

and a constructive dialogue with various stakeholders from the Danube Region to mitigate the impact on sturgeons and their habitats. Such intensified cooperation between different organizations involved in sturgeon conservation may be strengthened by the ongoing political integration of the EU WFD, EU Floods Directive and EU Habitats Directive (Sundseth 2015). Acquiring increasing support of decision makers will have a vital role for the implementation of measures and the success of this program.

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Restoration programs for the Sterlet (*Acipenser ruthenus*) in the Upper and Middle Danube

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Of the five native sturgeon species in the Upper Danube, only the Sterlet is still present in a small population in the Aschach impoundment at the border between Germany and Austria. The Middle Danube sustains larger Sterlet quantities, but stocks are decreasing. At this point little is known on habitat use, population size and population dynamics of this species. Reintroductions with fish of hatchery origin in other sections of the Danube did not result in the establishment of viable populations thus far (Reinartz 2008; Friedrich 2013; Friedrich et al. 2014), questioning the success rate of conventional stocking methods. In the last years several projects were implemented to address these issues accordingly.

INTERREG – Sterlet Project in Upper Austria/Bavaria

In the border region between Upper Austria and Bavaria, several consecutive modules of a bilateral research project are running since 2013. The goal of these efforts is to acquire basic knowledge needed for the conservation and management of the local, self-sustaining Sterlet population.

A mark-recapture program has been implemented, and already more than 100 gillnet catches were examined. Photographs, morphological and meristic characteristics of the fish and DNA samples were taken, the fish were marked

with PIT tags, and recaptures were identified. Preliminary calculations suggest that the local population size is in the order of a few hundred individuals, but further recapture and telemetry results are needed to confirm this rough estimate. Hybridisation with Siberian Sturgeon is a threat to this population, but fortunately the proportion of hybrids in the last years was by far lower, compared to the study by Ludwig et al. (2009).

20 Sterlets were tagged with acoustic transmitters and tracked by boat and with loggers spread over the impoundment of Aschach, but also two more impoundments downstream. Based on the patterns of catches of the fishery, it was hypothesized that the head of the impoundment would be the preferred habitat of the population (Friedrich et al. 2014). But telemetry data showed that Sterlets strongly prefer deep areas all year round. They were recorded in depths of less than 4-5 m only in very rare cases. The deepest parts, mainly in the centre of the impoundment, are used as overwintering habitats. Pressure/depth sensor data revealed astonishing patterns of vertical migrations between habitats used during day and night. Typical migration patterns in summer show sequences of long residence in restricted areas that are interpreted as "feeding habitats". These phases are interrupted by phases of fast, unidirectional migrations. In the case of upstream migrations, these phases frequently end at the power plant of Jochenstein (Figure 1). Wandering downstream through turbines, several fish left the impoundment and could be tracked in the two subsequent Danube sections (Ratschan et al. 2014).

Efforts in 2016 will further focus on the discovery of key habitats, especially spawning and wintering habitats and on exchanges with neighbourly sections of the Danube and possible sub-populations. In this regard the DNA samples

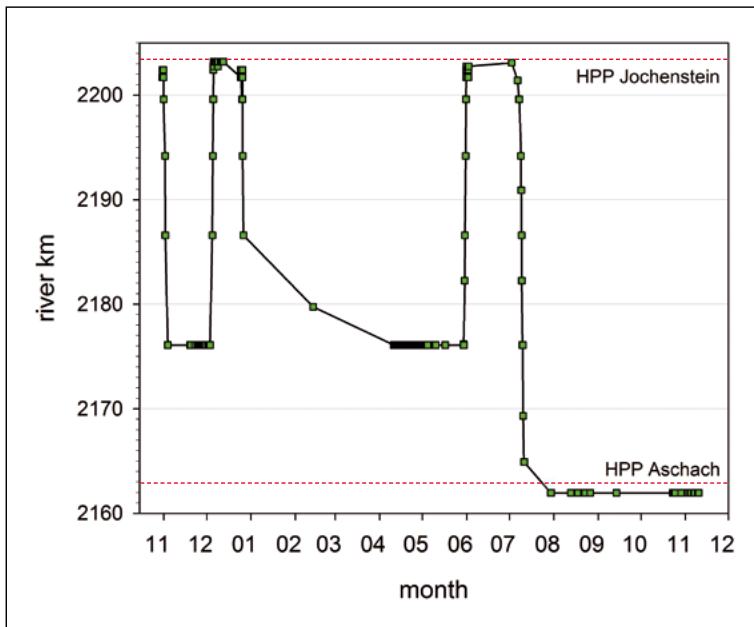


Figure 1. Example for a longitudinal migration pattern of a Sterlet (size at tagging: 470 mm) over a year. Every symbol ($n=16,844$) indicates that the fish was located. Red lines: Hydropower Plants (HPP)

of this local population are to be analysed and compared to other Sterlet stocks within a LIFE project.

LIFE Sterlet – Restoration of Sterlet populations in the Austrian Danube (Austria/Slovakia)

This LIFE project runs from 2015 to 2021 and was designed in compliance to “Sturgeon 2020” (Sandu et al. 2013) and the FAO guidelines on hatchery practices and release (Chebanov et al. 2011). It combines ex-situ and in-situ actions. The project team is supplied by the Institute for Hydrobiology and Aquatic Ecosystem Management of BOKU University Vienna, the Viennese governmental body for river and waters (MA45) and the Institute of Botany Bratislava of the Slovak Academy of Sciences. The project is sponsored by several partners from fisheries, governmental authorities, the National Park administration and the Waterway Directorate, and 60% co-funded through the LIFE Programme of the European Union.

The major focus is on the reestablishment of self-sustaining Sterlet populations in the Morava and two sections of the Danube, the Wachau and the National Park downstream of Vienna. A container breeding system, running with Danube water, will be established on an island in Vienna. A similar system has been in use for three years with Baltic sturgeon on the Odra River by the IGB-Berlin. The idea is to induce homing behaviour and fitness for survival with regard to natural feeding, predator avoidance and habitat use. It is planned to release 10,000 juveniles each year at the different sites, stemming from genetically autochthonous wild broodstock from the Slovakian Danube. Once established and running, it is hoped that similar systems can be implemented in the Middle and Lower Danube for all sturgeon species.

The monitoring program will focus on habitat use and behaviour of released juveniles to evaluate the success rate of restocking. A wide variety of methods will be used, including hydroacoustic telemetry, catch data of recreational fishery and different scientific sampling techniques. This should lead to the identification of sensitive habitats to provide recommendations for their conservation and to formulate a management plan for the species in the Upper Danube.

The whole project will be accompanied by a wide variety of PR actions like a public fish tank, exhibitions, excursions and workshops during the International Sturgeon Symposium (<http://www.iss8.info>), short films and press articles and exercises for students and pupils. For further information see: <http://life-sterlet.boku.ac.at> and www.facebook.com/DanubeSturgeonTaskForce/

Danube Sturgeons Management and Protection (Slovakia)

The project is financed by the Slovak Research and Development Agency under the contract No. APVV-0820-12 and intends to increase the knowledge on biology and autecology of the Sterlet in the Middle Danube downstream of the Gabčíkovo dam. In tight cooperation with the Slovak Anglers Club Union, responsible for the management of wild fish stocks in Slovakia, telemetry methods to identify key habitats and various sampling methodologies to evaluate the stocking efficiency and to record any natural spawning will be applied. The gained results and experience will be used to protect habitats and to develop stocking plans. These measures will support migratory sturgeon species when a fish passage at the Iron Gate dams will be built.

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