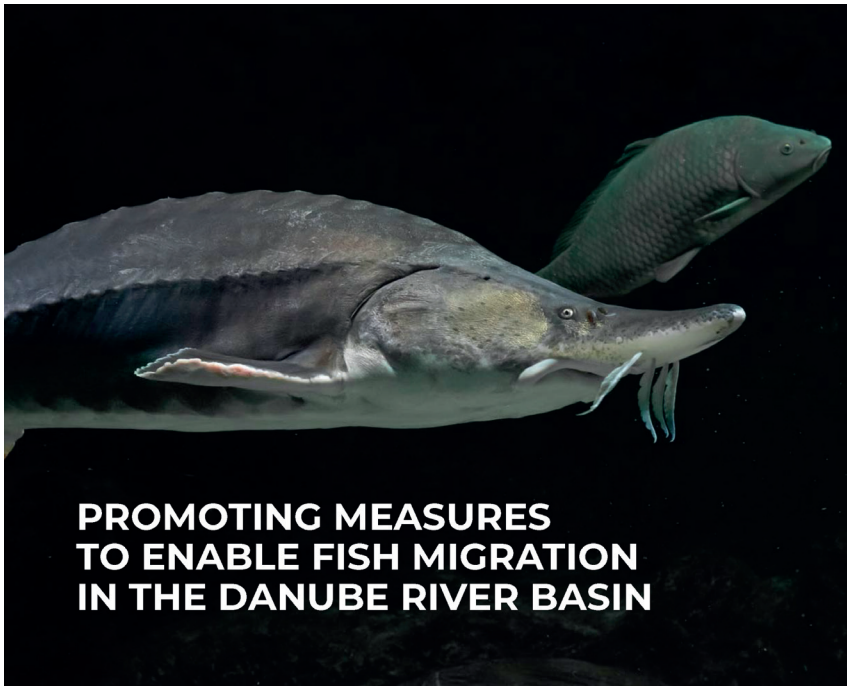


## Promote measures to enable fish migration in the Danube River Basin



### PROMOTING MEASURES TO ENABLE FISH MIGRATION IN THE DANUBE RIVER BASIN



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In autumn 2021, the Priority Area 4 (PA4), Water Quality, of the European Strategy for the Danube Region (EUSDR) has published a new brochure on 'Promoting Measures to enable Fish Migration in the Danube River Basin'. The EUSDR PA4 puts a strong emphasis on the protection of water resources and one of the seven targeted actions aims to promote measures to enable fish migration in the Danube River Basin.

PA 4, Water quality, aims to promote measures towards reducing knowledge deficits and to

- raise broad public awareness and political commitment for the Danube sturgeons as flagship species for the Danube River Basin and for the ecosystems and biodiversity of the Danube River basin as a whole,
- foster sturgeon conservation activities including protection of habitats, restoration of fish migration routes and ex-situ conservation measures,
- close knowledge gaps concerning monitoring of pressures and planning of measures for fish migration.

The decline of migratory fish populations in the Danube River Basin started centuries ago due to overfishing,

and their vulnerability was increased by the large river regulation schemes, hydro-power utilization, pollution and shipping from the 19<sup>th</sup> century onwards. The current environmental status of the Danube and its major tributaries is not satisfactory with respect to the requirements of the long- and medium-migratory fish species.

Migratory fish are particularly affected by fragmentation and destruction of river habitats, as they are prevented from movements between their spawning grounds and other core habitats, which are essential for their long-term survival and recovery. Blocking migration routes with river control facilities is the leading cause of their down-trending population dynamics.

The functionality of ecological corridors is a fundamental conservation priority in a river system, which can be ensured by the following measures: 1) improving the physical connectivity by mitigation or the removal of migration barriers, 2) restoration or maintaining core habitats for fish and 3) enhancing or sustaining viable fish populations by supportive programmes for rebuilding population structure and restoring natural reproductive potential.

A variety of passage facilities can be installed at river barriers for the restoration of connectivity of fragmented rivers. Despite the cost of building these structures, there is not enough information about their functionality and overall success in restoring the ecological corridor. Surmountability of most of the fish passes is usually incomplete, and accumulation of migratory fish is often observed below obstacles. Tagging, mark-recapture, fish pass trap and telemetry tracking of fish movement are informative methods for assessing the overall effectiveness of fish passages.

