

Kaluga (Great Siberian) Sturgeon



Yuzhno-Sakhalinsk

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INTRODUCTION

Kaluga is a representative of the ancient fish family of sturgeons. Scientists believe that the sturgeon family originated more than 250 mil. years ago.

3 species of sturgeons occur in the Amur river basin: Kaluga or Great Siberian sturgeon (*Huso dauricus*), Amur sturgeon (*Acipenser schrencki*), and Sakhalin sturgeon (*Acipenser mikadoi*). They all make long migrations: Amur sturgeon travels down to the Amur river estuary, while Kaluga moves out into the Okhotsk Sea and the Sea of Japan, reaching Kamchatka, the Kuril Islands, Hokkaido, and even Primorskii region of Russia! Sturgeon migrations total up to several thousand kilometers in distance.

Amur is virtually the only Eurasian river where sturgeon populations are not split up by large dams. In spite of the fact that fishing for sturgeon species is prohibited, their numbers are decreasing year after year. Illegal fishing is the primary reason for kaluga and Amur sturgeon decline.

Kaluga was considered one of the most valuable commercially targeted species in the past. At the end of the XIX century, its harvest in the lower Amur river reached up to 580 metric tons. Kaluga stocks were exhausted back at the turn of XIX and XX centuries. Today, according to some estimates, kaluga populations abundance amounts to only 50-55 thousand mature individuals (15 years and up in age and 5-60 kg in weight, 180 cm in length).

Zeya-Bureya kaluga populations and Amur sturgeon are Red-book listed as Category 1 ETP species in Russia: “endemic species population in danger of extinction”. In the Sakhalin region Red book (ETP) list, this species is listed under Category 2, as “species steadily declining in numbers that may enter Category 1 in near future if left under continued negative impact by various factors”. All Amur river sturgeon species are registered in the Red List of Threatened Species by the International Union for Conservation of Nature (IUCN).

Kaluga is also listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Attachment #2).

BIOLOGY

Species Classification:

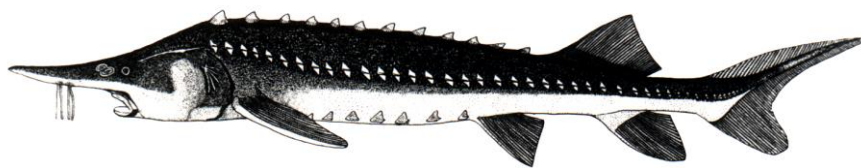
Class **TELEOSTOMI (ACTINOPTERYGII, OSTEICHTHYES)** – **Bony fishes**

Order **Acipenseriformes** – **Ray-finned fishes**

Family **Acipenseridae** – **Sturgeon**

Genus ***Huso*** BrandtetRatzeburg, 1833

Species ***Huso dauricus*** (Georgi, 1775) – Kaluga.



Distribution

Kaluga were formerly believed to be an exclusively freshwater fish. Today it is known that juveniles (approximate weight 30-50 kg) occupy large marine territories in addition to their freshwater habitat.

Kaluga’s freshwater range is identical to that of the Amur sturgeon, as they both are found in the several thousand kilometers stretching from the brackish waters of the Amur Bay to the Amur river upper reaches. Its distribution also includes basins of the rivers Shilka, Argun, Zeya, Bureya, Songhua, Ussuri (including Lake Khanka), Amgun, and flood-plain lakes in the lower Amur sections, such as Orel-Chlya, Kadi, Kizi, Bolon, and others.

Their marine distribution runs along the northern shores of the Sea of Okhotsk (Amur river basin, Okhota, Kukhtui, Tauiskaya inlet, north-western Kamchatka) south all the way to Tartar Strait (the

Sea of Japan), and northern coasts of Hokkaido Island (southern parts of the Sea of Okhotsk). Kaluga is found mainly within the shelf boundaries at the depths of 1-50 m.



Interview surveys with fishermen revealed that individual kalugas are encountered from time to time in catches off the coasts of the Okhotsk and Magadan districts, although not every year. In the Ayano-Maysky district, individual kaluga catches are reported annually; in the Tuguro-Chumikan district - every year and up to several dozen. Once, when a local resident of the Vanino district was asked to take a picture of Sakhalin sturgeon caught in the Tumnin river, he provided Khabarovsk branch of TINRO with images of... kaluga. Apparently, young kalugas are being harvested by local residents out of the Tumnin river and continental coasts of Tartar Strait in even greater numbers than Sakhalin sturgeon. Young kalugas have also been found in rivers of South Primorye. Since individual kaluga encounters have been registered off Hokkaido Island, its distribution includes waters off the coast of the entire Sakhalin Island, not only its northern areas.

