9. European Eel *(Anguilla anguilla)*

Irish name: Easgann Eorpach

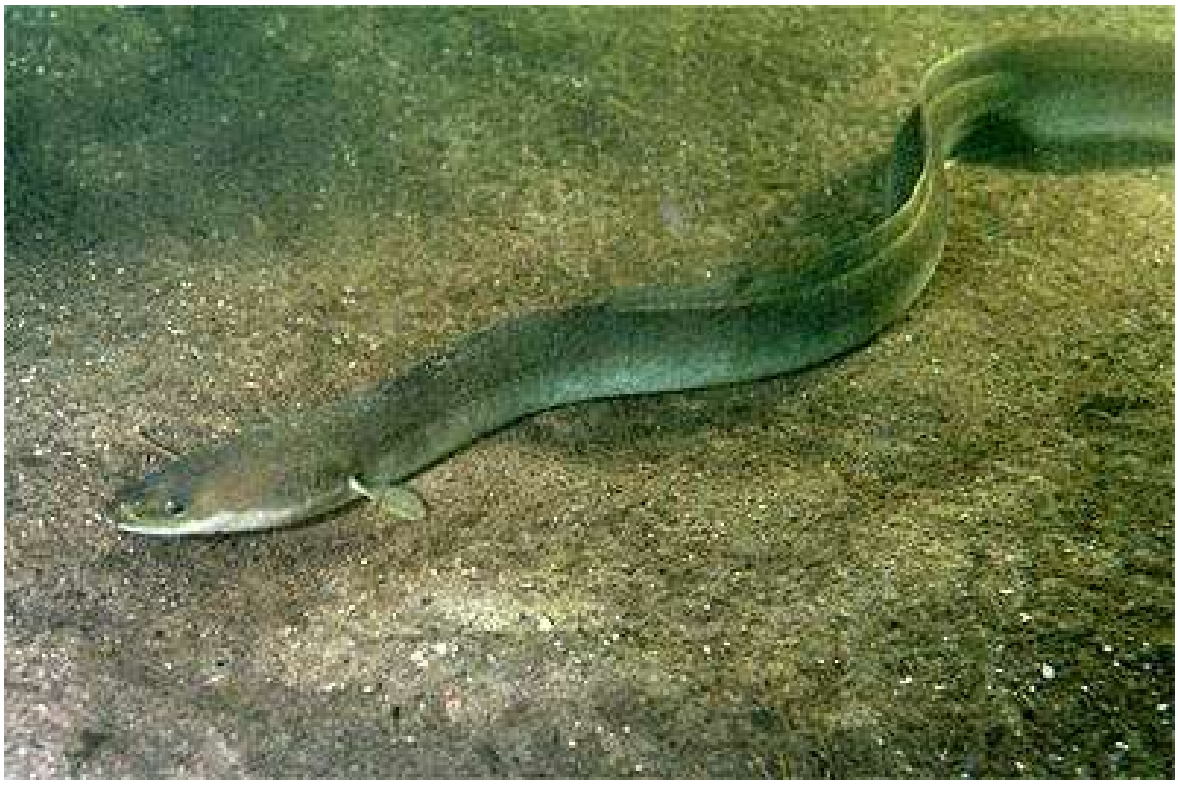

Figure 1. European Eel, *Anguilla anguilla* (Linnaeus, 1758) © By GerardM - http://www.digischool.nl/bi/onderwaterbiologie/ , CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=284678

Background

The European eel is long and snake-like in shape with a tough, slimy skin, which can be black, brown, or dark olive green in colour above, paler and yellowish on the underside (Avant 2007). The adult eel is most abundant in estuaries and low salinity pools but is also found around the coast in permanent tide pools, on the lower shore and shallow sublittoral; being nocturnal it is inactive during the day under rocks or weed or in soft sediment (Avant 2007). European eel has a complex life history that is poorly understood. It involves migration of mature adults from European rivers and estuaries to the Sargasso Sea in the west Atlantic for spawning, and the subsequent return of juveniles. They metamorphose twice, part of the life cycle spent in freshwater and part in estuarine or full sea water (Whitehead *et al*., 1986).

