

# ICES

## European eel (*Anguilla anguilla*) Advice 2022

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Science for sustainable seas



# Life Jonathan White Academia & Employment



## Chair of the ICES Fisheries Resources Steering Group

*To coordinate the activities of fisheries stock assessment related working groups across ICES*

## 25+ years experience aquatic ecology and stock assessments

Team Lead Demersal Stock Assessment Science  
Fisheries Ecosystems Advisory Services  
Marine Institute, Ireland

- Natural Resource Management
- Freshwater ecology
- Statistics
- Data management
- Seabed habitat mapping
- Wild Atlantic salmon stock assessment (national & international)
- Demersal stock assessments
- Science/management advice - Industry/ Government/ national & international



# European eel (*Anguilla anguilla*) throughout its natural range

*ICES Advice on fishing opportunities and conservation  
Ecoregions in the Northeast Atlantic  
Published 3 November 2022*

**ICES (2022): European eel (*Anguilla anguilla*) throughout its natural range. ICES Advice: Recurrent Advice. Report.**  
<https://doi.org/10.17895/ices.advice.19772374.v1>

**Based on work and assessment of:  
JOINT EIFAAC/ICES/GFCM WORKING GROUP ON EELS (WGEEL)**



# WGEEEL: Joint EIFAAC/ICES/GFCM Working Group on Eels

109 members  
29 jurisdictions



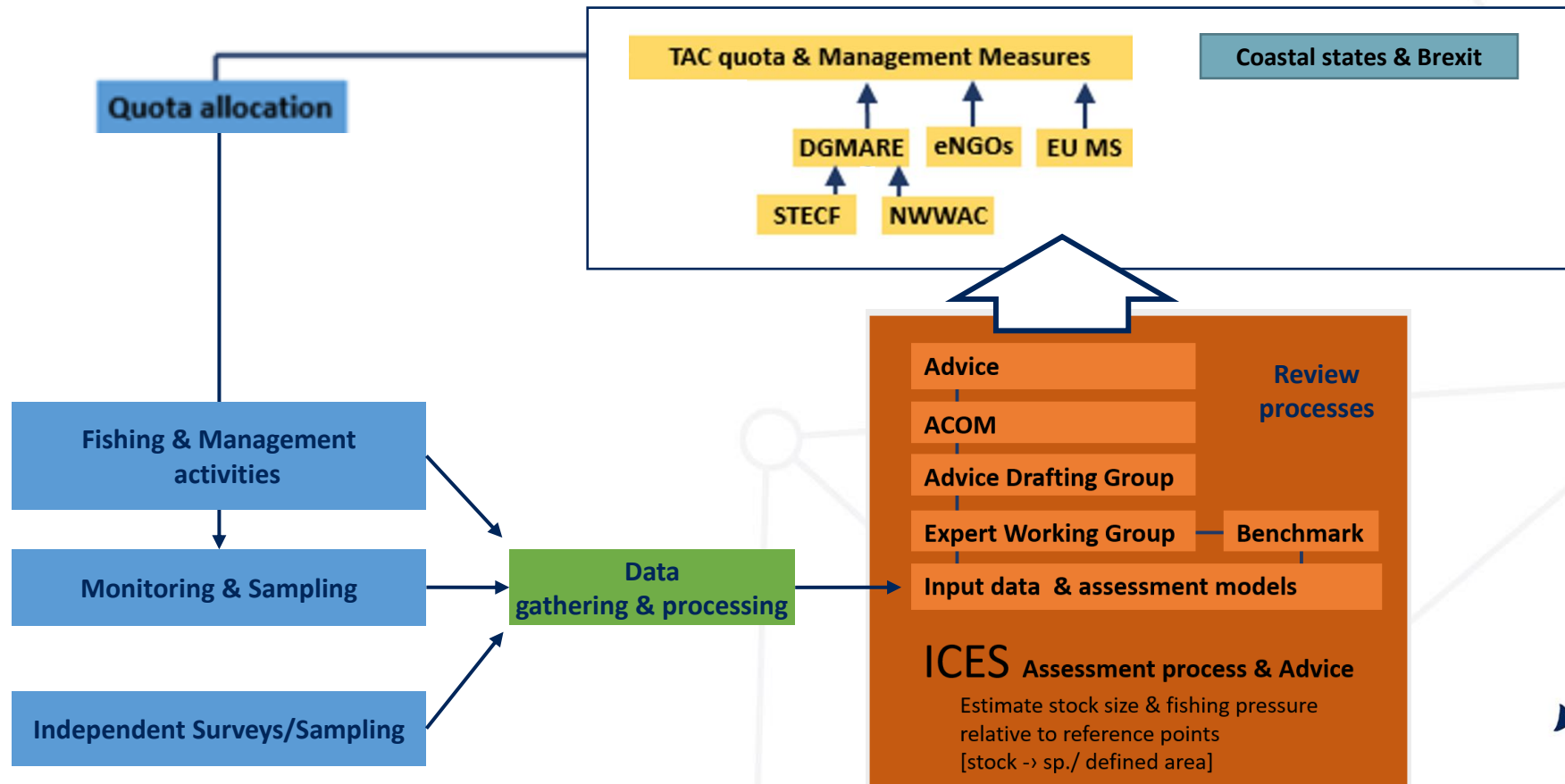
- Conducts annual stock assessments of European eel
- Reports on new science including emerging threats and opportunities
- Develop tools and methods to compile and analyse comprehensive data on the widespread single stock of the European eel.
- Reviews impacts of both anthropogenic and non-anthropogenic factors on the stock.