Along the north-west coast of Sakhalin, Great Siberian sturgeon is found directly in the north of the island and down to Tyk Bay reaching the town of Aleksandrovsk; they sometimes enter river estuaries (Viakha river). **Only immature fish are found in the northern areas of the Sea of Okhotsk.**

According to current data provided by the Department of Fishery Management in the Heilongjiang Province, mature kalugas do not migrate upstream above the city of Blagoveshchensk. However, on 05/25/2018, a media report came through of a kaluga catch in China: a large kaluga was harvested in the Amur River near the city of Fuyang in North-East China (Heilongjiang Province). It was reported that the fish was at least 100 years old weighing 514 kg and 3.59 m in length. The giant was purchased by a local fish rearing company.

Discription

Kaluga's physical appearance is similar to that of white sturgeons, except for a fewer number of dorsal fin rays (less than 60), a much larger mouth, and a bigger first dorsal scute. The anal fin contains 26-35 rays. The fish has 10-16 dorsal, 32-45 lateral, and 8-12 ventral scutes. Between the scutes, the body is covered with tiny denticles, although some larger representatives of the species may carry

larger circular platelets. Among the dorsal scutes, the first one is the largest in size. Their mouth is huge, resembling half-moon and partly entering the sides of the head. Barbels are smooth, not fringed. The back is grey-green or grey-black in color, while the belly is yellowish white or white.

Size and Weight

Kaluga can be very large with length more than 4 m weighing up to 800-1000 kg. According to data provided by Berg (1949), there was kaluga found in the Amur River estuary with the following characteristics:

Age, years	Amur estuary	
	Length, cm	Weight, kg
2 – 4	71	2,0
5 – 7	101	5,3
8 – 10	143	20,3
14 – 16	209	61,7
20 – 22	245	102,4
29 – 31	275	149,7
38 – 40	297	193,3
47	328	248,0

Life Expectancy V.K. Soldatov identifies kalugas weighting 656 kg as being 50-55 years old. However, according to mass media reports, the fish caught on 05.25.2018 in China that weighted 514 kg and was 3.59 m in length, was no less than 100 years in age.

Diet

Kaluga is a typical aggressive predator that feeds on smaller sturgeon and invertebrates in its first years of life. Kaluga fry feed on mosquito larva and freshwater shrimp, mysids among others. As young fish, kaluga eat minnows, lamprey, ide, juvenile dace and more. Mature kaluga feed primarily on fish: lamprey, chum salmon, pink salmon, carp, ide, and silver carp. In the Amur estuary, their primary food source are chum and pink salmon. Besides those, it feeds on lamprey, shrimp, herring, smelt, whitefish, cod, flounder, and – before the pink salmon run begins – its own juveniles. Feeding continues through the winter. The predator’s mouth, when open, resembles a pipe: it literally sucks the prey in together with the water flow. The fish’s appetite is quite extensive – kaluga can easily swallow a meter-long chum or pink salmon – and its stomach is able to fit up to ten fish of that size. Such appetite allows the species representatives to grow quickly and reach substantial size.

Life History

There are 2 forms of Great Siberian sturgeon: an estuarine, semi-anadromous form that enters the Amur to spawn, and a freshwater resident form. The resident form of Amur kaluga does not migrate large distances along the Amur river and resides in relatively isolated colonies within the river. Juveniles may enter lakes for rearing. During winter months, kaluga gather in the mainstream Amur channel. It does not utilize wintering holes.

Anadromous kaluga of the estuarine form enter the river at different stages of maturation: some with mature reproductive products - they spawn in the lower river sections; and others at early stage of reproductive development that migrate far upstream, all the way to Blagoveshchensk and further. The latter can spawn in the spring (overwintering in the river) or in the fall (fall-spawning).

Maturation

The maturation age is quite old. According to some source, the fish enter reproductive age at 16-17 years at a length of more than 2 meters. Berg provides a maturation age of 18-20, with a length of about 230 cm and weight 80 kg.

Reproduction

Great Siberian sturgeon spawn only in sandy or pebble riverbeds, on pebble and sand bars within the main Amur channel at the depth of 3 to 7 m. Spawning grounds begin at the distance of just several kilometers from the Amur River mouth, with more spawning grounds at Sredne-Tambovskii, below Troitskoye village, at the exit of the Gionskaya arm, 65-70 km below Khabarovsk, 100 km above Khabarovsk, and more. At the nearest to Khabarovsk location, spawning occurs in June (water

temperature 12-14°C). Sometimes spawning is delayed until July. The eggs are large, 3.6-4 mm in diameter, and viscid, thus attaching to the benthic substrate. Adult kalugas spawn not every year but skipping a year or two. As the fish ages, the time between spawning events increases to 3, 4 years and more. V.K. Soldatov's data shows that kaluga fecundity at the length of 2.45 m and weight of 150 kg comes to 665 thousand eggs.

