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UK Sturgeon Project: A Barclay's project overview

Rory Moore, Morven Roberston and Alex Hubberstey

MAY 2021

Species Overview:

Sturgeon are the most Critically Endangered group of species in the world, according to the IUCN. 27 species belong to the family Acipenseridae, with most of these being classified as Critically Endangered, Endangered or Threatened.

These ancient species date from the time of the dinosaurs, around 200 million years ago. They are so suited to their environments that they have had little need to evolve since then. They have survived at least two mass-extinction events and over a dozen ice ages, but now due to habitat degradation, pollution and over-exploitation, they are at risk of extinction.

The UK was once home to two native sturgeon species, the Critically Endangered European sturgeon (*Acipenser sturio*) and its close relative the Near Threatened Atlantic sturgeon (*Acipenser oxyrinchus*). Blue Marine Foundation's (BLUE), UK Sturgeon Project is laying the foundation to restore and protect European sturgeon in the Greater Severn catchment.



European Sturgeon (*Acipenser sturio*)

As a non-predatory species, sturgeon feed among the substrate eating worms, snails, shrimp and other detritus, using their telescopic mouths to suck up their food. European sturgeon are an anadromous fish, much like salmon and shad. This means they will spend most of their adult life in marine and coastal environments but return to freshwater rivers to spawn once they are sexually mature; twelve years for males and twenty years for females. Sturgeon spawn on gravel beds in deep, well oxygenated water. Unlike salmonids, that return to their river of origin to spawn, it is common for around 10 per cent of sturgeon to actively seek new rivers to spawn in.

Due to their sensitivities to anthropogenic changes, sturgeon are excellent indicators of river and estuary ecosystems. They also feed on dead fish and other detritus, naturally cleaning their environments and contributing to healthier ecosystems. Sturgeon have

fundamental ecological links to other native species such as shad and giant freshwater pearl mussels. Given their size and unaggressive behaviours, globally, sturgeon have become a socially important and interesting species, which has led to great community support for conservation.

Sturgeon have transboundary life histories so effective conservation must be a collaborative approach with other former range states. This has led to the development of the *Pan-European Sturgeon Action Plan*.

European Sturgeon

Former Range: Historically, European sturgeon ranged throughout much of Europe's coastal and inland waters. This included waters as far north as Scandinavia in the Norwegian Sea, and as far south as the Mediterranean and Black Sea. The farthest inland they could be found was Czechia. Their natural temperature tolerance ranges from 3-30°C.

Current Range: The last known breeding population is found in the Gironde region of France, but natural spawning has not been observed since 1994. There have been reintroductions of juveniles in the Gironde, France; Elbe, Germany and the Rhine, Netherlands, although renewed natural spawning is yet to occur.

Size: Estimated to mature at an average size of 1.25m (male) and 1.65m (female), though this is known to differ between locations. European sturgeon can grow up to six metres.



European Sturgeon (*Acipenser sturio*)

Severn Catchment Overview:

The River Severn is the longest river in the UK at 220 miles from its source in the Cambrian Mountains down into the Bristol channel. The river encompasses the boundary between England and Wales with the majority of the catchment being rural. The Severn Estuary has one of the highest tidal ranges in the world of approximately 15 metres, and is the second largest estuary in Britain; 557km². The tidal flats and saltmarshes are of international importance to waterfowl and migratory birds who feed on the vast quantities of worms, molluscs and crustaceans. It is of national and international importance for conservation which is highlighted by the multiple conservation designations; Special Protection Area (SPA), Ramsar Site, Special Area of Conservation (SAC) and Sites of Special Scientific Interest (SSSIs).

Other notable rivers in the catchment include the Usk, and the Wye. The Wye is relatively unique in a UK context as it has remained mostly unmodified by river barriers. Of the over 250 records of sturgeon in these three rivers since 1600, the majority belong to the Severn (222), followed by the Wye (31) and then the Usk (13). Another river included in the UK Sturgeon Project is the river Tywi (pronounced towie). Although it is not in the Severn catchment it does flow into the Bristol Channel. It is like the Wye in that it is mostly unmodified, save for a large reservoir far upstream – further than sturgeon could traverse. It has 63 records of sturgeon from 1815-1990. The highest in the area after the Severn.



The River Severn

The Severn catchment supports many different species from fish such as twaite shad (*Alosa fallax*), and the Critically Endangered European eel (*Anguilla anguilla*), to mammals like otters (*Lutra lutra*) and water voles (*Arvicola amphibius*) and countless species of insects and waterfowl.

