For many people our attention turns to college football games, sitting in a tree stand on opening day, raking leaves, or shopping for the upcoming holiday season. But for some of Arkansas' residents it is a time of life dependent activity – reproduction and avoidance of freezing temperatures. The behavior and activity level of amphibians and reptiles is dictated by the changing of the seasons. As temperatures decrease and precipitation increases autumn has the perfect conditions for increased movements and breeding activity in amphibians and reptiles.

Fall is a good time to observe snakes on warm sunny days as they move about for several reasons – breeding, dispersal, and movement to hibernacula. Several species of snakes actually breed in the fall; the young are born the following summer. Such species as the Timber Rattlesnake and the Redbelly Snake engage in fall mating, and males can be found

crossing country roads as they move across the landscape in search of receptive females. This is also the time for the young of the year to disperse from areas where they were born or hatched in late summer. Unfortunately this often results in juvenile snakes appearing in people's homes. The most frequent offender is the Black Ratsnake, a species that likes to live and hunt for rodents in and around human habitation.

Movements of snakes in the autumn are not limited to dispersal or reproduction, but are also necessary to avoid freezing temperatures. In the Ozark Highlands and Ouachita Mountains large snakes, such as copperheads, rattlesnakes, coachwhips, ratsnakes, and racers will congregate at rocky outcrops, ledges, or talus slopes, where they enter cracks or crevices that reach deep below the freeze line. Sites where multiple individuals and/or species congregate are referred to as "communal dens." In the Mississippi Delta and Coastal Plain snakes will overwinter individually in rotten tree stumps and root tunnels, or use abandoned animal burrows.



If you are driving on a warm rainy autumn night you may observe frogs, toads, and salamanders on the road. Some of these amphibian species may be moving to breeding sites. The first heavy rains in October will activate breeding in the Ringed Salamander, Marbled Salamander, and Southern Leopard Frog. The Ringed Salamander and Leopard Frog will deposit their eggs directly in rain filled pools, where the eggs hatch and larvae develop until metamorphosis in late winter or early spring. In contrast to this, female Marbled Salamanders will arrive at the dried beds of temporary woodland ponds to lay their eggs in shallow cavities formed under logs, leaf litter, or stones. The female remains with the eggs until rains fill the pond, the eggs hatch, and the larvae develop until metamorphosing in late winter or early spring.

Other amphibian species can also be detected in the fall, but not for their breeding activity. Autumn rains make it conducive for surface and sub-surface activity in many frogs and salamanders and they take advantage of these favorable conditions to feed before winter closes in. One can often hear the occasional creak, trill, or peep of Chorus Frogs, Spring Peepers, and Gray Treefrogs during or after periods of warm rainy weather, even though these species will not begin breeding until the following spring.

Alligators can be seen basking on sunny fall days. They generally stop feeding by mid October to early November, as cooler temperatures inhibit enzyme activity necessary for digestion of food items. Should an alligator feed during periods of cool temperatures it could die, as any ingested food would not be digested and would rot in the gut. Alligators avoid freezing temperatures in one of two ways: (1) by excavating a burrow into stream bank, levee, or abandoned beaver burrow; or (2) by staying in deep water where they remain submerged for extended periods of time, coming up to breath only once every hour or so, this is accomplished by lowering the heartbeat and metabolic rate.

Aquatic turtles and frogs will remain active during warm spells in the fall and early winter but they will wallow down into sediments on the bottoms of rivers, lakes, and ponds and remain submerged for extended periods during cold weather by lowering the metabolic rate. So as you watch the seasons change you can also observe changes in the level and pattern of activity in Arkansas' amphibians and reptiles. Changes necessary for their kind to survive the changing of the seasons.



Pebbles...

(Quick notes on what we've been up to...)

- We all three attended a Programs Section meeting at the Grandview Prairie Education Center.
- Bill assisted District 8 Fisheries Biologists with sampling on the Middle Fork Saline and Caddo Rivers.
- Kelly spent several weeks from late July through mid-September working on assembling and preparing field equipment and conducting fieldwork with researchers from Arkansas State University on ongoing hellbender monitoring in the Spring, Eleven Point, and White Rivers in Independence, Fulton, and Randolph counties.
- Bill attended the L'Anguille Watershed Workshop and displayed mussels found in Arkansas.
- Brian attended a meeting of the Southern Division AFS Nongame Aquatics Committee in Mobile, Alabama.
- Bill conducted surveys on the Black, White and Current Rivers for boat ramp construction/repairs.
- We all attended a Fisheries Division budget managers meeting in Monticello.
- Bill presented mussel information at the Underwater Arkansas program sponsored by the Education Division.
- Brian and Bill attended a meeting of AGFC's GIS Team.
- Bill conducted endangered mussel surveys on the Little Missouri River.
- Brian presented the Nongame Aquatics Program Plan to the Commission.
- Bill assisted the Stream Team by conducting a survey of Long Creek.
- Brian and USFWS Biologist David Kampwerth provided support for divers entering a Stone County cave in search of cave crayfish – the search was unproductive and will be repeated at a later date.
- Bill attended the Cross County Fair and displayed mussels from Arkansas.
- Brian assisted the Trout Program and District 2 with a fish survey of Big Spring in Cotter.
- Bill attended a meeting with US Fish and Wildlife Service, US Army Corps of Engineers and Arkansas Highway and Transportation Department to discuss the future of the endangered fat pocketbook mussel.

Brian Wagner, Nongame Aquatics Biologist - bkwagner@agfc.state.ar.us
 Bill Posey, Malacologist/Commercial Fish Biologist - brposey@agfc.state.ar.us
 Kelly Irwin, Herpetologist - kirwin@agfc.state.ar.us
 Arkansas Game & Fish Commission, 915 E. Sevier Street, Benton, AR 72015



The stippled darter (Etheostoma punctulatum) lives in spring-fed streams in north Arkansas. It grows to 3.5 inches maximum total length. (photo by Doyle Crosswhite of The Nature Conservancy)



Arkansas Game & Fish Commission
Nongame Aquatics Program
915 E. Sevier Street
Benton, AR 72015