Biological and engineering expertise is now available to build and operate fish passes, however more detailed biological information is needed about migratory behaviour of the Danube fish, above all sturgeons. The swimming ability of target fish species varies. Understanding of complex interacting factors of fish migration and proper knowledge of swimming performance is crucial for designing effective fish passage systems.

The cumulative effect of a series of limited efficiency fish passes may be very significant. The importance of monitoring is particularly apparent in the case of rivers where multiple facilities operate to support fish migration. Long-term monitoring of fish migration provides information about

the effectiveness of facilities providing connectivity and function of ecological corridors.

The mortality of fish migrating downward is confirmed by several surveys at hydropower plants. Migrating fishes are often not likely to be successful in overcoming the numerous obstructions in sufficient quantities to maintain populations unless mitigating measures are taken. A variety of downstream protection facilities have been used to guide fish away from turbine intakes and transport them to the tailrace downstream of the power station.

The conservation of migratory fish species and the enhancement of their populations require a long-term, well-funded program of fish pass developments and constructions, improvements to dam operation, and removal of barriers wherever possible in the Danube River Basin. Governments are obliged to comply with international agreements such as the Convention of Biological Diver-

sity (CBD), the Convention on Migratory Species (CMS), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Ramsar Convention, etc. and regional regulations such as the Habitats Directive, Water Framework Directive (WFD), EUSDR, etc. These frameworks can therefore be used actively to promote the restoration of fluvial ecological corridors. The strategies and action plans for the conservation of migratory fish can be successfully implemented through strong international cooperation. Development of national organisations for research of fish migration would be also important for the success of extensive international cooperation.

### References and links:

This brochure can be downloaded here:  
[https://dunaregiostrategia.kormany.hu/download/8/33/e2000/EUSDR\\_digital\\_oldalpar.pdf](https://dunaregiostrategia.kormany.hu/download/8/33/e2000/EUSDR_digital_oldalpar.pdf)

## The Estuarine Ecological Knowledge Network Makes Progress: International Project Sites and Potential Ways Forward

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The Estuarine Ecological Knowledge Network (EEKN) brings together scientists and coastal fishing communities in seeking new ways forward for Earth's major river deltas and estuaries, including the Mississippi (United States), Rio Grande (United States), Danube (Romania/Ukraine), Ganges (India/Bangladesh), Niger (Nigeria), and Mekong (Vietnam) river deltas, and the Patos Lagoon (Brazil). Such environments are universally understood as crucial for the biological productivity of oceans and they are home to hundreds of millions of human inhabitants, many of whom directly depend on that marine richness in terms of the operation of their socioeconomic systems. As human-induced climate change and its consequences for Earth's oceans and coastlines increases, estuarine ecosystems are particularly threatened by problems such as sea-level rise, coastal erosion, saltwater intrusion, and increased impacts from tropical storms. These problems are often amplified by human dynamics of environmental degradation, including overfishing, pollution, and large-scale landscape modification projects. The EEKN is designed to enhance communication and cooperation between fishing communities, scientists, and policy makers in learning about the complexity of both ecological and socioeconomic systems in estuaries and deltas, and in developing more effective policy for managing fisheries, protecting and restoring coastlines, and increasing the resilience of coastal communities.

The Danube Delta was selected as a case study site in this truly transcontinental project because it is one of the global ichthyo-diversity hotspots, including numerous endemic, rare, and important species both of conservation and economic importance. A specific unique complex of ecosystems also plays a key role for the Danube River and Black Sea ichthyofauna through its function as buffer and shelter as well as a transitional feeding and reproduction area.

Due to its opportunities for international participation and collaboration the EEKN's group of project partners covers five continents and eight countries, covering some of Earth's most important marine environments. However, the EEKN's project partnerships are intended to expand to the innumerable estuarine contexts – both large and small – not already included among the project sites. In addition, while the project group views the starting working steps as essential pilot research, the long-term goal is to promote collaboration between fishing communities, scientists, and policy makers across the international project sites. It is assumed that effective strategies and novel scientific knowledge will begin to emerge within local networks and spread between international project sites.

For further information and details on the project team as well as on the progress of the project please visit <https://www.eekn.org/>.