

SIBERIA'S BLACK GOLD:

HARVEST AND TRADE IN AMUR
RIVER STURGEONS IN THE
RUSSIAN FEDERATION

ALEXEY VAISMAN AND PAVEL FOMENKO

A TRAFFIC EUROPE REPORT

TRAFFIC

the wildlife trade monitoring network

This report was published
with the kind support of



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Suggested citation: Vaisman, A. and
Fomenko, P. (2006). *Siberia's black gold:
harvest and trade in Amur River sturgeons
in the Russian Federation*. TRAFFIC
Europe.

ISBN 978-2-930490-05-2

Front cover photograph:

Sun shines on the Amur floodplain, Russian
Federation.

Photograph credit: Hartmut Jungius/WWF-
Canon.

Printed on recycled paper.

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Credit: WWF Russia

Kaluga *Huso dauricus*

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ACKNOWLEDGEMENTS

This study and the publication of the report were possible with the financial support of WWF Germany and the Global Species Programme of WWF, the global conservation organization. The Rufford Maurice Laing Foundation is also gratefully acknowledged for its generous support to TRAFFIC.

This project was undertaken with the support of many people both in Moscow and in the Russian Far East. The authors would like to thank the project field staff who worked selflessly on the shores of rivers interviewing local fishermen and took risks contacting poachers and shadow traders. Among the field executants we want especially to thank Sergey Kuznetsov, whose enthusiasm was the real engine that drove this project's field activities.

We extend our appreciation to regional staff from the Far-Eastern Customs Directorate, Khabarovsk Inter-district Nature Conservation Prosecutor's Office, the Service for State Hunting Inspectorate and the Amur Basin Authority for the Protection of Fish Resources and Fishing Supervision (*Amurrybvod*: currently known as the Directorate of Federal Services for Veterinary and Phytosanitary Control for Khabarovsk Krai and Yevraiskaya Autonomous Oblast), who supported our work with their knowledge and professional experience.

Special thanks to Dr Georgy Ruban, who was a reviewer of the report and an advisor on all sections concerned with biological characteristics of Amur River sturgeon species.

The authors acknowledge the assistance of Carol Inskipp in editing the English of this report.

The assistance of TRAFFIC staff Alexander Shestakov, Caroline Raymakers, Stephanie von Meibom and Maylynn Engler in the final stages of preparation of this report is much appreciated.

EXECUTIVE SUMMARY

Three species of sturgeon inhabit the Amur River, the Kaluga *Huso dauricus*, the Amur Sturgeon *Acipenser schrenckii* and the Sakhalin or Green Sturgeon *A. mikadoi*. The first two species (hereafter referred to collectively as Amur River sturgeons) are the focus of this report and are endemic to the Amur River basin, where they are widely distributed. Both the Russian Federation and China are Amur River sturgeon range States, but the scope of this report centres on the Russian Federation. As with other sturgeon species in the Russian Federation, Amur River sturgeons are harvested chiefly for caviar, the unfertilized eggs, or roe, of the females, one of the most valuable wildlife commodities. Currently the population status of both the Kaluga and Amur Sturgeon elicits conservation concern and in 1996 the species were classified as Endangered by IUCN.

The objectives of this study are to report on the population status of the Kaluga and Amur Sturgeon, evaluate legal fishing and illegal harvest of the sturgeons, and assess efforts to prevent illegal sturgeon fishing in the Amur River basin. The study also investigates legal and, where possible, illegal trade in caviar and meat of Amur River sturgeons. Recommendations are directed to the Russian Federation Government, the Government of the People's Republic of China, the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and non-governmental organizations. The recommendations aim to enhance protection and growth of Amur River sturgeon stocks and to prevent illegal fishing and illegal trade of sturgeons in the Amur River basin.

Surveys conducted in 2000 and 2003 in the Russian Far East form the basis of this investigation, during which visits to Amur River sturgeon wintering and spawning sites were made; local Amur communities were visited and residents, including poachers, were interviewed; government officials knowledgeable about and/or responsible for Amur River sturgeons and their trade were interviewed; and markets for sturgeon products were visited. Published literature on Amur River sturgeons was also used to inform this study.

Published texts record populations of Amur Sturgeon and Kaluga in decline, for over a century in the case of the latter. Captive breeding establishments in the Russian Federation and China do not appear to be boosting wild populations.

All sturgeon species in the Russian Federation are considered a “federal resource” and are managed by the federal authorities. As a result of the sharp decrease in sturgeon stocks, sturgeon fishing for commercial purposes was banned in the Russian Far East by these authorities during the periods 1923–1930, 1958–1976, and from 1984 to the present.

Current legislation regulating the catch and use of aquatic biological resources, including sturgeon, is inadequate and complex. For example, on the domestic market, sturgeon products are required to be accompanied only by documents that confirm their conformity with sanitary requirements and quality standards, and none regarding their legal origin.

Documented catches of Amur River sturgeons chart their decline. Historically, sturgeons played an important economic role on the Amur shores, both Russian and Chinese, and in the late 19th century the quantity of sturgeon harvested in the lower reaches of the Amur River was more than double the present Russian catch in the Caspian Sea Basin. From the early 20th century, catches decreased significantly, however, and by 1947 they were less than a tenth of their 1891 levels. Overall decline has continued into the 21st century. A similar decline has been documented in the Chinese part of the Amur River basin.

Despite these declines and the ban on commercial fishing in place since 1984, Amur River sturgeons can be harvested through “test fishing”, which is carried out by the Khabarovsk Branch of the Pacific Research Institute of Fisheries with the aim of population monitoring. However, while this is said to be the aim of test fishing, it is used as a cover for commercial fishing and is a source of Amur River sturgeon caviar that is then commercially traded. Because of this, the ban has not had a significant impact on catches and, moreover, actual catch levels are in excess of those recorded, as a result of illegal fishing. The impact on stock levels is indicated by the fact that fishers found it difficult to fulfil even small quotas, such as those given in 2002 and 2003 for scientific purposes (as distinct from test fishing)—only three tonnes for Amur Sturgeon and 10 t for Kaluga, per annum. Residents of coastal settlements surveyed during this study unanimously confirmed that during 2002, 2003 and 2004 sturgeons had become noticeably fewer and a further indicator of over-fishing is the drop in the average weight of individual fish. In 2002–2004, the average weight of a Kaluga ready to spawn was found to be 99.4 kg, equivalent to the average weight of a Kaluga female that is a first-time spawner. This suggests that the sexually mature population comprises a high proportion of first-time spawners, which in turn indicates that practically all Kaluga entering the river to spawn are caught in their first reproductive year.

Since local criminal groups reportedly control nearly all sturgeon fishing in the Amur River basin, the activities of fishery enforcement agencies are ineffective. Furthermore, while there are examples of honest and devoted fishing inspectors, there is also corruption among them and the majority of poachers are able to pay for the “right” to catch sturgeon for RUB20 000–30 000 (USD656–985) a season. Fishermen also reportedly pay a “natural tribute”, whereby part of the illegal catch is “confiscated” by inspectors who do not then pursue the violation of fishing regulations.

The trade in caviar and sturgeon meat is the main motivation both for legal and illegal harvests of Amur River sturgeons. Some fishers and poachers interviewed believed that the legal trade was insignificant, whereas the illegal trade was a well-organized business which appeared to be influenced strongly by high-placed bureaucrats in local administration and/or defence and law enforcement agencies. The quantity of sturgeon harvested annually by poachers in the Russian Federation from the Amur River is many times more than the allowed catch. For example, in 2002, an estimated 800 kg of Amur River sturgeon caviar, maximum, could have been harvested legally based on the Total Allowable Catch

(TAC) that was approved for test fishing for that year. However, the total quantity of caviar that received official veterinary certification by authorities was 2173 kg.

The products of poached Amur River sturgeons are mostly consumed on the domestic market. Often meat and caviar are sold openly in markets, shops, and via advertisements. Amur Sturgeon and Kaluga dishes are widely offered on restaurant menus. Kaluga caviar can also be purchased online in Moscow. In 2005, prices ranged from RUB1500 (USD49) to RUB7500 (USD246) for one kilogramme of caviar and from RUB100 (USD3.3) to RUB200 (USD6.6) for one kilogramme of sturgeon meat. From 2000 to 2003, 6469 kg of sturgeon caviar was confiscated by the Khabarovsk Krai government and it is very likely that the majority of this caviar was sold.

All Acipenseriformes occurring in the Russian Federation, including the Amur River sturgeons, were listed in CITES Appendix II in 1997, since when the number of attempts to transport sturgeon products illegally across the Russian Far East border increased sharply, especially to China. At this border, the Russian Far-Eastern Customs Directorate seized around 8000 kg of caviar and 18 000 kg of sturgeon meat, 1999–2004. According to the Customs Directorate, most smuggled sturgeon products go to China, and often from there to the USA. Japan is also an important destination. In addition to smuggled trade, some illegal export appears to have taken place with official documentation, since caviar in excess of the amount calculated to be obtainable from legal catch was exported with government permits, and even in years when there was no official export quota.

Recommendations:

The rehabilitation and conservation of Amur River sturgeon populations will require concerted efforts at the local, regional, federal and international levels. The following recommendations, framed to achieve these ends, are based on the findings of this study.

