

“Sturgeon 2020”

**A program for the protection and
rehabilitation of Danube sturgeons**



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Foreword

Sturgeons represent a natural heritage of the Danube River Basin (DRB) and their dramatic decline in the last decades has become an issue of basin-wide importance that got the attention of the Danube countries and the European Commission. The adoption of the EU Strategy for the Danube Region (EUSDR) in June 2011, aiming to harmonize the sectoral policies under an integrative approach, offered the proper frame for their revival by balancing the environmental protection with the social and economic requirements at regional level. With the support of the environmental pillar of EUSDR, scientists, governmental and non-governmental organizations, the Danube Sturgeon Task Force (DSTF) was established in January 2012 to support the achievement of the EUSDR target “to ensure viable populations of sturgeon and other indigenous fish species by 2020”.

*The aim of the DSTF is to foster synergies of the existing organizations and support the conservation of highly endangered native sturgeon species in the Danube River Basin and Black Sea by promoting the implementation of the Program “**Sturgeon 2020**”.*

This document comprises two parts:

- **Part I: The Strategy to implement the Program “Sturgeon 2020”** – an overall framework prepared for policy makers, presenting briefly the sturgeons as flagship species of the Danube River Basin and the key measures required for their conservation.
- **Part II: The Program “Sturgeon 2020”** – a living document focused on six key topics, describing the measures required to achieve a successful implementation of the conservation and revival of sturgeon populations in the Danube River Basin and the adjacent Black Sea region.

The Strategy to implement the Program “Sturgeon 2020”

Background

Once present in large, viable populations in the Danube River Basin and contributing greatly to the stocks of the adjacent Black Sea, the sturgeons declined dramatically during the last century. From the six native Danube sturgeon species which partly migrated as far as Regensburg on the Upper Danube, one is already extinct, one is functionally extinct, three are **on the verge of extinction**, while one is considered threatened (Table 1). Major impacts were overfishing and illegal marketing, disruption of spawning migration and habitat loss due to river engineering.

Species	Known as	Status	Trend
		According to IUCN ¹	
<i>Acipenser gueldenstaedti</i>	Danube sturgeon or Russian sturgeon	Critically endangered	Decreasing
<i>Acipenser nudiiventris</i>	Ship sturgeon or Fringebarbel sturgeon	Critically endangered	Decreasing
<i>Acipenser ruthenus</i>	Sterlet	Vulnerable	Decreasing
<i>Acipenser stellatus</i>	Stellate sturgeon	Critically endangered	Decreasing
<i>Acipenser sturio</i>	Common sturgeon, European sturgeon, Atlantic sturgeon	Critically endangered (extinct in DRB)	Decreasing
<i>Huso huso</i>	Beluga sturgeon or Great sturgeon	Critically endangered	Decreasing

Table 1: Overview of Danube sturgeon species and their status and trend according to IUCN

The sturgeons are a **flagship species** of the Danube River with unique value for biodiversity, both from the scientific perspective (as “living fossils” and indicators of good water and habitat quality) and from a socio-economic standpoint (healthy and properly managed stocks could sustain the livelihood of residents).

Despite the adoption of the Sturgeon Action Plan in 2005² in the frame of the Bern Convention, ratified by all Danube countries, the measures taken at national and international level (sturgeon fishery bans, restocking programs), the existent protective international legislation (CITES – Convention on International Trade with Endangered Species, Bern Convention and CMS – Convention on the Conservation of Migratory Species of Wild Animals, CBD – Convention on Biological Diversity, RAMSAR Convention, BSC – Black Sea Convention on the Protection of the Black Sea against pollution, EU environmental Directives), and the support received from governmental and non-governmental organizations (ICPDR – International Commission for the Protection of Danube River, IAD – International Association for Danube Research, WWF – World Wide Fund for Nature, WSCS – World Sturgeon Conservation Society), the status of sturgeon populations has declined dramatically (IUCN 2004, 2010, see Table 1). Their immediate and effective protection at Danube Basin scale is therefore a prerequisite to prevent their extinction.

¹ Source: <http://www.iucnredlist.org/search> (Accessed: 28 April 2013)

² SAP (Sturgeon Action Plan). 2005. Bloesch, J., Jones, T., Reinartz, R., Striebel, B. (eds). Action plan for the conservation of sturgeons (Acipenseridae) in the Danube River Basin. Nature and Environment no. 144, 121 pp. – Available at: www.dstf.eu

The Program “Sturgeon 2020”

The Danube Sturgeon Task Force (DSTF) is a network of dedicated volunteers from scientific, governmental and non-governmental organizations established in January 2012 in the frame of the EU Strategy for the Danube Region (EUSDR). It aims to foster sturgeon conservation in the Danube River Basin and the Black Sea, according to the EUSDR target “to ensure viable populations of sturgeon and other indigenous fish species by 2020”. For this purpose, the **Program “Sturgeon 2020”** was developed (based on the Sturgeon Action Plan) as a framework for action. This program combines environmental aspects with social and economic measures aiming not only to bring benefit for sturgeons, but also to contribute to the social stability of the Danube Region by improving the economic situation of stakeholders being affected by the conservation measures in the Middle and Lower Danube. Further information can be found on www.dstf.eu

Due to its integrative approach, the implementation of the Program “Sturgeon 2020” requires substantial support of all the 11 Priority Areas (PA) of the EUSDR (Fig.1) and other relevant actors.

