

EU request to provide advice on fisheries-related anthropogenic impacts on eels in EU marine waters

Advice summary

ICES provides advice on fisheries-related anthropogenic impacts on eel in EU marine waters, particularly as it relates to achieving the objectives of the EU Common Fisheries Policy (CFP) and the EC Eel Regulation (EC, 2007), based on seven questions posed by the European Commission. The responses to these questions are elaborated on below.

- 1- ICES considers that, given the current status of the eel stock, the prescribed 50% reduction in marine catches/efforts is not likely to achieve the objectives for the Common Fisheries Policy (CFP) as they only apply to exploitation by marine fisheries of the European eel.
- 2- ICES advises that the values of current reported biomass of escapees are uncertain and incomplete and not suitable to provide stock-wide estimates by main maritime area or sea basin. However, for the reporting Eel Management Units (EMUs), escapement biomass ranged from 0% to 140% (140% in heavily restocked areas) of the reported pristine biomass estimates, averaging 25%.
- 3- ICES advises that catches in marine waters can be quantified, but the effect on the spawning potential and stock recruitment cannot be estimated.
- 4- ICES advises that none of the measures proposed in the EU request to reduce eel fisheries in EU waters seaward of the baselines would be enough to achieve the 40% escapement biomass target.
- 5- ICES advises that fishery-specific management measures aimed at reducing fishing mortality for both yellow and silver eel in the marine environment would have a positive impact on the stock. ICES advises that measures for silver eels are more likely to have the most immediate effect on the potential spawning stock.
- 6- ICES could not identify any management measures for human activities other than fisheries that could be taken in the marine environment seaward of EMUs to protect eel escapement in support of the recovery of the stock.
- 7- ICES advises that glass eel fisheries have a negative impact on the recruitment and subsequent adult biomass, and the impact may be significant.

Request

Background Information

In 2016, ICES confirmed again that the status of the stock of European eel remains critical and that recruitment of glass and yellow eels is very low. The perception of the stock status has not changed over the last decade. As a result, ICES advises that "when the precautionary approach is applied for European eel, all anthropogenic impacts (e.g. recreational and commercial fishing on all stages, hydropower, pumping stations, and pollution) decreasing production and escapement of silver eels should be reduced to – or kept as close to – zero as possible".

Given the critical state of the stock, European eel was listed both in CITES Annex II¹ and the IUCN list of endangered species². At the EU level, a specific Regulation was adopted in 2007 to ensure the recovery of the stock. According to this Regulation, Member States (MS) have to establish and implement eel management plans for their river basins that constitute significant eel habitats. The plans must be able to achieve the escapement to the sea of at least 40% of the adult stock biomass that would have escaped without human influence. For the marine part of the eel lifecycle, MS that operate fisheries have to enforce a 50% reduction in catches or effort compared to the 2004-06 average.

While it is MS' obligation to address the anthropogenic impacts on eels in internal waters through their national eel management plans, the measures to be taken in the marine waters fall under the exclusive competence of the EU.

The main objective of 2013 Common Fisheries Policy is to ensure the sustainable exploitation of marine biological resources, including diadromous species during the marine part of their lifecycle. For analytical stocks this means to achieve F_{msy} by 2020 at the latest, while for data limited stocks the precautionary approach should be followed.

Questions:

¹ Refers to CITES Appendix II.

² Refers to the IUCN list of critically endangered species.

- 1) On this basis, ICES is requested to assess whether the 50% reduction either in catches or in effort compared to the 2004-06 average prescribed in the Eel Regulation is sufficient to achieve the objectives of the 2013 CFP.
- 2) ICES is also requested to assess the current biomass of escapees by main maritime area (if possible by sea basin, i.e. EU sea basins that have eels: Baltic, North Sea, Atlantic, Mediterranean), more specifically from the boundaries of the EMU to marine waters, in absolute terms and in terms relative to the hypothetical escapement under no human influence.
- 3) And ICES is requested to assess the extent to which catches of silver eel in marine waters reduce the spawning potential in a manner jeopardising the recovery of the stock.
- 4) In particular, ICES is requested to assess the impact and effectiveness of the following measures against the objective to increase the glass and yellow eel recruitment (as in consider the potential impact on the SSB of eel) by 2020, provided that these measures remain in place until then:
 - a) Reducing all eel fisheries to 50% of the 2004-06 average in the Union waters seaward from the baselines ('baselines' here refer to the delimitation of Eel management plans – "seaward of the boundary of Eel Management plans" – article 8 par. 2 of the Eel regulation) as prescribed in the Eel regulation;
 - b) Reducing all eel fisheries to 25% of the 2004-06 average in the Union waters seaward from the baselines;
 - c) Reducing all eel fisheries to 0% of the 2004-06 average in the Union waters seaward from the baselines.
- 5) ICES is requested to further comment on the modalities of the application of the above measures in order to reach the highest effectiveness, e.g. the stages of eels to be subject to the measures mentioned above, the duration of the measures, the seasonal aspect, the geographical area, the gears, the urgency of the need to take the measures etc., taking into account the resulting application of the landing obligation.
- 6) ICES is also requested to provide comments on other equally effective measures that could be used as alternatives to achieve respective reductions of fisheries in marine waters as in point 4.
- 7) Finally, ICES is requested to comment on the impact of glass eel fisheries on recruitment and subsequent adult stock biomass.

