



**UK STURGEON
CONSERVATION STRATEGY
AND ACTION PLAN**

2023–2033



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FUNDER CREDITS



ISBN NUMBER

Online: 978-0-900881-96-1
In print: 978-0-900881-97-8

CITATION

McCormick, H., Murray, J., Colclough, S., Gessner, J., Greenslade, J., Reynolds, L., Hedges, S., Philipsen, P., Debney, A. (Eds), 2023. UK Sturgeon Conservation Strategy and Action Plan. Zoological Society of London, UK. 39 pp.



CONTENTS

- 4** Foreword
- 5** Executive Summary
- 6** Background
- 10** Conservation Status and Protection of Sturgeon in the UK
- 12** Potential Threats
- 16** Vision, Goals and Objectives
- 17** Goal 1: Essential Habitat Protection and Restoration
- 21** Goal 2: Population Recovery
- 24** Goal 3: Sturgeon Bycatch Reduction
- 28** Goal 4: Stakeholder Engagement
- 32** Goal 5: Closing Evidence Gaps
- 36** References
- 37** Appendices
- 39** Glossary
- 39** Abbreviations



FOREWORD



Sturgeons have been an important part of our freshwater, estuarine and marine environments for thousands of years.

These elusive giants and their migratory life cycles depend on the interconnectivity between aquatic systems which are often viewed in isolation. Their tendency to roam emphasises the need for a European-wide effort to aid their recovery. As pan European populations of sturgeons continue to be restored, we will use the following Action Plan to encourage and support their return to UK waters. Charismatic animals have helped to successfully galvanise ambition for nature recovery on land and I'm sure the sturgeon can make a similar contribution for rivers, estuaries and seas.

Tony Juniper CBE, Chair of Natural England



▶ FOREWORD

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

EXECUTIVE SUMMARY

There are two species of sturgeon that are native to UK waters: the European sturgeon and the Atlantic (Baltic) sturgeon. Historically, these fish would be found in UK fresh, estuarine, and marine waters. However, due to population declines caused by overfishing and other human impacts such as barriers to migration, there have been no native sturgeon records in UK freshwater since 1994.

Native sturgeons have not entirely disappeared from all UK waters as occasional sightings are reported in UK coastal waters. A group of environmental Non-Governmental Organisations (NGOs) formed the UK Sturgeon Alliance in 2020 to champion sturgeon conservation in the UK. Together with government agency representatives, experts, and other interested NGO's, the Sturgeon Alliance developed this Action Plan in accordance with the Pan-European Action Plan for Sturgeons under the Bern Convention. This Action Plan highlights the actions necessary to achieve five goals for UK sturgeon conservation:

- 1 Essential habitat protection and restoration,
- 2 Population recovery,
- 3 Sturgeon bycatch reduction,
- 4 Stakeholder engagement, and
- 5 Closing evidence gaps.

These goals support the wider vision for sturgeons in the UK:
to restore populations of both native species of sturgeon as flagship species for healthy marine, estuarine and freshwater systems, contributing to their pan-European recovery, while realising their societal importance.



Please note for the purposes of this document, when using “sturgeon(s)”, this is in reference to both Atlantic (*Acipenser oxyrinchus*) and European sturgeon (*Acipenser sturio*). When referring to just one of these two species, their common names will be used. It should also be noted that although Atlantic sturgeon is used here, this species is also known as Baltic sturgeon.

Foreword

EXECUTIVE SUMMARY

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

BACKGROUND

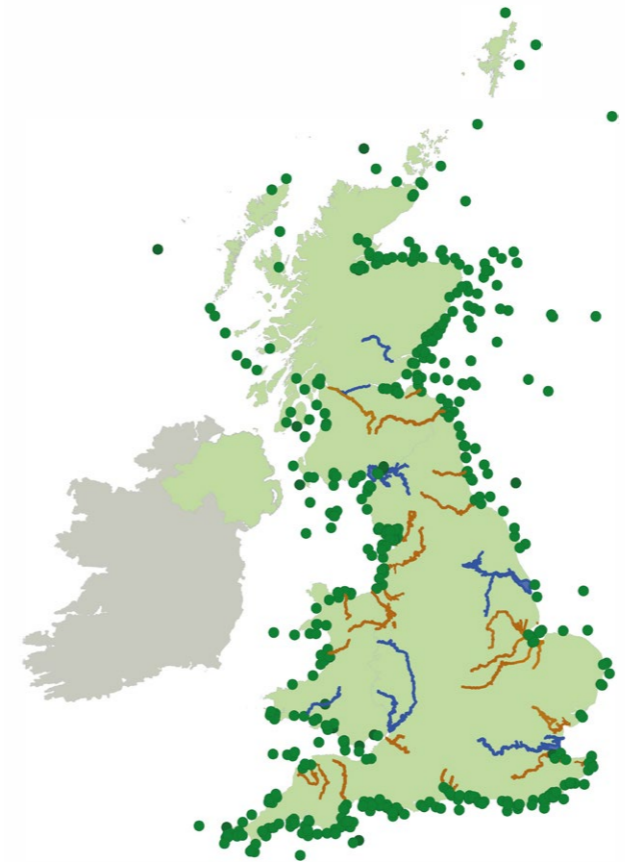
Sturgeons are a group of long-lived, late-maturing fish that make up the most threatened group of animals on the IUCN Red List (Friedrich *et al.*, 2018; IUCN, 2022).

Currently, there are 26 species of sturgeon worldwide; eight of these are native to Europe, and two are native to UK waters: the European sturgeon (*Acipenser sturio*) and the Atlantic, or Baltic, sturgeon (*Acipenser oxyrinchus*) (Friedrich *et al.*, 2018). These two species are very closely related, and until 1997, the Atlantic sturgeon was considered a subspecies of the European sturgeon (Birstein, 1997). Both species are anadromous, migrating into freshwater to spawn (Gessner *et al.*, 2010). Young sturgeons spend one to three years in freshwater, depending on the species, after which time they will start migrating into brackish and marine waters to feed primarily on polychaete worms and crustaceans (Brosse *et al.*, 2000). Female European sturgeons reach maturity between 14 and 18 years and males between 10 and 12 (IUCN, 2022), while female Atlantic sturgeons reach maturity anywhere between 10 and 27 years, and males between 6 and 10 years, depending on environmental factors (Hilton *et al.*, 2016).

Historical records compiled by Colclough (2021) demonstrate that sturgeons were regularly present in UK waters up until the early 1900s, when their numbers began to decline. From 1100 to 1990, there were over 1,400 sightings or captures reported in UK fresh and estuarine waters, and 3,705 in coastal or marine waters (Colclough, 2021). The decline in reported catches per year since the late 19th century corresponds with the decline of sturgeon populations in continental Europe. The freshwater systems in England with the most historical records are shown in Figure 1. The ample evidence that sturgeons were present in UK freshwaters clearly indicates

the importance of these habitats to the completion of their life stages. There have been one or two records of young sturgeon in UK freshwater, such as the 23cm-long juvenile reported from the River Thames in 1878. This dearth of juvenile records may be due to them being harder to spot and less likely to catch, or simply being less interesting and therefore unlikely to be reported. Despite the lack of juvenile and spawning event records, there are records of mature females shedding eggs at the time of their catch, suggesting these individuals were carrying large numbers of ova and were ready to spawn (Colclough, 2021). This implies that it is very likely that sturgeons did spawn in UK rivers (Colclough, 2021). River systems with records of females shedding eggs at the time of catch are indicated on the map (Figure 1).

From 1990 to present, just one native sturgeon has been reported in UK freshwaters, one in a UK estuary, and over 20 in UK marine and coastal waters (Colclough, 2021). While this does not mean they are no longer present in these environments, the decline in the number of sightings does suggest their numbers have dwindled. The severe decline in sturgeon numbers in the UK and across Europe is due to various factors. These most notably include fishing pressure, habitat degradation, barriers preventing up and downstream migration, hydro-morphological changes in rivers, and pollution (Charbonnel *et al.*, 2023, Gessner *et al.*, 2010; Friedrich *et al.*, 2018).