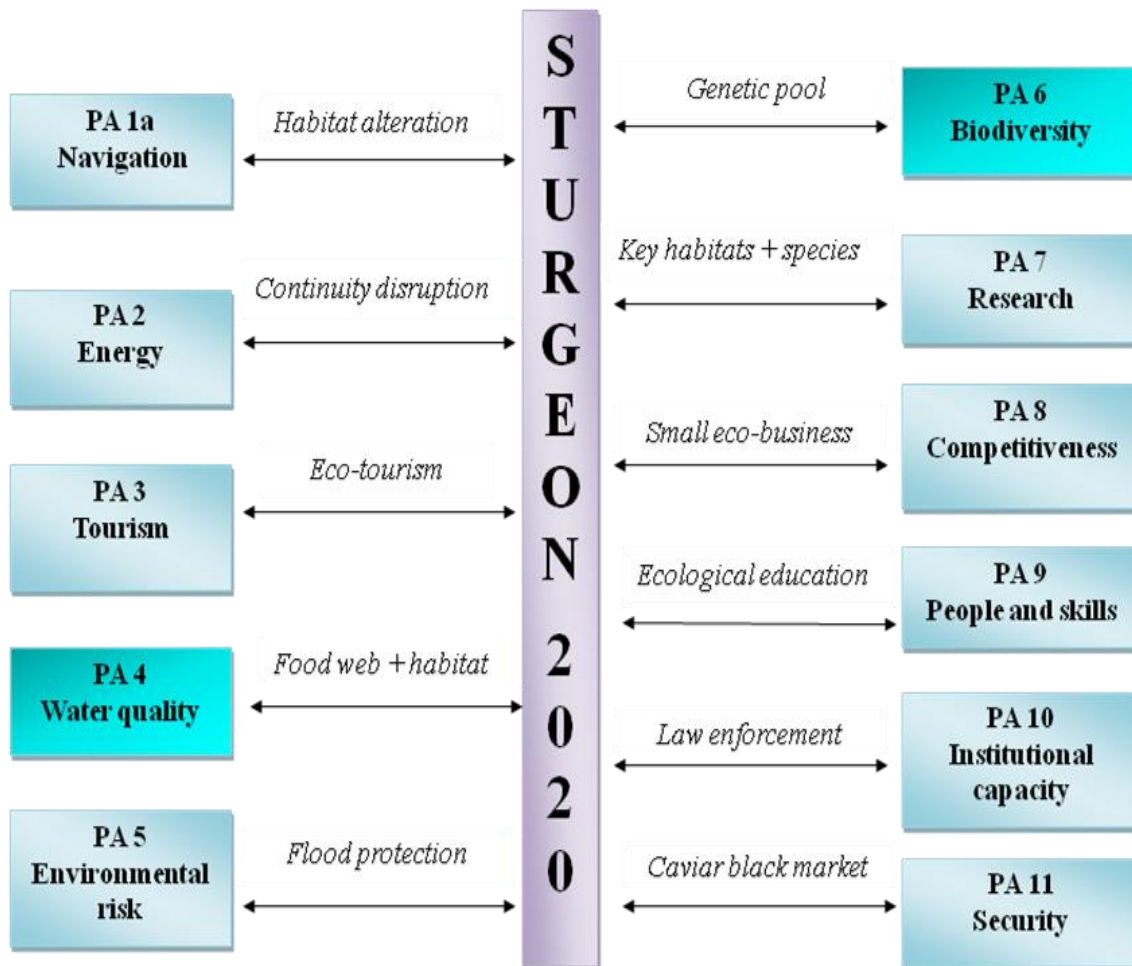


Fig. 1. Connections between the Program “Sturgeon 2020” and the Priority Areas of EUSDR
(note the stronger connections with PA 4 and PA 6)

Key players and key measures

The Program “Sturgeon 2020” has a living structure. Its success depends on the **long-term commitment and the comprehensive implementation power** of the Danube and Black Sea countries, as it requires complex cooperation between governments, decision makers, local communities, stakeholders, scientists, and NGOs. The key measures encompass habitat protection, restoration of migration routes, supportive stocking programs, economic alternatives to sturgeon fishery, fighting illegal fishing and the caviar black market, ecological education, harmonization of legislation and law enforcement. These measures are grouped into **six interconnected key topics**:

1. Acquiring political support for sturgeon conservation
2. Capacity building and law enforcement
3. In-situ sturgeon conservation
4. Ex-situ sturgeon conservation
5. Socio-economic measures in support of sturgeon conservation
6. Raising public awareness

For the implementation of the **Program “Sturgeon 2020”** applied projects and measures are required. These will be developed by making best use of existing funding instruments as well as EU and national legislation, in particular the EU Marine Strategy Framework Directive (MSFD), the EU Water Framework Directive and the Danube River Basin Management Plan (DRBM Plan)³ which is elaborated and regularly updated by the Danube countries in the frame of the ICPDR. Specifically the 2nd DRBM Plan and its Joint Program of Measures for the period 2016 to 2021 offers a key opportunity for measures implementation towards the achievement of the 2020 sturgeon target of the EUSDR. Furthermore, opportunities within the ongoing EU Marine Strategy Framework Directive have to be fully utilized for measures implementation in the Black Sea.

Due to the high heterogeneity of environmental, social, cultural and economic conditions across the Danube River Basin and the adjacent Black Sea area, the measures should be adapted to the peculiarities of each region. The milestones to be achieved by 2020 will help to verify the progress, and according to the further needs, the program will be continued in an adaptive management approach.

³ ICPDR (2009): Danube River Basin Management Plan - <http://www.icpdr.org/main/activities-projects/river-basin-management>

The Program “Sturgeon 2020”

Based on the identified 6 key topics, the program “Sturgeon 2020” describes the respective measures required to achieve a successful implementation of the conservation and revival of sturgeon populations in the Danube River Basin and the adjacent Black Sea region. The program shall be considered as a living document, in which activities can be changed or added according to the needs identified within the implementation process.

