

Ecological Aspects and Conservation Challenges of the Russian sturgeon (*Acipenser gueldenstaedtii*) in Romanian Waters

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INTRODUCTION & AIM

The Russian sturgeon (*Acipenser gueldenstaedtii*) is a critically endangered potamodromous species that has undergone a catastrophic demographic collapse within the Lower Danube River and the Danube Delta ecosystems. This research aims to synthesize two decades of empirical scientific literature and official monitoring data to critically evaluate the species' current ecological status while assessing the efficacy of existing Romanian conservation frameworks. The study seeks to elucidate the discrepancy between theoretical legislative protections and the biological reality of wild populations, providing a critical perspective on long-term viability under persistent anthropogenic pressures.

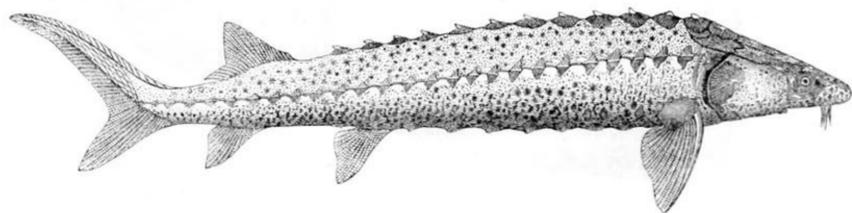


Figure 1. Scientific illustration of the Russian sturgeon (*Acipenser gueldenstaedtii*). Source: Heckel & Kner (1858), Die Süßwasserfische der österreichischen Monarchie.

While the 2006 moratorium reduced legal extractive pressure, mortality remains high due to persistent illegal, unreported, and unregulated (IUU) fishing, alongside emerging chemical and microplastic pollutants that impair larval ontogeny. A critical "survival gap" is identified within captive breeding efforts, where high post-release mortality and the loss of physiological cues due to insufficient river connectivity marginalize the long-term impact of current mitigation measures.

METHOD

The research methodology involved a comprehensive systematic review and meta-analysis of ichthyological monitoring reports and peer-reviewed studies published between 2004 and 2024. Specific emphasis was placed on correlating habitat fragmentation data with natural recruitment indicators and genetic diversity metrics. The evaluation included an analysis of the 2006 commercial fishing moratorium's impact and an examination of ex situ restocking protocols, utilizing empirical evidence to quantify the degradation of longitudinal and lateral ecosystem functions in the Romanian Danube sector relative to the species' biological requirements.

RESULTS & DISCUSSION

Analysis indicates that anthropogenic pressures have surpassed the species' resilience threshold, with habitat fragmentation from the Iron Gates I and II dams being responsible for the loss of over 80% of historical lithophilic spawning grounds. This physical barrier has isolated populations and resulted in a natural recruitment decline of over 90% compared to mid-20th-century baselines.



Figure 2. Interruptions of river continuity for fish migration in the Danube River Basin. Source: ICPDR, DRBMP Update 2021, Map 14.

CONCLUSION

The study concludes that current conservation strategies, which rely heavily on passive protection, are insufficient to prevent the functional extinction of the species within the next two decades. A paradigm shift toward active ecological restoration is mandatory, integrating the restoration of migratory pathways with the sustainable management of critical habitats. Without immediate structural interventions at major dam infrastructures and the harmonization of environmental policies across the Danube basin, conservation efforts will remain marginal against the accelerated decline of *A. gueldenstaedtii*.

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