Basis of the advice

Methods

The request for advice from the EU Commission was addressed through a workshop (WKMAREEL; ICES, 2017) attended by eel experts who are members of ICES WGEEL. The workshop report (ICES, 2017), reviewed by two independent experts, formed the basis of this advice.

Background

Data used

In response to the request, ICES collated catch data provided by the European Commission from a request to EU Member States. Also considered were data from Fishery Data Exchange system of the European Commission (FIDES), stock status indicators by EU Member States in the context of the tri-annual post-evaluation of national Eel Management Plans (EMPs), and data from national monitoring reported annually to ICES WGEEL (Country Reports). Based on the many data deficiencies and inconsistencies between these data sources reported by the workshop, it was decided to use the best available, most recent information, i.e. the data obtained through the request by the European Commission, supplemented by other data sources for the non-reporting countries.

Areas covered

The EC Eel Regulation (EC, 2007) applies in “Community waters, in coastal lagoons, in estuaries, and in rivers and communicating inland waters of EU Member States” (Art. 1.1), and urges EU Member States to pay maximum possible regard to the definition of River Basin Districts in the Water Framework Directive (Article 3 of Directive 2000/60/EC). The Water Framework Directive defines ‘Coastal water’ as “surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.” Surface waters on the seaward side of that line constitute Community waters. However, the Eel Regulation (Art. 2.1) obliges EU Member States to define ‘eel river basins’ that ‘may include maritime waters’ (Art. 8.2). National Eel Management Plans generally define their ‘eel river basins’ as including coastal waters, but for most reported information (catches, stock indicators), it is unclear whether or not all coastal waters have been covered. For the purpose of this advice, all coastal eel catches are considered – seaward of estuaries and lagoons (transitional waters).

Life stages

Glass eels, recruiting from the ocean towards the continent, are exploited in estuaries and rivers, but not in coastal waters. Silver eels, returning to the ocean after 5–25 years to spawn, are fished in inland waters (lower rivers) across the distribution area, and in coastal waters, especially near the exit of the Baltic Sea. The growing stage in-between, the yellow eels, are exploited in coastal and inland waters. For the purpose of this advice, all data on yellow and silver eel catches in coastal waters were considered, even though in most areas (especially in the Baltic Sea, where most coastal catches are made) silver eels dominate the catch. Glass eel catches (in estuaries) were considered only in regard to Question 7.

Elaboration on the advice

Question 1: *ICES is requested to assess whether the 50% reduction either in catches or in effort compared to the 2004-06 average prescribed in the Eel Regulation is sufficient to achieve the objectives of the 2013 CFP.*

ICES response

The EC Eel Regulation (EC, 2007) prescribes that there should be a 50% reduction in catches or in effort compared to the 2004–2006 average. The reduction in catches has been attained for some countries, but information from many other countries (including non-EU countries) is not available. Many Eel Management Plans (EMPs), as reported in 2015, were not yet achieving the EC Eel Regulation biomass targets and exploitation in marine areas is only part of the overall anthropogenic impact.

According to the request ICES received from the EU Commission, the main objective of the 2013 CFP is to ensure the sustainable exploitation of marine biological resources, including diadromous species during the marine part of their lifecycle. For analytical stocks this means achieving F_{MSY} by 2020 at the latest; for data-limited stocks the precautionary approach should be followed.

ICES advice on the status of the European eel stock is based on an evaluation of the trend in eel recruitment, as this is the most reliable series available (ICES, 2016a). As management plans/strategies for European eel do not cover the whole stock, ICES considers the European eel to be a data-limited stock; ICES advice is therefore based on ICES precautionary approach.

The ICES precautionary approach advice for the stock does not provide quantitative catch advice for European eel. As such, it is difficult to assess reductions in fishing catch or effort of European eel in the marine environment which would correspond to a sustainable exploitation. ICES has previously advised that “*all anthropogenic impacts (e.g. recreational and commercial fishing on all stages, hydropower, pumping stations, and pollution) decreasing production and escapement of silver eels should be reduced to – or kept as close to – zero as possible*” (ICES, 2016a).