At the federal level, the Government of the Russian Federation should:

- Clearly define “test fishing”, as well as its status and its limits.
- Whether through test fishing or other means, develop a scheme for monitoring sturgeon populations in the Amur River basin, including an analysis of the spawning and immature age classes and also the size of commercial stocks.
- Maintain the ban on commercial sturgeon fishing in the Amur River, allowing catch only for broodstock destined for artificial reproduction, for restocking and scientific purposes.
- Amend the legislation pertaining to violations regarding the illegal fishing of sturgeons in the Amur River, in collaboration with ICPO-Interpol and the World Customs Organization, to address current regulatory gaps, develop clear criteria to categorize the levels of infringements, and define the

appropriate legal jurisdiction for prosecutions. Additionally, fines and penalties should be increased and a qualifying clause should be introduced into Article 256 of the Criminal Code of the Russian Federation to refer specifically to sturgeon species.

- Require that all domestic transport of sturgeon products needs a unique permission form, which should be given to enterprises that are engaged in legal sturgeon fishing and trade, and ensure that these permission forms cannot be duplicated or fabricated.
- Introduce the mandatory destruction of all confiscated sturgeon products and disallow the re-selling of confiscated sturgeon meat and caviar.
- Establish and advertize a telephone hotline that allows the public to inform fisheries enforcement bodies of any illegal activities related to the fishing of and trade in sturgeons, and other protected aquatic resources.
- Organize a regional working group of governmental agencies, including representatives from the commercial sector and representatives on non-governmental conservation organizations, to develop a long-term strategy to preserve and restore Amur River sturgeon populations, including:
 - Development of sturgeon aquaculture to increase the quantity of juvenile fish released, to meet demand for sturgeon meat on the domestic and international markets, and to satisfy international markets for fertilized eggs and juvenile sturgeons.
 - Assessment of the possibilities, risks and benefits of developing social programmes for the re-training of sturgeon fishers, possibly including fishing tourism in the Amur River basin, including sport fishing for sturgeon.
 - Develop guidelines that will encourage the processing of sturgeon by-products that are currently not marketed, such as skins, cartilage, etc., which could be used to bring added value to the sturgeon fishery.
- Engage in dialogue with the governments of the People's Republic of China, Japan and the USA regarding illegal trade in caviar to those countries.

At the regional level, the Government of the Russian Federation should:

- Create passive physical defences of existing spawning grounds by lining them with specially prepared obstructions such as “hedgehogs”, in accordance with established procedures for the administration of district water ways and hydraulic work.
- Conduct unplanned and unannounced raids of shops and markets that sell fish products, to identify individuals who buy sturgeon and sturgeon caviar harvested illegally and who sell illegal sturgeon products. The raids should be conducted by the Khabarovsk Interdistrict Nature Conservation Prosecutor's Office, together with representatives of internal affairs bodies and staff from the trading inspectorate of the Khabarovsk Krai Administration.
- Consider the possibilities of creating specialized raid groups to protect sturgeon in the Amur River basin.

The Governments of the Russian Federation and the People's Republic of China should:

- On the basis of the existing intergovernmental Agreement on the Amur and Ussuri Rivers, jointly develop and introduce a plan to manage and restore sturgeon populations, address the potential impacts of aquaculture, and create a permanent Russian-Chinese working group, to advise the CITES Management Authorities and controlling agencies in both countries on the appropriate measures to be taken by relevant authorities.
- Develop policies and memoranda of understanding between themselves, to work towards harmonizing regulations and legislation regarding Amur River sturgeons, to ensure regional co-operation in order for sturgeon conservation efforts in the Amur River basin to occur successfully.

The CITES Secretariat should, in accordance with *Resolution Conf. 12.7 (Rev. CoP 13)*:

- Call upon consumer countries of the Amur River sturgeon products to provide financial and technical assistance to range States, i.e. the Russian Federation and China, in order to:
 - Combat illegal fishing of and trade in Amur River sturgeons, and
 - Undertake further research to clarify the status of the Amur River sturgeon populations.

The Animals Committee should:

- prepare a report on the status of Kaluga and Amur Sturgeon populations, their population dynamics and structure.

Non-governmental organizations should:

- Provide assistance to scientific and governmental organizations in organizing the monitoring of Amur River sturgeon populations, their harvest, and the market for sturgeon products.
- Provide assistance in creating specialized anti-poaching raid groups, especially in staff training, technical equipment, and legal support for these groups' activities.
- Support and initiate activities aimed at increasing the capacity of Russian and Chinese Customs and environment agencies to halt the illegal trade in Amur River sturgeons.

BACKGROUND

The Amur River is the longest undammed river in the Eastern Hemisphere. The waters form the border between the Russian Far East and the Heilongjiang province of eastern China. Born in the Khentii mountain range of north-eastern Mongolia, the Amur reaches the Sea of Okhotsk after a circuitous, 4500-km journey through the heart of a remarkable wilderness. The biologically productive river and its large estuary are favourable to the development of large sturgeon populations (Vaisman and Raymakers, 2001) and the family Acipenseridae is represented in the Amur River basin by three species: the Kaluga *Huso dauricus*, Amur Sturgeon *Acipenser schrenckii*, and Sakhalin (or Green) Sturgeon *A. mikadoi*. Both the Kaluga and Amur Sturgeon are endemic to the Amur River basin. The Kaluga is a large, long-lived, late-maturing species, while the Amur Sturgeon is a smaller species, maturing earlier than the Kaluga (Pikitch *et al.*, 2005). The Sakhalin Sturgeon occurs only occasionally, mainly as immature fish that enter the Amur River estuary (Nikolsky, 1971) and historically only five to 10 individuals have been caught annually (Krykhtin and Svirskii, 1997a).

The Kaluga and Amur Sturgeon, which form the focus of this report and are hereafter collectively referred to as Amur River sturgeons, have been fished commercially for more than 100 years. Amur River sturgeons, like other sturgeons in the Russian Federation, are harvested chiefly for caviar, the unfertilized eggs, or roe of the females (Vaisman and Raymakers, 2001). Caviar is one of the most valuable wildlife commodities (Pikitch *et al.*, 2005). Historically, sturgeons have played an important economic role on the Amur shores, both Russian and Chinese, and in the late 19th century, the amount of sturgeon harvested in the lower reaches of the Amur River was more than double the present Russian catch in the Caspian Sea basin. A decline in catches was evident in the Russian and Chinese harvests from the Amur River basin in the 20th century and, in 1996, the Kaluga and the Amur Sturgeon were both classified as Endangered by IUCN (IUCN, 2007). The main threat to both species appears to be over-exploitation for trade (Anon., 2000).

INTRODUCTION

The objectives of this report are to provide an examination of the harvest and trade in Amur River sturgeons in the Russian Federation by:

- evaluating the status of sturgeon populations in the Amur River basin;
- evaluating levels of legal and illegal fishing of Amur River sturgeons;
- assessing efforts made to prevent illegal sturgeon fishing in the Amur River;
- investigating legal and, where possible, illegal trade in the caviar and meat of Amur River sturgeons; and
- making recommendations to protect and enhance sturgeon stocks in the Amur River basin, including by preventing illegal fishing and illegal trade.

Following a presentation of the methodology used, this report presents sections on the biology, distribution and population status of the Kaluga and Amur Sturgeon; on Russian management of sturgeon fishing and trade in the Amur River; on catches of Amur River sturgeons; on the challenges of controlling illegal fishing of these sturgeons; and on their trade. Recommendations are made based on this study's conclusions regarding the levels of fishing and trade and their impact on Amur River sturgeons.

METHODOLOGY

The following sources were used to gather information for this study:

- investigations conducted during 2000 and 2003 within the framework of a small grants programme administered by WWF Russia's Far Eastern Branch, and related investigations. During these investigations, the following activities were undertaken:
 - visits to sturgeon wintering and spawning areas near the cities of Nikolayevsk-na-Amure and Komsomol'sk-na-Amure (Khabarovsk region);
 - informal surveys of local residents, including representatives of local indigenous peoples, poachers, residents of communities along the Amur River, and some homeless people, who support themselves by fishing illegally;
 - interviews with staff from the State Hunting Inspectorate. Although not directly engaged in the protection of aquatic bioresources or in operations concerning the illegal harvest of and trade in sturgeons, these staff are in regular contact with poachers and are therefore very familiar with the situation on the ground;
 - interviews with staff from the Directorate of Federal Service for Veterinary and Phytosanitary Control of Khabarovsk Krai and Yevraiskaya Autonomous Oblast (*Amur'rybvod*), regional fish inspectors, and ichthyologists, i.e. people involved directly in the conservation and reproduction of Amur River sturgeon species;
 - conversations with staff involved in test fishing for sturgeons;
 - market surveys targeting merchants who sell illegally sourced sturgeon products;
 - the gathering of information from the Far-Eastern Customs Directorate and an evaluation of the illegal export of sturgeon products provided by Far-Eastern Customs House staff.
- unpublished TRAFFIC reports based on work in the Russian Federation
- studies conducted by academic and scientific institutes to assess sturgeon population numbers (published as scientific reports and articles).
- official catch data prepared by the State Fishery Committee. These data were taken primarily from documents containing biological data ("biological justifications") provided in support of applications for total allowable catches (TACs).
- information provided by the Khabarovsk Interdistrict Nature Conservation Prosecutor's Office on volumes of poached sturgeon.
- Government of Khabarovsk Krai documents

Unless stated otherwise, information is obtained from original survey work, as outlined above.

Prices are stated in Russian roubles (RUB) and converted to US dollars (USD) using the exchange rates from www.onada.com: RUB1=USD0.035 for the year 2000 and RUB1=USD0.033 for 2003.