Severn Catchment Historical Sturgeon Records	
System	Total Captures
Severn	222
Tywi	63
Wye	31
Usk	13

Table 1: Table summarising the total records of European sturgeon (*Acipenser sturio*) in the Severn catchment rivers. Figures based on UK Sturgeon Database (Colclough, 2021).

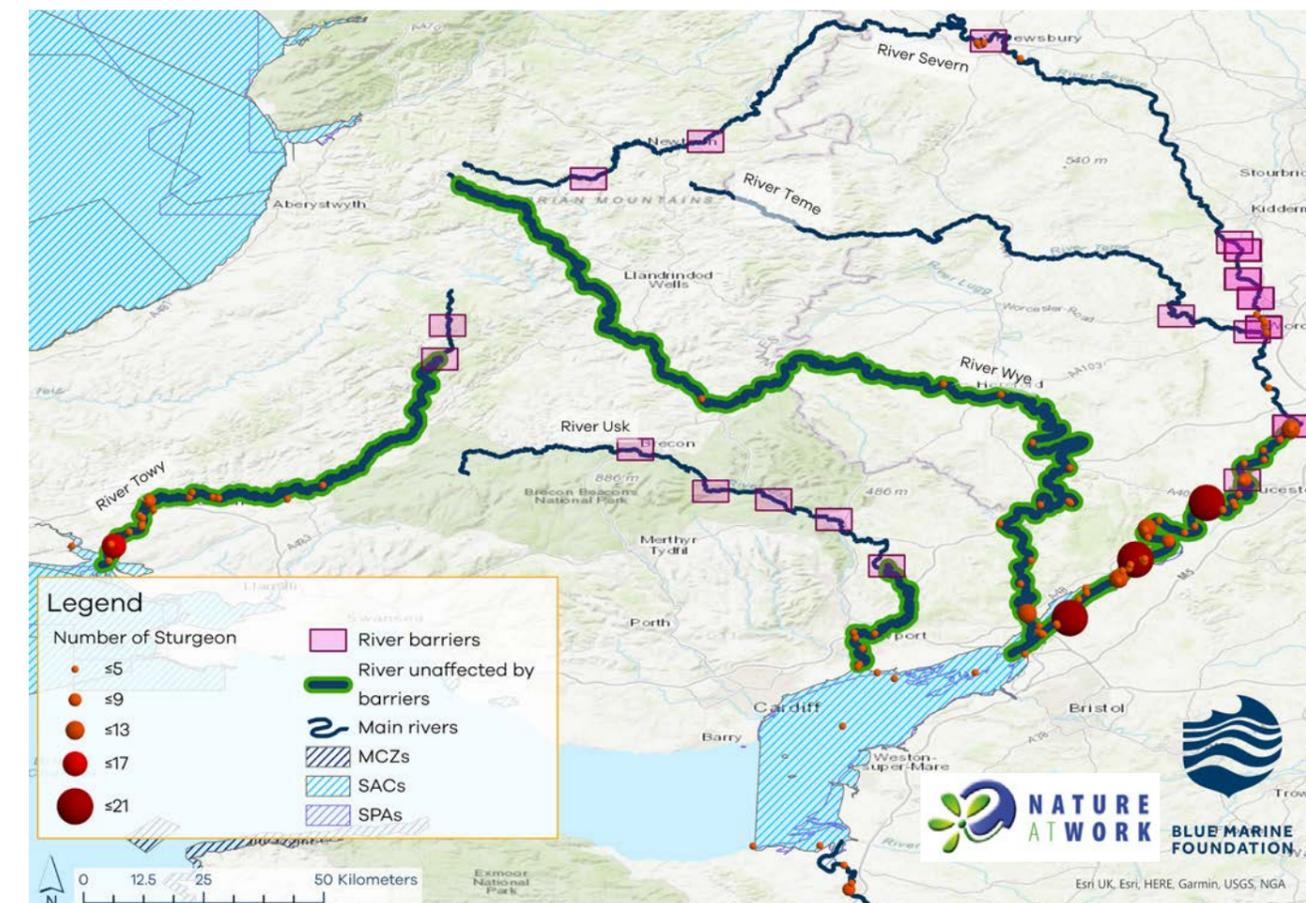


Figure 1: GIS map containing information about sturgeon for the Severn catchment and River Tywi. Information includes number of captures per location, any Marine Protected Areas (MPAs) and any river barriers.

Threats/Barriers to Recovery

Due to their long life-history, sturgeon are highly susceptible to anthropogenic factors such as habitat loss and degradation, pollution, overexploitation and persecution. In the Severn, the most damaging factor was likely the combination of the construction of weirs, which cut off mature adults from being able to spawn, and exploitation by humans, which removed most captured individuals from the river.