Key topic 1: Acquiring political support for sturgeon conservation

Rationale

To implement the Program “Sturgeon 2020” political support and stakeholder cooperation is crucial, while scientific expertise should provide a sound basis for conservation and restoration measures. Since sturgeons are long-living fish, their rehabilitation is complex and requires decades. Hence, the **success of the Program “Sturgeon 2020” depends on a substantial and long-term governmental commitment**, backed up by matching national and international priorities and legislation. Key topic 1 provides the needed policy framework and is inextricably *linked to all other key topics*.

Goals/Objectives

- Keep the Program “Sturgeon 2020” **high on the political agenda** by acquiring political support at local, national and international levels
- Bring relevant elements of the Program “Sturgeon 2020” into the **second WFD River Basin Management Plan (2015) and Program of Measures** at both basin-wide level (A) via the ICPDR and national (regional) level (B) in the Danube countries
- **Integrate the Black Sea region** and harmonize the Program “Sturgeon 2020” with the implementation of the EU Marine Strategy Framework Directive, as both the Danube Basin and the Black Sea are important for sturgeon conservation
- **Revise/harmonize fishery policy** in the Danube River Basin and the Black Sea region in line with the EU Fishery policy, considering the EU WFD and related Directives, the IUCN standards and the Bern Convention
- Balance the top down and bottom up approach in sturgeon policy by **optimizing public participation** to ensure successful implementation of the Program “Sturgeon 2020”
- Use **EU funding policy** for project submission and implementation to foster trans-disciplinary and trans-boundary projects

Measures and recommendations

- Continue and further **strengthen the established network and cooperation** of DSTF partners, in particular with support of EUSDR PA 6 and ICPDR link to EC, national governments and ministries, and relevant stakeholders.
- Maintain continuous **dialogue with key stakeholders such as navigation, flood protection and hydropower sectors**, all significantly impacting sturgeon populations through disruption of migration routes and habitat alteration:
 - **Navigation** – the ICPDR Joint Statement on Inland Navigation and Environment is raising awareness about the cumulative impact of navigation projects for long distance migratory fish species. By promoting environmental stakeholder participation it can help focus special attention on preventing/diminishing the impact of current and planned infrastructure projects for improving

navigation in the Middle and Lower Danube. Cooperation with PA 1a can help to prevent further habitat destruction.

- **Flood protection** – dikes and river embankments are major disruptors of lateral connectivity, and may lead to the destruction of valuable spawning, nursery, or feeding habitats. Therefore, based on the EU Floods Directive (EFD) and WFD, flood protection policy should be oriented more towards enhancing the natural retention capacity of floodplains and adjacent wetlands, and less towards building new constructions along the river banks. A dialogue with PA 5 and coordinated implementation of the EFD and WFD is required to harmonize the measures foreseen for flood risk management and environmental requirements of sturgeon populations.
- **Hydropower** – the ICPDR Guiding Principles on Sustainable Hydropower Development ⁴also point out the importance of sturgeon migration in the Danube and major tributaries. Planning new hydropower plants in river sections formerly used by sturgeons must at least include sturgeon migration and habitat requirements in the requested EIA, and a dialogue with PA2 is essential. The allocation of funding to restore sturgeon migration at the Iron Gate dams must be pursued with highest priority.
- Ensure the link to **EU and other funding programs** through PA 6 for the next period (2014-2020) to support complex and trans-disciplinary projects developed jointly by EU and non-EU Member States, where basic and applied science can be combined with socio-economic issues according to specific regional conditions and requirements.
- **Advocate at all appropriate levels** for the Program “Sturgeon 2020”, e.g. by using public events, ministerial declarations, etc.

Region-specific requirements

The ICPDR and EUSDR can facilitate sturgeon policy cooperation on the international level by fostering the implementation of the WFD, MSFD, EU Habitats and Floods Directives. National level policy actions will be required especially in the Middle and Lower Danube countries to protect the still existing wild sturgeon populations. Strengthening the dialogue with the Black Sea countries is an urgent issue, and additional efforts will be required for the non-EU member states.

Relevant actors

Governments/ministries of all Danube and Black Sea countries; ICPDR, EUSDR, the European Commission (DG REGIO, DG ENV, DG MARE), WSCS, Black Sea Commission, DABLAS, the future EU Strategy for the Black Sea Region (in process), environmental NGOs acting in the Danube and Black Sea basins, etc.

Links to EUSDR-Priority Areas

This key topic is linked to all PAs as shown in Fig.1, specifically with PA 1a Navigation, PA 2 Energy – hydropower development, gas & oil exploitation, PA 4 Water quality – good ecological status, PA 5 Risk management – flood protection, embankments, PA 6 Biodiversity – habitats & food webs, PA 7 – Research – life cycle aspects, PA 8 – Competitiveness, innovation and small business development, alternative likelihood, PA 11 – Security – organized crime (poaching, caviar black market).

⁴ ICPDR (2013): Guiding Principles on Sustainable Hydropower Development in the Danube River Basin. Final Version June 2013, adopted by the ICPDR Standing Working Group on 19 June, 2013.

Key topic 2: Capacity building and law enforcement

Rationale

There is a large variety of political and administrative governmental and non-governmental structures along the Danube and Black Sea countries with a significant role in Danube sturgeon conservation. Although supportive **international legislation, treaties and strategies** are in place (CITES, Bern Convention, CMS, the SAP, RAMSAR Convention, CBD, DRPC – Danube River Protection Convention, BSBLCP-SAP – Strategic Action Plan for the Black Sea Biodiversity and Landscape Conservation Protocol, EU environmental Directives), **national legislation** is not yet adequately harmonized, and implementation of sturgeon protection is rather weak. The sturgeon fishery bans imposed by Romania, Serbia and Bulgaria were not sufficiently effective as stand-alone measures and in part had controversial consequences (*see key topic 5*). **Continuity and solidarity** are crucial aspects that should be firmly applied on a basis of trust and common interest.