BIOLOGY, DISTRIBUTION AND ABUNDANCE OF KALUGA AND AMUR STURGEON

Kaluga Huso dauricus (Georgi, 1775)

The Kaluga, like all other sturgeon species, spawns in pebbly and sandy-pebbly substrates. The spawning grounds are located primarily in the main channel of the Amur River and sometimes also in its tributaries, but not in lakes (see also **Box 1**). It has an extended spawning period and, in the region around Khabarovsk, spawning takes place from early June to mid-July (Soldatov, 1915). After reaching four years of age, the Kaluga feeds primarily in the Amur River estuary and adjacent marine waters where it preys on the most abundant fish species,

Figure 1

Range of Kaluga and Amur Sturgeon in the Amur River basin (indicated by the pale grey line)



Source: Krykhtin and Svirskii (1997a).

such as migratory salmon, spawning herring and smelt. Large, sexually immature Kaluga thrive in salt water and are encountered in the Sea of Okhotsk (Kostarev and Tyurnin, 1970), the Tatar Strait (Krykhtin, 1984a, 1984b) and in the Sea of Japan (Amaoka and Nakaya, 1975 and Honma and Itano, 1994) (see **Figure 1**). The Kaluga reaches maturity only at 14–23 years and spawns every three to five years (Anon., 2000). First-time spawners have an average weight of around 95 to 100 kg (Krykhtin and Svirskii, 1997a). The maximum registered weight of a mature Kaluga is 1000 kg (Krykhtin and Svirskii, 1997a).

Box 1

Kaluga populations

Some experts (Krykhtin and Svirskii, 1997a) believe that the Kaluga can be divided into four populations, which respectively inhabit the:

1. Amur River estuary and coastal brackish waters of the Seas of Okhotsk and Japan. The majority of this population spawns 50 to 150 km upstream of Nikolayevsk-na-Amure.
2. Lower reaches of the Amur River. This population uses the same spawning grounds as the first population.
3. Middle reaches of the Amur River. The majority spawn in the lower part of the river's middle reaches, while smaller spawning grounds lie in the Sungari and Ussuri Rivers.
4. Lower reaches of the Zeya and Bureya Rivers, and the upper reaches and upper part of the middle reaches of the Amur River. This population is considered to be very small and is listed in the Russian Federation Red Data Book. The spawning grounds lie in the upper reaches of the Amur River and also along a 250-km stretch of the river downstream of Blagoveschensk.

However, there is some debate on the division of the Kaluga into four populations as it is not supported by any morphological or genetic data and because the populations are not reproductively isolated (Pavlov *et al.*, 2001). The Khabarovsk Branch of the Pacific Research Institute of Fisheries and Oceanography supports the view that there is only one population of Kaluga.

The species has been declining in numbers for more than a century and relatively recently the proportion of juvenile Kalugas was found to have increased considerably in the coastal waters of the northern part of the Tatar Strait and in the southern part of Sakhalin Bay (Krykhtin and Svirskii, 1997a). At the end of the 20th century, the population was believed to consist predominantly of young fish, mature fish accounting for only two to three per cent of the population (Krykhtin and Svirskii, 1997a). Krykhtin and Svirskii (1997a) expected the population to continue to decline as a result of the species's late maturation and generally low reproductive rate, especially in the middle Amur (the 975-km stretch of river between Blagoveshchensk city and Khabarovsk city).

Amur Sturgeon *Acipenser schrenckii* (Brandt, 1869)

Historically, Amur Sturgeon distribution extended upstream to Nerchinsk (Georgi, 1775). The species was relatively abundant in the lower reaches of the Amur River, in the Ussuri and Sungari Rivers, in Lake Khanka (Maak, 1861) and was also encountered in the Amur River estuary (Berg, 1909). The Amur Sturgeon was harvested in the Argun, Shilka, Nerch, Zeya and Ussuri Rivers and in the Amur River upstream and downstream of Khabarovsk (**Figure 1**).

Krykhtin and Svirskii (1997a) reported that, in general, the distribution of the Amur Sturgeon in the Amur River basin was similar to that of the Kaluga and reported its occurrence in the entire Amur River basin, from the estuary to the River's upper reaches. They also reported its occurrence in the Amur River tributaries, the Shilka, Onon, Argun, Nerch, Sungari, Nonni and Ussuri Rivers. Only a few individuals were reported to occur in Lake Khanka, near the mouth of the Ussuri River (see **Figure 1**), and the species is extremely rare in the River Ingoda, a tributary to the River Shilka. In the Amur River's lower reaches, this species was reported to be quite numerous and to occur in the estuary, though less so than the Kaluga.

Amur Sturgeons generally inhabit flat parts of a river channel with a sandy and, less often, pebbly bottom. In spring, sexually mature individuals move upstream from their wintering areas. Spawning takes place on pebbly and sandy substrate from late May until July (Svirskii, 1967). Large-scale spawning migrations were reported not to be typical for the Amur Sturgeon (Nikolsky, 1971). Tagging experiments have shown that, in all cases, marked sturgeons were caught within a radius of no more than 100 km from the place where they were tagged and released (Soldatov, 1915). The Amur Sturgeon reaches sexual maturity at 10–14 years, when 105–125 cm in length and weighing six to 18.5 kg (Krykhtin and Svirskii, 1997a). The spawning interval for females is no less than four years. The fecundity rate ranges from 41 000 eggs to 1 057 000 eggs per female, averaging 287 780 eggs (Krykhtin and Svirskii, 1997a). As is the case with the Kaluga, the gender ratio of the Amur Sturgeon is close to 1:1 (Soldatov, 1915).

The Amur Sturgeon population has declined considerably since the beginning of the 20th century (Krykhtin and Svirskii, 1997b).

Captive breeding of Amur River sturgeons

Russian Federation

Currently, there are two companies in Khabarovsk Krai that are captive-breeding sturgeons: the Fish Hatchery Department of the Amur Thermal Power Station (Khabarovskenergo Open Joint-Stock Society) and the Novoamursky Collective Fishing Farm. Both enterprises release juveniles into the Amur River (see **Table 1**). In 2005, the Amur Thermal Power Station planned the release of 400 000 juvenile Kalugas and Amur Sturgeons and the Novoamursky Fishing Collective Farm envisaged the release of 80 000 Amur Sturgeons (staff of the relevant companies, pers. comms, 2005).

Table 1

Release of juvenile sturgeons by fish hatcheries in Khabarovsky Krai, 2000–2003

	2000	2001	2002	2003
Amur Thermal Power Station	235 000	237 000	391 000	187 000
Novoamursky Collective Fishing Farm	127 300	92 000	87 000	82 000

Source: Information submitted in support of application for total allowable catch for 2002–2004.

China

Since 2000, sturgeon aquaculture in China has grown rapidly and now appears to be the largest production of its kind in the world (Wei *et al.*, 2004). The Amur Sturgeon and an Amur Sturgeon x Kaluga hybrid are the main sturgeons cultured, but Kalugas are also bred. Harvests in the Amur River have shifted from caviar production to the artificial culture of sturgeon hatchlings, mainly for commercial purposes (Wei *et al.*, 2004).



Credit: Dr Georgy Ruban

Sturgeon fingerlings at a Russian captive breeding centre

Hatchery propagation and release of Amur Sturgeons occurred in the Amur River in China 1988–1998, but operations have been jeopardized by financial constraints (Wei *et al.*, 1997). In 2001, 20 000 Kalugas and 130 000 Amur Sturgeon fingerlings (5–10 cm) and 3000 Amur Sturgeon juveniles (1.5 kg) were released into the Amur River in Heilongjiang. In addition, 50 000 Amur Sturgeon

juveniles were released into the Amur River in 2002. No assessments of the success of release projects for the Amur Sturgeon or Kaluga in China have been conducted (Wei *et al.*, 2004).

While the rearing facilities in Heilongjiang are currently sufficient to produce fingerlings for stocking, the rearing tanks and related facilities need to be improved and expanded, as development of sustainable sturgeon aquaculture for both commercial and conservation purposes is hindered by a shortage of higher-age stock or pre-broodfish in captivity (Wei *et al.*, 2004). However, uncontrolled development of sturgeon farming in China could threaten the wild sturgeon populations in the Amur River through catch of wild fish for broodstock and the introduction of hybrids which could have negative impacts on indigenous sturgeon species (Wei *et al.*, 2004).

MANAGEMENT OF AMUR RIVER STURGEON FISHING AND TRADE IN THE RUSSIAN FEDERATION

Relevant authorities

All sturgeon species in the Russian Federation are considered a “federal resource” and are managed by the federal authorities. Since administrative reforms in 2004 and 2005, the Department for Protection, Restocking and Use of Aquatic Biological Resources under the Ministry of Agriculture has been responsible for the management of “commercial aquatic resources”, including all sturgeon species in the Russian Federation. This Department is also the head authority for the regional directorates (i.e. in krais, oblasts, etc.) and includes the regional fishery inspectorates, which have the authority to apprehend those violating the law and seize their fishing gear, as well as any illegally harvested fishery products. In September 2005, the Federal Service for Veterinary and Phytosanitary Surveillance became the designated Russian CITES Management Authority for Acipenseriformes. (Until mid-2004, the State Committee of Fishery was the CITES Management Authority for all sturgeon species and there was no official CITES Management Authority for sturgeon species from that date until September 2005.)

Relevant legislation

The use of aquatic biological resources, including sturgeons, is regulated by a complex suite of laws and articles, including the federal law *On fauna*, the *Fishery Act*, and regional fishery regulations. For details of specific difficulties in regulating sturgeon fishing, see **Challenges in controlling illegal fishing of Amur River sturgeons**.

Catch quotas

Since 2005, the Ministry of Agriculture has established annual TACs by special decree. Currently, annual catch quotas for all aquatic animals and plants in the Amur River basin are established through the following procedures:

- Scientific staff of fisheries companies prepare annual requests for catch quotas for each species harvested within the Amur River basin. These requests require a special attachment called a

“biological justification”. This justification is based on local experts’ knowledge of the status of populations for the species.

