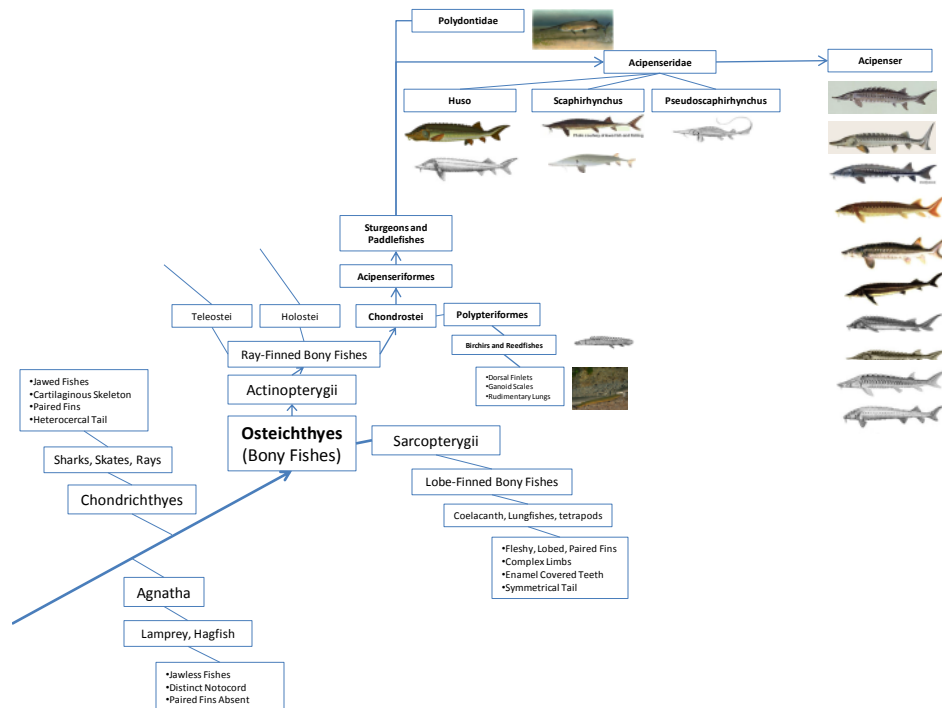


Morphological Phylogeny of Sturgeons

Biological Classification of Sturgeons and Paddlefishes

Kingdom	Anamalia	Multicellular organism	
Phylum	Chordata	Vertebrates	
Superclass	Osteichthyes	Bony Fishes	
Class	Actinopterygii	Ray-finned fishes	
Subclass	Chondrostei	Cartilaginous and ossified bony fish	
Order	Acipenseriformes	Sturgeons and Paddlefishes	
Family	Acipenseridae	Sturgeons	
		Genus	Species
		<i>Acipenser</i>	
		<i>Huso</i>	
		<i>Pseudoscaphirhynchus</i>	
		<i>Scaphirhynchus</i>	
Family	Polydontidae	Paddlefishes	
		Genus	Species
		<i>Polydon</i>	
		<i>Psephurus</i>	

Currently there are 31 species within the order “Acipenseriformes” which contains two paddlefish species and 29 sturgeon species. Sturgeons and paddlefishes are a unique order of fishes due to their interesting physical and internal morphological characteristics.



Acipenseriformes likely evolved between the late Jurassic and early Cretaceous geological periods (70 to 170 million years ago). The word “sturgeon” likely originated from the European derivative “sturio” or “stirrer”. These words likely refer to the feeding habits since sturgeon stir up the bottom of lake and rivers in which they inhabit to feed. Of those 29 sturgeon species listed by the World Sturgeon Conservation Society (<http://www.wscs.info/>), 9 of them are found in North American inland lakes and oceanic waterways.

North American Species of Sturgeon (Family: Acipenseridae)

	Common Name	Scientific Name	Home Range	Max Growth
1	Lake Sturgeon	<i>Acipenser fulvescens</i>	Great Lakes, St. Lawrence, Hudson Bay, Mississippi basins	8 ft 11 in
2	Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	Atlantic Coast	4 ft 8 in
3	Green Sturgeon	<i>Acipenser medirostris</i>	Pacific Coast	8 ft 2 in
4	Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	Gulf of Mexico	
5	Atlantic Sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>	Atlantic Coast and Gulf of Mexico	14 ft 1 in
6	White Sturgeon	<i>Acipenser transmontanus</i>	Pacific Coast	20 ft 0 in
7	Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Missouri and Mississippi Rivers	6 ft 6 in
8	Shovelnose Sturgeon	<i>Scaphirhynchus platyrhynchus</i>	Mississippi River	3 ft 3 in
9	Alabama Sturgeon	<i>Scaphirhynchus suttkusi</i>	Mobil basins in Alabama	

Lake Sturgeon (*Acipenser fulvescens*)