Goals/Objectives

- Revise/improve national legislation by **capacity building and identifying gaps**, e.g. by strengthening the commitments taken under the Bern Convention and CMS
- **Combat illegal, unregulated and undocumented fisheries (IUU), as well as illegal trade in sturgeons and their products (especially caviar)**, to foster conservation and sustainable management of Danube sturgeon populations
- Harmonize international and national legislation and transboundary monitoring, and conclude an **international agreement on Danube sturgeon conservation between all relevant countries**, i.e. Ukraine, Romania, Bulgaria, Serbia, Croatia, Bosnia and Herzegovina, Hungary, Austria, Slovakia, and Germany, including also Russia, Georgia and Turkey
- Establish a visionary **Danube Sturgeon Conservation Centre**, e.g. as part of a research institute, encompassing sturgeon literature, a research mega data-base and socio-economic information, to support politicians, decision makers and stakeholders

Measures and recommendations

- Based on common agreement, every country may **assign a responsible department/person for sturgeon conservation at governmental level** and **create a national network** connecting all the institutions and stakeholders involved. The national networks should be connected with DSTF that can ensure international coordination to improve dialogue and transparency between the organizations.
- The DSTF will **organize joint workshops for capacity building** and promoting discussions between relevant and responsible ministries and administrations of the Danube and Black Sea countries to identify problems and develop solutions. In particular, more coordination and cooperation between fishery agencies, customs, CITES management authorities across borders is urgently needed. **A common statement and plan of implementation** should be prepared, urging for action.
- **Strengthening local enforcement organizations, NGOs, local councils and action groups (e.g. fishery associations)** and improved communication will significantly contribute to the competence building and implementation process (*see key topic 6*). **Local communities and stakeholders should be involved** in the decision making process, in trainings, knowledge exchange, meetings, nature conservation activities, thus contributing to the common vision and actions, and the success of this program. The Natura 2000 network may be used to promote information for decision makers from academia, politics and business.
- The **control capacity of the police or fishery agencies should be strengthened** including „community control“ through local fishermen and angler associations. Apart from fines, also rewarding systems should be put in place. The **control of sturgeon trade** should be enhanced by

improving enforcement and communication. Introducing rapid identification systems to determine the origin of sturgeon products would help identify and combat illegal trade. Global caviar traders in the EU, Switzerland and USA must be involved in the strategy to ensure compliance, e.g. by not buying caviar from dubious sources or origin, and financially supporting enforcement, best-practice producers or research. Incentives for the private sector should be identified (*see key topic 5*).

Region-specific requirements

Capacity building and law enforcement must be coordinated between all Danube and Black Sea countries. Considering that poaching activities affect mostly the Lower Danube and North Western Black Sea, enforcement and control measures will be focused initially on these regions; after river continuity restoration and sturgeon reintroduction in the Upper and Middle Danube, such activities will be extended to these regions as well.

Relevant actors

Existing **key organizations** with well established networks such as the ICPDR, Black Sea Fisheries, Black Sea Commission, Central Asian and Caucasian Fisheries Commission (CACFish), FAO, DG MARE, and INTERPOL. National administrations such as Environmental and Agriculture Ministries (water use, fishery), agencies responsible for the CITES process, Nature Park administrations, and environmental police.

International and national NGOs such as WWF, World Sturgeon Conservation Society (WSCS), International Association for Danube Research (IAD), Danube Environmental Forum (DEF), TRAFFIC, European Anglers Alliance (EAA) etc.

Links to EUSDR-Priority Areas

This key topic is linked to PA 10 – Institutional capacity and PA 11 – Security, organized crime.

Key topic 3: In-situ sturgeon conservation

Rationale

Sustainable species conservation requires the preservation of the complete life cycle in the natural habitat. While in the Upper Danube, part of the former habitats and the resident species were lost due to pollution, hydropower dams and embankments, the Middle and Lower Danube still provide valuable habitats, sheltering five out of the former six Danube sturgeon species. However, habitat alteration, disruption of spawning migration and overexploitation brought the wild populations on the verge of extinction.

Goals/Objectives

- **Identify, protect and restore the life cycle** of sturgeon species in the Danube River and major tributaries, including all life stages, their supporting habitats and migration routes
- Provide basic prerequisites for “on site” sturgeon conservation through **scientific research** by characterizing all relevant sturgeon species and forms, and describing their life cycle, including habitats, local movements, migration and specific requirements
- **Standardize the respective methodologies** across the Danube River Basin
- Establish a **monitoring network** (in compliance with Water Framework Directive requirements)
- Support the development of **sustainable management**
- Provide **tools for decision making and management** like e.g. identification of key habitats, scientific documentation to increase habitat protection status, habitat maps⁵

Measures and recommendations

A) Preparatory research activities to provide the basic prerequisites for the development and implementation of applied in-situ conservation measures for Danube River sturgeons

A1) A quantitative and qualitative **population analysis of sturgeon populations** (including their status, genetic integrity and variability) allows for the determination and development of necessary conservation and management measures aimed at wild populations as well as the necessary extent of ex-situ measures (*see key topic 4*). This analysis based on literature⁶ and new investigations must include:

- a survey and evaluation of existing methodologies for sturgeon population analysis with regard to their applicability, but also adaptations and/or the development of new methodologies for the Danube River, wherever necessary
- an identification and description of the different species, forms and populations of sturgeons in the Danube River (in line with the respective analysis of captive populations, *see key topic 4*)
- a genetic characterization by using state-of-the-art methodology of the different entities of populations within the different species to identify management entities (in line with the respective analysis of captive populations, *see key topic 4*)
- estimation of stocking effects on the genetic integrity of relevant units
- an assessment of the population sizes and an estimation/determination of the functional population size, including a complete demography showing critical thresholds and the vulnerability of sturgeon populations

⁵ An incomplete draft map is presented in: ICPDR (2013): Discussion Paper: Danube sturgeons and potential fields of ICPDR actions. Draft 1 (2013-04-28) – www.icpdr.org

⁶ Reinartz, R. (2002): Sturgeons in the Danube River. Literature Study on behalf of IAD, Landesfischereiverband Bayern e.V. and Bezirk Oberpfalz. 150 pp.