- The above-mentioned requests are submitted to the Russian Federal Institute for Fishery and Oceanography (VNIRO), which reviews them and compiles a combined request for a TAC by species and basin, supplemented by an overall biological justification. VNIRO then officially presents this request to the State Ecological Panel of Experts.
- The State Ecological Panel of Experts has a number of expert commissioners for species and groups of species, including an expert commissioner for sturgeons. The expert commissioners review the requests submitted by the VNIRO before deciding whether to recommend approval of the requested TACs to the Russian Government. An expert commissioner can also decide to return a request to VNIRO for revision. Catch quotas that are recommended by the Panel of Experts can consist of different components, e.g. sturgeon catch quotas can consist of commercial quotas, quotas for artificial reproduction and quotas for “test fishing” (see below).
- After receiving recommendations from the Panel of Experts, the Russian Government approves the TACs for species and basins by issuing a special annual decree.
- Approved quotas are sent back to the regional fishery directorates and then distributed to fishing companies.

Table 2 shows TACs for Amur River sturgeons, 2000–2004; none of these were for commercial fishing (see *Sturgeon fishing bans and “test fishing”*).

Table 2

Russian catch and export quotas for Amur River sturgeons (2000–2004)**

Species	Quota	2000	2001	2002	2003	*2004
Amur Sturgeon	Catch (kg)		20 000	3000	3000	6000
	Export (kg) caviar	2000	2140	350	350	0
	Export (kg) meat	4000	4000	1500	1500	0
Kaluga	Catch (kg)		65 000	10 000	10 000	30 000
	Export (kg) caviar	6000	7000	2300	1000	0
	Export (kg) meat	18 000	20 000	5000	5000	0

Source: CITES Secretariat website (http://www.cites.org/eng/resources/quotas/sturgeon_intro.shtml); CITES did not issue export quotas for Kaluga and Amur Sturgeon for 2004, 2005 and 2006.

* According to a Decree of the Government of the Russian Federation (No. 1947-P, dated December 30, 2003 and revised November 19, 2004).

** Russian catch quotas for the species in 2005 were as for 2004 and those for 2006 were scientific quotas of 14 t for Kaluga and three tonnes for Amur Sturgeon, according to an order issued by the Ministry of Agriculture.

Export quotas

All Acipenseriformes occurring in the Russian Federation, including the Amur River sturgeons, are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which means that their international trade must be regulated according to a permitting system. Russian export quotas for Amur River sturgeons 2000–2004 are shown in **Table 2**. No export quotas for Amur River sturgeons were authorized in 2005 and 2006.

Sturgeon fishing bans and “test fishing”

In the early 20th century, a sharp decrease in sturgeon numbers and poor sturgeon catch in the Amur River led to a complete ban on sturgeon fishing once Moscow had consolidated power in the Russian Far East. The ban began on 1 January 1923 and remained in effect until 1 January 1930. Within the territory of the USSR, and later the Russian Federation, the ban on commercial sturgeon fishing in the Amur River was again in force from 1958 to 1976 and subsequently from 1984 to the present. In 1984, “test fishing” of sturgeon species was introduced. This allows the harvest of Amur River sturgeons for primarily non-commercial purposes (see **Box 2**). From 1984 to 1990, test fishing was only allowed in the estuary and was restricted to the Kaluga, but as of 1991 it has also been allowed for the Amur Sturgeon and within the Amur River. Consequently, Amur River sturgeons can be legally harvested under the test fishing regime and, in addition, small volumes of sturgeon may be harvested for research purposes on a quota basis. These research quotas are allocated specifically to the Khabarovsk Branch of the Pacific Research Institute of Fisheries and were 10 t for the Kaluga and three tonnes for the Amur Sturgeon for 2002 and 2003 (see **Table 2**).



Credit: WWF Russia



Credit: Hartmut Jungius/WWF-Canon

Sturgeon fisherman, Russian Federation, (l.) and fishermen on the Amur River, Russian Far East (r.)

Box 2

Test fishing

“Test fishing” occurs separately from, and in addition to, fishing for the purposes of scientific research only, which is undertaken by the Khabarovsk Branch of the Pacific Research Institute of Fisheries. The purpose of test fishing is to monitor the status of commercial fish populations.

Test fishing quotas are planned annually by the Khabarovsk Branch of the Pacific Research Institute of Fisheries and require approval from the Sturgeon Expert Commission of the State Ecological Panel of Experts. The Ministry of Natural Resources of the Russian Federation is obliged by the Russian Government to advise the Sturgeon Expert Commission of the State Ecological Panel of Experts, and consequently has a special department for this purpose. This Ministry department organizes expert groups to advise on issues relating to biological resources. The State Fishery Committee was the group responsible for fisheries management advice in the Russian Federation in 2004. This body no longer exists and, instead, the Fisheries Agency, which is now part of the Ministry of Agriculture, plays this role. Once approved, test fishing quotas are auctioned to private commercial firms. There are currently no regulations on what may legally be done with the test fishing catch (Anon., pers. comm., State Fishery Committee, 2004).

Test fishing is believed to be used often as a means to circumvent established bans on commercial fishing, since the private commercial firms that buy test fishing quotas reportedly catch far over their allowed quota. As a result, while it seems that stocks are being preserved (through the ban on commercial fishing), fishing for commercial purposes actually continues in reality, including in the case of Kaluga and Amur Sturgeon in the Amur River basin (G. Ruban, Chairman of the Sturgeon Expert Commission, pers. comm. 2004).

Test fishing for Kaluga and Amur Sturgeon has taken place since the mid-1980s. However, it has not produced concrete scientific data on the population status of these two species. As a result, in 2002 the Sturgeon Expert Commission concluded that the requirements of test fishing were not being met. Moreover, the biological basis for conducting test fishing is considered to have been poorly prepared by the Khabarovsk Branch of the Pacific Research Institute of Fisheries, with errors and contradictions in the data (G. Ruban, State Fishery Committee, pers. comm., 2004).

Decrees of the Government of the Russian Federation in 2002 and 2003 resulted in rejection by the State Ecological Panel of Experts of an application from the Pacific Research Institute for test fishing and in the approval of fishing for scientific purposes only, with an annual quota of 10 t for Kaluga and three tonnes for the Amur Sturgeon. Upon reviewing the biological basis of the TAC for sturgeon in the Amur River in 2004, the Sturgeon Expert Commission again found it to be flawed. However, the Commission recognized the necessity for obtaining objective data on the status of Kaluga and Amur Sturgeon populations and, in 2004, it considered commitments made by representatives from the State Fishery Committee to improve research on population numbers, reproduction and other population status indicators of these species and approved a catch of 30 t of Kaluga and six tonnes of Amur Sturgeon for these purposes in 2004. Catch quotas for the same amount per species were issued for 2005 but catch quotas for 2006 were lower (see **Table 2**).

CATCHES OF AMUR RIVER STURGEONS

Legal catch of Amur River sturgeons—Russian Federation

In the 19th century, sturgeon-fishing provided for local people only and the level of harvest did not undermine stocks (Maak, 1861). In the late 19th century, the amount of sturgeon harvested in the Amur River's lower reaches was roughly double modern-day Russian sturgeon TACs in the Caspian Sea basin (approximately 450 t each year, 2004 and 2005; Krykhtin and Svirskii, 1997a). This relative abundance in the past is illustrated by the quantities produced by a sturgeon fishing and processing enterprise set up in the village of Verkhne-Tambovskoye in 1895. In 1897, it produced 800 pood (12.8 t)—a pood is an old Imperial Russian unit of weight equivalent to approximately 16.38 kg—of salted sturgeon, not including caviar, spinal cords (used to make a delicacy), fat, and other peripheral products (Bykov, 1898, cited in Soldatov, 1915). In the same decade, in 1891, a total of 1202 t of sturgeons (595 t of Kaluga and 607 t of Amur Sturgeon) was harvested in the Amur River basin (Kryukov, 1894, cited in Krykhtin and Svirskii, 1997a).

From 1891 to 1913, the legal Amur River sturgeon catch decreased by about 80%, because of poor fisheries management (Svirskii, 1971; Krykhtin and Svirskii, 1997a) (see **Table 3**). The resulting ban on sturgeon fishing from 1923 to 1930 had a positive influence on sturgeon populations, as the proportion of sexually immature fish caught decreased from 90% in the beginning of the century (Soldatov, 1915), to 70% by the time the ban was lifted (Probatov, 1935). However, in subsequent years, sturgeon stocks were in an unsatisfactory state. This was illustrated by the low catches in the mid-20th century (see **Table 4**). By 1947, the catch had decreased dramatically compared to 1891 levels.

Table 3

Russian sturgeon catch from the Amur River 1891–1913

Year	1891	1909	1910	1911	1912	1913
Catch (t)	1202	284	365	298	349	215

Source: Krykhtin and Svirskii, 1997a; Soldatov, 1915.

Table 4

Soviet sturgeon catch from the Amur River during the mid-20th century

Year	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Catch (t)	157.1	156.2	161.7	195.3	190.1	167.2	147.0	94.9	82.9	75.7

Source: Svirskii, 1971.

Table 5 shows the Soviet/Russian Kaluga and Amur Sturgeon catch for the period 1980–2005. Since commercial fishing has been banned since 1984, all figures in **Table 5** for the years 1984–2005, inclusive, were derived from non-commercial fishing. As can be seen, the ban on commercial fishing seems to have had no effect and indeed the average annual harvest 1980–1983 (i.e. before the ban) was smaller than that following the ban, i.e. for the period 1984–2005 (**Table 5**). In addition, the figures in

Table 5

Soviet/Russian sturgeon catch from the Amur River, 1980–2005.