- River with sturgeon recorded
- River with sturgeon recorded and intent to spawn suggested
- Location of marine/coastal sturgeon record

Figure 1: Map of sturgeon records in UK marine, coastal, and freshwaters from 1700–2023 based on the database from Colclough (2021). This map only shows the 860 marine records with accurate location described, out of 3,705 marine records total. Of the additional records that don't have accurate location information: 1,923 came from the North Sea, 242 from the Danish Coast, 172 from the Bay of Biscay, and 8 from the Dogger Bank.

Foreword

Executive Summary

▶ BACKGROUND

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

UK STURGEON ALLIANCE

To coordinate sturgeon recovery activities, the UK Sturgeon Alliance was formed in 2020 to assist in, and collaboratively work towards, the overall goal of recovering native sturgeons in the UK. Current members of the Sturgeon Alliance are listed in Appendix I, along with information about joining the Alliance.

UK STURGEON ACTION PLAN

In October 2022, the Zoological Society of London (ZSL) hosted a workshop on behalf of the UK Sturgeon Alliance to develop a UK Sturgeon Conservation Strategy and Action Plan. The threats, goals, and actions included in this document were identified during the in-person workshop. They were then finalised and revised during a consultation process involving all workshop invitees. This Action Plan will span 10 years (2023–2033), with a review of progress made after two years (2025). This review will be undertaken by the Steering Group, and will assess which actions have been completed, and which objectives and goals have been met. The attendees of the workshop (see Appendix II) were identified as the Steering Group for the Action Plan, to review progress and make adjustments to the Action Plan as necessary.

PAN-EUROPEAN ACTION PLAN

One of the goals of the UK Sturgeon Action Plan is to support the Pan-European Action Plan for Sturgeons, which was published in 2018 by the World Sturgeon Conservation Society and World Wide Fund for Nature (WWF) under the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats). The Pan-European Action Plan is a multi-species plan for all European sturgeon species and was written to promote a holistic approach to sturgeon conservation, as flagship species for coastal, estuarine and riverine health. In addition, coordinated efforts and long-term funding are necessary to ensure their successful conservation (Friedrich *et al.*, 2018). The purpose of the Pan-European Action Plan is to support and serve as a guiding framework for national or regional

plans. Further emphasis was placed on the importance of action plans at this scale by recommendation 127 (2007) of the Bern Convention, which proposed that all contracting parties draft and implement a national action plan to conserve and restore the European sturgeon (Rosenthal *et al.*, 2008). The plan resulted in national action plans for France (2012) and Germany (2011) for the conservation and restoration of the European sturgeon (*Acipenser sturio*). The UK ratified the Bern Convention in 1982 and it is transposed into national law through the Wildlife & Countryside Act. Since publication of the Pan-European Action Plan in 2018, countries have published more targeted action plans, including the HELCOM Action Plan for the Protection and Recovery of the Baltic (Atlantic) Sturgeon, and the First Action Plan for the European Sturgeon (*Acipenser sturio*) for the Lower Rhine.



Foreword

Executive Summary

▶ BACKGROUND

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

NATIVE SPECIES

Native species are those that are part of an ecosystem by natural processes. The well-documented historical presence of European and Atlantic sturgeons in UK fresh, estuarine, coastal and marine waters for hundreds of years demonstrates their status as part of our native fauna. This is further supported by the inclusion of European sturgeon on England's Species of Principal Importance list. Once considered a Priority Species under the UK Biodiversity Action Plan, it did not transfer to subsequent Priority Species lists for Wales and Northern Ireland. It does, however, appear on Scotland's Biodiversity List, as well as Protected Species lists for both Scotland and Wales, recognising that it is a naturally occurring fish in Scottish and Welsh waters (see Table 1).

TABLE 1: PROTECTION STATUS OF EUROPEAN STURGEON IN ALL UK COUNTRIES

COUNTRY	PROTECTION STATUS	REFERENCE
England	Species of Principal Importance	https://www.gov.uk/government/publications/habitats-and-species-of-principal-importance-in-england
Northern Ireland	None	N/A
Scotland	Scottish Biodiversity Species	https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy-and-cop15/scottish-biodiversity-list
	Schedule 2 of Conservation (Natural Habitats, &c.) Regulations 1994	https://www.nature.scot/doc/table-all-scotlands-protected-species
	European Protected Species known to occur naturally in Scotland	https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/legal-framework/habitats-directive-and-habitats-regulations
Wales	Legally protected fish in Wales	https://naturalresources.wales/permits-and-permissions/species-licensing/list-of-protected-species/fish-licensing/?lang=en

Foreword

Executive Summary

▶ BACKGROUND

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

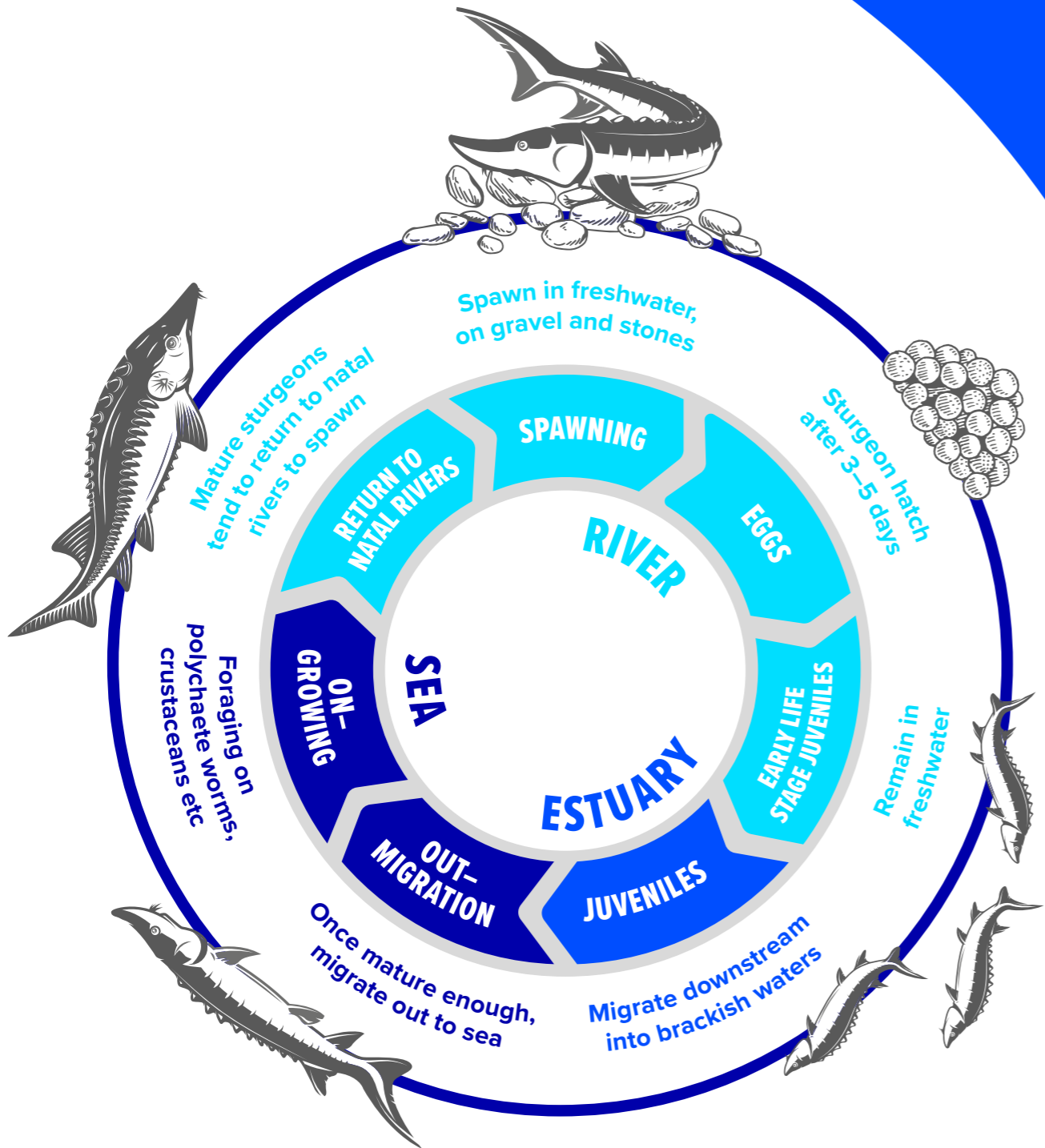
Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations



**MAXIMUM LENGTH:
>5 METERS**

**MAXIMUM LIFESPAN:
>100 YEARS**

Foreword

Executive Summary

▶ BACKGROUND

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

CONSERVATION STATUS AND PROTECTION OF STURGEON IN THE UK

TABLE 2: CONSERVATION DESIGNATIONS FOR EUROPEAN STURGEON (*A. STURIO*)

IUCN RED LIST STATUS	REGION	SOURCE
Critically Endangered	Global	Gessner <i>et al.</i> , 2010; IUCN, 2022
Critically Endangered	Europe	Freyhof & Brooks 2011
Not assessed – to be assessed with other marine/coastal fish	Great Britain	GB FW Fishes Red List project board member, pers. comm 2022.

