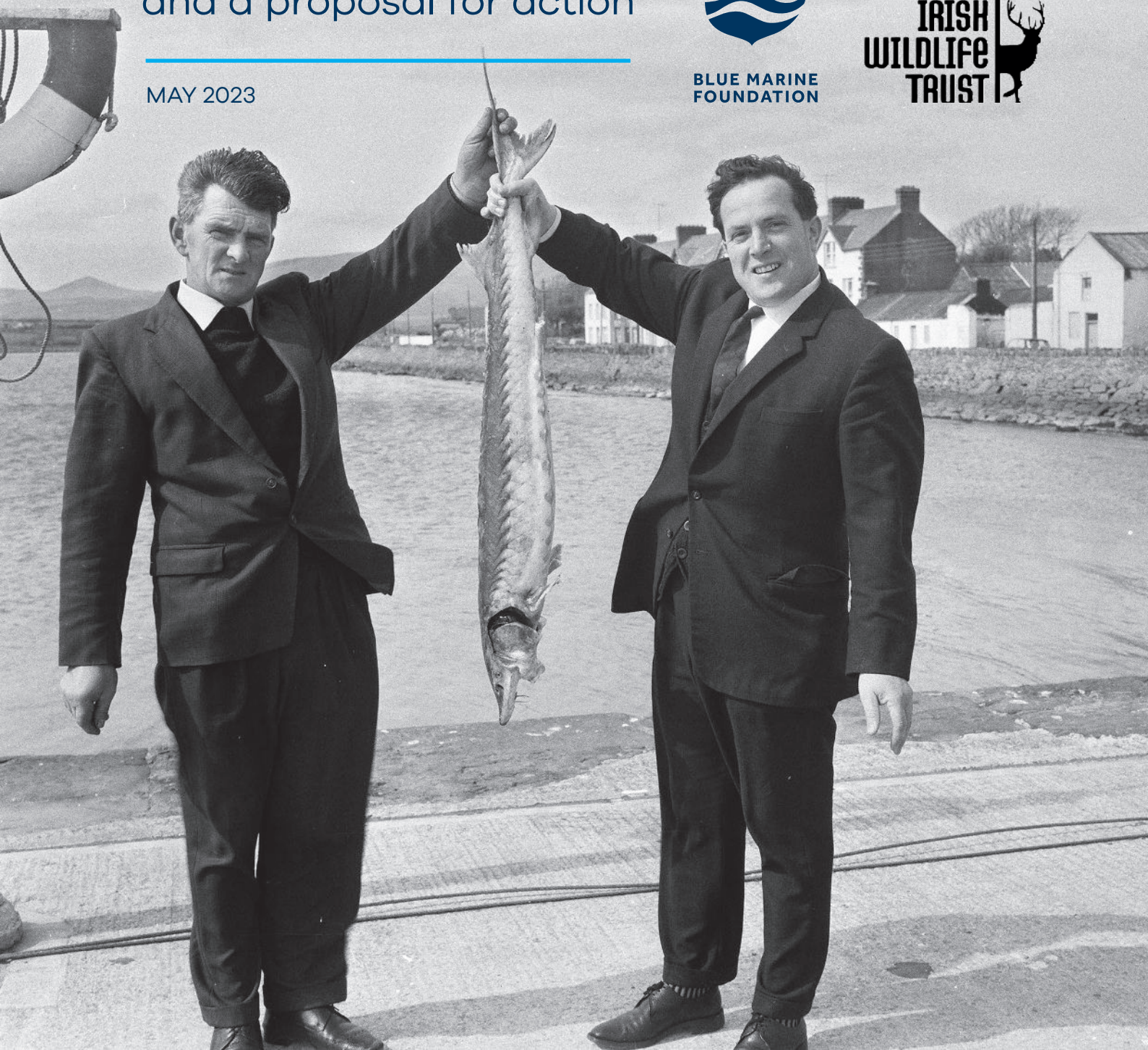

RESTORING THE STURGEON TO IRISH WATERS

A review of evidence
and a proposal for action

MAY 2023



BLUE MARINE
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ACKNOWLEDGEMENTS

This paper was written by Pádraic Fogarty (Irish Wildlife Trust), Adrian Gahan (Blue Marine Foundation) and Jenny Murray (Blue Marine Foundation), drawing on the research of Melissa Vanderheyden and Declan Quigley. Our thanks to Melissa and Declan for contributing their time and expertise.

Cover: 2 April 1966; Fishing vessel 'Ard Ide' landed a sturgeon in St Finian's Bay, Dingle, Co. Kerry by Skipper Sean Brosnan. It was the first sturgeon caught in the area in living memory. Mr Michael Keane, Manager of the Dingle Co-operative Society, said the fish would be presented to President De Valera as part of the Easter Ceremonies. ©Padraig & Joan Kennelly/Kennelly Archive

EXECUTIVE SUMMARY AND KEY RECOMMENDATIONS

European and Atlantic sturgeon are large, bottom-swimming fish which were once found in the waters around Ireland but are now endangered with extinction throughout their ranges. They spawn in freshwaters and there is some evidence that this included Irish rivers. However, physical alterations to rivers, including dams, weirs and other barriers to movement, pollution and bycatch in fisheries are likely to have resulted in the extinction of the fish from Irish rivers and seas. There are now moves across Europe to restore sturgeon populations and the Irish Wildlife Trust and Blue Marine Foundation is calling for the Irish government to be actively involved in these initiatives.