Year	Kaluga			Amur Sturgeon			Total (t)
	Channel	Estuary	Total (t)	Channel	Estuary	Total (t)	
1980	<i>Complete ban on fishing in the river</i>	46.6	46.6	<i>Complete ban on fishing</i>			46.6
1981		44.7	44.7				44.7
1982		47.0	47.0				47.0
1983		64.1	64.1				64.1
1984		59.5	59.5				59.5
1985		61.1	61.1				61.1
1986		62.2	62.2				62.2
1987		69.0	69.0				69.0
1988		44.0	44.0				44.0
1989		61.0	61.0				61.0
1990	61.9	61.9			61.9		
1991	34.4	60.5	94.9	41.0	0	41.0	135.9
1992	13.6	52.9	66.5	48.7	0	48.7	115.2
1993	36.5	62.3	98.8	11.3	0	11.3	110.1
1994	28.0	35.0	63.0	14.0	0	14.0	77.0
1995	11.5	51.0	62.5	3.6	0	3.6	66.1
1996	31.1	50.0	81.1	8.0	0	8.0	89.1
1997	40.1	50.0	90.1	17.7	0	17.7	107.8
1998	21.1	27.0	48.1	18.0	0	18.0	66.1
1999	38.9	0	38.43	19.33	0	19.33	57.76
2000	60.8	3.0	63.8	14.0	0	14.0	77.8
2001	59.4	2.8	62.2	18.6	0	18.6	80.8
2002	0	9.5	9.5	2.3	0	2.3	11.8
2003	Catch of 10 t permitted; official catch data unavailable.			Catch of three tonnes permitted; official catch data unavailable.			
2004	10	20	30	6	0	6	36
2005							31.2

Note: The blue text indicates years when commercial fishing of Amur River sturgeons was officially banned

Source: VNIRO 2000–2005, unpublished.

Table 5 show that, under the test fishing regime, fishing efforts started to shift to the river channel, where the sturgeon are more mature and, consequently, more commercially valuable than those in the estuary. This shift was particularly evident in 1991 and, by 1999, the harvest had shifted almost entirely to the river channel, where sexually mature fish are harvested during their spawning migration. This shift can be explained by the market reforms in the then newly formed Russian Federation: prices were no longer fixed by the government and started to be determined by the market, which created an incentive for fishers to target larger fish which would attain a higher market price. This shift caused a lack of test fishing in the estuary, with the result that there are no size assessments for various age classes of Kaluga that inhabit the main feeding areas in the estuary.

Legal catch of sturgeons from the Amur River—China

Different sources offer varying data on the sturgeon catch in Chinese territory. According to

Wei *et al.* (2004), harvest records documented by the Heilongjiang Fisheries Bureau show that the Amur Sturgeon and Kaluga populations have declined and that the Kaluga may be near extinction. In 1940, the catch in the Chinese part of the Amur River basin was reported as 76 192 jin, and in 1941 as 53 080 jin. (A jin is a Chinese unit of weight roughly equal to 0.550 kg or 1.2 lbs, so these weights correspond to 42 t and 29 t,

respectively.) In 1987, the catch reached 452 t, but by 1999 it had declined to 129 t as a result of over-fishing and water pollution (Shi *et al.*, 2002). **Table 6** shows the catch for those years as slightly different, but overall a decreasing trend in catches is evident nonetheless.

Table 6
Sturgeon catch from the Amur River in China (t)

1940	42	1967	26	1979	132	1991	237
1941	29	1968	13	1980	59	1992	184
1957	39	1969	20	1981	145	1993	164
1958	46	1970	26	1982	150	1994	158
1959	49	1971	66	1983	150	1995	211
1960	72	1972	33	1984	150	1996	164
1961	79	1973	20	1985	184	1997	136
1962	86	1974	39	1986	150	1998	151
1963	33	1975	92	1987	461	1999	145
1964	33	1976	105	1988	368	2000	151
1965	20	1977	53	1989	289	2001	50
1966	33	1978	92	1990	289	2002	25

Sources: Qiwei Wei, 2001; Nikolsky, 1956; materials submitted in support of application for total allowable catch for 2004.

Total legal catch in the Amur River

Table 7 shows the change over the period 1980–2005 in the total legal catch of Amur River sturgeons for both the Russian Federation and China. However, it should be noted that data for legal catch do not reflect the size of the actual catch, because significant volumes are harvested illegally (see next section).

Table 7

Total legal catch (Russian and Chinese) of Amur River sturgeons, 1980–2005 (t)

1980	105.6	1981	189.7	1982	197.0	1983	214.1
1984	209.5	1985	245.1	1986	112.2	1987	530
1988	412	1989	350	1990	350.9	1991	372.9
1992	299.2	1993	274.1	1994	235	1995	277.1
1996	253.1	1997	243.8	1998	217.1	1999	202.76
2000	228.8	2001	130.8	2002	36.8	2003	12.9
2004	36	2005	31.2				

Sources: as for Tables 5 and 6.

Illegal fishing of Amur River sturgeons

A partial understanding of the actual catch levels (i.e. including both legal and illegal catch), can be gained from data from the Government of Khabarovsk Krai, presented in **Table 8**. The volume of caviar which could have been obtained from the quantity of sturgeon caught was calculated using gonad-somatic indices. The average gonad-somatic index for the Kaluga is 12% and for the Amur Sturgeon 20% (Kazansky, 1979). The natural gender ratio in these species is 1:1, so the quantity of caviar that can be obtained from the total catch is 6% for the Kaluga and 10% for the Amur Sturgeon. Figures for amounts of caviar calculated using this index are included in **Table 8** in italics. **Table 8** also shows that the quantity of caviar and sturgeon that was certified by regional veterinary authorities (necessary to obtain permits from the CITES Management Authority) significantly exceeded the quantity of sturgeon, and especially caviar, that could have been harvested legally under annual catch quotas 2000–2002. For example, in 2000, the quantity of caviar that received veterinary certification (36 700 kg) exceeded the quantity that could have been caught under the TAC and sold legally (6185 kg), seven times over.

According to interviews with local conservation experts and staff of regional fish inspectorates, the reason for this is that the illegal catch was “legalized”, or laundered. For example, the catch harvested by poachers may have been placed under the care of high-ranking officers in the local government and/or defence and law enforcement agencies, where it may then have been passed off as legal catch. Alternatively, sturgeon meat and caviar that was confiscated from poachers may not have been properly documented as per official protocols, and may have re-entered into trade as laundered products.

Information provided by staff in 2002 and 2004 from the Khabarovsk Branch of the Pacific Research Institute of Fisheries indicated that the quantity of sturgeon poached annually in the Russian Federation from the Amur River was approximately 500–750 t. The primary centres for the preparation and sale of illegal products were located in Nikolayevsk-na-Amure and Komsomol’sk-na-Amure. Both illegal fishing and trade took place primarily in the Nikolayevsk, Ulch and Komsomolsk Districts of

Khabarovsky Krai. Nearly all sturgeon fishing in the Amur River basin was said to be controlled by criminal groups from Khabarovsk and Komsomol'sk-na-Amure (Khabarovsk Branch of the Pacific Research Institute of Fisheries staff, pers. comms, 2002 and 2004).

Table 8

Reported volumes of Amur River sturgeon meat (t) and caviar (kg) caught legally and illegally, 2000–2003

	2000		2001		2002		2003	
	Meat	Caviar	Meat	Caviar	Meat	Caviar	Meat	Caviar
Legal catch ¹	68	5228	72	5592	11.8	800	12.9	900 ²
Illegal catch (based on volumes seized by the Ministry of Internal Affairs and <i>Amurrybvod</i>)	99.3	957	176.5	2763	91	1468	87.7	1281
Total (legal and illegal) catch	167.3	6185	248.5	8355	103	2268	100.6	2181
Total quantity of caviar and sturgeon meat which received veterinary certification by the Regional Directorate of Veterinary Science	194.9	36 700	110.2	22 656	235.7	2173	85.5	n.a.

Notes: **1** = Harvested under “test fishing” regime. **2** = Owing to the fact that official catch data for this year are unavailable, the calculation is based on the TAC for this year. n.a.= data not available. **3** *Amurrybvod* is the Directorate of Federal Services for Veterinary and Phytosanitary Control for Khabarovsky Krai and Yevraiskaya Autonomous Oblast.

Source: Letter ref. no.4.4.16-1330 from the Deputy Chairman of the Government and Minister of Natural Resources of Khabarovsky Krai, 24 February 2002.

According to information obtained during survey work, illegal sturgeon fishing is carried out actively in the Amur River estuary by residents from Pyr, a village located on Baidukov Island. Fish are often purchased by crew members of vessels who have passed Customs registration already and are waiting for departure near the Chastye Islands in the Amur estuary. Illegally harvested sturgeon may then be loaded onto these vessels and then smuggled abroad. The volume of illegally prepared sturgeon caviar on these vessels can vary from 300 to 4000 kg per vessel, per season, according to information collected in 2000 and 2003. The caviar that is harvested illegally in the estuary was reported in 2003 to be smuggled mainly to Japan. In the Yevraiskaya Autonomous Oblast, residents of the former collective farms Pogranichny and Novo-Amursky were also reported to be actively engaged in illegal sturgeon fishing. According to information reported in 2000, Federal Safety Service staff were said to have confiscated 1300 kg of sturgeon caviar in 1999 in the Yevraiskaya Autonomous Oblast from people attempting to export it illegally to China by evading Customs checkpoints.