European eel is an OSPAR listed species with the latest Quality Status Report (QSR) stating "*the European eel is widely distributed in marine, coastal, brackish and freshwater habitats of Europe and occurs from the Atlantic coast of north Africa, in all of Europe (including Baltic Sea) and in the Mediterranean waters of Europe and northern Africa. In addition, the European eel also occurs in the Canary Islands, Madeira and the Azores Islands, and in Iceland* (Figure 2).

Rationale for spatial protection in the western Irish Sea

European eel was nominated for inclusion with particular reference to its conservation listing under OSPAR and listing as Near Threatened or greater (Irish, EU or Global Red List). European eel are listed as Critically Endangered by the IUCN Red List, Irish and European Red List. European eel is also listed as Critically Endangered globally. According to the 2022 OSPAR assessment "*The status of European eel is still very poor in all OSPAR Regions where the species occurs, as glass eel recruitment, although stable since 2010, remains at a very low level with no clear sign of an upturn. Eel is a panmictic species which affects its management. While the pressure of commercial fishing on the stock appears to be decreasing in the current assessment period (2010 to 2021), other pressures (dams, turbines, habitat loss, pollution, poaching, diseases and pathogens, climate change, etc.) still pose a significant threat to the species.*"

Fishing restrictions: ICES (2022) advises that when the precautionary approach is applied, there should be zero catches in all habitats in 2023. This applies to both recreational and commercial catches and includes catches of glass eels for restocking and aquaculture.

It is known that most of the rivers emptying into the western Irish Sea contain European eel (Table 1). Eels use the Irish sea as a migration route, incoming as juvenile glass eel and outgoing as mature silver eel heading for spawning grounds. The exact routes taken by eels in the Irish Sea are not known and distributional data for the marine portion of their life-cycle is very sparse.

Based on current knowledge certain stages of the European eel's life-cycle are amenable to spatial protection (other than the freshwater phase, which does not fall within the scope of the current project study). ICES (2022) advises based on ecosystem based management considerations that: all non-fisheries related anthropogenic mortalities should be zero; and that the quantity and quality of eel habitats should be restored; this includes restoring connectivity and the physical, chemical, and biological properties of the habitats. Estuaries are an important habitat for the species (high confidence) that fall within the area of interest and are amenable to spatial protection.

Sensitivity assessment

The highest associated sensitivity scoring for European eel was in relation to barriers to movement, physical loss of (estuarine) habitat, and targeted and non-targeted removal (bycatch) by fishing. Barriers to movement primarily relates to river access being impeded by dams, weirs, turbines *etc*., which are outside of the scope of this study, but the cumulative effect of ORE installations on the migration routes of European eels is poorly understood (high confidence). Targeted and non-targeted removals of eels in the western Irish Sea are prohibited, so although sensitivity is high, incidence is low. Physical loss of estuarine habitat has been identified as a key sensitivity (high confidence) and adult eels are known to be abundant in this habitat.

Offshore energy impacts on European eel are poorly understood, however, based on existing knowledge eel may be sensitive to some of the associated sectoral pressures.

There is evidence that electromagnetic fields can affect eel movement but it is not yet known whether the magnitude of such disturbance is significant over the scale of their entire migration. However, due to the large distances over which European eels migrate, the effects of a pressure (or indeed local spatial protection) may not be immediately evident, spatially or temporally.

Following the precautionary principle, European eel were identified as sensitive to some shipping related pressures (low confidence). This mainly relates to transition elements, organo-metal, hydrocarbon and PAH contamination of essential estuarine habitats.

Further research needs

Key knowledge on the distribution of European eel in the western Irish Sea remains limited and requires further investigation. The limited number of research studies on the effect of electromagnetic fields means it is difficult to recommend specific measures. More research is needed, particularly field studies on the cumulative effect of multiple ORE installations. In addition, evidence to identify the potential effect of multiple pressures was insufficient to form an assessment. These pressures included synthetic compound contamination and introduction of other substances.

