

Lessons learned include that (1) alternatives should have been elaborated in the EIA that was of poor quality, (2) monitoring should be focused on the essential impacts of the project, (3) monitoring and construction should not take place at the same time, and (4) methodology should be transparent and based on state-of-the-art.

Conclusions

Sturgeon migration is a typical example of how aquatic biota are of important concern over large river stretches including tributaries. The same is true for abiotic processes like sediment transport, erosion and accumulation. Significant human interventions in river ecosystems always have long-term effects that are not obvious during technical constructions. This holds true not only for sturgeon habitats, but also for floodplains via discharge and groundwater table fluctuations. Therefore, predictive modeling is a necessity.

These two case studies clearly show that sturgeon conservation is an issue in river basin management (ICPDR 2015). Therefore, the ICPDR plays a key role in the implementation of sturgeon protection by persuading the stakeholders and riparian countries, in particular Romania and Serbia, to engage better in restoring fish migration at the Iron Gates and preventing disruption of sturgeon migration in the Bala Branch. Such requests are not only supported by the NGOs, but also endorsed by the Program "Sturgeon 2020", elaborated in the frame of the EU Strategy for the Danube Region (www.dstf.eu). Moreover, restoring river connectivity and free fish migration is required by three EU Directives (Habitats Directive, Water Framework Directive and Marine Strategy Framework Directive).

Sturgeon poaching and illegal caviar trade – a problem of basin wide and international concern

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As stated in the Action Plan for the conservation of sturgeons in the Danube River Basin (Bloesch et al. 2005), over-exploitation is a key threat to Danube sturgeons and the pressure by poaching and illegal trade remains intense. This holds true even after catch and trade bans were introduced for wild sturgeons in the most relevant range states. In the Ukraine and in Serbia there has been a permanent sturgeon catch ban since 2000 and 2009, respectively (<http://www.sturgeons.info/generalinfo/endangering/endangering.htm>), for all species except the Sterlet in Serbia. In Romania, a 10-year catch and trade moratorium for all species started in 2006, which may be prolonged, and in Bulgaria, such a ban is in place since 2011 and was recently extended for another five years (http://wwf.panda.org/wwf_news/?261670/bulgaria-extends-the-sturgeon-fishing-ban-for-another-five-years).

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The caviar market in Romania and Bulgaria

A WWF and TRAFFIC survey on caviar trade (Jahrl 2013) aimed to collect reliable data and provide clear indications as to whether illegal caviar is available in Romania and Bulgaria. From April 2011 to February 2012, local surveyors visited shops, restaurants, markets, street vendors and sturgeon farms and collected a total of 30 samples (14 in Romania, 14 in Bulgaria and two of Bulgarian farmed caviar in Austria). The DNA was analysed to determine the species of origin (Ludwig et al. 2015). The key results were as follows:

- Five samples were declared by vendors to be wild-caught (and therefore illegal); four of these five samples were from the highly sought-after and endangered Beluga Sturgeon (*Huso huso*).
- Eight samples did not have mandatory CITES labels with CITES codes (excluding restaurants, where the container

with the label is not expected to be on display); two of these were in fact caviar from sturgeon (both of which were said to be wild-caught), six samples proved to be fake (from Lumpfish or produced artificially).

- Three samples had CITES labels, but DNA analyses suggested they originated from species or hybrids other than those declared on the label; two of these mislabelled samples were Bulgarian farmed caviar bought in Vienna (Figure 1).

These cases demonstrate clear contraventions of CITES labelling provisions and EU Wildlife Trade Regulations. In addition, they suggest that caviar of wild sturgeons – reportedly from the Danube – is offered for sale, which indicates that sturgeons are still being poached. Local fishermen told surveyors that modern equipment such as sonar and GPS as well as forbidden traditional hook lines ('carmacs') are used to catch wild sturgeon. In supposedly illegal caviar trade, surveyors found that vendors tended to only sell to people they trusted. The result is a covert chain of custody from poachers to customers.

An article published in the German magazine DER SPIEGEL on 24 December 2015 (<http://www.spiegel.de/spiegel/print/d-140604239.html>) described two cases of Beluga caviar labelled as from Bulgarian aquaculture. However, results of isotope analysis excluded Bulgarian origin almost certainly and considered the Caspian Sea as source region. It seems likely that caviar from poached Caspian sturgeons was "white-washed" as Bulgarian aquaculture product.

These findings underline how crucial effective law enforcement is, especially in sturgeon range states but also in consumer countries. This should include strong interagency and transborder coordination and application of modern technology such as DNA or isotope analysis. The issue of illegal sturgeon fishing and caviar trade deserves more attention and also firm political support to achieve success in wild sturgeon protection, particularly in the Danube.