Estimates by local poachers who were interviewed put the number of boats fishing for sturgeon in the estuary and the lower reaches of the Amur River in 2001 and 2002 at 200. During seven to 10 days of spring fishing, each boat harvested approximately 300–400 kg of sturgeon. Poaching pressure increased greatly in 2002 and 2003, according to data gathered from surveys of fishermen involved in sturgeon fishing. Unlike in previous years, poachers began to keep all fish caught, including juvenile Amur Sturgeons and Kalugas. Nets also increased significantly in size: whereas 10 years or so ago fishermen used nets 50–60 m in length, they now use nets no smaller than 100–300 m.

Interviews with fishermen involved in sturgeon test fishing revealed there was a permanent group of residents of Komsomol'sk-na-Amure who fished illegally for sturgeon in the Amur River. The boats used were equipped with modern Japanese Yamaha motors ranging from 100 to 225 horse power. Such boats, even heavily loaded, can easily evade pursuit.

Impact of illegal fishing practices on Amur River sturgeon stocks

The impact of over-fishing—the cumulative effect of legal and illegal fishing—on Amur River sturgeons can be reflected by scarcity of fish stocks. As previously discussed (see **Box 2**), the quotas for test fishing for Kalugas and Amur Sturgeons in 2003 were denied because the biological justification materials prepared for the TAC applications were considered unsatisfactory. Moreover, catch quotas for scientific purposes of only a few tonnes—see **Table 2**—were hard to fill because of small catches. According to information obtained during survey work, even an experienced fleet of fishermen, who had been engaged in test fishing for several years, could catch only 9.5 t and were unable to catch any Kalugas over a three-month period owing to a lack of fish. (The fishing season is around four months in the region.)

Residents of coastal settlements surveyed unanimously confirmed that during the period 2000–2003, sturgeons had become noticeably fewer. One of the most active poachers from Nikolaevsk-on-Amur said that in the past he had prepared and sold 300–350 kg of caviar each year, but during the 2001 fishing season, he had sold only about 100 kg. In 2002–2003, the situation was dire in villages where poaching is relied upon as a means of existence, as the seasonal catch averaged five to seven sturgeons per village, for the entire season.

According to biological justification materials for the TAC applications for the years 2002, 2003 and 2004, the average weight of a Kaluga at spawning was 99.4 kg, which is approximately the average weight of a Kaluga female that spawns for the first time (95 to 100 kg) (Krykhtin and Svirskii, 1997). This indicates that the entire sexually mature population consists only of first-time spawners. Furthermore, biological justification materials for the TAC of 2003 and 2004 noted that Kalugas older than 26 years were only rarely encountered.



Credit: Thomas Neumann/WWF-Canon

Flood plain of the Amur River, Russian Far East

CHALLENGES IN CONTROLLING ILLEGAL FISHING OF AMUR RIVER STURGEONS

The control of illegal fishing for Amur River sturgeons is compromised by various challenges, as described below.

Legislative weakness

Regulations in force for the conservation of Amur River sturgeons are considered ineffective for various reasons:

- According to the Criminal Code of the Russian Federation, the illegal harvest of aquatic plants and animals is categorized as a non-serious crime (Article 256). Even flagrant violations of its terms result in a maximum imprisonment of only two years. Review of such cases shows that most of them terminate at the investigation stage, for various “non-exonerating reasons”, for example, amnesty or active remorse. In prosecution cases, sturgeon species are treated as common river fish, such as perch, or pike.
- Certain legislative difficulties accompany the successful prosecution of cases of illegal fishing of sturgeons. The legislative text specifies “illegal extraction” as being in violation of the law, which

is interpreted as direct illegal harvest, killing, or other methods of extraction of aquatic plants or animals from an aquatic environment. The impacts, including widespread damage, of such extraction are listed in Part 1 of Article 256 of the Criminal Code. However, the legislation does not establish a measure of the scale of such damage and experts from the Nature Conservation Prosecutor's Office consider it necessary to improve specificity in Article 256 by reference to damage "concerning species, the harvest of which is forbidden".

- There are several problems in preventing illegal trade in aquatic biological resources. According to Article 129 of the Civil Code of the Russian Federation, the harvest of, or trade in sturgeon and sturgeon products, as well as other wildlife products, is not restricted, except that exports of sturgeon products are regulated according to CITES requirements, implemented in the Russian Federation through point 4 of Article 15 of the Constitution of the Russian Federation. Although sturgeon exports are subject to quota, domestic trade is not specifically regulated and sturgeon products are required to be accompanied only by documents that confirm their conformity with sanitary requirements and quality standards. According to the deputy of the Khabarovsk Interdistrict Nature Conservation Prosecutor's Office, this is a gap in legislative provision which "seriously impedes the battle against illegal harvest of sturgeon and other species" (Nature Conservation Deputy-Prosecutor, *in litt.*, 2000).

Enforcement inadequacies

Information obtained from the Khabarovsk Interdistrict Nature Conservation Prosecutor's Office shows that measures undertaken by State bodies specifically responsible for the protection of aquatic resources are inadequate to stop sturgeon poaching on the Amur River. This is despite the fact that, annually, more than a thousand incidents of sturgeon poaching are identified, dozens of tonnes of fish and thousands of kilogrammes of caviar are seized and dozens of criminal cases are initiated (see **Table 9**). This situation has arisen because of the ineffectiveness of fish protection bodies (Nature Conservation Deputy-Prosecutor, *in litt.*, 2000). Such bodies have little technical and financial support and corruption is reportedly a widespread problem (Khabarovsk Interdistrict Nature Protection Prosecutor's Office, pers. comm.). Both legal fishermen and poachers reported that inspectors often accepted bribes. Fishermen said that "the right" to catch sturgeon in the estuary cost RUB20 000–30 000 (USD656–985) for one season and that it was easy to "come to an agreement" with an inspector by paying a "fine". Many of the poachers interviewed had already paid a "natural tribute", which amounted to parts of their illegal catch being confiscated by inspectors, who then did not levy a fine for violation of fishing regulations. The fishermen reported that, usually, the inspector simply waited in the vicinity while illegal fishing took place and that, once the fishermen had made a catch, he collected the fish and left without filling out any forms, allowing the fishermen to continue fishing. Sometimes, before fishing begins, the inspector goes to a fishermen's camp and issues fines for very minor violations under the fishing regulations. The poachers pay in full for these ostensible violations and then fish illegally for sturgeon without further disturbance from fish inspectors.

Table 9**Documented incidences of illegal sturgeon fishing in the lower reaches of the Amur River (within Khabarovsk Krai) 2000–2001**

Number of documented incidences	1057	2554
Number of seized nets	1195	2017
Seized sturgeon (kg/RUB)	28 659/429 796	26 171/839 229
Seized caviar (kg/RUB)	1122/95 600	691/190 381
Cases transferred to investigative agencies (cases/persons)	46/44	56/69

Source: Khabarovsk Interdistrict Nature Protection Prosecutor’s Office.

Another source of illegal income for inspectors is “ownerless” fishing equipment, including catch. According to the State Hunting Inspectorate staff of Nikolayevsk District, in one raid fish inspectors took 53 Amur Sturgeons and Kalugas weighing approximately 100 kg in total from abandoned nets. However, no record of this incident was registered by the Amur Basin Authority for the Protection of Fish Resources and Fishing Control, which suggests that the fish may have been divided among the officers participating in the raid. According to fishermen, this situation is typical of what happens along the entire Amur River. Additionally, it is reported that fishermen frequently pay inspectors in order to have nets seized by the Fishing Inspectorate returned. According to representatives of the Nature Conservation Prosecutor’s Office, such incidents are very difficult to prove because of the reciprocal interests of all parties involved.

In summary, combating illegal sturgeon fishing in the Amur River is not effective. Current legislation is not equal to the task and is, in any case, infrequently enforced, as inspectors often have limited motivation to perform their duties. Not only are they tempted to collaborate with poachers by the prospect of personal profit, but there are numerous examples of honest and devoted fish inspectors, whose property is burned or damaged, who are severely injured, or even killed for carrying out their duties. Some poachers belong to criminal or partially-criminal alliances which can provide practical impunity. The illegal trade is reportedly a well-organized business, mostly placed under the protection of corrupt, high-placed bureaucrats in local administration and/or defence and law enforcement agencies.

TRADE IN AMUR RIVER STURGEONS

Domestic trade

There are several routes for selling illegal sturgeon meat and caviar on the domestic market in the Russian Federation. For example, fresh fish is often transported in passenger vessels servicing the Khabarovsk–Komsomol’sk-na-Amure–Nikolayevsk-na-Amure route and Komsomol’sk-na-

Amure–Nikolayevsk-na-Amure route (see **Figure 1**, page 3). Freshly caught fish and caviar is sometimes loaded onto ships in the middle of the river and before passengers' eyes. Fish and caviar are also transported on cargo vessels going up the Amur River or by motor transport overland. Caviar, and sometimes fish, is also transported by air, with collaboration from ex-pilots involved in purchasing caviar and fish from poachers, while serving pilots exercise sufficient authority to transport products to airports and load them onto planes without examination. Such shipments, after arriving in Khabarovsk from Nikolayevsk-na-Amure, can be reloaded, again without any examination, onto aeroplanes bound for other large cities in the Russian Federation, where the products are sold.