- an estimation of the quantitative and qualitative effects of harvest through both legal fisheries and poaching
- the development of a standardized basin wide monitoring approach for population assessments
- the development of operative management measures and tools for all sturgeon species, populations and units for the effective protection, respectively, restoration based on the population analysis, in line with *key topics 4, 5 and 2*.
- the development of a system to estimate the effectiveness of measures like e.g. functional sturgeon passes and reintroductions (success control)

A2) The **identification and documentation of the sturgeon life cycle for all species and forms** (including habitat requirements, habitat use and migrations between different habitats) allows for its protection and restoration. The associated activities based on literature and new research must include:

- a survey and evaluation of existing methodologies for life cycle analysis with regard to their applicability, but also adaptations and/or the development of new methodologies for the Danube River, wherever necessary
- a survey and evaluation of existing methodologies for implementing up- and downstream passing solutions for sturgeons at migration barriers and the development of passing solutions in the Danube River Basin
- evaluation of hydrological and physical parameters (flow and temperature) as triggers for upstream spawning migrations
- an identification of the key life cycle characteristics including the role in the food web and associated habitat types for all species and forms through the documentation of life stages and the respective habitat use
- a documentation of the physico-chemical and spatio-temporal characteristics of habitat types and habitat use
- a determination of the quantity and quality of currently used habitats for protective measures, and identification of former and potential habitats for restoration measures, in view of reintroduction

B) Applied in-situ conservation measures

These are based on the preparatory activities mentioned above and include:

- a monitoring of the sturgeon life cycle for all species, forms and relevant units to initiate and conduct management measures
- the conservation and restoration of life cycle requirements and populations including the respective habitats and movements between these, comprising passing solutions at migration barriers
- a harmonization of the respective measures and methodologies within the Danube River Basin
- a harmonization of fisheries regulations and their enforcement in line with *key topics 2 and 5*.
- research on the possibility to develop and introduce sturgeon-friendly fishing techniques in the Danube River and Black Sea fisheries and to reduce by-catch

Species-specific and region-specific requirements

The species-specific and region-specific sturgeon requirements are compiled in the following table. They represent the state-of-the-art knowledge and the **prioritised measures** needed for their conservation [**Priority 1 most urgent – “must have” (bold)**; *Priority 2 indispensable – “need to have” (italic)*; Priority 3 not urgent, yet possibly necessary in the future – “nice to have” (regular)].

Species status (according to IUCN and SAP)	Species-specific and region-specific requirements			
	Upper Danube (UD)*	Middle Danube (MD)**	Lower Danube (LD)***	Black Sea (BS)***
<i>Acipenser gueldenstaedti</i> , migratory form (critically endangered)		Iron Gate dams passage upstream/ downstream; Reintroduction	Population analysis; Life cycle assessment; Applied in situ measures	Population analysis; Life cycle assessment; Applied in situ measures
<i>Acipenser gueldenstaedti</i> , resident form (critically endangered)		<i>Population status; Applied in situ measures (if populations can be confirmed)</i>		
<i>Acipenser nudiiventris</i> (critically endangered, nearly extinct in DB)		Population analysis; Life cycle assessment; Applied in situ measures	<i>Population status; Applied in situ measures (if populations can be confirmed)</i>	
<i>Acipenser ruthenus</i> (vulnerable, declining in MD)	Population analysis; Life cycle assessment; Applied in situ measures if population status for Aschach stock is confirmed	Population analysis; Life cycle assessment; Applied in situ measures	Population analysis; Life cycle assessment; Applied in situ measures	
<i>Acipenser stellatus</i> (critically endangered)		Iron Gate dams passage upstream/ downstream; Reintroduction	Population analysis; Life cycle assessment; Applied in situ measures	Population analysis; Life cycle assessment; Applied in situ measures
<i>Acipenser sturio</i> (critically endangered, extinct in DB)		Reintroduction (after restoration of river continuity at the Iron Gate dams)	Reintroduction	Reintroduction
<i>Huso huso</i> (critically endangered)		Iron Gate dams passage upstream/ downstream; Reintroduction	Population analysis; Life cycle assessment; Applied in situ measures	Population analysis; Life cycle assessment; Applied in situ measures

*) sturgeon distribution areas upstream of Gabčíkovo

**) sturgeon distribution areas between Iron Gate dam II and the migration barrier at Gabčíkovo

***) sturgeon distribution areas downstream of Iron Gate dam II are biologically connected with the BS

Relevant actors

Research institutions, universities and private enterprises/consultants with expertise in fish/sturgeon biology and/or genetics, ICPDR, hydrology, river morphology and habitat restoration.

Links to EUSDR-Priority Areas

This key topic provides the scientific basis for all PA as shown in Fig.1, but is linked specifically to PA 4 – Water quality (habitats conservation, good ecological status), PA 5 – Risk management (flood protection and hydromorphological alterations), PA 6 – Biodiversity, and PA 7 – Research.

Key topic 4: Ex-situ sturgeon conservation

Rationale

Viable sturgeon populations depend on a multi-aged structure comprising all different age-classes. Ex-situ conservation measures ensure the viability of the respective populations in captivity (living gene banks) by supporting natural reproduction and the natural life cycle. They are not intended as stand-alone activities but should always be in line with in-situ conservation measures (*see key topic 3*). They are not necessary if the natural life cycle is fully operational.