Figure 1. Emily Damstra

Lake sturgeon bear a single row of preanal shields. They lack a soft area on the top of the head and black viscera. Large blotches are present on anterior half of upper surface of snout and on back. Lower surface whitish. Inhabits bottom of lakes and large rivers. Usually in 5-9 m depth, over mud, sand, and gravel. Occasionally enters brackish water. A specimen caught in 1952 was reputed to have been 152 years old. Lake sturgeon search for food with the aid of the sensory ability of the barbels, by constantly moving close to the substrate. Lake sturgeon are opportunistic omnivorous, virtually anything edible that enters the mouth is sucked up and consumed. The food is worked or pulled in the mouth, often partly ejected and sucked in again. Spawning sites are rocky and boulder filled areas along the outside bend of rivers. (<http://www.fishbase.us/summary/Acipenser-fulvescens.html>).

Shortnose Sturgeon (*Acipenser brevirostrum*)



Figure 2. http://fieldguides.eol.org/fieldguide-view.php?guidekey=222&eol_id=206884&sci_flag=0

Shortnose sturgeon inhabit river mouths, lakes, estuaries, and bays; and occasionally enters the open sea. Maximum known age is 67 years for females and 30 years for males. Shortnose sturgeon meat is of good quality and eggs are suitable for caviar. Shortnose sturgeon have 33-42 dorsal soft rays and 18-24 Anal soft rays. Their snout is short, bluntly V-shaped, but not upturned at tip. Shortnose sturgeon have four short Barbels. Shortnose sturgeon fontanelle and post dorsal shields are absent. And they have a single row of pre anal shields, 6-11. Shortnose sturgeon also possess 7-13 Dorsal shields, and 22-34 lateral shields. Head and back dark, lower surface white. (<http://www.fishbase.us/summary/Acipenser-brevirostrum.html>).

Pallid Sturgeon (*Scaphirhynchus albus*)



Figure 3. <http://bsw.net/pallids/index.htm>

Pallid sturgeon inhabit large, deep, turbid river channels, usually in strong current over firm sand or gravel. They feed on aquatic insect larvae, particularly caddisfly (Trichoptera) larvae, and small fish. In North America, pallid sturgeon are nearly restricted to main channels of Missouri River and lower Mississippi River from Montana to Louisiana. (<http://www.fishbase.us/summary/Scaphirhynchus-albus.html>).

Shovelnose Sturgeon (*Scaphirhynchus platorynchus*)

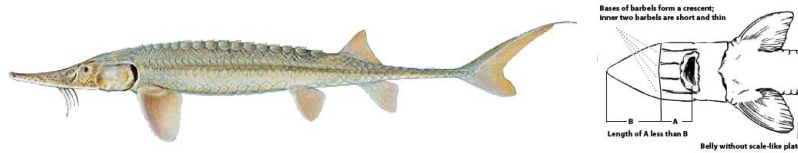


Figure 4. <http://www.agfc.com/species/Pages/SpeciesWildlifeDetails2.aspx?Title=Shovelnose%20Sturgeon>

Shovelnose sturgeon inhabit the bottom of main channels and embayments of large turbid rivers; frequently in flowing water over sand and mixed with gravel and mud. They feed primarily on larvae of aquatic insects (especially burrowing mayflies (Ephemeroidea), caddis (Trichoptera) larvae and midge (Chironomidae) larvae), worms, and crustaceans. Spawning occurs from April to June in large rivers in areas of swift current and coarse substrates. In North America Shovelnose sturgeon are in the Mississippi River basin from west Pennsylvania to Montana and south to Louisiana; Mobile Bay drainage, Alabama and Mississippi; upper Rio Grande, New Mexico. (<http://www.fishbase.us/summary/Scaphirhynchus-platorynchus.html>).

Green Sturgeon (*Acipenser medirostris*)



Figure 5. [Allfishingbuy.com](http://www.allfishingbuy.com)

Green sturgeon are found in estuaries, lower reaches of large rivers, and in salt or brackish water off river mouths. Green sturgeon likely spawn in fresh water. Green sturgeon may migrate considerable distances in the ocean. Their meat, although edible possesses a disagreeable taste and unpleasant odor. Green sturgeon have 33-35 soft dorsal rays and 22-28 soft anal rays. They have a single row of 1 to 4 bony plates along the midventral line between the anus and the anal fin, and about 33 to 35 rays in the dorsal fin. The dorsal fin arises at posterior third of the total length; anal fin arises under posterior part of dorsal. The pectoral fins originate low on the body just behind the gill opening (operculum) and are large and rounded. The pelvic fins arise near the anus. Green sturgeon are generally olive to dark green in color, while their lower parts more or less whitish green. They possess a longitudinal olive-green stripe on each side between lateral and ventrolateral plates, and another on midventral surface. Their fins are grayish to pale green. (<http://www.fishbase.us/summary/Acipenser-medirostris.html>)

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)