“Following the drastic decline of recruitment in the European eel after the 1980s, many efforts were undertaken by policy-makers to facilitate the recovery of the stock. It is the role of WGEEEL to describe the current stock status and improve our understanding of its dynamics in order to inform policy makers and provide the scientific basis for the advice.”

<https://www.ices.dk/community/groups/pages/wgeel.aspx>



# Fisheries Stock assessment – Annual Advice cycle



Clarity in how processes work Why, How, Who, What

# ICES Advice

## European eel (*Anguilla anguilla*) throughout its natural range



### ICES advice on fishing opportunities

ICES 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.

### ICES advice on conservation aspects

#### Stock development over time

#### Conservation status

#### Catch scenarios

#### Basis of the advice

Table 1a [The basis of the advice for fishing opportunities](#)

Table 1b [The basis of the advice for conservation aspects](#)

### Quality of the assessment

#### Issues relevant for the advice

#### On fishing opportunities

*Restocking*

*Aquaculture*

#### On conservation aspects

*Other anthropogenic impacts*

#### Other aspects

### Reference points

#### Basis of the assessment

#### History of the advice, catch, and management

#### History of catch and landings

#### Summary of the assessment

#### Sources and references

Advice for fisheries stocks follow a standard structure

“Conservation Aspects” are a new inclusion

# Advice basis



## ICES “Category 3” assessment :

Stocks for which surveys, trends-based assessment or other available indices provide reliable indications of trends in stock metrics (total mortality, recruitment, biomass).

## Advice based on Precautionary Approach (PA)

UN Conference on Environment and Development (UNCED, 1992) - precautionary approach

UN Straddling Fish Stocks Agreement of 1995 (UNFSA 1995) - precautionary approach

# European eel (*Anguilla anguilla*) throughout its natural range



## ICES advice on fishing opportunities

ICES 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.

## ICES advice on conservation aspects

ICES advises based on ecosystem based management considerations that:

- all non-fisheries related anthropogenic mortalities should be zero.
- the quantity and quality of eel habitats should be restored; this includes restoring connectivity and the physical, chemical, and biological properties of the habitats.