Our study, which included a legal opinion from Dr Sarah Ryan-Enright and research from Melissa Vanderheyden into the availability of existing river habitat for sturgeon in Ireland, found that sturgeon is a legally protected species in our waters, that suitable habitat is available for them which could be greatly enhanced through measures that Ireland has already agreed to undertake (such as Marine Protected Areas and removing barriers from rivers) Our study also finds that there is a legal requirement for the Irish government to examine the feasibility of reintroducing the species.

The sturgeon is only one of over a hundred species that are known to have gone extinct in Ireland since the arrival of humans. Reintroducing species is a recognised tool which helps to restore biodiversity and ecosystems and so is an essential facet of addressing the biodiversity and climate crisis. Ireland has already seen a number of successful reintroduction programmes, but we need a much more coordinated approach and one which allows greater participation of NGOs and community groups.

Our study shows that the sturgeon is a high priority candidate for reintroduction and we call on the government to act swiftly on our recommendations so that we can once again see these 'living dinosaurs' swimming in our waters.

Blue Marine Foundation is a UK-based marine conservation charity working to end overfishing, establish protected areas and restore marine habitats



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across Europe and around the world. This paper represents Blue Marine Foundation's first activity in Ireland.

The Irish Wildlife Trust aims to conserve wildlife and the habitats it depends on throughout Ireland while encouraging a



greater understanding and appreciation of the natural world and the need to protect it.

The Irish Wildlife Trust and the Blue Marine Foundation call on the Irish government to:

1 Carry out a formal analysis, as it is legally required to do under Article 22 of the EU Habitats Directive, of the desirability and feasibility of reintroducing sturgeon to Ireland. This would include an examination of European versus Atlantic sturgeon as preferred candidates, as a part of the Pan-European Action Plan for Sturgeons¹. We call on the Irish Government to fulfil this legal requirement.

2 Review the IUCN (International Union for Conservation of Nature) Red List of freshwater fish in Ireland to include an assessment of sturgeon that recognises it was not a rare, vagrant species, but rather one that was resident in Irish waters and likely spawned in Irish rivers.

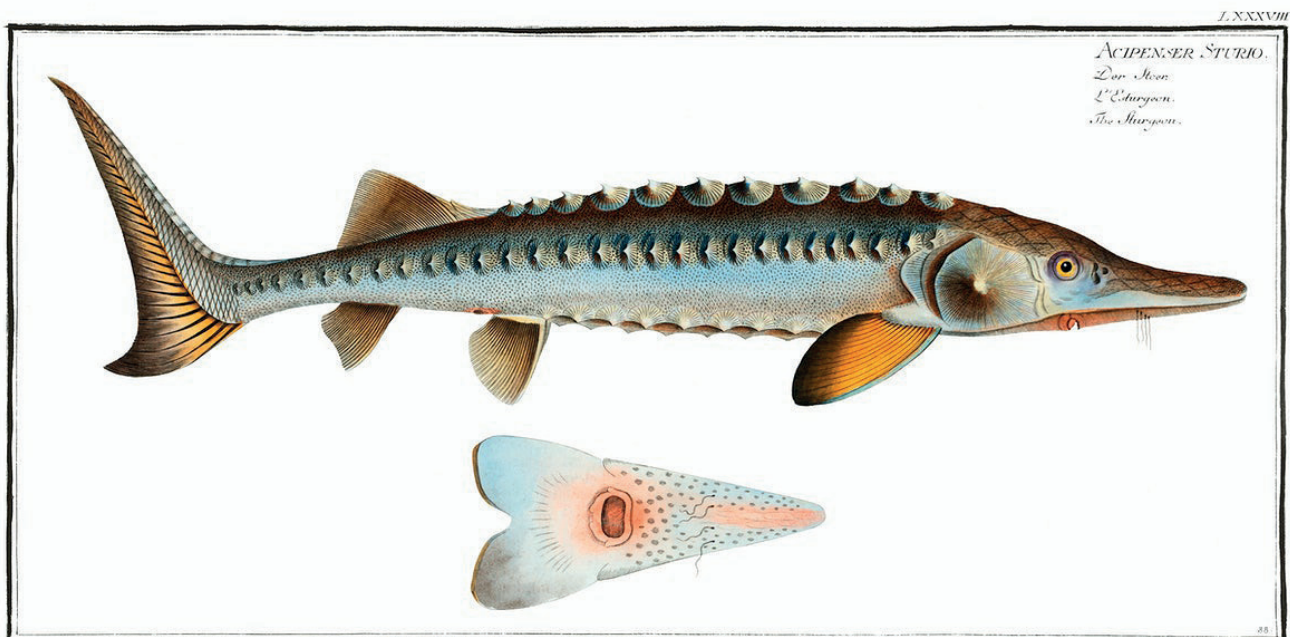
3 Adopt national measures by the end of March 2024, as per the deadline set by the EU Action Plan², to prohibit mobile bottom fishing in all MPAs that are Natura 2000 sites designated under the Habitats Directive to protect the seabed and marine species.

4 Accelerate the implementation of existing laws and policies that would enhance the habitat quality of sturgeon populations in freshwater, transitional and marine habitats.

5 Campaign for an ambitious EU Nature Restoration Law, as proposed by the EU Commission to come in to law in 2024, and to implement its requirements at a national level with an ambition commensurate to the biodiversity and climate emergencies.