CONSERVATION STATUS	REGION
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1998) – Appendix I	Global
Convention on Migratory Species (CMS) – Appendix I and II	Global
EU Habitats Directive (1992) – Appendix II and IV (species of special concern to the EU)	Europe
Bern Convention (1979) (UK contracted 1982) Annex II	Europe
OSPAR. Annex V: Protection and conservation of the ecosystems and biological diversity of the maritime area. Reviewed 2021.	North-East Atlantic
Wildlife and Countryside Act 1981	UK
Conservation of Habitats and Species Regulations 2010. Schedule 2 (European protected species of animals) lists those species of animals listed in Annex IV(a) to the Habitats Directive which have a natural range which includes any area in Great Britain.	England & Wales
Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006. Species of Principal Importance in England.	England
Scottish Biodiversity List	Scotland
The Conservation (Natural Habitats, &c.) Regulations 1994, listed as a European Protected Species (EPS).	Scotland

Foreword

Executive Summary

Background

► CONSERVATION STATUS AND PROTECTION OF STURGEON IN THE UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations



OSPAR RECOMMENDATIONS

The Convention for the Protection of the Marine Environment of the North-East Atlantic, or OSPAR Convention, regulates international cooperation for environmental protection of the North-East Atlantic. As a signatory to the convention, the UK contributes to and participates in the programmes and measures as set out to protect the marine environment. The European sturgeon is included on the OSPAR List of Threatened and/or Declining Species, and the recommendations to contracting parties on the protection and conservation of the European sturgeon include, among others, addressing possible threats and establishing information campaigns about the need for their conservation. For a full summary of OSPAR recommendations for European sturgeon, see Appendix III.

TABLE 3: CONSERVATION DESIGNATIONS FOR ATLANTIC STURGEON (*A. OXYRINCHUS*)

RED LIST STATUS	REGION	SOURCE
Vulnerable	Global	Hilton, E. & Fox, D. 2022
This species was not included in the European Red List assessment, as it was determined to no longer be present in Europe	Europe	Freyhof & Brooks 2011, Kottelat & Freyhof 2007
Regionally extinct	HELCOM (The Baltic Marine Environment Protection Commission)	HELCOM Red List Fish and Lamprey Species Expert Group 2013
Not assessed – to be assessed with other marine/coastal fish	Great Britain	GB FW Fishes Red List project board, pers. comm. 2022

CONSERVATION STATUS	REGION
Bonn Convention (1979) – Convention on Migratory Species (CMS) – Appendix I and II treated as <i>A. sturio</i>	Global
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1998) – Appendix I	Global
EU Habitats Directive Appendix II and IV (species of special concern to the EU) treated as <i>A. sturio</i> since the species was discriminated after the directive was adopted	Europe
Bern Convention (1979) – Not listed since the species was discriminated from <i>A. sturio</i> in 2002 only	Europe

Foreword

Executive Summary

Background

► **CONSERVATION STATUS AND PROTECTION OF STURGEON IN THE UK**

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

POTENTIAL THREATS

TABLE 4: POTENTIAL THREATS TO EXISTING AND FUTURE STURGEON POPULATIONS IN UK WATERS

They are grouped by IUCN threat classification (IUCN, 2022). Note that one of the IUCN threat categories, number 10 (Geological events), was not considered to pose a threat to sturgeon populations. Threat levels were assigned by group consensus at the October 2022 workshop.

IUCN THREAT CATEGORIES	THREAT	EXPLANATION	REGION (riverine, estuarine, coastal, marine)	THREAT LEVEL (high, medium, low)
1. Residential & commercial development	Dredging, trawling, dumping materials	Disturbs or destroys habitats, can be particularly damaging to sturgeon feeding and spawning habitats. Also can be risk of direct mortality, and temporary barrier to migration.	Riverine, estuarine, coastal, marine	High
	Habitat modification/ habitat loss due to hydropower/navigation/ water abstraction	Creation of navigation channels and water management infrastructure can disturb or destroy existing habitats suitable for sturgeons and can act as barriers to migration.	Riverine, estuarine	High
	Construction e.g., pile driving	This poses a threat due to sound levels and general disturbance, potentially creating barriers within habitats. Lack of knowledge about how and to what extent it might impact populations.	Coastal, estuarine	Low
2. Agriculture & aquaculture	Runoff from agriculture	Excessive pollutant and sediment loads entering river systems from agriculture.	Riverine, estuarine, coastal	Medium
	Non-native species from aquaculture	There are at least two caviar farms in the UK, but it is unknown how many of these individuals, if any, escape into the wild.	Coastal, estuarine	Unknown

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

POTENTIAL THREATS

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

TABLE 4: POTENTIAL THREATS TO EXISTING AND FUTURE STURGEON POPULATIONS IN UK WATERS CONTINUED...

IUCN THREAT CATEGORIES	THREAT	EXPLANATION	REGION (riverine, estuarine, coastal, marine)	THREAT LEVEL (high, medium, low)
3. Energy production & mining	Hydropower (Freshwater)	Infrastructure for this kind of power can be damaging to fish and other aquatic life through direct mortality and barriers to migration.	Riverine	Medium
	Tidal power	Infrastructure for this kind of power can be damaging to fish and other marine life both due to direct mortalities (mechanical impact) as well as through habitat alteration and barriers to migration.	Estuarine, coastal	Medium
	Heating and cooling systems including nuclear power	Infrastructure for this kind of power can be damaging to fish and other marine life (impingement, temperature increase, etc.).	Riverine, estuarine, coastal	Medium
	Offshore wind	Possible threats from offshore wind include habitat destruction, noise and vibration, electromagnetic fields, among others. Impacts of these on sturgeons are currently unknown and need research.	Marine	Unknown
4. Transportation & service corridors	Ship strikes	Collisions with ships can cause harm and mortality to sturgeons.	Marine, coastal, estuarine	Low
	Navigation development	Developing navigation routes for ships, particularly in freshwater, causes habitat loss for sturgeons.	Riverine, estuarine	Medium
5. Biological resource use	Bycatch mortality	There is no direct catch of sturgeons permitted so fishing mortality of sturgeons is most likely a result of unintentional capture.	Riverine, estuarine, coastal, marine	High
	Illegal trade/poaching	Illegal removal of fish for the production of caviar is to be expected once sufficient population sizes have been established.	Riverine, estuarine, coastal, marine	Low

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

POTENTIAL THREATS

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

TABLE 4: POTENTIAL THREATS TO EXISTING AND FUTURE STURGEON POPULATIONS IN UK WATERS CONTINUED...