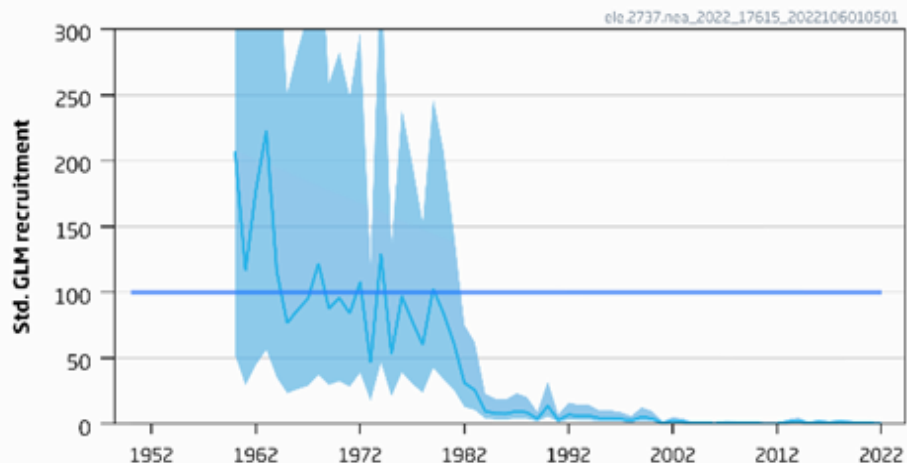
## Stock development over time

**Glass eel recruitment:** (scaled to the 1960-1979 geometric mean)

- North Sea: 0.5% in 2022 (provisional) and 0.6% in 2021 (final).
- Elsewhere Europe: 9.7% in 2022 (provisional) and 5.5% in 2021 (final).

Time-series from 1980 to 2022 show that glass eel recruitment remains at a very low level.

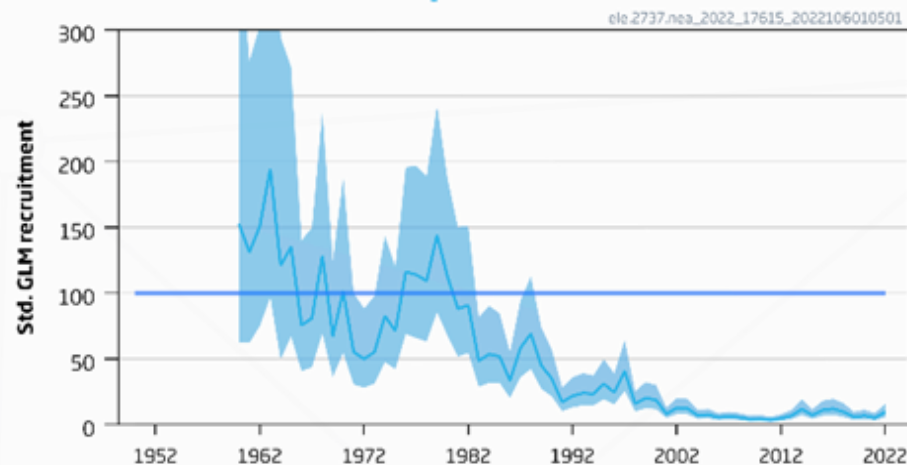
### Glass eel North Sea recruitment index



26 time series:

Norway, Sweden, Germany, Denmark,  
Netherlands, UK, Belgium

### Glass eel Elsewhere Europe recruitment index



31 time series:

UK, Ireland, France, Spain, Portugal, Italy

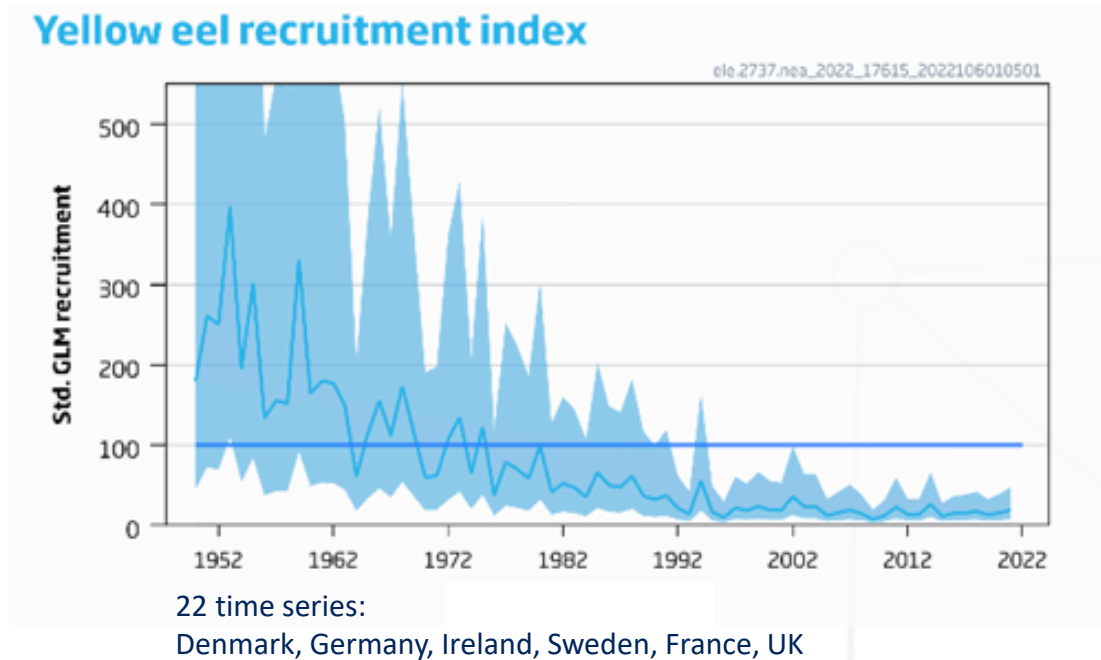
Scaled to the 1960-1979  
geometric mean

Horizontal lines: estimate  
of “ $R_{lim}$ ” reference point

## Stock development over time

**Yellow eel recruitment:** Scaled to the 1960-1979 geometric mean

- 19% 2021 (final).



Scaled to the 1960-1979  
geometric mean

Horizontal lines: estimate  
of “ $R_{lim}$ ” reference point

## Stock development over time

- ICES cannot assess the exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined.
- Recruitment geometric means 1960–1979 is considered a likely limit reference point ( $R_{lim}$ ).
- Given that current recruitment estimates have been below  $R_{lim}$  for many years, it is assumed that current biomass is below a likely  $B_{lim}$ .
- Therefore, while stock-size reference points are also undefined, it is considered likely that the stock size is well below potential biological limit reference points.

## Conservation status

Non-fisheries related anthropogenic mortalities are not reliably quantified (ICES, 2022a) and no reference points are defined.

The European eel (*Anguilla anguilla*) is listed on the IUCN Red List as critically endangered.

## Catch scenarios

ICES is not in a position to provide catch scenarios in the absence of accurate catch information.

### Management plans

EU management framework established (2007)

Management measures in the Mediterranean (2018)

Not been evaluated by ICES for their conformity with the precautionary approach

Therefore not used as basis for the advice.

Eel fisheries further regulated by :

- EU Regulations (two) on 'Fishing Opportunities' (2022)
- Commission Implementing Decision 'Specific Control and Inspection Programme' (2018).