6 Establish an expert forum to examine the reintroduction of all native species, both terrestrial and marine, which have gone extinct in Ireland and which should be reintroduced as part of wider ecosystem restoration. This forum should establish candidate species and set priorities for a nation-wide programme of reintroductions.

7 Publish guidance on species reintroductions including licencing, public consultation and monitoring of reintroduction programmes, as per Ireland's responsibilities under the Bern Convention and the Convention on Biological Diversity.



Above: European sturgeon *Acipenser sturio* by Marcus Elieser Bloch (1723–1799)

INTRODUCTION

The sturgeon is a large fish that was once found throughout Ireland. It was eaten by the monks at Clonmacnoise along the River Shannon in the 7th century while under English rule it was, along with whales, considered a 'royal fish', i.e. the property of the Crown. Records of sturgeon throughout the 19th and 20th centuries indicate it was not uncommon around our coasts and in estuaries. Nearly half of the records are from the Irish Sea³. While records peaked in the mid-1800s we see that sturgeon was noted right up to the end of the 20th century. However, no records at all were made in the 1990s or early 2000s.

The Irish Wildlife Trust and the Blue Marine Foundation want to see the sturgeon return to Irish waters. All sturgeon species in European waters are endangered with extinction and it has disappeared from much of its former range. We want to see Ireland participate in European efforts which are currently underway to bring sturgeon back from the brink.

This report looks at why the return of sturgeon is important. It will examine the work that has been done to identify the ecological barriers to successful recovery, the initiatives that are underway in Britain and elsewhere in Europe to boost the sturgeon population. It also includes a specially commissioned legal opinion on the responsibilities of the Irish government to restore the species to its original habitat.

The sturgeon is among a relatively small number

of fish that straddles the marine and freshwater environments and so can be a 'flagship species' for promoting wider environmental measures. We look at the existing policy and legal commitments for protecting and restoring aquatic life as their implementation would enhance the prospects for a future sturgeon population.

The sturgeon has an ancient lineage; it has been swimming in rivers and seas since Jurassic times, 201-145 million years ago. For this reason they are sometimes referred to as 'living dinosaurs'. Yet few in Ireland have any living memory of the fish. This is a loss not only for the ecosystems upon which we depend but also for our culture and heritage.

We hope that this report will stimulate a wider discussion on how we can bring back Ireland's many lost species and in particular how we can look forward to the day when sturgeon are once again swimming and spawning in Irish waters.

The sturgeon has an ancient lineage; it has been swimming in rivers and seas since Jurassic times, 201-145 million years ago



Above: European sturgeon *Acipenser sturio* by Dominique Vassie for Blue Marine Foundation

THE TWO STURGEON OF NORTHERN EUROPE

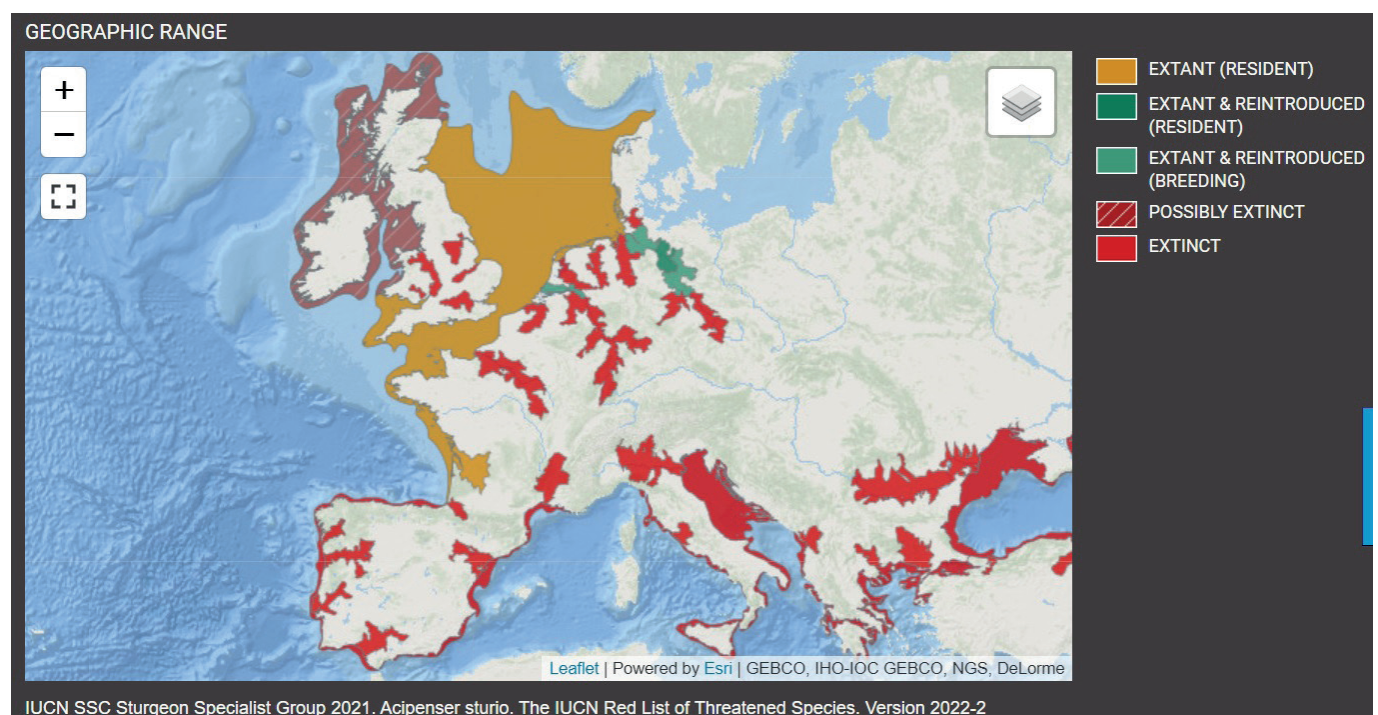
There are two species of sturgeon which are considered native to Northern European waters: the European sturgeon *Acipenser sturio* and the closely-related Atlantic (Baltic) sturgeon *Acipenser oxyrinchus*, which is also found off the Atlantic coasts of Canada and the USA. The National Museum of Ireland has two Irish sturgeon specimens in its collection, from which samples were processed in 2016. Only one was good enough for a species identification and this turned out to be an Atlantic sturgeon.