Awareness raising and capacity building among key stakeholder groups

To stress the problem of illegal fishing and trade, the LIFE Information and Communication project "Joint actions to raise awareness on overexploitation of Danube sturgeons in Romania and Bulgaria" was conducted by WWF Austria, Bulgaria and Romania from June 2012 to September 2015. The project focused on the groups with highest impact on and responsibility for the protection of sturgeons from poaching and illegal trade in Bulgaria and Romania:

- local fishing communities
- law enforcement agencies
- decision makers
- companies that breed sturgeons or trade/process/export caviar.

Fishermen, who traditionally relied on the Danube for sustenance, have found themselves beyond the law with regards to sturgeon fishing (Figure 2). Existential needs of local communities have not been adequately addressed after the national sturgeon fishing bans were imposed and no form of compensation or other support to prevent poaching has been offered. Consequently, illegal fishing is still happening in communities and many fishermen have rather negative attitudes to conservation measures.

For these reasons, fishermen were strongly involved in the project. WWF "Sturgeon Advocates" regularly visited villages where sturgeons used to be fished. They informed fishermen about the threats to sturgeons and the impact of fishing; on the other hand, they learned about the living and working conditions of fishermen and their attitudes, experiences and suggestions with regard to sturgeons. This raised the understanding of sturgeon conservation needs and protection measures in fishing communities but also achieved a far better comprehension of the situation and motives of fishermen.

In addition, fishing communities were supported in identifying alternatives to generate income that could fill the gaps caused by the sturgeon fishing bans. In workshops, possible sources of revenue were discussed and potential funding options presented. In some villages, fishermen had very clear ideas of investments that could help them increase profits, improve services or set up small local businesses (e.g. in tourism, manufacturing of local products, fish processing and marketing), while in others, no alternative options were yet seen. A successful showcase activity was the training of fishermen in sturgeon monitoring. In the Bulgarian fishing village of Vetren, experts qualified fishermen in techniques applied in scientific monitoring of sturgeon populations. Interest has already been signalled by state agencies to employ these fishermen in future sturgeon monitoring. Moreover, the personal involvement of fishermen in sturgeon conservation resulted in increased motivation to protect sturgeons, while at the same time they acquired practical skills that can be marketed to research and conservation institutions.

Law enforcement agencies in charge of controlling all aspects relevant for sturgeon conservation – fishing, aqua-



Figure 1. Mislabelled caviar bought in Vienna: species of origin should be Beluga according to CITES code but was determined as Russian or Siberian Sturgeon by DNA analysis



Figure 2. Danube fishermen in Bulgaria, key players between sturgeon conservation and poaching

culture and trade – need sufficient capacities and knowledge to fight illegal activities. Workshops and practical training courses with national and international experts were held to enhance expertise on status of sturgeons, aquaculture production, caviar trade, fraud and smuggling techniques, legislation and enforcement. This also facilitated the crucial cooperation between national agencies and with responsible authorities in neighbouring countries. In addition, a comprehensive handbook was produced, compiling all necessary information to support the work of law enforcement agencies. Increased enforcement resulted e.g. in a large police operation in Romania in May 2014, leading to seizures of 80 kg of sturgeon caviar and 4 tons of sturgeon meat. These figures show the amounts of questionable products still in circulation.

Enterprises breeding sturgeons or trading, processing or exporting caviar pose a potential threat to wild sturgeons if not operating fully according to CITES and EU regulations, especially in range states. It must be ensured that sturgeon breeders do not illegally and unsustainably take brood stock from the wild or introduce non-native sturgeon species or populations to the wild. Moreover, the companies should refrain from introducing caviar that is illegally obtained from wild sturgeons into the market, e.g. mislabelled as legal, “captive bred” caviar.

To include the industry in sturgeon conservation, a Code of Conduct was set up, explaining these threats and listing appropriate measures. By signing this, four companies in Romania and four companies in Bulgaria officially declared compliance with relevant regulations and transparency in their business conduct to avoid any threat to wild sturgeons.

This is a first important step to ensure a sustainable regional sturgeon aquaculture industry that will benefit wild sturgeons and regional economy alike.

It is also essential that the caviar industry in consumer countries understands the critical status of sturgeons and the importance of legal requirements for caviar trade, especially the mandatory CITES labelling to determine the origin of the product and to distinguish legal from illegal caviar. Therefore, information material in different languages was distributed to companies in Romania and Bulgaria as well as to international producers and traders at information stands at the Global Seafood Expo in Brussels, the worldwide largest fair for fish and seafood products.

More on the project, all information material as well as a project synthesis, recommendations and long-term strategic directions for conservation of sturgeons in the Lower Danube from illegal fishing and trade are available on the project website: danube-sturgeons.org

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