**Table 1a** The basis of the advice for **fishing opportunities**

Advice basis	Precautionary approach
	A management framework for eel within the EU was established in 2007 by Council Regulation (EC) No. 1100/2007 (EU, 2007) and the General Fisheries Commission for the Mediterranean (GFCM) adopted Recommendation GFCM/42/2018/1 (GFCM, 2018), establishing management measures for European eel ( <i>Anguilla anguilla</i> ) in the Mediterranean Sea.
Management plan	These management plans have not been evaluated by ICES for their conformity with the precautionary approach and, for this reason, have not been used as the basis for the advice.  Eel fisheries in EU waters are further regulated in Council Regulations (EU) No 2022/109 and (EU) 2022/110 on 'Fishing Opportunities' (EU Council, 2022a,b) and in the Commission Implementing Decision (EU) No 2018/1986 'Specific Control and Inspection Programme' (EC, 2018).

## Basis of the advice



### Existing conservation measures

- IUCN Red List - Critically Endangered (2008)
- CITES Appendix II (2007)
- EU implementation of CITES rules (2009)
- Convention on the Conservation of Migratory Species of Wild Animals Appendix II (2014)
- OSPAR List of Threatened and/or Declining Species and Habitats (2008)
- OSPAR Convention recommendation to strengthen protection at all life stages (2014)
- The Baltic Sea Action Plan (BSAP; HELCOM) includes several eel targets (2007)
- National conservation measures and progress
  - Water Framework Directive (2000)
  - Marine Strategy Framework Directive (2008)
  - Habitats Directive (1992)
  - The Ramsar Convention on Wetlands (1976)

Advice basis	Ecosystem-based management (EBM) considerations
	<p>The European eel (<i>Anguilla anguilla</i>) has been listed as Critically Endangered on the IUCN Red List since 2008 (IUCN, 2022), in the CITES Appendix II since 2007 (CITES, 2007, 2022) and in the EU implementation of CITES rules (Annex B to Council Regulation [EC] No 338/97; EU Council, 1996) since 2009.</p> <p>European eel was added to Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) in 2014 (CMS, 2018).</p> <p>European eel was included on the OSPAR List of Threatened and/or Declining Species and Habitats in 2008. In 2014, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) issued a recommendation to strengthen the protection of the European eel at all life stages (OSPAR, 2014).</p>
Existing conservation measures	<p>The Baltic Sea Action Plan (BSAP) of the Baltic Marine Environment Protection Commission (HELCOM) contains several targets for the European eel (HELCOM, 2007, updated 2021).</p> <p>National conservation measures are reported in the report on the technical evaluation of EU Member State progress reports for submission in 2021 (WKEMP), Eel Management Plan progress reports, and WGEEEL country reports (ICES 2022a, 2022b); ICES is not aware of any information for countries not listed in these reports.</p> <p>Other international legislation relevant to eel conservation:</p> <ul style="list-style-type: none"><li>• Directive 2000/60/EC, known as the Water Framework Directive (WFD; EU, 2000)</li><li>• Directive 2008/56/EC, known as the Marine Strategy Framework Directive (MSFD; EU, 2008).</li><li>• Council Directive 92/43/EEC, known as the Habitats Directive (EU, 1992)</li></ul> <p>The Ramsar Convention on Wetlands (UN, 1976) aims to stem the loss and progressive encroachment on wetlands, an important European eel habitat.</p>

## Quality of the assessment



- Assessment comprises two glass and one yellow eel “R” indices, each of multiple time-series
- Data from fisheries and scientific surveys
- Varying quality of data
- No applied data weightings
- 2022 increase in glass eel recruitment partly due to an increase in number of data series  
increase not observed in the Bay of Biscay (contributes a large proportion of recruitment)
- Landings and effort data are incomplete  
inconsistencies in reporting and changes in management.
- Data deficiencies in recreational fisheries are described (ICES 2016)  
This is improving, though largely unquantified  
landings (yellow and silver eels) can be of the same magnitude as commercial
- An annual eel data call (2017 onwards) substantially improved coverage and completeness
- Data on fisheries and anthropogenic impacts remains incomplete
- No single international legislative requirement to collect / provide data that covers the entire stock area

### On fishing opportunities

#### *Restocking*

ICES notes that the restocking of eels (practice of adding eels to a waterbody from another source) is considered a “conservation measure” in the EU Council Regulation (EU Council, 2007) and in many eel management plans is implemented for achieving the 40% escapement target on all Eel Management Units (EMUs). Restocking is reliant on a glass eel fishery catch, which is in contradiction with the current advice.