The UK Sturgeon Conservation Strategy and Action Plan describes how both species are native to UK waters and so it must be assumed that Irish records will also reflect a combination of both species.

This report refers to sturgeon in the sense that it encompasses both the Atlantic and the European species. The European sturgeon is 'critically endangered'⁴ while the Red List of freshwater

fish published by the IUCN and the EU state that Atlantic sturgeon "was known from the Baltic Sea but is no longer present in Europe"⁵.

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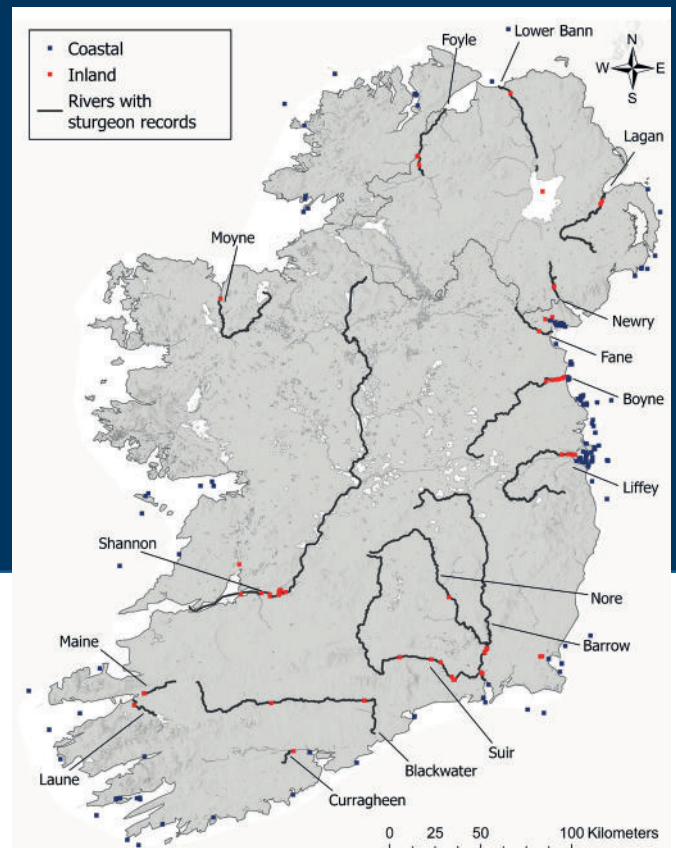


ARE STURGEON EXTINCT IN IRELAND AND, IF SO, WHY?

In a 2011 review of the conservation status of freshwater fish in Ireland the sturgeon was not assessed as it was thought to be a “vagrant” and “rarely recorded”. It was referred to as a “species which may enter freshwater for variable periods but principally occur in marine or estuarine waters”⁶. In England sturgeon is classified as a ‘species of principle importance’ under Section 41 of the Natural Environment and Rural Communities (NERC) Act.

The IUCN highlights that European sturgeon are ‘possibly extinct’ in marine waters around Ireland⁷.

Figure 1: Map: Records of sturgeon catches in Ireland between 1738 and 2014, based on newspaper archives. Symbols for coastal catches represent estimates, not exact locations. Data collected by Quigley (2014), published in *Restoring an umbrella species: Do Irish rivers provide suitable habitat for the European sturgeon?*, Melissa Vanderhayden, Galway Mayo Institute of Technology, May 2021.



WERE STURGEON A RARE VAGRANT OR WERE THEY RESIDENT IN IRISH COASTAL WATERS AND EVEN BREEDING IN IRISH RIVERS?

Records compiled by Declan Quigley, biologist and former Sea Fisheries Protection Authority officer, show that sturgeon were a regular occurrence in Irish waters, even if they were never very common or particularly abundant. Quigley also notes that there is circumstantial evidence to indicate that sturgeon were breeding in Irish rivers, with records of their presence throughout the breeding season as well as citing the presence of a large female in the River Suir in Co. Waterford in 1865 laden with

roe, juvenile sturgeon observed near Malahide in Co. Dublin in 1944 and in the freshwater portion of the River Lee in Co. Cork in 1955. The UK Sturgeon Conservation Strategy and Action Plan has cited evidence suggesting that it “is very likely that sturgeons did spawn in UK rivers”⁸.