IUCN THREAT CATEGORIES	THREAT	EXPLANATION	REGION (riverine, estuarine, coastal, marine)	THREAT LEVEL (high, medium, low)
6. Human intrusion & disturbance	Artificial light at night	Artificial lights can impact feeding, migration, and other behavioural patterns in fish.	Riverine, estuarine, coastal	Unknown
7. Natural system modifications	Barriers/freshwater infrastructure	Navigation of sturgeons in existing freshwater channels to reach spawning grounds is made very difficult or impossible by barriers that interrupt upstream/downstream migration while river infrastructure potentially alters hydromorphology and as such habitat quality.	Riverine	High
	Competition with other native fish	Unlikely to be a major threat.	Riverine, estuarine, coastal, marine	Low
8. Invasive & other problematic species, genes & diseases	Unregulated releases of non-native sturgeon species	Could lead to: <ul style="list-style-type: none"> Hybridisation – this tends to be more of a threat between sympatric species due to lack of same-species breeders and loss of habitat (means more species are using the same smaller habitat areas). Potential disease transfer from other species, particularly non-native. 	Riverine, estuarine, coastal, marine	Medium
	Increased predation through anthropogenically altered fish assemblages, i.e., introduction of non-native non-sturgeon species for game purposes	Impacts are largely unknown, introduction of predators such as European catfish (<i>Silurus glanis</i>) or pike perch (<i>Zander lucioperca</i>) have the potential to significantly increase natural mortality.	Riverine, estuarine, coastal, marine	Unknown
	Unregulated rewilding	Threat of “cowboy rewilders” reintroducing sturgeons is low, consequences are similar to the impacts addressed above.	Riverine	Low

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

POTENTIAL THREATS

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

TABLE 4: POTENTIAL THREATS TO EXISTING AND FUTURE STURGEON POPULATIONS IN UK WATERS CONTINUED...

IUCN THREAT CATEGORIES	THREAT	EXPLANATION	REGION (riverine, estuarine, coastal, marine)	THREAT LEVEL (high, medium, low)
9. Pollution	Water quality (WQ)	While oxygen availability is a necessity, WQ was not identified as a priority threat in France. However, habitat destruction through poor water quality (nutrients, sedimentation) is a threat, as are the potential impacts of pesticides and contaminants on reproduction and saltwater tolerance.	Riverine, estuarine, coastal, marine	Medium
	Bioaccumulation – unknown (e.g., endocrine disruption)	Impacts of bioaccumulation are largely unknown but the potential for bioaccumulation in sturgeons is high due to their long lifespan.	Riverine, estuarine, coastal, marine	Unknown
11. Climate change & severe weather	Climate change	Climate change is a threat in terms of water quantity, water quality, ocean acidification, deoxygenation, increased flood risk, etc. However, <i>A. sturio</i> is responding to climate change by moving north as temperatures rise – could increase numbers in UK waters in the future.	Riverine, estuarine, coastal, marine	Low

CONSTRAINTS:

- Lack of knowledge about the species and their distributions, because these species have been in decline for many years and therefore few opportunities for researching these species exist.
- Lack of awareness about native UK sturgeons and the threats they face. This lack of awareness requires engagement with the public in general, but will also require more targeted engagement with anglers, recreational river users, landowners and the aquatics trade etc.

- Foreword
- Executive Summary
- Background
- Conservation Status and Protection of Sturgeon in the UK
- POTENTIAL THREATS**
- Vision, Goals and Objectives
- Goal 1: Essential Habitat Protection and Restoration
- Goal 2: Population Recovery
- Goal 3: Sturgeon Bycatch Reduction
- Goal 4: Stakeholder Engagement
- Goal 5: Closing Evidence Gaps
- References
- Appendices
- Glossary and Abbreviations

VISION, GOALS AND OBJECTIVES

Vision: To restore functioning and resilient populations of both native sturgeon species as flagships for healthy marine, estuarine and freshwater systems, contributing to their pan-European recovery, while realising their societal importance.



The following section is categorised by the five overarching goals for UK sturgeon conservation. Within each of these sections, the objectives under each goal are listed, along with the actions that will be taken to meet the objectives. The timeframe to complete each action is included, and these are defined as:

Short: 1 to 2 years **Medium:** 3 to 5 years **Long:** 5 to 10 years

The priority associated with each action is also included. There are three priority levels:

High **Medium** **Low**

Priority levels were assigned by group consensus at the October 2022 workshop. The organisations listed next to each action were those present at the workshop who agreed to be involved. However, other organisations not listed below are still welcome to be involved in actions relevant to their work or area of expertise.

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

► VISION, GOALS AND OBJECTIVES

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 1: ESSENTIAL HABITAT PROTECTION AND RESTORATION

Goal Description:

Sturgeon habitats in UK fresh, estuarine, coastal and marine waters, particularly aggregation and feeding areas, are identified and protections implemented where necessary.

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

▶ GOAL 1: ESSENTIAL HABITAT PROTECTION AND RESTORATION

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

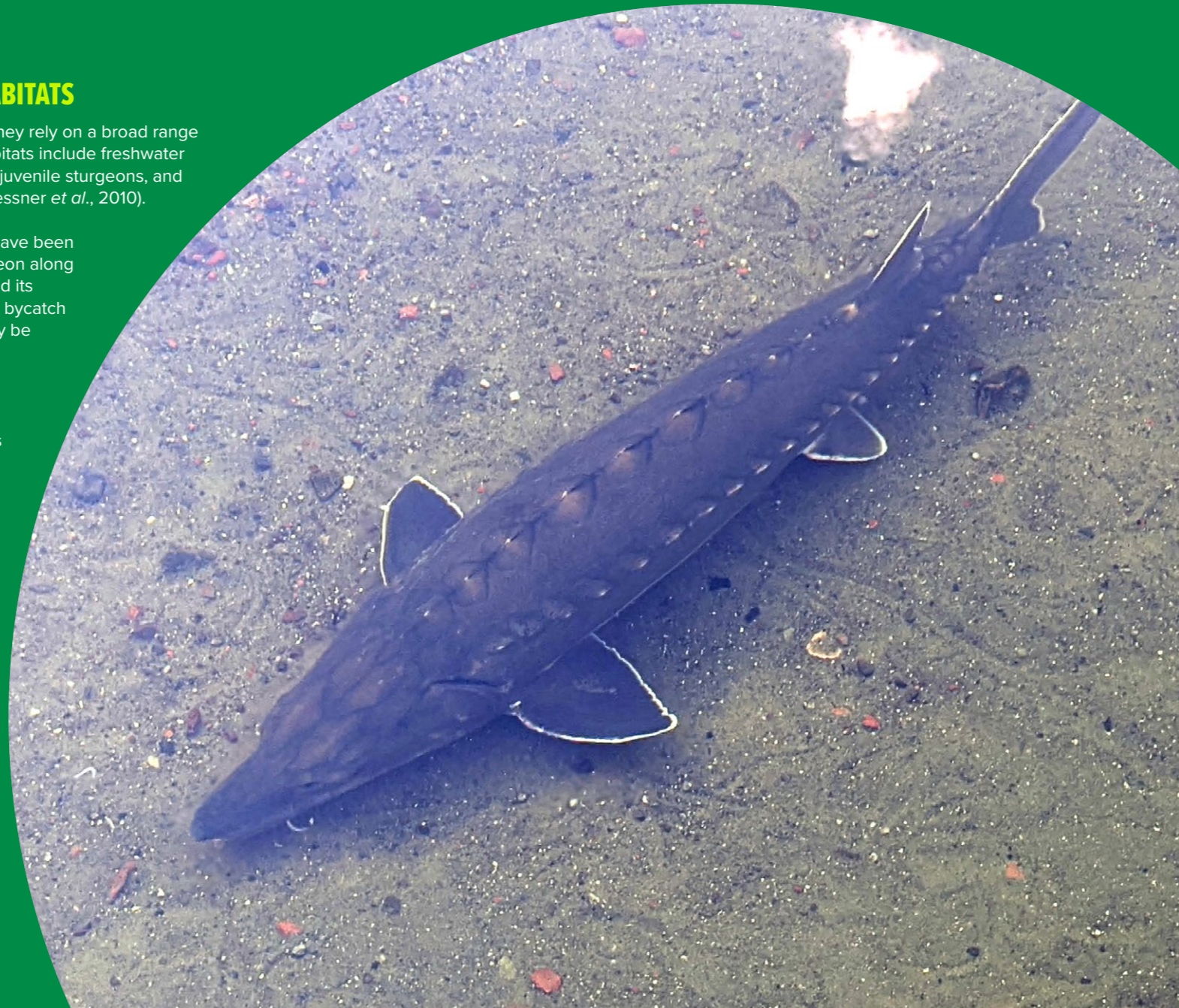
Glossary and Abbreviations

CURRENT SITUATION: ESSENTIAL HABITATS

The anadromous nature of both species means they rely on a broad range of habitats throughout their life cycles. These habitats include freshwater sand and gravels for spawning, brackish mud for juvenile sturgeons, and littoral sand and mud when foraging as adults (Gessner *et al.*, 2010).