The net benefit of the restocking of eels to the reproductive potential of the stock is unknown. It requires information on e.g. carrying capacity estimates of glass eel source estuaries, detailed mortality estimates at each step of the restocking process, and the spawning potential of stocked vs. non-stocked eels. ICES (2016b) found that while a local increase in eel production may be apparent, an assessment of net benefit to the spawning stock was unquantifiable. ICES advises that when constrained by the above-mentioned uncertainties and potential harmful effects (ICES, 2016b), while following the precautionary approach, no catch for restocking should be allowed.



### On fishing opportunities

#### *Aquaculture*

Since cultured eels are always wild caught and either permanently removed from the stock (for consumption) or used for restocking (and hence not for conservation purposes), ICES consequently advises that no catch for aquaculture purposes should be allowed.

### On conservation aspects

#### *Other anthropogenic impacts*

...are substantial:

- a) hydropower, pumping stations, other water intakes
  - b) habitat loss or degradation
  - c) pollution, diseases, and parasites
  - d) other management actions that may affect levels of predation (e.g. conservation vs. control of predators)
- Climate change may have further effects, though are not well understood
  - Environmental impacts contribute to anthropogenic stresses on eels (mortality and reproductive success)  
Environmental legislation (WFD/ MSFD) aiming to make improvements could have a positive effect
  - ICES is not able to quantify level or relative impact, of non-fisheries anthropogenic factors  
Given the state of the stock:  
ICES advises that all non-fisheries anthropogenic impacts decreasing production and escapement of silver eels should be zero in 2023
  - ICES acknowledges that catches for subsequent release to improve survival may be part of temporary conservation measures (e.g. up and downstream movement across barriers within a waterbody) could be considered – if associated mortality is likely less than in the absence
    - Upstream assisted migration should only be applied if future escapement (silver eels) is ensured
    - In such conditions, current advice does not apply to these catches

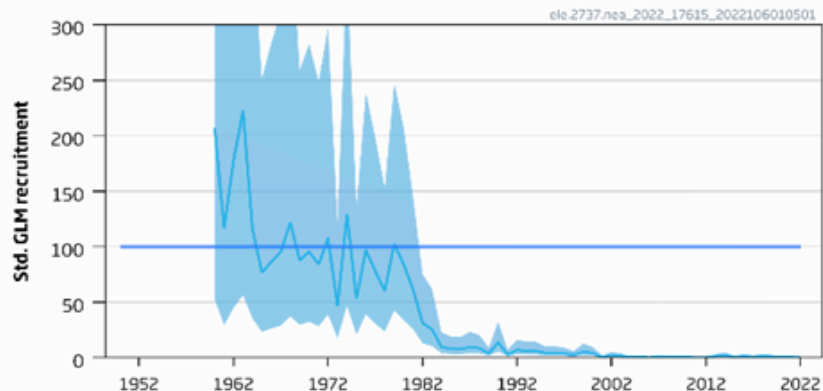
### Other aspects

- Illegal, unreported, unregulated (IUU) fishing is known to occur
- Customs seizures indicate that the illegal export of glass eel could be substantial
- Few countries reported levels of misreporting and illegal fisheries (i.e. seizure of illegal nets; illegal trade of glass eels - inside and outside the EU).