While sturgeon are not officially assessed as being extinct from Irish waters, Quigley’s records show a decline from the 1970s and the last confirmed

sighting of the 20th century occurring in 1987 off the coast of Dublin.

The decline in records coincided with a general decline in wild fisheries during the 1980s and 90s, which saw the collapse in populations of commercially important species such as herring, Atlantic salmon, cod and whiting. The long-lived, slow-growing and never abundant sturgeon is likely to have been a victim of fishing activities, including accidental bycatch, but may also have been under pressure from pollution and barriers on rivers that prevented access to spawning grounds. European sturgeon also disappeared from Spanish, Italian and German waters at this time, while the last successful spawning of the fish in France occurred in 1994.

Figure 2: Sturgeon taken from Poolbeg Salmon Fishery, River Liffey, Dublin in June 1890. On display at the National Museum of Ireland, Dublin. Recent DNA analysis shows the specimen to be an Atlantic sturgeon *Acipenser oxyrinchus* rather than European *Acipenser sturio*. Photo: Pádraic Fogarty.



Quigley's records show a decline from the 1970s and the last confirmed sighting of the 20th century occurring in 1987 off the coast of Dublin

WHAT EFFORTS ARE UNDERWAY TO RESTORE STURGEON IN EUROPE?

2007 BERN CONVENTION ACTION PLAN

The 2007 Council of Europe *Action Plan for the conservation and restoration of the European sturgeon*⁹ recommended that "contracting Parties" to the Bern Convention "consider drafting and implementing **national Action Plans for the European sturgeon**". France and Germany published plans in 2012 and 2011 respectively. Ireland has yet to do so, despite being a contracting party.

Since 2007 captive breeding programmes have been underway at the last remaining spawning ground in Europe for European sturgeon on the

Garonne River in France, as well as the lower River Rhine in Germany and in Holland. Germany and Poland began a breeding programme for Atlantic sturgeon in the early 2000s and restocking efforts have resulted in more than 4.5 million Atlantic sturgeon being released into the Baltic Sea.

Likely as a result of these reintroduction programmes, 15 individual sturgeon have been caught in UK waters in the last decade. In 2017, a sturgeon was caught in a gill-net in Lough Neagh in Northern Ireland, the first record of sturgeon in Ireland since 1987¹⁰.

2018 BERN CONVENTION ACTION PLAN

In 2018, the *Pan-European Action Plan for Sturgeons* was published which encompasses all countries which are signatories to the Bern Convention on Migratory Species (including Ireland)¹¹.

This Action Plan notes that protection of sturgeon “needs a holistic approach, connecting international waters, coastal areas, and often multi-national river systems”.

The goal of the 2018 Action Plan is to: “restore all existing sturgeon populations to ‘least concern’ (IUCN) or ‘favourable’ (Habitats Directive) status and re-establish self-sustaining sturgeon populations as well as their life-cycle habitat in their historic range to an extent that ensures

species survival and representation of the subpopulations where possible”.

It states that it is “most probably the last chance to save Europe’s sturgeon species from extinction”.

Among the ‘high priority’ actions of the Plan are to:

- **“Establish basin-wide ex situ programmes” (i.e. captive breeding and release of brood stock)**
- **Identify habitat restoration possibilities**
- **Implement pilot restoration actions**
- **Identify suitability of rivers for sturgeon restoration**

2023 ZOOLOGICAL SOCIETY OF LONDON ACTION PLAN

The Zoological Society of London has recently published the *UK Sturgeon Conservation Strategy and Action Plan*. The purpose of this Plan is:

- **To restore populations of both native species of sturgeon as flagship species for healthy marine, estuarine and river systems, contributing to their pan-European recovery, while realising their societal importance**

It aims to support Europe-wide efforts towards sturgeon restoration and includes actions to better understand sturgeon ecology, reduce the potential for bycatch in commercial fisheries and minimise mortality, particularly in gill-net and trawl fisheries, protect essential freshwater habitats with spawning potential and to enhance connectivity to potential spawning habitats.

2024 EU NATURE RESTORATION LAW

In June 2022, the European Commission published its proposal for a Nature Restoration Law¹² which is expected to come into force in 2024. It will set legally binding targets for the restoration of ecosystems, species and habitats across land and sea and will require each member state to publish National Restoration Plans.

This law will mean that targets for the restoration of European sturgeon will be required due to the sturgeon being listed for ‘strict protection’ under the Habitats Directive, and which requires the establishment of Special Areas of Conservation (SACs) for the conservation of the species.

The Nature Restoration Law is expected to set a target for restoration of at least 25,000km of rivers across the EU into free-flowing rivers by 2030 through the removal of barriers to the longitudinal and latitudinal connectivity of water flow. Member State’s specific targets have not yet been agreed and this is currently being worked out between the Council, Commission and Parliament.

ARE HABITAT CONDITIONS IN IRELAND TODAY SUITABLE FOR STURGEON REINTRODUCTION?

Sturgeon are 'anadromous' fish, meaning they spend much of their lives in seawater but migrate to freshwaters to spawn (like Atlantic salmon). At sea, sturgeon live at depths of 10-40m and feed on small invertebrates and fish¹³. Adults can lay between 500,000-2,500,000 eggs on gravel in freshwater and, upon hatching, the young fish migrate downstream to the estuary, where they stay for several years before moving to the marine environment upon maturity.