In the Russian Far East, caviar and sturgeon are sold practically everywhere, both in shops and in markets. Smoked Kaluga is commonly found on restaurant and café menus and dishes made of Amur Sturgeon and Kaluga (fried, baked or boiled) are offered widely. Since no test fishing was authorized in 2002 and 2003, there was no legal source of sturgeon for those years apart from the small amounts caught for scientific research purposes and seized from poachers. Records of sales of products confiscated from poachers are unclear. For example, according to official data from the Khabarovsk Krai Government, in 2002, 12 t of Amur River sturgeons were caught for scientific purposes and 91 t of sturgeon and 1468 kg of sturgeon caviar were confiscated from poachers. However, in the same year, veterinary certificates were issued for much larger amounts: for 236 t of sturgeon and 2173 kg of caviar (see **Table 8**). Despite any theoretical restrictions in supply, during 2001 and 2002 the following instances of sturgeon meat and caviar for sale were recorded:

Nikolayevsk-na-Amure

Retail dealers paid fishermen RUB1500–2500 (USD49–82) per kilogramme for sturgeon caviar, depending on its quality.

Komsomol'sk-na-Amure

In markets, caviar could be bought easily for RUB2500 (USD82) per kilogramme. Caviar was displayed on shop counters in unlabelled glass jars, without any of the necessary certificates or documents stating its origin. The price of one kilogramme of fresh sturgeon meat ranged from RUB100 to RUB150 (USD3.3–4.9) and smoked sturgeon cost between RUB180 and RUB220 (USD5.9–7.2) per kilogramme.

Khabarovsk

Kaluga and Amur Sturgeon were regularly sold at Khabarovsk's central market as whole, including live, fish and in pieces. The Kalugas offered were generally not large, weighing up to 15–20 kg. Many businessmen were involved in the sale of fish processed by firms such as "Usad'ba", "Amur-ryba", "DV-areal" and "Kerad". In Khabarovsk's central and fish markets, caviar that was of illegal origin

was sold at almost every booth that dealt in fish and caviar, which illustrates the scope of the illegal domestic trade in sturgeon products. Kaluga meat was a regular commodity not only at markets, but also in shops in Nikolayevsk-na-Amure, Khabarovsk and Komsomol'sk-na-Amure. On 19 April 2005, the Far-Eastern Interior Directorate announced in a press release, that four tonnes of illegally harvested Kaluga meat had been seized by police at Khabarovsk railway station. The fish was found in a refrigerator coach being frozen and prepared for transportation. The amount seized was estimated to be worth about RUB500 000 (USD17 355) (RIA'Novosty, 2005).

In 2002–2005 the price of sturgeon ranged from RUB150–200 (USD4.9–6.6) per kilogramme, regardless of the species. Dealers promised to deliver any weight of fish, up to several tonnes, following an advance order. The price of caviar at Khabarovsk's central market ranged from RUB6000 to RUB7500 (USD197-246) per kilogramme, depending on quality.

Vladivostok

Sturgeon caviar was sold openly in shops in Vladivostok. The name “Russian Caviar” was on the jar lids. This firm is involved in the processing and trade of caviar from Caspian Sea sturgeons and it is not unlikely that products produced by this firm are delivered to the Russian Far East. However, considering that sturgeon caviar prices in Moscow were significantly higher than they were in the Russian Far East, this could suggest that these jar labels were fake and that the jars were packed with Amur Sturgeon and Kaluga caviar. It would be economically irrational to transport this caviar across the entire country only to sell it for a much cheaper price.

The price of sturgeon ranged from RUB150 to RUB200 (USD4.9–6.6) per kilogramme, regardless of the species.

Moscow

In Moscow, the sale of Kaluga caviar was advertised online for a price of RUB5000 (USD164) per kilogramme. Sellers could be contacted by telephone only and the order could then be delivered to a Moscow address specified by the buyer. One firm contacted offered caviar for sale in large amounts, from 500 to 1000 kg and reported that delivery was possible in five to 10 days, once a 50% deposit had been received. Of the documents normally required to accompany sales of this kind, the firm was only able to present a veterinary certificate; it was unable to present documents attesting to the goods' legal origin, which might be used for the official registration of export papers.

Export from the Russian Federation

Table 10 presents volumes of Kaluga and Amur Sturgeon caviar, as reported by the Russian Government to the CITES Secretariat, 1998–2004, and compares these volumes to the volumes of

caviar calculated to be obtainable from legally harvested fish (based on figures shown in **Table 5**). **Table 10** shows that, from 1999, there has been a significant difference between the volumes of caviar that could be obtained from legally harvested fish and the actual exports of Kaluga and Amur Sturgeon caviar reported to the CITES Secretariat. For example, in 1999, 4857 kg of Kaluga caviar was reportedly exported, but based on the quotas for legal catch, it is estimated that only 2306 kg of caviar could possibly have been harvested legally in that year. During this study, it was not possible to establish reliably the origin of this “surplus” caviar, however it is very likely that it was of illegal origin. High rates of poaching, illegal trade and exports exceeding established quotas indicate that quota-setting methods require more scrutiny. **Table 10** also shows that all the caviar that could be obtained from legally harvested fish was exported, which demonstrates that all caviar from Amur River sturgeons sold on the domestic market in the Russian Federation is likely to be the product of poaching. **Table 10** also shows that, although there was no export quota established in 2004 or 2005, “legal” exports of caviar from both species of Amur River sturgeon were reported by the Russian Federation,

Table 10

Legal¹ Kaluga and Amur Sturgeon export volumes, compared to calculated volumes of legally fished caviar, 1998–2005

Kaluga						Amur Sturgeon				
Year	Export quota (kg)	Legal export (kg)	Legal fish (t)	Legal ² caviar (kg)	Difference between exports and legal caviar (kg)	Export quota (kg)	Legal export (kg)	Legal fish (t)	Legal ² caviar (kg)	Difference between exports and legal caviar (kg)
1998	-	2758	48.1	2886	+ 128	-	1385	18.0	1800	+ 450
1999	-	4857	38.4	2306	- 2551	-	2975	19.3	1933	- 1042
2000	6000	5473	63.8	3828	- 1645	4000	2446	14.0	1400	- 1046
2001	7000	5929	62.2	3732	- 2197	4000	837	18.6	1860	+ 1023
2002	2300	1996	9.5	570	- 1432	1500	812.3	2.3	230	- 582.3
2003	1000	185	n.a.	n.a.	-	1500	55	n.a.	n.a.	-
2004	0	570	n.a.	n.a.	-	0	499	n.a.	n.a.	-
2005	0	648	n.a.	n.a.	-	0	0	n.a.	n.a.	-

Notes:¹ “legal” in this context means that the trade was under governmental control, requiring the use of official documents issued by regional controlling agencies, such as veterinary and sanitary certificates, transport permits, trade licences, etc. CITES permits issued by the CITES Management Authority in the Russian Federation can also be associated with this trade in caviar but it is not common. Caviar that is traded in this way can have illegal origins and then go through laundering processes so that it may then enter legal trade channels. ² The volume of caviar is calculated based on gonad-somatic indices in conditions in which the gender ratio in the population is 1:1; for Kaluga, the index is six per cent of the weight of harvested fish and for Amur Sturgeon 10%. The catch volumes on which these calculations are based are those in **Table 5**, up to 2003.

n.a.: reliable data not available.

Source: TRAFFIC Europe-Russia survey data; Far-eastern Customs Statistics; CITES trade data from the UNEP-WCMC database; VNIRO 2000–2005 (unpublished).

which indicates that these exports were made with permits from the Russian CITES Management Authority.

According to data from the Far-Eastern Customs Directorate, the following sturgeon products are illegally transported across the border of the Russian Federation:

- Kaluga and Amur Sturgeon meat (fresh, frozen, and smoked);
- Kaluga and Amur Sturgeon caviar (salted, unfertilized eggs);
- Amur Sturgeon and Kaluga caviar (fresh, unfertilized eggs), and
- Amur Sturgeon and Kaluga eggs (fresh, fertilized).

Destinations

According to data from the Operating Field Service of the Russian Far–Eastern Customs Directorate, most product from Amur River sturgeons, chiefly caviar, goes to China. However, according to information obtained from the Customs authorities in the Russian Far East, the sturgeon caviar in China is mostly in transit to the USA. Russian Far East Customs reported that, in 2005–2006, one kilogramme of sturgeon caviar prepared in accordance with US requirements, cost almost USD1200 in the USA, while in Khabarovsk markets, one kilogramme cost just USD210–263.

The Russian Far-Eastern Customs Directorate states that illegal caviar arrives in Vladivostok and Nakhodka by train from Komsomol'sk-na-Amure, where it is packed into small containers by small illegal enterprises. Afterwards, the caviar is sold to foreign tourists (notably from China, the Republic of Korea, the USA and Japan), who arrive by air and on cruise ships. This illegal trade in sturgeon products is carried out daily in public areas near Vladivostok and Khabarovsk airports.

Sturgeon products are transported illicitly to Japan by sea. Sturgeon caviar is also transported illicitly by air through Khabarovsk airport to the USA, Japan, UK and other countries, including Uzbekistan. Contacts involved in the caviar business in the Amur River region have provided information about a permanent supply of sturgeon caviar exported to Japan through the port of Sovetskaya Gavan. The port serves as a departure point for direct smuggling and for



Credit: Sergey Lyapunin

Seized Amur Sturgeon

Credit: Hartmut Jungius/WWF-Canon



Credit: Hartmut Jungius/WWF-Canon



(Above) Heihe, Heilongjiang Province, China, on the south bank of the Amur River and (below) Blagoveschensk, the Russian city on the opposite bank. It is possible to cross the river between Blagoveschensk and Heihe by car or bus when the two cities are joined by ice in winter.

smuggling using tourists as couriers, in similar fashion to caviar smuggling from areas of the Russian Federation closer to Europe (Vaisman and Raymakers, 2001).