Figure 6. http://images3.enature.com/fishes/fishes_m/fi0193_1m.jpg

Atlantic sturgeon are an Anadromous species. They are often found solitarily or in small groups. Atlantic sturgeon inhabit shallow waters of continental shelves. At the sea, Atlantic sturgeon occur in coastal and estuarine areas on soft bottom down to a depth of 50 m. Adult Atlantic sturgeon are highly migratory while at sea and make long migrations along the coast. They forage mainly in brackish waters but ascend large rivers to spawn. Juveniles may remain in fresh or brackish water until 2-5 years of age. Tagging studies have shown that this species may move distances up to 1,450 km (900 miles). Atlantic sturgeon are nearly threatened globally. For example they are extirpated in Europe due to massive overfishing, damming, river regulation and pollution. Atlantic sturgeon have approximately 30-46 soft dorsal spines and 22-32 soft anal spines. They possess a double row of pre anal shields as well as a soft fontanelle. The head and back of an Atlantic sturgeon is bluish-black and lower surface a whitish color. Their snout is long, sharply V-shaped with 2 pairs of short, slender barbels in transverse line midway between end of snout and anterior edge of mouth. Atlantic sturgeon are located in the Western Atlantic: Hamilton River, Labrador, Newfoundland, Canada to northeastern Florida, USA. They are occasionally found in Bermuda and French Guiana. Recent research revealed that this nearly globally extinct species existed in the Baltic Sea, but is now extirpated in that region. (<http://fishbase.org/summary/speciessummary.php?id=2593>).

Alabama Sturgeon (*Scaphirhynchus suttkusi*)



Figure 7. <http://gallery.usgs.gov/photos/360>

Pallid sturgeon were only recently identified as a genetically distinct species. They are found in Mobil basins in Alabama, USA. Due to critically low population numbers, information on this species' life history and ecology is relatively unknown. (<http://www.fishbase.us/summary/Scaphirhynchus-suttkusi.html>).

White Sturgeon (*Acipenser transmontanus*)

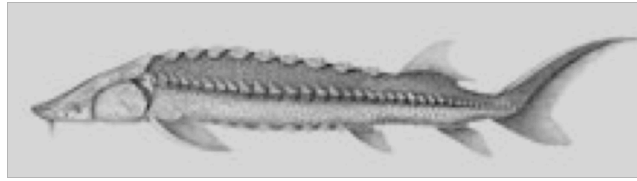


Figure 8. http://en.wikipedia.org/wiki/White_sturgeon

The white sturgeon spends most of its time in the sea, usually close to shore. They enter estuaries of large rivers and moves far inland to spawn where habitat is accessible. White sturgeon larger than 48.3 cm feed mainly on fishes; smaller ones feed mainly on midge larvae (Chironomidae), but they also consume small crustaceans, other insects and mollusks. Feeding of adult white sturgeon ceases just before spawning. Historically, the airbladder from white sturgeon was made into isinglass, which is used for clarification of wine and beer. White sturgeon possess 44-48 soft dorsal spines and 28-31 soft anal rays. White sturgeon are distinguished by the 2 rows of 4 to 8 bony scutes on a mid-ventral line between the anus and anal fin. Also, white sturgeon have about 45 rays in the dorsal fin. They are gray or brownish above, a paler color below while their fins are gray. In the Eastern Pacific, white sturgeon can be found in Alaska Bay to Monterey, California, USA. Many Landlocked populations in Columbia River drainage exist, as well as in Montana. (<http://www.fishbase.us/summary/Acipenser-transmontanus.html>).

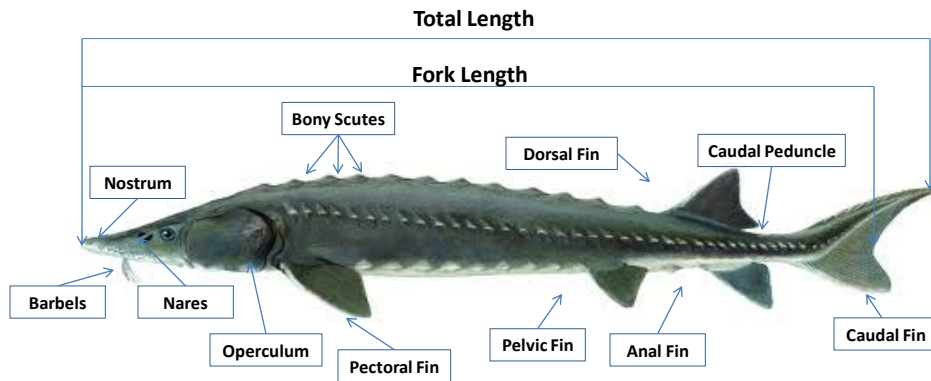
Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)



Figure 9. <http://www.landbigfish.com/fish/fish.cfm?ID=193>

The Gulf sturgeon is a sub-species of sturgeon that was not recognized until the 1950's.

Fish Anatomy (with emphasis on lake sturgeon)



A Key to the Families of Great Lakes Fishes (structure from Project FLOW)