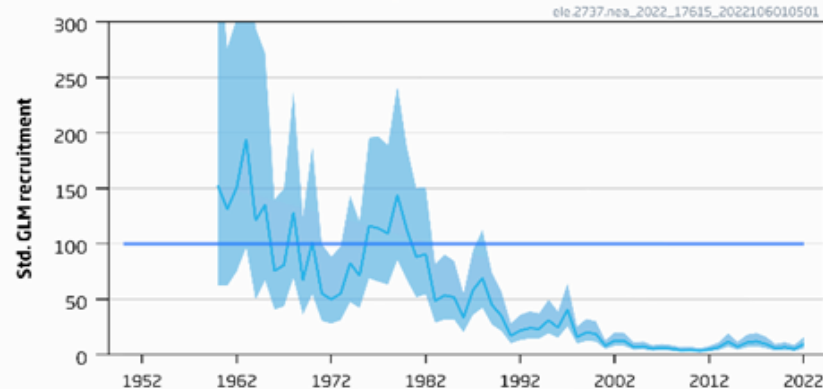
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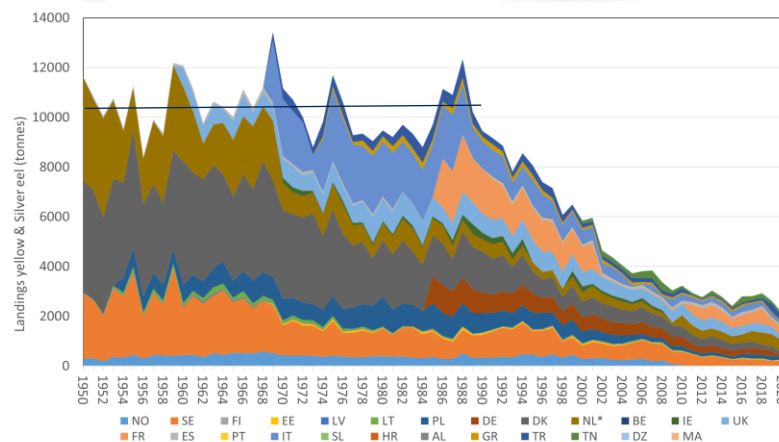
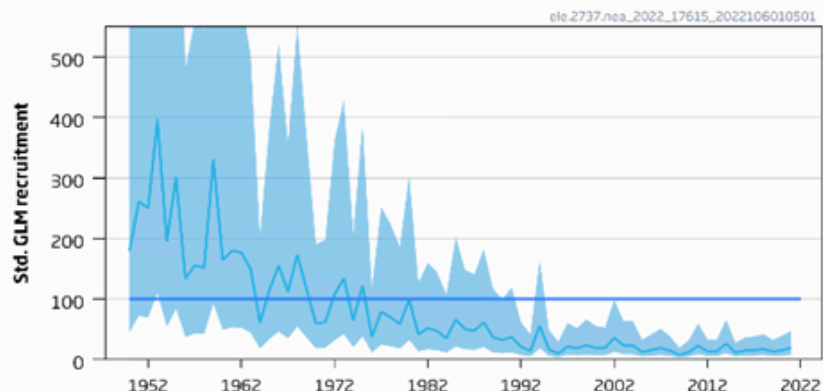
Glass eel North Sea recruitment index