Melissa Vanderheyden, a student at the Galway-Mayo Institute of Technology, studied the European sturgeon as part of her MSc thesis entitled: 'Restoring an umbrella species: Do Irish rivers provide suitable habitat for the European sturgeon *Acipenser sturio*?'

This study specifically examined the suitability of spawning and rearing habitats in five river ecosystems: the Shannon, Boyne, Suir, Barrow and Munster Blackwater, chosen because they had the highest former sturgeon presence based upon historical records. It examined the existing hydrological regime, migration barriers and water quality, based on the main habitat requirements of the fish.

It did not examine the suitability of marine habitats but it could reasonably be expected that vast tracts of suitable marine habitats are available but, as noted previously, bycatch in fishing gear would need to be addressed as part of any successful reintroduction programme. Drift net fishing for Atlantic salmon is believed to have been a significant cause of mortality of sturgeon in Irish river estuaries, however this was banned in 2007. While limited fishing activity now takes place in Irish estuaries, there are few restrictions on bottom or midwater-trawling in the coastal zone.

Vanderheyden's study concludes that:

The [Habitat Suitability Index] shows that the presence of barriers such as weirs and dams is problematic for spawning [sturgeons]. Upstream migration would be partly or entirely blocked in the lower reaches of each of the five rivers. A second analysis without including the barriers shows a large increase in the suitability, so barrier removal should be a first target in restoring spawning habitat for European sturgeons.

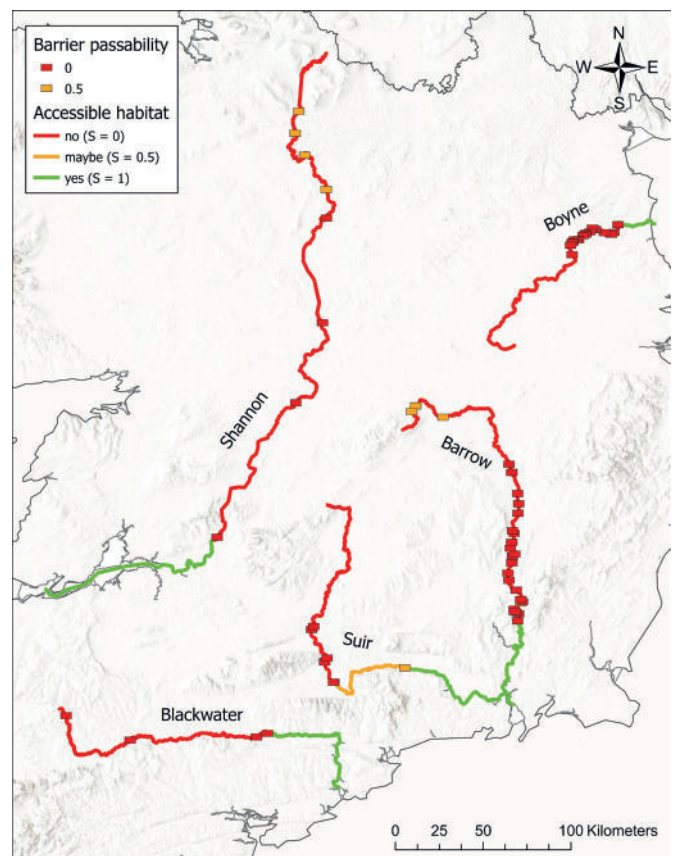


Figure 3: Accessibility of river sections for adult sturgeon traveling upstream during spawning season. All rivers blocked the upstream migration at some point. Data published in (Vanderhayden, 2021)

As noted previously, the forthcoming Nature Restoration Law will require the removal of barriers to fish movement to open up 25,000km of free-flowing rivers across Europe. Ireland's National Restoration Plan, a requirement under the EU Nature Restoration Law (due to come into force in 2024), will need to set national targets for this objective which will benefit other migratory fish such as Atlantic salmon *Salmo salar*, European eel *Anguilla anguilla* and Sea lamprey *Petromyzon marinus*, all of which are also protected under the Habitats Directive.

In addition, the Irish government has committed to protecting 30% of its territorial waters by 2030 within Marine Protected Areas (MPAs)

and enabling legislation is expected to be law before the end of 2023. For MPAs to comply with international definitions, these new designations must prohibit industrial fishing, including bottom trawling, which presents a high risk for sturgeon as a bottom-feeding fish.

The EU Action Plan: Protecting and restoring marine ecosystems for sustainable and resilient fisheries (**Feb 2023**) states that "by the end of March 2024, [Member States should] adopt national measures or, where appropriate, propose joint recommendations to the regional groups to prohibit mobile bottom fishing in the MPAs that are Natura 2000 sites designated under the Habitats Directive that protect the seabed and marine species". The estuaries of the Rivers Shannon, Boyne, Barrow/Suir and Munster Blackwater are all designated as SACs (although there may be little bottom trawling underway in these areas as things stand).

Vanderheyden's study notes that the Rivers Shannon and Suir had the greatest area of potentially suitable habitat, while the River Shannon came out on top when the availability of potential rearing habitat was also included, although this is contingent on improving connectivity at the Parteen Weir.

It also noted that the habitat availability would be increased further by removing or creating a bypass around two weirs. At the Barrow "mitigation would be more challenging as no less than 19 weirs are located between the most suitable habitat and the sea".