There is a strong linkage between ex-situ and in-situ measures, and an in-depth genetic assessment of the populations must be performed as a basic prerequisite to identify management units to be conserved. Hence, both sturgeon oriented *key topics 3 and 4* overlap with necessary research.

Goals/Objectives

- Provide basic measures to **establish captive broodstock** of all relevant sturgeon species and forms in non-commercial facilities, built exclusively for supportive stocking and reintroduction, and running according to the state-of-the-art scientific methods
- Supervise ex-situ broodstock and hatchery facilities by governmental authorities **implementing the joint conservation strategy**. The facilities must not be subject to commercial interest, but are supposed to provide mutual benefit by providing access to offspring for stocking purposes at minimal cost and high reliability. However, expertise, equipment and logistics from the commercial sector might be involved, if necessary
- Organize ex-situ facilities as **joint regional network operations of Danube countries**. The approach must include joint responsibilities of the relevant countries and provide access to guarantee long-term operation with shared costs, since the measures may last for several generation cycles of the species concerned
- **Evaluate the performance of ex-situ facilities** on a regular basis. Improvements and new research results relevant to the application of methods have to be incorporated in the protocols, so as to maintain state-of-the-art
- **Execute and monitor stocking measures** based on the status of natural reproduction by respecting the principle to not interfere with natural recruitment

Measures and recommendations

- In-situ population structure will define the requirements for ex-situ broodstock composition and management. For instance, **retrieval of the long distance migratory forms of adults still arriving at the Iron Gate dam II must be secured for ex-situ measures to maintain these forms for the rehabilitation of populations once the migration route at the Iron Gate dams has been restored.**
- A primary objective should focus on preparing a **joint inventory of existing broodstock in captivity** (e.g. conservation programs, living gene banks) to minimize duplication of efforts (excessive additional catches from the wild) while guaranteeing the best coverage of the genetic structure found in wild populations.
- A survey should be conducted to determine the **structure and capacity of existing facilities**, focusing on the suitability and adjustments required if these units will be incorporated into an overall ex-situ conservation program according to the aimed high quality standard. Also the potential for the establishment and inclusion of gamete repositories/sperm banks into such programs has to be assessed and such facilities implemented if and wherever appropriate.

- Ex-situ facilities for conservation purposes should be designed in line with the **WSCS-FAO guideline** on hatchery management for release, facilitating the cultured fish for fitness of survival in natural environments after release⁷. This includes measures to (1) acclimate juveniles step by step to changing environmental conditions (e.g. micro-turbulence, salinity, photoperiod, temperature regime), (2) to allow natural behaviour in-situ, (3) to train behavioural reactions to avoid predators, and (4) to establish facilities near the selected and intended release sites for gradual adaptation of fish to natural conditions.
- Hatcheries for release will have to **develop joint protocols** to allow proper functional analysis and assessment of operational success. Joint databanks should follow the same layout for international assessment and comparison. A joint methodology for introduction/release and monitoring (success control) has to be developed and applied.
- To build broodstocks for species or biological groups considered almost extinct (e.g. *Acipenser nudiiventris*), a **rescue program** should be implemented which involves fisheries and respective authorities to secure incidental catches. This includes the timely preparation and maintenance of means for rapid transportation as well as holding/rearing.
- Reintroductions into formerly inhabited parts of the riverine-marine system have to be in line with IUCN guidelines⁸ and based on and coordinated with the respective in-situ measures. A joint program has to be carried out – preferably with the involvement of the fishery community in monitoring – to rate the performance (migration, growth and survival) of released fish. Past stocking activities should undergo a retrospective analysis on their structure, effectiveness and overall outcome to learn from experience and optimize future programs.

Species-specific and region-specific requirements

The species-specific and region-specific sturgeon requirements are compiled in the following table. They represent the state-of-the-art knowledge and the prioritised measures needed for their conservation [**Priority 1 most urgent** – “**must have**” (**bold**); *Priority 2 indispensable* – “*need to have*” (*italic*); Priority 3 not urgent, yet possibly necessary in the future – “nice to have” (regular)].

Overall, **anadromous sturgeon species** (*Huso huso*, *A. gueldenstaedti*, *A. stellatus*) are to be considered a priority also for the Middle Danube, in particular when connectivity of the Danube has been re-established in line with the obligations of the EU-WFD. As outlined above, the current retrieval of decreasing numbers of broodstock of long distance migrants downstream of the Iron Gate dam II is considered an urgent priority (“must have”).

⁷ Chebanov, M., Rosenthal, H., Gessner, J., Van Anrooy, R., Doukakis, P., Pourkazemi, M., Williot, P. 2011. Sturgeon hatchery practices and management for release – Guidelines. FAO (Fisheries and Aquaculture Technical Paper No. 570. Ankara, FAO, 110 pp.; download pdf-version at: <http://www.fao.org/docrep/015/i2428e/i2428e.pdf>)

⁸ IUCN 1998. Guidelines for Re-introductions. Prepared by the IUCN/ SSC Re-introduction Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. 10 pp.