The greatest number of seizures of sturgeon products occurs during the winter, probably because products are transported mainly through Customs checkpoints freshly frozen and by motor vehicle: after the Amur River has frozen, it is possible to drive across the ice between the Russian Federation and China at Blagoveschensk, Amurzet, Nizhneleninsky, Khabarovsk, and Pokrovka. The primary overland routes for illegal export of sturgeon products are through the Customs checkpoints in Blagoveschensk (see **Figure 1**, page 3), Pokrovsky, Lazarev, Amurzet, Poltavsky, Markovo, and Pogranichny. According to Far Eastern Customs Directorate data, smuggling attempts made on

the Russian-Chinese border are primarily by representatives of mixed Russian-Chinese firms, or firms under Chinese ownership.

Following the listing of Amur River sturgeon species in Appendix II of CITES in 1997, a listing which came into force in 1998, the number of attempts to transport sturgeon products to China illegally sharply increased. In 1999, in the Yevraiskaya Autonomous Region, Federal Safety Service staff confiscated as much as 1300 kg of sturgeon caviar which was being smuggled into China. In 2000, Blagoveschensk Customs officers intercepted smugglers attempting to transport several live Amur Sturgeons to China. Since 2001, Customs officials have discovered attempts to export fertilized sturgeon eggs to China, probably to be used in aquaculture. In total, 14.33 kg of fertilized sturgeon eggs were seized, 2001–2003.

Table 11 lists Amur River sturgeon products confiscated at the Russian Far East border, 1999–2004. Five cases were brought to court, 1999–2003, to prosecute individuals attempting illicit export of sturgeon products according to Article 188 of the Criminal Code of the Russian Federation.

Table 11

Amur River sturgeon products confiscated by Russian Customs at the Russian Far East border (1999–2004)

Derivative	Quantity of sturgeon products confiscated (kg)						
	1999	2000	2001	2002	2003	2004	Total
Amur Sturgeon meat	6619	1088	10 076	946	28	5406	17 777
Kaluga meat	165	160	50	15		-	390
Salted caviar	536	77	285	6856	238	-	7992
Fertilized eggs	-	-	14	-	-	-	14

Note: Dashes signify that this type of product was not confiscated in the year stated.

Source: Far-Eastern Customs Directorate.

CONCLUSIONS

Published literature records the decline in population of the Amur Sturgeon and Kaluga over the 20th century. Changes in catch volumes and surveys of those who fish for sturgeon indicate that sturgeon stocks populations in the Amur River basin are in a critical state and continue to decline. It appears that the majority of sturgeon entering the river to spawn are harvested in their first reproductive year, as demonstrated by the absence of larger-sized returning spawners in landings. The release of juvenile fish from the two fish hatcheries in the Russian Federation and fish hatcheries in China are not sufficient to mitigate the declining population trends of the Kaluga and Amur Sturgeon.

This documented and observed decline in stocks of the Amur Sturgeon and Kaluga has been reflected by declining quantities of these fish harvested in the Russian Federation: relative to catches in the early 20th century, catches in the early 21st century have been hundreds of tonnes less. However, fishing levels are nonetheless not as low as they should be. For example, they have not been reduced by the ban on commercial fishing, effective since 1984, and quantities of sturgeon taken from the Amur River by poachers in the Russian Federation are many times the legal total allowable catch. Amur River sturgeons are reported to have become scarcer in recent years, to the point where even scientific quotas for a few tonnes have been hard to fill. Official records in China document an overall declining trend in sturgeon catches from the Amur River.

Current policies and efforts to control fishing for Amur Sturgeons and Kalugas do not have any significant influence on sturgeon poaching of these fish. The legislation governing the fishing of these species is complex, stipulates only inadequate penalties and is insufficiently specific. While test fishing is supposed to occur for the sole purpose of population monitoring during the ban, its definition and limits are unclear and it consequently serves as a cover for poaching. Enforcement of the law for Amur River sturgeon fishing in general is a problem. Despite the presence of honest and dedicated fish inspectors, reportedly many are corrupt, with strong and well-established ties to the criminal groups which control sturgeon poaching in the region. Consequently, it is concluded that efforts to prevent illegal fishing of Amur River sturgeons in the Russian Federation are not equal to the task.

The trade in caviar and sturgeon meat is the main motive for both legal and illegal harvests of Amur River sturgeons and trade in their products occurs almost throughout the Russian Far East, where it has developed into a well-established business, allegedly controlled by criminal groups in conjunction with local authorities. The fact that exports of 1069 kg and 648 kg of Amur River sturgeons were authorized for 2004 and 2005, respectively, years for which there were no official export quotas for these sturgeons, serves as a prominent example of the irregularity of trade in these sturgeons in the Russian Federation. Additionally, numerous instances of seizures of Amur River sturgeon products and reports of attempted smuggling are recorded. Notable destinations for products from illegally harvested Amur River sturgeons, mainly caviar, are China, the USA and Japan.

RECOMMENDATIONS

The rehabilitation and conservation of Amur River sturgeon populations will require concerted efforts at the local, regional, federal and international levels. The following recommendations, framed to achieve these ends, are based on the findings of this study.

At the federal level, the Government of the Russian Federation should:

- Clearly define “test fishing”, as well as its status and its limits.
- Whether through test fishing or other means, develop a scheme for monitoring sturgeon populations in the Amur River basin, including an analysis of the spawning and immature age classes and also the size of commercial stocks.
- Maintain the ban on commercial sturgeon fishing in the Amur River, allowing catch only for broodstock destined for artificial reproduction, for restocking and scientific purposes.
- Amend the legislation pertaining to violations regarding the illegal fishing of sturgeons in the Amur River, in collaboration with ICPO-Interpol and the World Customs Organization, to address current regulatory gaps, develop clear criteria to categorize the levels of infringements, and define the appropriate legal jurisdiction for prosecutions. Additionally, fines and penalties should be increased and a qualifying clause should be introduced into Article 256 of the Criminal Code of the Russian Federation to refer specifically to sturgeon species.

- Require that all domestic transport of sturgeon products needs a unique permission form, which should be given to enterprises that are engaged in legal sturgeon fishing and trade, and ensure that these permission forms cannot be duplicated or fabricated.
- Introduce the mandatory destruction of all confiscated sturgeon products and disallow the re-selling of confiscated sturgeon meat and caviar.
- Establish and advertize a telephone hotline that allows the public to inform fisheries enforcement bodies of any illegal activities related to the fishing of and trade in sturgeons, and other protected aquatic resources.
- Organize a regional working group of governmental agencies, including representatives from the commercial sector and representatives on non-governmental conservation organizations, to develop a long-term strategy to preserve and restore Amur River sturgeon populations, including:
 - Development of sturgeon aquaculture to increase the quantity of juvenile fish released, to meet demand for sturgeon meat on the domestic and international markets, and to satisfy international markets for fertilized eggs and juvenile sturgeons.
 - Assessment of the possibilities, risks and benefits of developing social programmes for the re-training of sturgeon fishers, possibly including fishing tourism in the Amur River basin, including sport fishing for sturgeon.
 - Develop guidelines that will encourage the processing of sturgeon by-products that are currently not marketed, such as skins, cartilage, etc., which could be used to bring added value to the sturgeon fishery.
- Engage in dialogue with the governments of the People’s Republic of China, Japan and the USA regarding illegal trade in caviar to those countries.

At the regional level, the Government of the Russian Federation should:

- Create passive physical defences of existing spawning grounds by lining them with specially prepared obstructions such as “hedgehogs”, in accordance with established procedures for the administration of district water ways and hydraulic work.
- Conduct unplanned and unannounced raids of shops and markets that sell fish products, to identify individuals who buy sturgeon and sturgeon caviar harvested illegally and who sell illegal sturgeon products. The raids should be conducted by the Khabarovsk Interdistrict Nature Conservation Prosecutor’s Office, together with representatives of internal affairs bodies and staff from the trading inspectorate of the Khabarovsky Krai Administration.
- Consider the possibilities of creating specialized raid groups to protect sturgeon in the Amur River basin.

The Governments of the Russian Federation and the People's Republic of China should:

- On the basis of the existing intergovernmental Agreement on the Amur and Ussuri Rivers, jointly develop and introduce a plan to manage and restore sturgeon populations, address the potential impacts of aquaculture, and create a permanent Russian-Chinese working group, to advise the CITES Management Authorities and controlling agencies in both countries on the appropriate measures to be taken by relevant authorities.
- Develop policies and memoranda of understanding between themselves, to work towards harmonizing regulations and legislation regarding Amur River sturgeons, to ensure regional co-operation in order for sturgeon conservation efforts in the Amur River basin to occur successfully.

The CITES Secretariat should, in accordance with *Resolution Conf. 12.7 (Rev. CoP 13)*:

- Call upon consumer countries of the Amur River sturgeon products to provide financial and technical assistance to range States, i.e. the Russian Federation and China, in order to:
 - Combat illegal fishing of and trade in Amur River sturgeons, and
 - Undertake further research to clarify the status of the Amur River sturgeon populations.

The Animals Committee should:

- prepare a report on the status of Kaluga and Amur Sturgeon populations, their population dynamics and structure.

Non-governmental organizations should:

- Provide assistance to scientific and governmental organizations in organizing the monitoring of Amur River sturgeon populations, their harvest, and the market for sturgeon products.
- Provide assistance in creating specialized anti-poaching raid groups, especially in staff training, technical equipment, and legal support for these groups' activities.
- Support and initiate activities aimed at increasing the capacity of Russian and Chinese Customs and environment agencies to halt the illegal trade in Amur River sturgeons.

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