Data from recreational and commercial bycatch have been used to model the distribution of European sturgeon along the European Atlantic coast and better understand its habitat preferences (Charbonnel *et al.*, 2023). UK bycatch data and historical distribution data could similarly be used, along with environmental parameters such as bathymetry, temperature, substrate type and salinity to predict the locations of existing and potential sturgeon foraging habitat. With a better understanding of these locations, targeted efforts can be made to protect sturgeons and their marine habitats. It is critical that these efforts include close collaboration with fishers and other marine users who may be impacted by protection measures, in order to minimise or avoid potential socio-economic impacts.

For freshwater and estuarine habitats, the recent absence of sturgeons in these areas means that historical records along with habitat data can be used to predict the location of preferred sturgeon habitats. Once priority areas are identified, the degree to which these river systems are impacted by the threats above can be determined, and restoration measures can be implemented. In this way, sturgeons can serve as a flagship species for riverine and estuarine health and system connectivity.



Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

GOAL 1: ESSENTIAL HABITAT PROTECTION AND RESTORATION

▶ Current Situation: Essential Habitats

Objectives and Actions

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

OBJECTIVES AND ACTIONS

Objective 1.1: Identify primary habitat types and locations in UK waters

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Map potentially suitable freshwater, estuarine, coastal, and marine habitat types in the UK using existing predictive models	IFM, ZSL	Short	High
Ground truth the work that has already been done in certain river systems about suitability of habitat for sturgeons (Tees, Severn) and fill in existing data gaps on primary river systems identified	Sturgeon Alliance	Short	High
Conduct eDNA surveys in priority areas, looking for 1) presence of Atlantic sturgeon 2) presence of European sturgeon and 3) presence of any other species of sturgeon to identify non-native species	Natural England, Blue Marine Foundation, Wildfowl and Wetlands Trust (WWT), Cefas	Medium	High

Objective 1.2: Identify and minimise threats to primary sturgeon habitats

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Gather existing data to map fishing pressure, dredging activities, water quality etc. to understand the existing threats to primary sturgeon habitats	IFM, ZSL, Cefas	Medium	High
Devise protection or restoration measures for primary sturgeon freshwater habitat where necessary, including building sturgeons into any existing protections. This should be done in close collaboration with stakeholders and organisations local to the habitat locations	Smaller working group of Alliance and Steering Group	Long	High
Devise protection or restoration measures of primary sturgeon estuarine, coastal and marine habitat where necessary, including building sturgeons into any existing protections. This should be done in close collaboration with commercial fishers and any other coastal/marine stakeholders	Smaller working group of Sturgeon Alliance and Steering Group – Blue Marine Foundation, Wildfish	Medium	Medium

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

GOAL 1: ESSENTIAL HABITAT PROTECTION AND RESTORATION

Current Situation: Essential Habitats

► **Objectives and Actions**

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 1

Objective 1.3: Ensure that UK conservation designations provide adequate protections to sturgeon habitat

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Understand where habitat protections already exist within areas of suitable sturgeon habitat	Angling Trust, IFM, Blue Marine Foundation	Medium	High
Once habitat modelling is complete, review the feasibility of adding sturgeon as a feature of existing protected sites	Natural England	Short	Medium
Create a GIS database of habitats, migration obstacles, locations of historical sturgeon catches, impact on habitats, and designated sites eg Sites of Special Scientific Interest (SSSI), Marine Protected Areas (MPA)	IFM, ZSL	Short	High
Conduct UK Red List assessment on sturgeons as coastal/marine native UK species	Natural England	Medium	Medium

Objective 1.4: Ensure connectivity to potential spawning grounds is reinstated

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Define and map the existing man-made barriers to sturgeon migration in priority sturgeon rivers and assess, where possible 1) the quality of the obstacle, 2) suitability for remediation measures, 3) impact on downstream migration, and 4) potential for mitigation of impacts	ZSL, IFM, local rivers trusts, government agencies, Cefas	Short	High
Define the fish passage specifications for sturgeons eg, solutions developed in Europe or the USA.	Sturgeon Alliance, Cefas	Short	High
Promote the inclusion of the above specifications in new or refurbished fish passage solutions	Sturgeon Alliance	Long	High

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

GOAL 1: ESSENTIAL HABITAT PROTECTION AND RESTORATION

Current Situation: Essential Habitats

► **Objectives and Actions**

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 2: POPULATION RECOVERY

Goal Description:

UK sturgeon populations are established or strengthened.

Photo courtesy of IGB Berlin

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

► GOAL 2: POPULATION RECOVERY

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations



CURRENT SITUATION: POPULATION RECOVERY

In response to the critical condition of European and Atlantic sturgeon populations in Europe, several countries have conducted reintroductions of both species of sturgeon. European sturgeon from the last known wild stocks have been reared in *ex situ* facilities and were first released into the Gironde in France in 2007 and the Elbe in Germany in 2008 (Gessner *et al.*, 2010). Since then, an *ex-situ* brood stock has been maintained by these countries, and over 1.5 million individuals have been stocked over the past 20 years (Roques *et al.*, 2018). Researchers are now starting to see some of these individuals returning to the river from where they were released (Jörn Gessner; pers. comm.).

For Atlantic sturgeon, Germany and Poland began a breeding programme in the early 2000s, and these brood stocks are still maintained today (Gessner *et al.*, 2019). They have provided offspring to three other Baltic nations (Lithuania, Latvia, and Estonia) for rearing and release. Restocking efforts have resulted in more than 4.5 million Atlantic sturgeons being released into the Baltic (Jörn Gessner, pers. comm.). These restoration projects are also starting to see individuals returning to the river systems from which they were reintroduced (Jörn Gessner, pers. comm.).

As a result of these reintroduction programmes, it is believed that 20 of these individuals have been caught in UK coastal waters. While there is no evidence that they have permeated UK freshwaters to explore new spawning habitats, this is a possibility in the future due to the small percentage of strayers evident in sturgeon populations. Given the historic evidence of use, it is highly likely that the utilisation of UK waters by sturgeons play an important role in the completion of their life cycle. These species are not bounded by country lines, and their increasing presence in UK waters emphasises the legal responsibility of the UK under its relevant habitats legislation to support the populations under development by the European reintroductions.

In addition to supporting pan-European population restoration, it is critical to explore the feasibility, advantages, and potential disadvantages of restoring UK sturgeon populations by reintroduction. Further, the EU Habitats Directive requires that all states study the feasibility and desirability of reintroducing species in Annex IV of the Directive, including both European and Atlantic sturgeons.

To ensure this is approached in an evidence-based manner considering potential impacts on stakeholders and the river and coastal ecosystems, this is best done through a structured decision-making process. This method integrates clear objectives, data-driven modelling, and socio-economic values into decision making. It also addresses sources of uncertainty.

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

GOAL 2: POPULATION RECOVERY

► Current Situation: Population Recovery

Objectives and Actions

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

OBJECTIVES AND ACTIONS

Objective 2.1: Support existing European and Atlantic sturgeon recovery programmes in Europe

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Establish sturgeon conservation and restoration knowledge exchange and skill sharing across Europe through regular communication, meetings and study tours	Sturgeon Alliance, European colleagues	Short	High
Share fliers, resources, and communications to support increasing the profile of sturgeons across Europe	Sturgeon Alliance, European colleagues	Ongoing	High
UK Sturgeon Alliance to join the World Sturgeon Conservation Society	ZSL	Short	Medium
UK facilitate the implementation of Bern Convention recommendations	Sturgeon Alliance	Ongoing	High

Objective 2.2: Determine which interventions, including reintroduction, would be most effective at increasing/restoring UK sturgeon populations

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Historical ecology report of sturgeons in the UK is finalised and published	IFM, ZSL	Medium	High
Identify which species is considered prevalent in the different sturgeon rivers (European or Atlantic) as a prerequisite for the planning of recovery measures	IFM, ZSL	Medium	High
Conduct a structured decision-making process to determine if reintroduction is a suitable conservation strategy, and if so, how and where to implement	ZSL, IUCN, Natural England, Sturgeon Alliance	Short	High
Conduct a Disease Risk Analysis for the reintroduction of both species of sturgeon to UK waters	ZSL, Cefas (Weymouth)	Short	High
Conduct social surveys to uncover community attitudes towards sturgeons reintroduction in priority areas	Blue Marine, ZSL, Cefas	Medium	High

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

GOAL 2: POPULATION RECOVERY

Current Situation: Population Recovery

▶ Objectives and Actions

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 3: STURGEON BYCATCH REDUCTION

Goal Description:

Accidental sturgeon capture and bycatch mortality is minimised through working closely with the fishing industry and recreational fishing communities.