Species status (according to IUCN and SAP)	Species-specific and region-specific requirements			
	Upper Danube (UP)*	Middle Danube (MD)**	Lower Danube (LD)***	Black Sea (BS)***
<i>Acipenser gueldenstaedti</i> , migratory form (critically endangered)		Ex-situ measures (after restoration of river continuity at the Iron Gate dams)	Rescue program	Rescue program
<i>Acipenser gueldenstaedti</i> , resident form (critically endangered)		Rescue program (based on results of population assessment and incidental catches)		
<i>Acipenser nudiiventris</i> (critically endangered, nearly extinct in DRB)		Rescue program	Rescue program (based on results of population assessment and incidental catches)	
<i>Acipenser ruthenus</i> (vulnerable, declining in MD)	Population assessment of the stock in Aschach impoundment; Ex-situ measures if population status is confirmed	<i>Assessment of current ex-situ measures</i>	<i>Linking to in-situ measures & population assessment</i>	
<i>Acipenser stellatus</i> (critically endangered)		<i>Linking to in-situ measures & population assessment (after restoration of river continuity at the Iron Gate dams)</i>	<i>Linking to in-situ measures & population assessment</i>	<i>Linking to in-situ measures & population assessment</i>
<i>Acipenser sturio</i> (critically endangered, extinct in DRB)		Linking to recovery programs in Europe (after restoration of river continuity at the Iron Gate dams)	Linking to recovery programs in Europe	Linking to recovery programs in Europe
<i>Huso huso</i> (critically endangered)		Ex-situ measures (after restoration of river continuity at the Iron Gate dams)	Extensive ex-situ measures	Extensive ex-situ measures

*) sturgeon distribution areas upstream of Gabčíkovo

**) sturgeon distribution areas between Iron Gate dam II and the migration barrier at Gabčíkovo

***) sturgeon distribution areas downstream of Iron Gate dam II are biologically connected with the BS

Relevant actors

Research institutions, universities and private enterprises/consultants with expertise in fish/sturgeon biology, genetics and/or controlled propagation, authorities responsible for fishery and fish protection, the ICPDR (water management in the Danube River Basin), Black Sea Commission, DABLAS, etc.

Links to EUSDR-Priority Areas

This key topic is mainly linked to PA 6 – Biodiversity, PA 7 – Research, and PA 8 – Competitiveness – small business development.

Key topic 5: Socio-economic measures in support of sturgeon conservation

Rationale

For centuries, sturgeon fishery represented a major income source for many communities along the Danube River, particularly in the Middle and Lower Danube as well as the Danube Delta. The decline of sturgeon populations was caused partly by unregulated fisheries and over-exploitation. This triggered the ruin of fishermen communities that based their existence on this living resource, leading to the collapse of the local economy. The sturgeon bans in three Lower Danube countries were not accompanied by appropriate compensation measures to reduce the adverse effects upon local fisheries communities and, hence, could not prevent poaching (*see key topic 2*).

Providing alternative income sources and raising the quality of life of the fisheries communities along the Danube River and the Black Sea shore will make fishermen less oriented towards illegal fisheries and will raise their stake in sturgeon conservation. Such measures will contribute also to the aim of the EUSDR to strengthen the regional stability.

Beyond this approach on a local and regional level it is also necessary to consider markets and consumers. In a long-term perspective the future of the sturgeons can be assured if their value for society and economy is appreciated as a brand for nature and river protection/restoration in the Danube River Basin.

Goals/Objectives

- **Improve the fisheries rights along the Lower Danube to strengthen local communities and their responsibility for natural resources**
- **Identify local infrastructure and social services** needs and help local fishermen communities in the Middle and Lower Danube to access support for their development
- **Support local communities in developing alternative income sources**, in particular based on traditional activities and heritage, to lower orientation towards illegal activities and to strengthen social cohesion
- **Foster local production and market conditions** enabling fishermen to increase profits/revenues from sustainable/legal activities
- **Inform consumers** of the consequences of buying illegal sturgeon products and promote the demand for sustainable products (e.g. farmed caviar, meat) to lower the pressures on wild populations
- Investigate the **effect of sturgeon bans** to identify benefits, bias and risks; potential extensions of bans should consider the results of this analysis and investigate effectiveness of alternative measures
- **Assess and value ecosystem services** (including non-monetary values) and integrate them into cost-benefit analyses of infrastructure measures to foster sustainable solutions

Measures and recommendations

Measures must be developed **bottom up** in **participatory processes** with the support of experts who can bring ideas to the implementation level, respecting gender issues and social cohesion. Successful business models and initiatives devoted to the communities along the Danube River such as the program of Nova Skola, Belgrade, or the strategy of the Local Action Group “Delta People”, Mila 23, can be adapted to other communities. Measures to reach the goals encompass:

- **support job creation for local people related** to commercial and ecological sturgeon hatcheries (*key topics 3 and 4*) or other sustainable activities and help building up professional management
- establish **effective consultations of fishermen communities** in decisions of their concern and create **sturgeon fishermen advisory boards**.
- develop a **Danube Sturgeon brand** as a basis for tourism, communication activities, cultural exchanges and commercial partnerships
- raise awareness of **(regional) consumers** to increase demand for aquaculture caviar and farmed fish products, and diminish the black market

- reform **local market structures** by promoting small enterprises and family associations to increase employment rates, in due consideration of women and young people
- **foster the implementation of CITES requirements** in the policy framework that governs the internal market, including: drafting incentive schemes, regulations, control mechanisms and support measure for fishery associations
- **introduce a “community control”** concept in the Lower Danube countries that could contribute to reduce poaching
- support **alternative income sources** for fishery communities, e.g. by promoting **ecotourism**, develop handicrafts and local traditions, ecological local agricultural and forestry products, restore and develop village infrastructure and services, protected area management, and ecological education
- provide **access to funding sources and low-interest loans** as well as counselling (coaching) for small enterprises and start-ups concerning economic operation
- **complement (extensions of) sturgeon fishery bans** with environmental, social and economic protection measures to compensate loss of income and the decline of fishery resources

Region-specific requirements

These measures are mainly focused on the Middle and Lower Danube as well as the Black Sea shore (including non-EU countries) where most of the remaining wild populations of sturgeons are located. Other measures will target the whole Danube Basin. With regard to the caviar market, the global dimension of consumers should also be considered (key topic 2).

Relevant actors

Mayors and councils of municipalities, local authorities and entrepreneurs, SME (e.g. sturgeon aquaculture facilities), NGOs, fishermen associations, Local Action Groups from MD and LD countries, universities, economic sector, tourism, researchers in socio-economic sciences, etc.

