

Sturgeon Conservation in the Danube River Basin: How to implement the Sturgeon Action Plan 2005

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Keywords: EU Danube Strategy, sturgeon policy, public awareness, scientific state-of-the-art, conservation measures

Introduction

The over-exploitation and increasing loss of habitats and longitudinal connectivity have gradually pushed sturgeon species to the edge of extinction: all but one of the eight European species are now classified as Critically Endangered on the IUCN Red List (<http://www.iucnredlist.org/>), making conservation actions mandatory in order to ensure their survival.

Despite some recent progress in sturgeon research and protection in the Danube River, there is evidence of continuous need to endorse the full implementation of the "Action Plan for the conservation of sturgeons (Acipenseridae) in the Danube River Basin" (SAP, Bloesch et al. 2006), a legally binding document under the Bern Convention, signed by all Danube countries. Current information reveals that several main issues listed in the SAP such as location of key habitats, reference conditions, current status of sturgeon species (completion of the life cycle), migration patterns, and the state of ex situ brood stock to sustain sturgeon populations remain largely unknown. The analysis of the post SAP period shows little progress in sturgeon protection and management, although it is prominently mentioned in the documents of the International Commission for the Protection of the Danube River (ICPDR) and the new EU Strategy for the Danube Region (EUSDR) (ICPDR 2005, 2007a, 2007b, 2009; EUSDR Action Plan, Priority Area 4: Action "To reduce existing water continuity interruption for fish migration in the Danube River Basin"; Priority Area 6: Action "To secure viable populations of Danube sturgeon species and other indigenous fish species by 2020").

In January 2012, a group of sturgeon experts, NGO delegates, and representatives of the ICPDR, the EUSDR and national governments conducted a workshop on the status of and needed actions for Danube sturgeon protection. Aim of this workshop was to reactivate SAP implementation and to find means to coordinate and foster conservation of native sturgeon species in the Danube River Basin (DRB) and the adjacent Black Sea, making best use of the frameworks provided by the EUSDR and the ICPDR. The main result of the workshop was the creation of the Danube Sturgeon Task Force as a promising tool to propagate urgent sturgeon conservation measures in this region.

State-of-the-art of Danube and Black Sea sturgeon populations

Apart from many **pressures** addressed in the SAP, new potential threats for sturgeons were identified. Accumulative environmental pollutants impairing individual health will impact overall health of

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stocks (Poleksić et al. 2010). The introduction of exotic species into the aquatic ecosystem may be detrimental for sturgeons, by altering the food web and habitat structure (Karatayev 2007). Climate change is likely to increase temperature and alter the hydrological regime of rivers, affecting important sturgeon life cycle events such as migration and spawning (Xenopoulos et al. 2005; Ficke et al. 2007).

Detailed knowledge or reliable estimates on the **population status and trends** are still not available for Danube River sturgeons. In the *Upper Danube* the sterlet (*Acipenser ruthenus*) is the only native sturgeon species surviving in natural waters. Proofs of natural reproduction are scarce in this part of the river system; its occurrence depends mainly on stocking (Reinartz 2002; Ludwig et al. 2009). Two sturgeon species have been documented in the *Middle Danube* and its tributaries since 2005, the sterlet and the potamodromous form of the ship sturgeon (*Acipenser nudiventris*). Ship sturgeons are extremely rare (Guti 2006; Holčík et al. 2006; Ludwig et al. 2009). Populations of sterlet in the Upper and Middle Danube are either declining, threatened by hybridization or show unstable population structure and overaging (Guti 2006; Holčík et al. 2006; Lenhardt et al. 2008; Ludwig et al. 2009; Guti 2011), which was not known during the formulation of the SAP in 2005. Four species of sturgeons have been documented in the *Lower Danube* (*Huso huso*, *Acipenser gueldenstaedti*, *Acipenser ruthenus*, *Acipenser stellatus*) since 2005 (Suciu et al. 2011). The large migratory sturgeons have become very rare, which is true especially for *A. gueldenstaedti* (Paraschiv et al. 2006). Sturgeon migration in the Lower Danube is still confined to the free flowing river stretches below the Iron Gate dam II (rkm 863). A monitoring station for migratory fishes was established at Isaccea (rkm 100) and a monitoring system for YOY beluga (*H. huso*) sturgeons (juveniles: **Young Of the Year**) was successfully established at rkm 118–119 by Romanian researchers, documenting the differences in reproductive success of all four species (Paraschiv et al. 2011). The threatened status of sturgeon species in the DRB, the diminished access to sturgeon populations due to the increased scarcity of individuals and limited access to catches has stimulated studies involving **population viability analysis** (PVA). These studies revealed strong sensitivity of the Danube sturgeon populations to environmental changes reflected by changes in natural mortality, fecundity, age at maturity, and spawning frequency. Population models also confirmed that sturgeons are highly susceptible to even moderate levels of commercial fishery, and that their recovery is a multi-decadal process (Jarić et al. 2010).

The location of current **key habitats** for sturgeons in the Danube River is still mainly unknown as well as the **reference conditions** for their conservation and restoration. According to Guti (2011) important spawning habitats for sterlet in the Hungarian Szigetköz floodplain area were destroyed by river construction works. Researchers from Romania and Bulgaria were able to identify a few spawning, nursery and wintering sites for beluga sturgeon and sterlet in the Lower Danube River as well as some basic parameters such as substrate and water level conditions as prerequisites for successful spawning (Vassilev 2006; Onara et al. 2011; Suciu et al. 2011).