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courtesy of
IGB Berlin

Foreword

Executive Summary

Background

Conservation Status and Protection
of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection
and Restoration

Goal 2: Population Recovery

▶ **GOAL 3: STURGEON BYCATCH
REDUCTION**

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 3

CURRENT SITUATION: STURGEON BYCATCH

As species protected under the European Habitats Directive, there are strict protections that mean it is an offence to deliberately capture, injure or kill a European sturgeon, as well as disturb its resting or breeding grounds. Furthermore, Section 9 of the Wildlife and Countryside Act prohibits the intentional killing, injuring, or taking of sturgeon in England, without specific permission from the Marine Management Organisation (MMO) (Tables 1 and 2). Historically, sturgeon was an important fishery in the UK and across Europe (Colclough 2021). In the early 20th century, North Sea fisheries landed between 400 and 1,000 fish per year (Dickson & Pinnegar, 2010). While not all of these would have been caught in UK waters, the intensity with which sturgeon populations in Europe were overexploited for both meat and caviar contributed to the decline of both species. Overexploitation for both meat and caviar contributed to the decline of both species (Kirschbaum *et al.* 2011).

Despite it no longer being a fishery, there are occasional incidental catches of sturgeons that occur in UK waters. This has so far only occurred and been reported in marine or coastal waters by commercial fishing vessels, and is mostly likely to occur in gillnet and trawl fisheries (OSPAR Commission, 2009). Guidance from Marine Scotland states that sturgeon found stranded on the shoreline in Scotland are the responsibility of the local authority (Marine Scotland, 2019). In England, it is required by the MMO that any sturgeon caught be reported directly to the local MMO office, Cefas and Receiver of the Wreck (MMO, 2017). It is also currently advised that the individual be returned to the water immediately, to avoid harm or death (MMO, 2017). However, sometimes these catches do result in accidental death. Because of the legal implications of catching or landing a sturgeon and uncertainties about proper protocol, it is believed that some accidental catches go unreported. Guidance for reporting sturgeon catches in Scotland, Wales, and Northern Ireland does not currently exist, meaning that any catches in these areas are likely to go unreported. Marine capture is currently the only source of present-day data and is therefore a valuable resource in understanding sturgeon distribution in the UK. In France and Germany, where sturgeon reintroduction programmes are underway, they work closely with the fishing community to gather as much data as possible to monitor their released populations (Charbonnel *et al.*, 2023, Gessner *et al.*, 2019). They also work together to reduce these incidental captures, and the chances of these captures resulting in sturgeon death. For these reasons, it is important to work closely with the commercial fishing industry and the recreational fishing community. It is also critical that this relationship not only benefits sturgeon conservation, but also ensures the interests, concerns, and livelihoods of fishers are supported.

Currently, there are no reports of incidental native sturgeon catches in UK freshwaters. However, as sturgeon conservation is championed in the UK, early communication with the angling community will ensure that if/when sturgeons return to freshwaters, there is already a strong knowledge base about the species and the protections they carry. Part of this communication and knowledge-sharing should be around recognising the difference between native and non-native species of sturgeon.

ROYAL FISH

In the 14th century, Edward II assigned sturgeons royal status due to their “superior excellence”. This meant all sturgeons caught within the realm had to first be presented to the Crown, with some exceptions. To this day, sturgeons remain royal fish, and any sturgeon landed must first be offered to the Crown via The Receiver of the Wreck. However, the last sturgeon accepted by the Crown was in 1969 (Colclough, 2021). This unique status exemplifies the importance of native sturgeons to UK history.

Photo courtesy of Blue Marine Foundation

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

GOAL 3: STURGEON BYCATCH REDUCTION

► **Current Situation: Sturgeon Bycatch**

Objectives and Actions

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

OBJECTIVES AND ACTIONS

Objective 3.1: Develop and implement a sturgeon catch reporting system that functions across the UK

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Use existing data and knowledge to identify which fishing operations are most likely to encounter sturgeons	IFM, ZSL, Angling Trust, Blue Marine Foundation, Cefas	Short	High
Work with the MMO, Marine Scotland, Welsh Marine and Fisheries Division, and DAERA Marine and Fisheries Division to provide an easy and safe reporting mechanism for fishers all over the UK	Blue Marine Foundation, Angling Trust, IFM, ZSL, Cefas	Short	High
Establish a reporting and information collection network to ensure a streamlined, efficient process for gathering marine catches data in the UK and across Europe	Smaller working group: National Research Institute for Agriculture, Food and Environment (INRAE), IFM, ZSL, Cefas, Natural England, Angling Trust, Blue Marine Foundation	Short	High

Objective 3.2: Sturgeon mortality through commercial fishing is eliminated

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Work with the commercial fishing industry to develop reporting procedures, and best practice for handling	IFCA, Blue Marine Foundation, Cefas	Medium	High
Work with the commercial fishing industry to disseminate information about sturgeon conservation designations and the catch reporting/handling processes to fishers and overcome any potential barriers to use	Blue Marine Foundation, Angling Trust, IFM, ZSL, Cefas	Short	High
Co-develop solutions to reduce sturgeon bycatch	Blue Marine Foundation, Angling Trust, IFM, ZSL, Cefas	Medium	High

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

GOAL 3: STURGEON BYCATCH REDUCTION

Current Situation: Sturgeon Bycatch

► **Objectives and Actions**

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 3

Objective 3.3: Sturgeon mortality from recreational angling is eliminated

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Review and update guidance for best handling practice for anglers when incidentally landing sturgeons (using existing guidance for shad and salmon as a guide). This guidance should include guidance for incidental capture of both native and non-native species, and recognising the different species	Angling Trust, IFM, Blue Marine Foundation	Medium	High
Communicate updated guidance to anglers throughout the UK	Angling Trust, IFM, Blue Marine Foundation	Medium	High



Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

GOAL 3: STURGEON BYCATCH REDUCTION

Current Situation: Sturgeon Bycatch

► **Objectives and Actions**

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations



GOAL 4: STAKEHOLDER ENGAGEMENT

Goal Description:

Stakeholders, both political and non-political, actively support and contribute to sturgeon conservation efforts.