Links to EUSDR-Priority Areas

This key topic is mainly linked to PA 3 – Tourism and culture (eco-tourism), PA 6 – Biodiversity (as a source of ecosystem services), PA 8 – Competitiveness (small business development) and PA 9 – People and skills (ecological education).

Key topic 6: Raising public awareness

Rationale

Raising public awareness is the key for the generation of continuous and long-term support in sturgeon conservation. The implementation of the Program “Sturgeon 2020” will require broad support on different levels, from decision makers to the local public. Therefore, communication has an essential role in raising the level of understanding and support. It should be based on latest scientific information, rely on existing basin-wide cooperation and networks, apply information targeted to specific stakeholder groups as well as the general public, and be easily accessible by using media, internet and modern communication tools. Overall, **the sturgeons should be promoted as natural heritage and valuable Danube flagship species that needs urgent protection to survive (“Our Danube – Our Sturgeons”)**.

Goals/Objectives

- **Emphasize the historic importance** of sturgeon fishery and caviar trade, and **the causes that led to the decline of wild populations** and **raise public concern** regarding their possible extinction
- **Increase awareness and get support for Danube and Black Sea sturgeon conservation actions**, especially concerning (1) basin wide protection, (2) long-distance migration, (3) protection of key habitats, (4) socio-economic benefits, and (5) prevention of illegal fishing and control of caviar trade
- Reduce the negative impact of human society on wild sturgeon populations by inducing a **change of attitude of the public, stakeholders and policy makers towards sturgeon and environmental values**
- **Foster the networking** of different governmental organizations and public bodies (incl. NGOs) to disseminate the sturgeon conservation measures at national level

Measures and recommendations

Public participation is the key element of raising awareness and ultimately achieving sturgeon conservation. The output of all other key measures will be used to disseminate the relevant knowledge and information. Particular attention should be given to measures that can be readily implemented by groups and organizations already active in the frame of EUSDR and DSTF. This will help to identify gaps and needs of further communication. Key tools are:

- **identify target groups and main actors**, their role and possible contribution to sturgeon conservation (setting concrete objectives for each target group)
- **investigate standpoints of local people and stakeholders** (as the firm basis for taking the right actions and implementing measures), e.g. by conducting interviews and questionnaires on individual and regional basis
- **develop key messages** and identify/employ suitable channels (TV, newspapers, magazines, etc.), right timing and materials adapted to each target group (pamphlets, flyers, brochures in Danube countries languages), including teaching tools for schools of all grades
- **organize information meetings**, workshops, trainings, seminars, conferences, etc. to address specific topics to different groups of people
- **use the internet** (DSTF website, Wikipedia, forums, Facebook, Twitter, etc.) **to advertise sturgeon protection** and foster networking with different stakeholders (e.g. the ICPDR, the Natura2000 network, the National Parks along the Danube River, the Marine Protected Areas, the various national and international fishery associations, and the different NGOs in the Danube countries)
- **connect the young, urban population to traditional lifestyles and nature**, promote sustainability as a mean to preserve nature and sturgeons as part of the ecosystem values – support them to discover a healthy, chic trend by “living with nature”

Region-specific requirements

While in Upper Danube countries communication should be oriented towards habitat restoration and shifting consumer preferences towards farmed sturgeon products, in the Middle and Lower Danube this should focus more on migration aids across dams, habitat protection, benefits brought by sturgeon conservation and raising support to prevent poaching on the wild populations (without neglecting consumer behaviour, however).

Relevant actors

Communication experts, teachers, local enterprises, NGOs, ICPDR and its observers such as the Danube Competence Center (DCC), aquariums, zoos and museums, managers of protected areas, fishermen associations, etc.

Links to EUSDR-Priority Areas

This key topic is encompassing all PA as shown in Fig.1 and linked specifically with PA 9 – People and skills.

List of Acronyms

BSC – Black Sea Convention on the Protection of the Black Sea against pollution
BSBLCP-SAP – Strategic Action Plan for the Black Sea Biodiversity and Landscape Conservation Protocol
CACFish – Central Asian and Caucasus Regional Fisheries and Aquaculture Commission
CBD – Convention on Biological Diversity
CITES – Convention on International Trade in Endangered Species of Wildlife Fauna and Flora
CMS – Convention on Conservation of Migratory Species
DABLAS – Danube-Black Sea Task Force
DCC – Danube Competence Centre
DEF – Danube Environmental Forum
DG ENV – EC Directorate General - Environment
DG MARE – EC Directorate General – Maritime Affairs and Fisheries
DG REGIO – EC Directorate General – Regional Policy
DRB – Danube River Basin
DRBMP – Danube River Basin Management Plan
DRPC – Danube River Protection Convention
DSTF – Danube Sturgeon Task Force
EAA – European Anglers Alliance
EC – European Commission
EFD – European Floods Directive
EU – European Union
EUSDR – EU Strategy for the Danube Region
FAO – Food and Agriculture Organization
IAD – International Association for Danube Research
ICPDR – International Commission for the Protection of Danube River
INTERPOL – International Criminal Police Organization
IUCN – International Union for Conservation of Nature
IUU – Illegal, undocumented and unregulated fishery
JPM – Joint Program of Measures
LD – Lower Danube
MD – Middle Danube
MSFD – Maritime Strategy Framework Directive
NGO – Non Governmental Organization (also Non Profit Organization)
PA – Priority Area
RAMSAR – Convention on Wetlands of International Importance
SAP – Sturgeon Action Plan
TRAFFIC – Wildlife Trade Monitoring Network
UD – Upper Danube
WFD – Water Framework Directive
WSCS – World Sturgeon Conservation Society
WWF – World Wide Fund for Nature