This study notes that due to a lack of data, the quality of the river substrate for sturgeon spawning was not included in the analysis and this could be a limiting factor affecting the suitability of habitat. Nevertheless, the study suggests that suitable habitat for sturgeon is available and would be greatly enhanced by actions such as barrier removal/modification and the creation of MPAs, which are already, or soon to be, commitments which the Irish government must undertake.

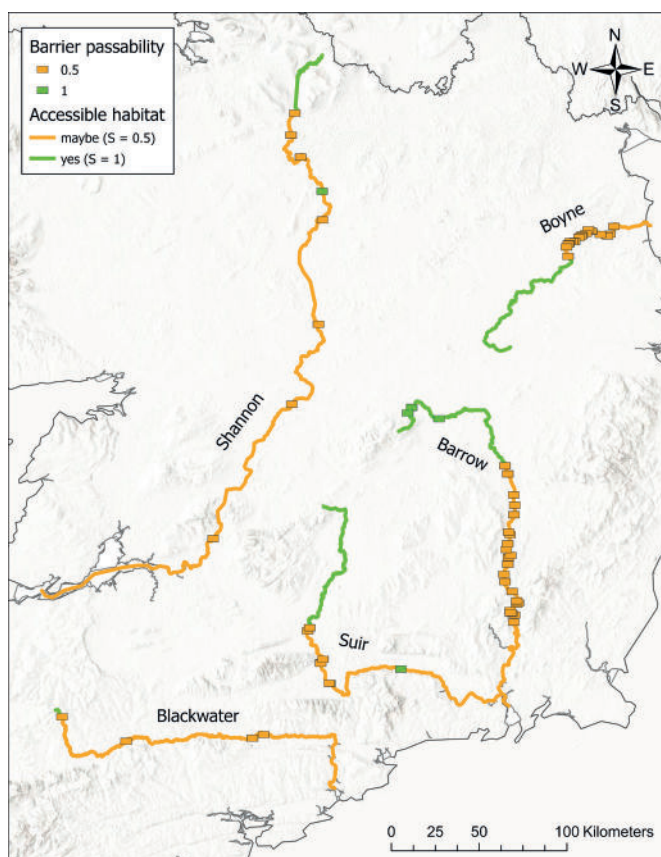


Figure 4: Accessibility of downstream river sections for juvenile sturgeon migrating towards the estuary. Downstream migration deemed possible for juveniles. Data published in (Vanderhayden, 2021).

ARE STURGEON PROTECTED IN IRISH WATERS?

As part of this study, the Irish Wildlife Trust and Blue Marine Foundation commissioned Dr Sarah Ryan Enright, marine environmental lawyer, to provide an opinion on the legal status of sturgeon in Irish waters¹⁴. Specifically, we wanted to know:

- **What is the legal status of sturgeon in Ireland? Is it a protected species?**
- **Is the Irish Government under a legal obligation to establish protected areas for sturgeon?**
- **Does the Irish Government have a legal obligation to reintroduce species, in particular sturgeon?**

Dr Ryan Enright's analysis confirmed that European sturgeon is a protected species in Ireland via its listing on Annex II of the Habitats Directive, which requires member states to establish Special Areas of Conservation (SAC). However, as the sturgeon is not currently found in Irish waters, there is no requirement to establish SACs at this time. As it is listed under Annex IV of this directive, the species is 'strictly protected' wherever it is found. Ireland is also required to 'study the desirability of re-introducing the sturgeon'.

It noted that Ireland is a party to a number of international agreements which are relevant to the conservation of sturgeon, including: the aforementioned Bern Convention, the UN's Convention on Biological Diversity (CBD) and the Regional Seas Convention for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR). These do not place an onus on Ireland to take measures for the conservation of sturgeon in a strict legal sense, however Ireland has clearly committed to these measures and so it has a responsibility to undertake them, albeit one that is not legally enforceable.

The legal research paper concludes that:

It is clear that more guidance is needed with regard to the extent of the legal obligations of States with regard to reintroduction in Europe, especially in the context of localised extinction, and the subsequent development and roll out of such programs on the ground from a scientific and socio-economic perspective. Various factors need to be considered such as the elimination of the risk factors and human pressures which led to extinction in the first place, stakeholder/public support, socio-economic, political and legal context, habitat suitability, and biological and environmental considerations, a discussion of which is beyond the scope of this paper. While acknowledging that it is an effective conservation tool, the IUCN has cautioned that reintroduction is a high risk undertaking which requires rigorous justification.

Legal summary:

- **Yes, European sturgeon is a protected species in Irish waters;**
- **No, there is no legal requirement for the creation of protected areas for sturgeon;**
- **No, there is no strict legal requirement to reintroduce the species;**
- **However, there is a requirement to examine the feasibility of reintroduction;**
- **There is a requirement, albeit not legally enforceable, that this should be done in compliance not only with the EU Habitats Directive but other international agreements, particularly the Bern Convention, the CBD and OSPAR.**

WHAT SHOULD HAPPEN NEXT?