Development

Embryonic development with water temperature of 18.3°C continues for about 108 hours, while the water temperature of 9-10°C slows it down to 15-16 days. Hatchlings measure 10-14 mm in length. The hatched out fry begin feeding 8 days after emerging with water temperature of 20.5°C and 16 days after hatching when water temperature is 15°C with the length of 20 mm. Recently hatched yolk sac larva are carried downstream with the Amur current. By the end of fall, the fry are 20-30 cm in length and weighs 10-100 gram. Yearlings measure 35 cm on average and weigh 146 gram.

Natural predators

Since kaluga is a predator and reaches very large sizes, it is not preyed on by other animals in its natural environment. However, kaluga is a valuable commercial resource – a real “treasure chest” for a fisherman; its meat is tender and delicious. To top it off, this fish has almost no bones at all, which makes it a target of large scale illegal harvest. Poachers illegally take immature individuals weighing 5 to 20 kg, subsequently decreasing the population abundance. Another cause of population decline is the loss of feeding and spawning grounds as a result of human activities (sand and gravel removal from the Amur channel, in-river construction, increase of water pollution in the Amur and its tributaries by industrial and agricultural drainage, and other).

FEDERAL STATUTORY LAWS OF THE RUSSIAN FEDERATION ON KALUGA CONSERVATION

The issue of kaluga catch by beach seining is regulated by 4 main documents:

- Federal Law # 52-FZ from 04.24.1995 “On Wildlife”
- Federal Law # 7-FZ from 01.10.2002 “On Environmental Protection”
- Federal Law #166-FZ from 12.20.2004 “On Fishing and Conservation of Aquatic Biological Resources”
- Fishing Regulations for the Far Eastern Fishery Basin.

I. Federal Law # 52-FZ from 04.24.1995 “On Wildlife”

Article 24. “Protection of rare and endangered wildlife” states: Actions that may lead to loss, abundance decrease, and habitat quality decline of the wildlife listed in the Red Book are prohibited. Legal entities and citizens conducting economic activities on land and aquatic habitat areas of Red Book-listed animals carry responsibility for conservation and reproduction of these wild animals in accordance with the laws of the Russian Federation and the laws of the constituents of the Russian Federation.

II. Federal law # 7-FZ from 01.10.2002 «On Environmental Protection»

Article 60. “Protection of rare and endangered plants, animals, and other organisms” states: Activities that lead to abundance decrease and habitat quality decline of the plants, animals and other organisms listed in the Red Book of the Russian Federation and the red books of the constituents of the Russian Federation are prohibited.

Established by Article 75 liabilities for the infringement of the environmental protection legislation provide for property, disciplinary, administrative and criminal liability.

In 2013, Great Siberian sturgeon, Amur and Sakhalin sturgeon were entered into the list of valuable species, illegal fishing of which is considered a criminal offence.

III. Federal Law # 166-FZ from 12.20.2004 “On Fishing and Conservation of Aquatic Biological Resources”

Article 27. “Restriction on catch (harvest) of rare and endangered aquatic biological species” states: for the purpose of conservation of the aquatic biological species listed in the Red Book of the Russian Federation and (or) red books of the constituents of the Russian Federation, their catch (harvest) is prohibited.

IV. Fishing Regulations for the Far Eastern Fishery Basin

Harvest of all sturgeon species is prohibited.

In the event of accidental by-catch of any prohibited aquatic biological species (including sturgeon), they should be released into the natural environment with least possible damage but regardless of their condition.

In addition, the liability for the harvest of kaluga is established under the Criminal Code of the Russian Federation:

Article 256. Illegal catch (harvest) of aquatic biological resources

1. Illegal catch (harvest) of aquatic biological resources (with the exclusion of aquatic biological resources of the continental shelf of the Russian Federation and the exclusive economic zone of the Russian Federation), if such action is conducted:

(Federal Law issued 06.27.2018 N 157-FZ)

- a) with the infliction of major damage;
- b) with the use of motorized watercraft or explosive and chemical substances, electrical current or other prohibited devices and means of mass extermination of aquatic biological resources;
- c) on spawning grounds or migratory routes to those areas;
- d) on specially protected natural territories or ecological disaster zone, or ecological emergency zones, -

are punishable by a fine in the amount of three hundred thousand to five hundred thousand rubles or in the amount of the convicted person’s salary or another type of income for the period of two to three years, or involuntary labor for a term of up to four hundred eighty hours, or correctional labor for up to two years, or imprisonment for the same term.

FEEES

FOR CALCULATION OF THE EXTENT OF DAMAGE INCURRED BY AQUATIC BIOLOGICAL RESOURCES

(Established by the degree of the Government of the Russian Federation
from November 3, 2018 # 1321)

Great Siberian sturgeon – 269,250 (two hundred sixty-nine thousand and two hundred fifty) rubles for 1 individual fish regardless of size and weight.

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