In recent decades a new threat has emerged. Non-native sturgeon. Escapees, originating from the ornamental pet trade, have made their way into the UK and threaten both ecosystems and native sturgeon restoration. The extent of their presence in the project area is currently unknown. The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) identify non-native sturgeon as the biggest threat to sturgeon restoration globally.

Project Overview

Vision			
Objective 1	Objective 2	Objective 3	
Restore UK rivers and estuaries so that suitable conditions are available for successful sturgeon spawning and egg development	Ensure that native sturgeon are effectively protected in UK waters, and fewer individuals are accidentally caught and killed	Develop a pioneering template for restoring lost or critically endangered marine species in the UK	
Activity 1	Complete a multi-level GIS map of the Greater Severn catchment specific to European sturgeon.	Use evidence and policy to clarify European and Atlantic sturgeon as native species in the UK.	Produce a report that lays the foundations for subsequent restoration of spawning grounds, and fingerling release in order to actively restore European sturgeon to UK rivers.
Activity 2	Ensure that UK rivers and estuaries are in a fit state to accommodate native sturgeon through habitat analysis and restoration.	Complete a series of local and regional stakeholder meetings, events and workshops to enable effective restoration.	Learn from sturgeon experts in the US and Europe about successful sturgeon restoration programmes.
Activity 3	Identify, protect and restore suitable sturgeon spawning and feeding habitats determined from existing literature.	Complete media campaigns to raise awareness of sturgeon conservation and the threat non-native sturgeon pose in the UK.	Develop conservation tools and a template for others to adopt for sturgeon and other endangered migratory species.
Activity 4	Explore ways under the IUCN Reintroduction Protocol to actively restore sturgeon numbers in the UK.	Prevent non-native sturgeon, originating from the pet trade, escaping into the wild through educational means and legislative changes.	Develop a UK Action Plan for native sturgeon restoration and conservation.

Table 2: Overall vision for the UK Sturgeon project including objectives and activities.



Unlocking the Severn

The UK Sturgeon Project is using the Severn catchment as the first proposed site for restoration in the UK due to the high numbers of historically recorded sturgeon and because the foundations have already been set by the Unlocking the Severn project. This £22 million EU LIFE and Heritage funded project is opening up 158 miles of river habitat between 2017 and 2021. Unlocking the Severn arose due to the decline of twaite shad in the Severn River and Estuary. According to a recent study, the UK's population of migratory fish species have declined by approximately 80%, predominantly caused by the development of dams and weirs. By removing and altering six migration barriers, they are reconnecting fish with their spawning habitat. Although these are specifically designed for shad, many of them will allow sturgeon to pass. This has provided a unique opportunity in the UK to restore previously lost species like European sturgeon.



European Sturgeon (Acipenser sturio) being released.

The River Severn

Why Restore and Protect European Sturgeon?

The Value of European Sturgeon			
Environmental	Social and Heritage	Economic	Political
Sturgeon are important indicators of water quality and environmental health	Sturgeon are a direct link to the prehistoric world – a living fossil, linking past and present	Spawning events attract visitors, which has the potential to contribute significantly to the local economies, as seen in Wisconsin, US	Helps meet multiple UK environment goals such as recovering threatened, iconic or economically important species and reversing and restoring marine biodiversity loss
By eating dead and decaying organic matter off the substrate, European sturgeon help clean their environments	Sturgeon are a flagship example of charismatic megafauna, connecting communities with rivers and estuaries	Through protecting, restoring and reconnecting habitats, other fish stocks will improve, potentially benefitting the commercial and recreational fishing industry	As a European transboundary species, sturgeon link multiple countries under one goal
Sturgeon restoration is synergistic. By unlocking rivers for sturgeon, the systems will be accessible to a vast array of other migratory species which populations will benefit	Create a nationwide network of conservation groups coming together for wide-spread change	Funding can be directed into scientific, academic or research industries centred around studying, breeding and conserving sturgeon	By utilising high-quality environments, European sturgeon could increase the amount of protection afforded to UK habitats such as the Dogger Bank MPA
Sturgeon conservation involves the establishment and strengthening of conservation areas protecting numerous species	Sturgeon can get students involved in conservation at all levels, from primary to post-graduate	Restored habitats help prevent river bank erosion and reduce the risk of flooding and their associated costs	If successful, it could make the UK a leading example of successful conservation measures for lost or critically endangered species

Table 3: The different aspects of value of *A. sturio* including environmental, social, economic and political



European Sturgeon (*Acipenser sturio*)



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