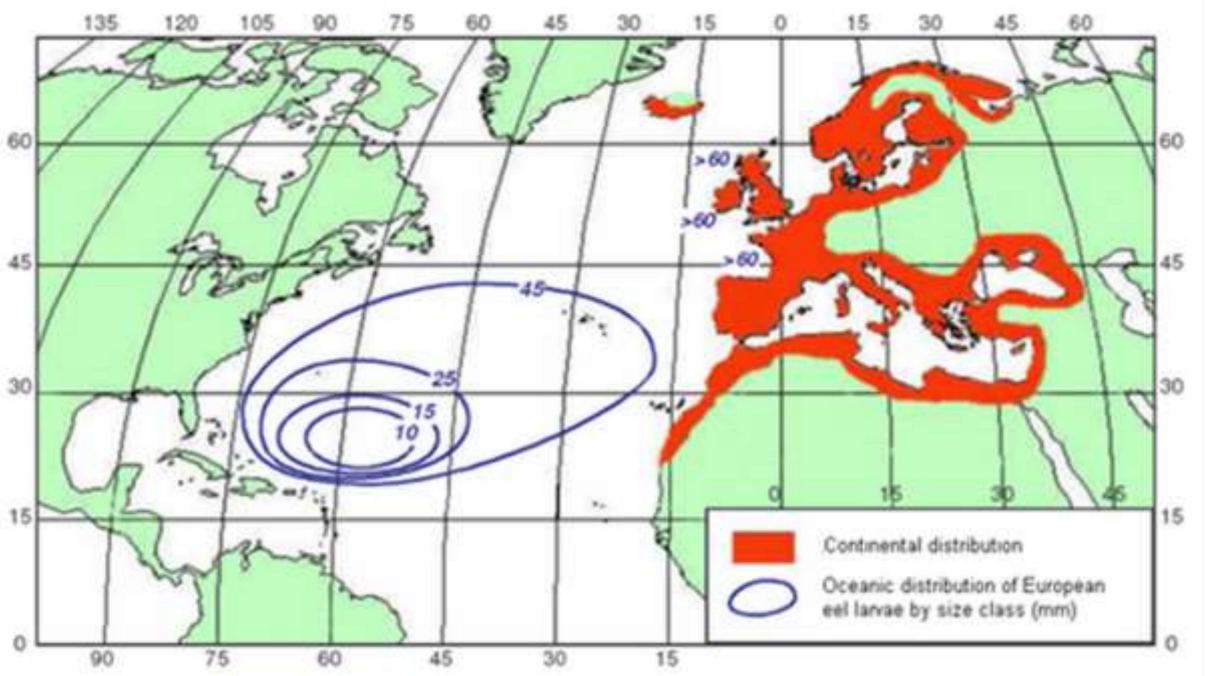

Figure 2. Global distribution of European Eel, Source: OSPAR QSR 2022 (adapted from Adam, 1997).