Some research has also been done on the determination of **migration** and **dispersal** patterns for Danube River sturgeons (Holostenco et al. 2011; Onara et al. 2011; Suciu et al. 2011). The barrages at Gabčíkovo and the Iron Gate are obstacles impassable for sturgeons as well as other fishes. A feasibility study for the restoration of river continuity, in particular for sturgeons, is urgently needed and planned (ICPDR 2007b; Danube Declaration (<http://www.icpdr.org/icpdr-pages/mm2010.htm>); Comoglio 2011); however, there is still a lack of political willingness and solidarity to fund and perform such a project. Moreover, some 500 km downstream of the Iron Gates dams, the navigation projects planned along the Lower Danube may result in a new migration barrier in the form of an underwater sill for water diversion (www.afdj.ro).

Catches by anglers and researchers show an increasing presence of **exotic sturgeons and sturgeon hybrids** in open waters, mostly resulting from intentional and unintentional release/escape of fishes from the pet-/ornamental fish trade and aquaculture (Holčík 2006; Holčík et al. 2006; Lenhardt et al. 2006; Masar et al. 2006; Simonovic et al. 2006; Ludwig et al. 2009; Guti 2011). Danube River sturgeon species can be found in a large number of **hatcheries** in the DRB. The origin of this brood stock in aquaculture is not always clear and unfavourable allochthonous origins could be documented in some cases (Reinartz 2002; Reinartz et al. 2011).

There is still no coordinated approach for the **ex situ-conservation** of sturgeons and the release of offspring into aquatic ecosystems of the DRB. Stocking of sterlets into the Danube River and some tributaries has been conducted occasionally in Germany and Austria, but regularly in Slovakia (Holčík et al. 2006). Stocking of sterlets in Hungary has become an occasional measure (Guti 2006; Guti 2011). Recently a few beluga juveniles were released in the Hungarian Danube and occasional stocking of juveniles of migratory species has also been conducted in Bulgaria and Romania. A confirmed ship sturgeon, caught on 2 December 2009 in the Danube River near Mohács (rkm 1440), is currently being kept in a live gene bank in Hungary as the basis for a conservation-breeding program.

In **policy**, sturgeons are species under the EU Habitats Directive (92/43/EEC) and under Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Some species are listed in Appendices II or III of the Bern Convention, yet Danube River sturgeon conservation is not high on the political agenda and there is no coordinated basin-wide approach to implement the SAP. A 10-year moratorium on the catch of sturgeons was issued by Romania in 2006, while Serbia banned the sturgeon fishery in 2009. Also Bulgaria declared the catching of wild sturgeons illegal in 2011, with a 4-year extension in 2012. Countries like Serbia and Bulgaria have issued national action plans for sturgeon conservation. Investigations made by TRAFFIC and WWF documented persisting sturgeon catches and a still flourishing black market for caviar and sturgeon products in the Lower Danube region, thus documenting the importance of this facet of the sturgeon issue (Kecse-Nagy 2011).

Socio-economic measures to sustainably tackle this issue have not been undertaken so far. Actions to raise **public awareness** like the preparation of flyers and documentaries (films) have been made, yet the problem of sturgeon conservation does not have basin wide attention in the public. The natural history museum collections of live sturgeons, such as the one recently established in Tulcea, may enhance public awareness.

While there is some knowledge about sturgeons in the Danube River, the information about the **Black Sea sturgeons** as the basis of Danube sturgeon populations is almost a black box and coordinated research on this issue is urgently needed.

Conclusions and outlook

The implementation of a “Sturgeon 2020” program, similar to that of “Salmon 2020” in the Rhine River (www.iksr.org/index.php?id=124&L=3), to bring the anadromous sturgeons back up to Austria and Germany by 2020, requires intensive efforts and cooperation at basin scale to make the vision become true. The biological traits of highly endangered sturgeon species imply a slow recovery process that was certainly not greatly supported by the few scientific and political actions undertaken since the adoption of the SAP. Hence, the overall status of Danube sturgeon species has deteriorated even more since 2005, bringing them closer to ultimate extinction.

In particular, the lack of public awareness and governmental involvement to implement legal requirements and coordinated measures was a major draw-back as such commitment is crucial also for the effective implementation of moratoria and other conservation measures on the executive level. While research must be intensified and better coordinated, a key role is given to the harmonization of national legislation, control of poaching and the domestic caviar market, management of hatcheries, and economic incentives for local fishing communities. Transboundary cooperation in the Danube River and Black Sea sturgeon conservation can only be effective, if based on a basin wide solidarity to solve the common problems.

The following concrete and immediate measures are proposed for further implementation of the SAP, to be fostered by the new Danube Sturgeon Task Force, founded in January 2012:

- a well coordinated transboundary research plan and population monitoring (road map) by leading organizations and institutes with focus on sturgeon stock status, habitat, migration, genetics and the establishment of competence centres for fish and fisheries (including sturgeons);
- supporting and coordinated PR actions (raising public awareness and participation, fundraising for sturgeon projects) by authorities and NGOs (e.g. WWF and IAD);

- continuous and intensified pro-active support of ICPDR and EUSDR to promote sturgeon policy, management and legislation; this includes, amongst others, the enforcement of migration aids at the Iron Gates and Gabčíkovo dams and an increased cooperation with CITES (Convention on International Trade with Endangered Species)/TRAFFIC (the Wildlife Trade Monitoring Network)/FAO (Food and Agriculture Organization of the United Nations) to positively influence the socio-economic aspects of sturgeon conservation and to ensure a sound basis for coordinated ex situ conservation measures.

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