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

▶ **GOAL 4: STAKEHOLDER ENGAGEMENT**

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations


CURRENT SITUATION: STAKEHOLDER ENGAGEMENT

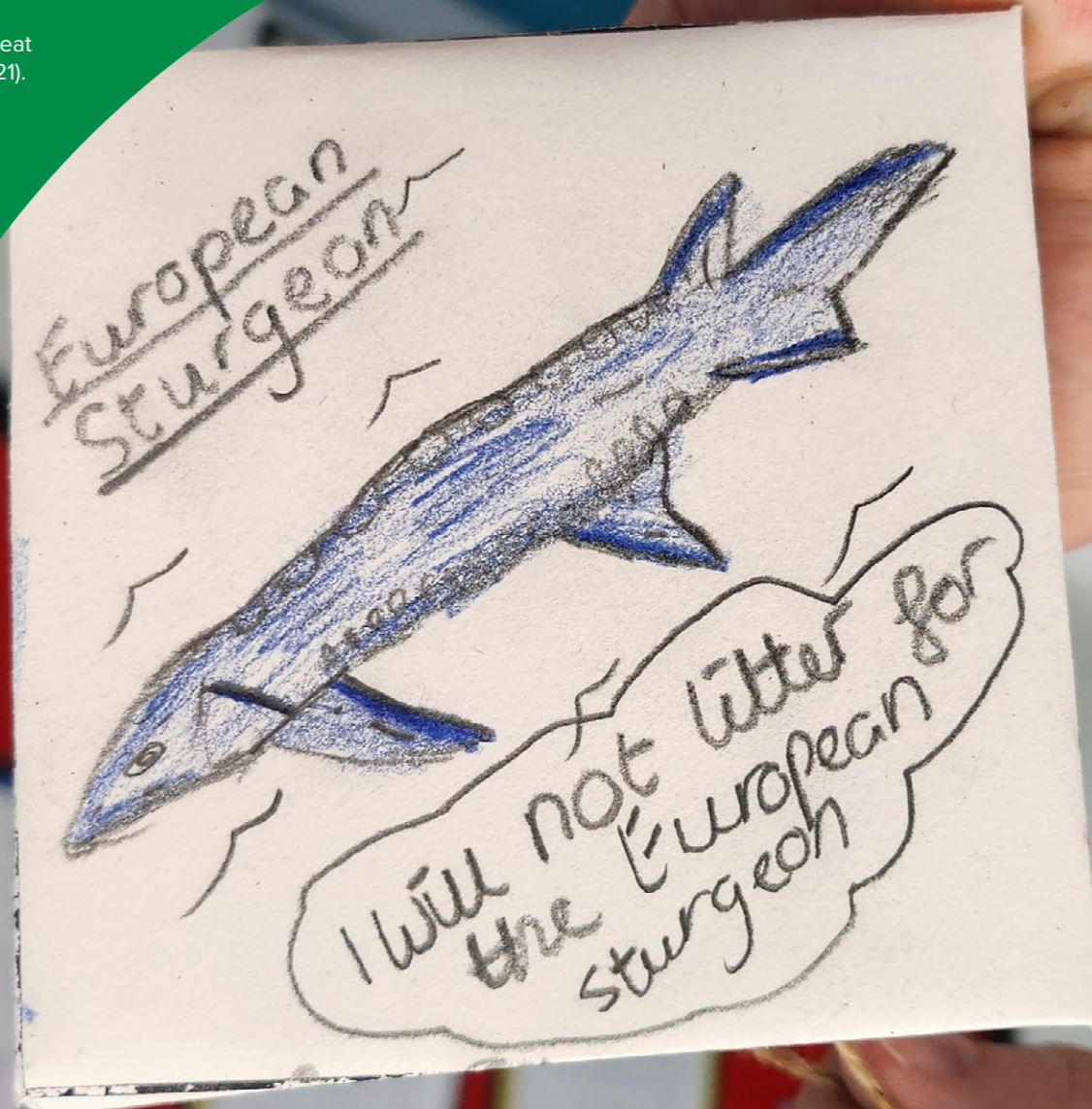
Due primarily to the small number of sturgeons recorded in UK waters over the past 100 years, many people are unaware that sturgeons are native to the UK, and the cultural importance they have carried. For many years, sturgeons were a high-demand fish to eat throughout Western Europe, even before the caviar industry emerged (Colclough, 2021).

Although protected under UK law (see Tables 1 and 2), there is limited knowledge about sturgeons and how some of these protections should be applied. Raising the profile of sturgeons through this Action Plan and other conservation activities may help ensure that these protections are enforced.

There are certain groups of people who may be impacted (positively or negatively) by sturgeon conservation, such as anglers, communities local to potential sturgeon spawning rivers, and the commercial fishing industry. It is critical that all stakeholder groups are identified as early as possible, so that a comprehensive stakeholder engagement strategy can be developed. Early identification and engagement also allow for stakeholders to be involved in decision making. Understanding and considering the values and opinions of stakeholders impacted by sturgeon conservation is paramount, to avoid both negative social impacts, and ensure support and project success.

The vision of restoring sustainable sturgeon populations to UK waters can only be achieved with the support of the public. Sturgeons are terrific flagship species due to their large size, long lifespan, and migratory nature (Friedrich *et al.*, 2018). Their life cycle demonstrates the connectivity between river systems, estuaries, and coastal waters, and the far-reaching impacts that damage to one of these habitats can have on the entire system (Friedrich *et al.*, 2018). Their unique appearance and large size also captivate the public and wider audiences, creating an appeal to protect and improve the UK's waterways.

 The card pictured was drawn and written by a year 6 pupil during a workshop led by Head4Arts. Photo credit Head4Arts.



Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

GOAL 4: STAKEHOLDER ENGAGEMENT

► Current Situation: Stakeholder Engagement

Objectives and Actions

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 4

OBJECTIVES AND ACTIONS

Objective 4.1: Review the legal relevance of sturgeon conservation in existing legislature to ensure proper implementation

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Update Natural England priority species action plan for sturgeon, using the actions as defined in this action plan	Natural England	Short	High
Once Action Plan is published, raise the profile of sturgeon in public authority's duty to have regard for conserving biodiversity	Sturgeon Alliance	Short	High
Advocate for new species or habitat protections if deemed necessary, as outlined in Goal 1 (Essential Habitat Protection and Restoration)	Sturgeon Alliance	Long	Low
Maintain clear and consistent communication with representatives from government bodies about steps towards sturgeon conservation and restoration	Sturgeon Alliance	Long	High

Objective 4.2: Engage with local communities and stakeholder groups about sturgeon plans and projects

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Identify stakeholders through a stakeholder identification process	UK Sturgeon Alliance, led by Blue Marine Foundation	Short	High
Write and implement a communication strategy for UK sturgeon conservation	Angling Trust, UK Sturgeon Alliance, led by Blue Marine Foundation	Medium	Low
Develop the Save the Sturgeon website and other social media outlets to improve public communication	UK Sturgeon Alliance, led by Blue Marine Foundation	Long	Medium

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

GOAL 4: STAKEHOLDER ENGAGEMENT

Current Situation: Stakeholder Engagement

▶ Objectives and Actions

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

GOAL 4

Objective 4.3: Ensure effective roll-out and implementation of the Action Plan

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Scientific and administrative evaluation of Action Plan implementation progress is conducted two years after publishing the plan	Steering Group	Long	Medium
Agree launch and communication strategy for Action Plan	Action Plan Steering Group	Short	High

“ The most conservative assessment for the results of the do-nothing-option would be a continuation of the negative linear trend, interpolated over the last three generations of sturgeon populations. ”
(Friedrich *et al.* 2018)

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

GOAL 4: STAKEHOLDER ENGAGEMENT

Current Situation: Stakeholder Engagement

► Objectives and Actions

Goal 5: Closing Evidence Gaps

References

Appendices

Glossary and Abbreviations

31

UK Sturgeon Conservation Strategy and Action Plan

zsl.org

Photo courtesy of Blue Marine Foundation

GOAL 5: CLOSING EVIDENCE GAPS

Goal Description:

Evidence gaps and uncertainty are addressed through research.



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of IGB Berlin

Foreword

Executive Summary

Background

Conservation Status and Protection
of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection
and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch
Reduction

Goal 4: Stakeholder Engagement

▶ **GOAL 5: CLOSING EVIDENCE GAPS**

References

Appendices

Glossary and Abbreviations

CURRENT SITUATION: EVIDENCE GAPS

There are quite a few evidence gaps in relation to sturgeons in the UK. These evidence gaps give rise to uncertainty, which means there are risks when making decisions around sturgeon conservation. Although there will always be some level of risk involved when making conservation decisions, addressing uncertainty can help to reduce these risks. In this case, there is a lot of uncertainty around the dangers that sturgeons may face if returned to UK waters, naturally or by reintroductions. These include the potential impacts of non-native species, distributions of non-native species, competition with other species, disease risk, and bioaccumulation of pollutants. It is also important to consider the possible effect of recolonised sturgeons on existing habitats and established species.

With limited time and resources, it is difficult to fill all evidence gaps to eliminate risk. One way to prioritise areas for further research is value of information analysis. This process reduces decision uncertainty and indicates whether more information about a particular risk is necessary to make a conservation decision.