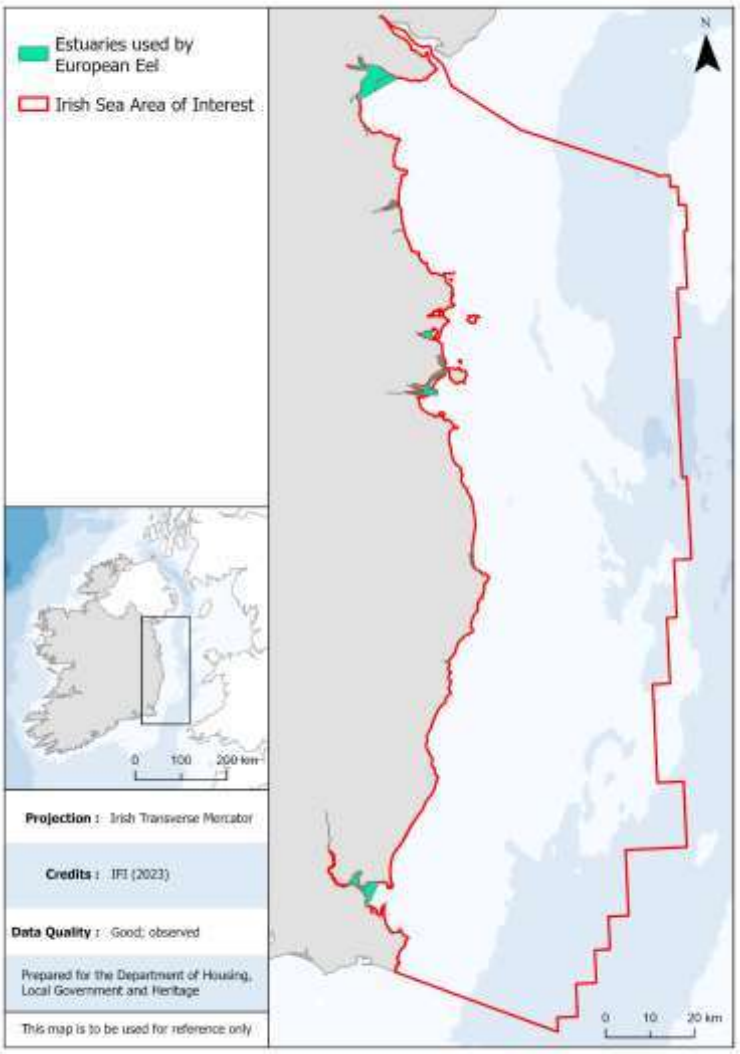

Figure 3. Data available for European eel, *Anguilla anguilla,* in the western Irish Sea.

Data sources and quality

No data relating to the distribution of European eel in the Irish Sea was available. It is known that eel migrate through the area to many rivers on the east coast of Ireland, but their exact route is unknown. Estuaries are an essential habitat for European eel, therefore estuaries associated with known eel rivers were included in the SCP process (Figure 3, Table 1).

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
Estuaries of Ireland	Department of Housing, Local Government, and Heritage	Good; observed	Estuaries	
Inland Fisheries Ireland (IFI) Water Framework Directive (WFD) Fish Ecological Status	Inland Fisheries Ireland	Good; observed	WFD Fish Ecological Status	

Table 1. List of rivers containing European eel that are named in the Irish Eel management Plan on the east and southeast coast of Ireland. ERBD = Eastern River Basin District, NBIRBD = Neagh Bann International River Basin District, SERBD = South Eastern River Basin District.

DISTRICT	NAME	River Basin District
Wexford	Three Mile Water	ERBD
Dublin	Dargle (River)	ERBD
Dublin	Shanganagh	ERBD
Dublin	Newtownmountkennedy	ERBD
Dublin	Newcastle [Wicklow]	ERBD
Dublin	Vartry (River)	ERBD
Dublin	Rathnew (River)	ERBD
Wexford	Potter's (River)	ERBD
Wexford	Avoca (River)	ERBD
Wexford	Redcross (River)	ERBD
Dublin	Dodder (River)	ERBD
Dublin	Tolka (River)	ERBD
Dublin	Liffey (River)	ERBD
Drogheda	Delvin (River)	ERBD
Dublin	Broad Meadow (River)	ERBD
Dublin	Ballough (Stream)	ERBD
Drogheda	Nanny (River)	ERBD
Dublin	Ballyboghil	ERBD
Drogheda	Boyne (River)	ERBD
Drogheda	Termonfeckin	NBIRBD (ROI)
Dundalk	Castletown (River)	NBIRBD (ROI)
Dundalk	Flurry (River)	NBIRBD (ROI)
Dundalk	Castletown (River)	NBIRBD (ROI)
Dundalk	Fane (River)	NBIRBD (ROI)
Dundalk	Glyde (River)	NBIRBD (ROI)
Dundalk	Dee (River)	NBIRBD (ROI)
Waterford	Annestown (Stream)	SERBD
Waterford	Dalligan (River)	SERBD
Waterford	Mahon (River)	SERBD
Waterford	Tay (River)	SERBD
Waterford	Colligan (River)	SERBD
Waterford	Brickey (River)	SERBD
Waterford	Suir (River)	SERBD
Waterford	Glen (River)	SERBD
Waterford	Lingaun (River)	SERBD
Waterford	Pil (River)	SERBD
Waterford	Black Water	SERBD
Waterford	Ballymoat (Stream)	SERBD

Waterford	Dawn (River)	SERBD
Waterford	Clodiagh (River)	SERBD
Waterford	John's River	SERBD
Waterford	Whelanbridge (River)	SERBD
Waterford	Nore (River)	SERBD
Waterford	Barrow (River)	SERBD
Waterford	Aughnavaud (River)	SERBD
Waterford	Pollmounty (River)	SERBD
Wexford	Duncormick	SERBD
Waterford	Corock (River)	SERBD
Waterford	Owenduff (River)	SERBD
Wexford	Sow (River)	SERBD
Wexford	Slaney (River)	SERBD
Wexford	Blackwater (River)	SERBD
Wexford	Inch (River)	SERBD
Wexford	Owenavorragh (River)	SERBD

References

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