Glass eel Elsewhere Europe recruitment index



Yellow eel recruitment index

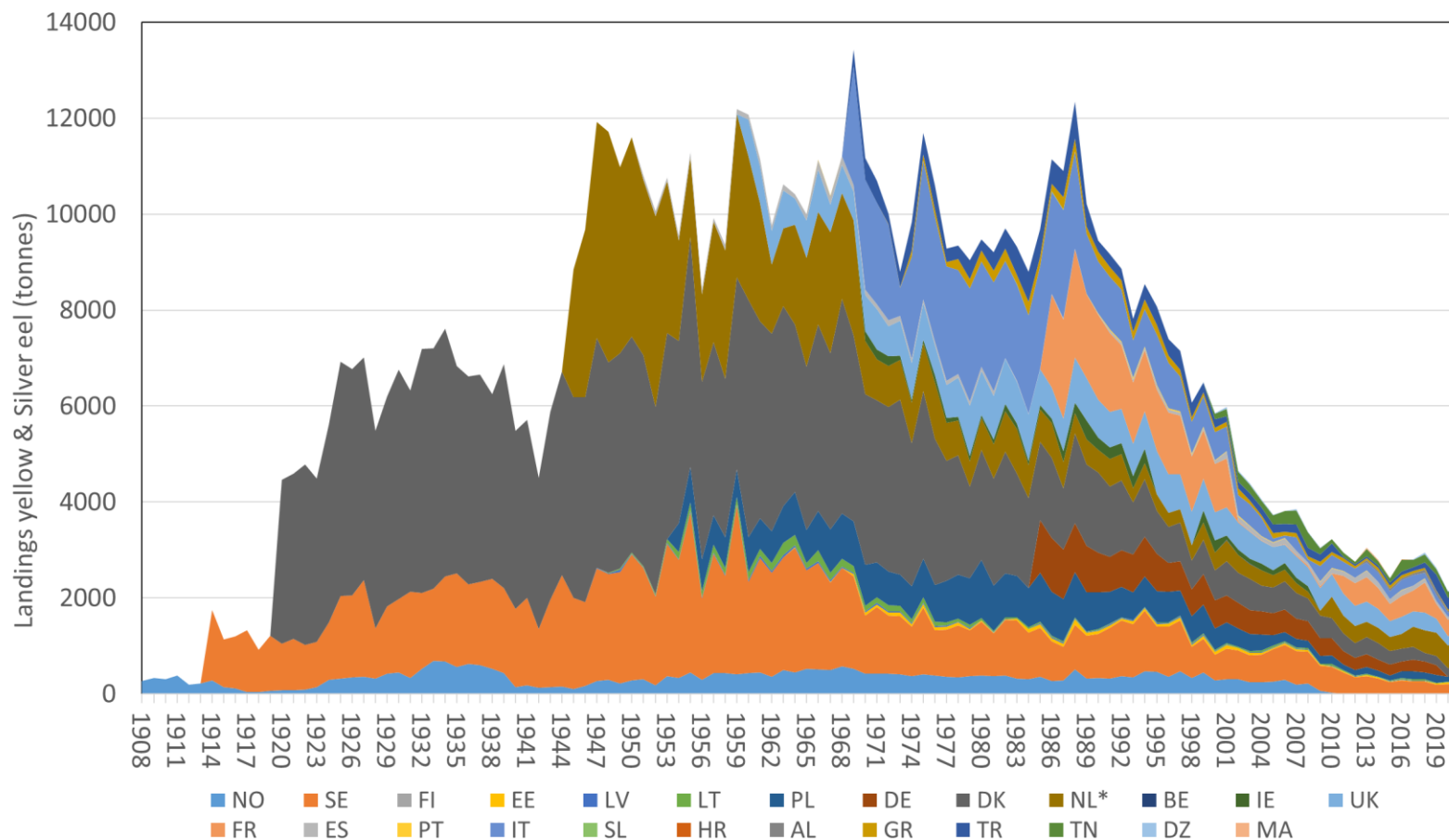


Official commercial landings (tonnes) of yellow and silver eel  
(Empty cell = no data, data not collected, or data not pertinent)

Glass:

- North Sea:
    - 2022: 0.5% (provisional)
    - 2021: 0.6% in (final)
  - Elsewhere Europe:
    - 2022: 9.7% (provisional)
    - 2021: 5.5% (final)
- Silver:
- 2021: 19% (final)

	Year Landings (t)	% of 1969 max (13,421t)
Average (1946-1990)	10424	78%
1990	9444	70%
1995	8072	60%
2000	7917	59%
2005	4654	35%
2010	3568	27%
2015	2992	22%
2020	3510	26%
2021	2201	16%



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# Thank you Questions?



Science for sustainable seas