Photo courtesy of IGB Berlin

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

GOAL 5: CLOSING EVIDENCE GAPS

► **Current Situation: Evidence Gaps**

Objectives and Actions

References

Appendices

Glossary and Abbreviations

GOAL 5

OBJECTIVES AND ACTIONS

Objective 5.1: Identify and minimise potential risk of non-native species release from the pet trade

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Investigate what has already been done for sturgeons in the GB non-native species secretariat risk assessment	Natural England, Cefas	Short	Medium
Work with Ornamental Aquatic Trade Association (OATA) to understand the risk of non-native species from the pet trade, and if risk is identified, reduce escape of sturgeons to the wild	ZSL, IFM, Cefas	Medium	Medium
Conduct health assessment of sturgeons from garden centres/pet trade	Fish Health Inspectorate	Medium	Medium

Objective 5.2: Identify potential risk from non-native species held in fishing lakes

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Quantify the risk posed by non-native species in fishing lakes on native sturgeon populations	ZSL, Institute of Zoology (IOZ), Cefas, EA	Medium	Medium
Review UK historical sturgeon records database to find where non-native species have been reported, to understand where fish are coming from and where they are being held	IFM	Short	Medium
On completion of the above: identify ponds/lakes holding sturgeons and support enforcement of their removal	Cefas	Medium	Medium

Objective 5.3: Assess other potential risks and identify which are priorities to address

ACTION	WHO WILL COMPLETE	TIMEFRAME	PRIORITY
Use value of information analysis to assess the uncertainty of potential risks (non-native species, bioaccumulation, competition with other species) and whether more information is needed	ZSL	Medium	Medium

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

GOAL 5: CLOSING EVIDENCE GAPS

Current Situation: Evidence Gaps

▶ Objectives and Actions

References

Appendices

Glossary and Abbreviations

GOAL 5

It is illegal to keep sturgeon in a fishery in England and Wales, under the terms of the Keeping & Introduction of Fish Regulations 2015



Photo courtesy of Blue Marine Foundation

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

GOAL 5: CLOSING EVIDENCE GAPS

Current Situation: Evidence Gaps

► **Objectives and Actions**

References

Appendices

Glossary and Abbreviations

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Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

▶ REFERENCES

Appendices

Glossary and Abbreviations

APPENDICES

APPENDIX I – UK STURGEON ALLIANCE MEMBERS

UK Sturgeon Alliance members, as of February 2023, include representatives from the following organisations:

- [Zoological Society of London](#)
- [Blue Marine Foundation](#)
- [Institute of Fisheries Management](#)
- [Nature at Work](#)
- [Severn Rivers Trust](#)
- [Wildfowl and Wetlands Trust](#)

The Alliance continues to welcome members. To inquire about joining the Alliance, email marineandfreshwater@zsl.org.

APPENDIX II – STURGEON ACTION PLAN STEERING GROUP

The following organisations were represented at the Action Plan workshop in October 2022, and are included in the Action Plan Steering Group. Other organisations who were not present but would like to be part of the Steering Group should email marineandfreshwater@zsl.org to join.

- [Angling Trust](#)
- [Blue Marine Foundation](#)
- [Centre for Environment, Fisheries and Aquaculture Science](#)
- [Department for Environment Food and Rural Affairs](#)
- [Environment Agency](#)
- [Inshore Fisheries and Conservation Authority](#)
- [Institute of Fisheries Management](#)
- [Leibniz Institute of Freshwater Ecology and Inland Fisheries](#)
- [French National Research Institute for Agriculture, Food and Environment](#)
- [Natural England](#)
- [Severn Rivers Trust](#)
- [Wildfowl and Wetlands Trust](#)
- [Zoological Society of London](#)

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

▶ APPENDICES

Glossary and Abbreviations

APPENDICES CONTINUED...

APPENDIX III – OSPAR RECOMMENDATIONS FOR EUROPEAN STURGEON

For full text from the OSPAR recommendations for European sturgeon, please visit <https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats/fish/sturgeon> where the full Recommendations document is available for download. The text below is the “Programmes and sMeasures” section of the Recommendations.

3.1. Each Contracting Party should consider in Regions II and IV:

- a. the possibility to introduce legislation to protect the European sturgeon in all their life stages in Regions II and IV of the OSPAR maritime area;
- b. implementing the Action Plan for the conservation and restoration of the European sturgeon and the resulting National Action Plans adopted within the framework of the Bern Convention, by taking relevant conservation measures particularly in “key areas” and those other areas where significant numbers of this species still occur or are reintroduced;
- c. establishing information campaigns in accordance with the above National Action Plans, particularly addressing commercial and recreational fishermen and fisheries observers, about the identification, conservation and protection status of the European sturgeon. Such campaigns may serve the purpose of data collection on European sturgeon occurrence, including information about size and condition of the fish, location and date and further identify its critical habitats and incidental catches in order to reveal areas where this species still occurs;
- d. whether any of the key areas justify selection and designation as marine protected areas for the protection of relict populations of and critical habitats for the European sturgeon and whether such areas may become a component of the OSPAR network of marine protected areas;
- e. promoting monitoring of the European sturgeon within existing monitoring programmes;
- f. acting for the fulfilment of the purpose of this recommendation within the framework of relevant competent authorities;

- g. taking appropriate measures, drawing upon the actions and measures suggested in the background document (OSPAR publication 2009/417), to address the threats from:
 - i. habitat alteration, such as construction of dams, dug channels and gravel extraction, having a direct effect on reproductive success;
 - ii. poaching;
 - iii. introduction of non-indigenous sturgeons from accidental release and intentional stocking.

3.2. Acting collectively within the framework of the OSPAR Commission, with the aim of promoting an ecosystem-based approach, Contracting Parties should:

- a. request the International Council for the Exploration of the Seas (ICES) to provide regular advice on the distribution, biology, conservation measures and research needs for this species;
- b. promote studies of the distribution and spatial dynamics of this species;
- c. develop and incorporate appropriate measures to mitigate habitat destruction (e.g. caused by maintenance dredging and sand and gravel extraction);
- d. promote the inclusion of the European sturgeon as protected species in European and international biodiversity conventions, taking into account the OSPAR Regions for which threats and/or decline have been indicated in the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008–6);
- e. in accordance with Article 4 of Annex V of the OSPAR Convention, or where coordination and cooperation with other international organisations and bodies is appropriate, draw the question of strengthening the protection of the European sturgeon to the attention of the authority or international body competent for that question, and encourage that authority or international body to take appropriate measures, drawing upon the actions and measures suggested in the background document (OSPAR publication 2009/417), to address the threats such as:
 - i. bycatch in fisheries;
 - ii. inappropriate handling and release methods resulting in low survival rates; where this is necessary for the conservation and recovery of the European sturgeon.

Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

▶ APPENDICES

Glossary and Abbreviations

GLOSSARY

ABBREVIATIONS

Actions: activities that will help to achieve the objectives and goals set.

Anadromous: a species that migrates up into the rivers from the sea to spawn.

Constraint: factors which contribute to or compound the threats.

Fishers: includes all types of fishing, including commercial, recreational, etc.

Flagship species: a species chosen to raise support for biodiversity conservation in a given place.

Goal: a desired result in attempts to save a species.

Impact: a marked effect or influence which may be positive or negative.

Objective: something to be achieved when attempting to reach a goal.

Structured decision-making: an approach for careful and organized analysis of decisions

Threat: something that is likely to cause declines in a species' populations, or harm to an individual.

Vision: a short inspirational statement describing the desired future state for the species.

Cefas: Centre for Environment, Fisheries and Aquaculture Science

DEARA: Department of Agriculture and Rural Development of Northern Ireland

Defra: Department for Environment Food and Rural Affairs

EA: Environment Agency

IFM: Institute of Fisheries Management

IGB: Leibniz Institute of Freshwater Ecology and Inland Fisheries

INRAE: National Research Institute for Agriculture, Food and Environment

IOZ: Institute of Zoology of ZSL

MMO: Marine Management Organisation

MPA: Marine Protected Area

NE: Natural England

SSSI: Site of Special Scientific Interest

WWF: World Wide Fund for Nature

WWT: Wildfowl and Wetlands Trust

ZSL: Zoological Society of London



Foreword

Executive Summary

Background

Conservation Status and Protection of Sturgeon in the UK

Potential Threats

Vision, Goals and Objectives

Goal 1: Essential Habitat Protection and Restoration

Goal 2: Population Recovery

Goal 3: Sturgeon Bycatch Reduction

Goal 4: Stakeholder Engagement

Goal 5: Closing Evidence Gaps

References

Appendices

► **GLOSSARY AND ABBREVIATIONS**



Visit our website zsl.org/uk-sturgeon to find out more. If you'd like to get in touch with us, please email marineandfreshwater@zsl.org.

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We're ZSL, a science-driven conservation charity, working to restore wildlife in the UK and around the world.

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