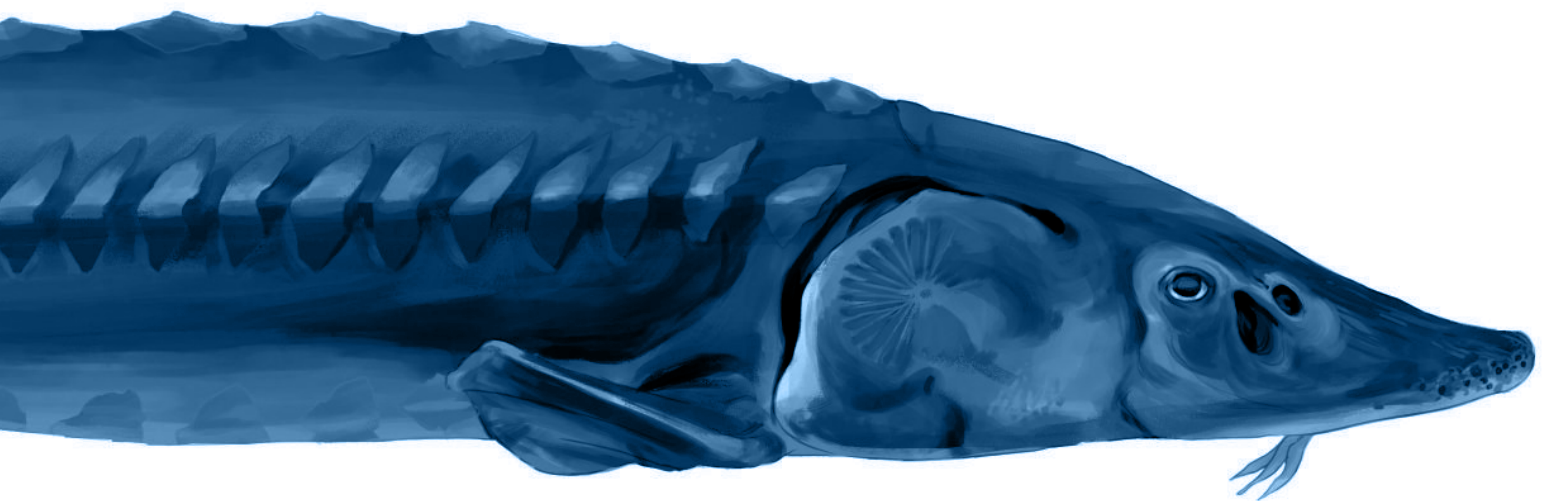
The Irish government has general legal obligations to enhance the status of ecosystems, species and habitats including:

- **To achieve good ecological status of all water bodies by 2027 (Water Framework Directive)**
- **To end overfishing by 2020 (Common Fisheries Policy)**
- **To achieve good environmental status of marine waters by 2020 (Marine Strategy Framework Directive)**
- **To achieve favourable conservation status of habitats and species listed in the Habitats Directive (not timebound)**
- **To protect 30% of territorial waters in MPAs by 2030 (currently a policy goal but is expected to be enshrined in law shortly)**

While the Nature Restoration Law will not come into force until (likely) 2024, this will add to Ireland's legal obligations for biodiversity restoration.

Ireland has so far failed to deliver on these commitments and many might wonder why reintroducing sturgeon should be prioritised while so much work remains to be done for species and habitats that are still found in Ireland. However, we believe that the sturgeon, far from distracting us from these tasks, could act as a driving force for delivering on the overdue protection of existing species. This will therefore be a complementary process.

The *Pan-European Action Plan for Sturgeons* has set an objective that "sturgeons serve as a flagship species for healthy river ecosystems". In other words, because sturgeon occupy a broad range of habitats, actions for **their conservation can promote wider ecosystem restoration that benefits biodiversity far beyond the sturgeon themselves.**



CONCLUSION

Although sturgeon are probably little known among the Irish public, they are a potentially flagship species for marine reintroduction in Ireland due to their evolutionary age, their distinctive appearance and their (potentially at least) large size. Reintroduction programmes, such as those for the white-tailed eagles, golden eagles and red kites in Ireland, have typically attracted a lot of public attention and support. The National Parks and Wildlife Service (NPWS) will embark on a reintroduction of osprey in summer 2023.

A sturgeon reintroduction could similarly help to draw attention towards our aquatic environments and provide a gateway for education and awareness raising that engages people in wider environmental issues.

The IWT has long believed that species that have been driven to extinction in Ireland should be brought back. They belong here. They are a part of our culture and heritage, as well as our ecology, even if they have been absent for many years. There are overwhelming ethical, as well as

practical and political, reasons for examining the reintroductions of the 120 or so native species that are known to be extinct¹⁵.

In the UK, the House of Commons has recently conducted a select committee inquiry into “the role species reintroduction can play in supporting nature recovery and biodiversity, how to maximise the benefits of reintroduction and manage any conflicts¹⁶”.

The Irish Wildlife Trust and Blue Marine Foundation believe that the Irish government, led by the National Parks and Wildlife Service, should do the same. Ireland needs a clear policy statement that reintroductions are desirable as well as guidelines for how species should be selected and what procedures need to be followed.

The sturgeon, in our view, would be a high priority candidate given the likely high chance of success, the existing legal and policy context for the conservation of the species, and the lower risk of conflict with economic interests.

A sturgeon reintroduction could similarly help to draw attention towards our aquatic environments and provide a gateway for education and awareness raising that engages people in wider environmental issues.

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**BLUE MARINE
FOUNDATION**

3rd Floor South Building,
Somerset House, Strand,
London, WC2R 1LA
United Kingdom

+44 0207 845 5850
info@bluemarinefoundation.com
www.bluemarinefoundation.com



8 Cabra Road,
Dublin 7,
D07T1W2
Ireland

+353 1 445 7259
info@iwt.ie
www.iwt.ie