Question 2: ICES is also requested to assess the current biomass of escapees by main maritime area (if possible by sea basin, i.e. EU sea basins that have eels: Baltic, North Sea, Atlantic, Mediterranean), more specifically from the boundaries of the EMU to marine waters, in absolute terms and in terms relative to the hypothetical escapement under no human influence.

ICES response

Within the context of the EC Eel Regulation, EU Member States reported in 2012 and 2015 on the status of their stocks, including estimates of current actual ($B_{current}$), current potential (B_{best}), and pristine biomass of spawner escapement (B_0) for their management units (ICES, 2016b). Given that such reports are unavailable for non-EU countries and that a considerable number of the EU Member States have not reported (or only incompletely), this information provides no reliable basis to derive stock-wide (or region-specific) estimates of the current biomass of escapees by main maritime area or sea basin. For the reporting Eel Management Units, escapement biomass (Figure 1) ranged from 0% to 140% (140% in heavily restocked areas) of the reported pristine biomass estimates, averaging 25%.

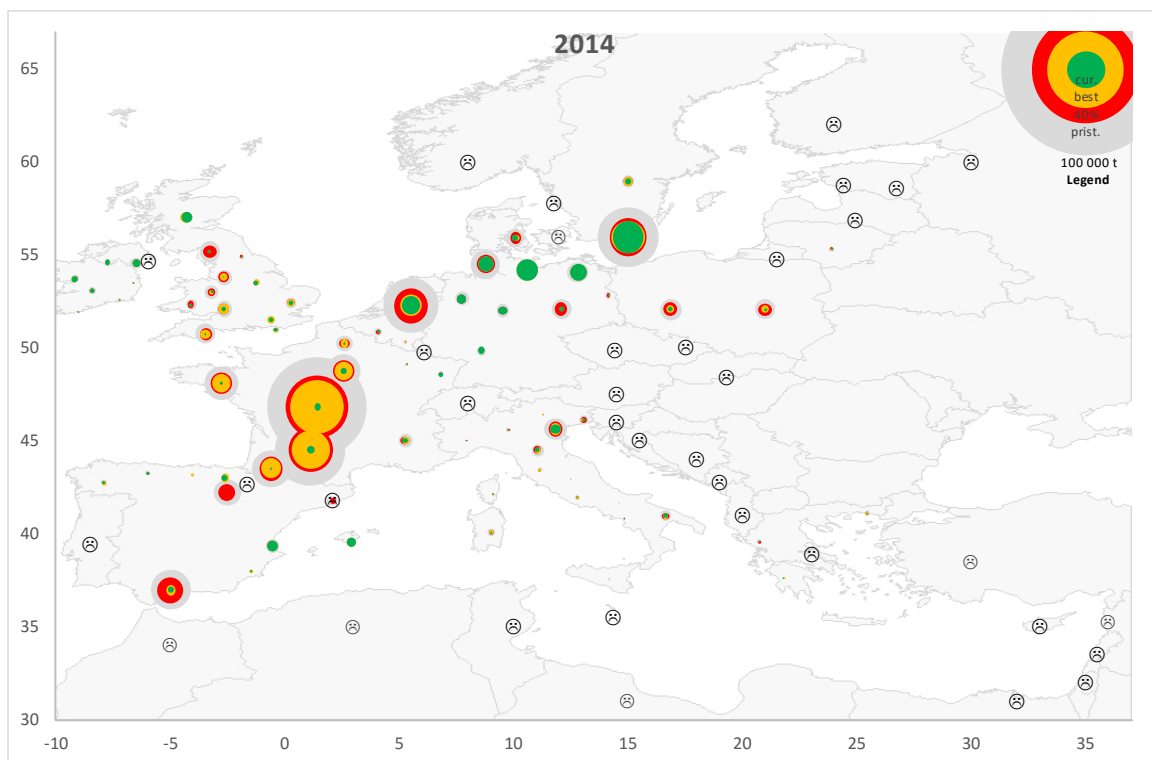


Figure 1 Reported stock biomass indicators for 2014 (reported in 2015), plotted on the location of the Eel Management Units they refer to, or on the countries for non-EU countries. For each area/country, estimates of the current escapement ($B_{current}$), the current potential escapement (B_{best}), the limit set by the EC Eel Regulation (40% of B_0), and the pristine escapement (B_0) are shown. For non-reporting EMUs/countries, a ⊕ of arbitrary size is plotted. Note: non-EU countries were not obliged to report data according to the EC Eel Regulation. (After ICES, 2016b.)

In some cases the national data reported in response to the Commission request (February 2017) only covered the marine areas outside EMPs, but in most cases areas within the EMPs were also included with no differentiation between the two areas (see “Areas covered” in the “Basis for the advice” section). In addition, many countries (both EU Member States and others) did not report data. As the workshop was unable to sort out all these potential data mismatches, it was not possible to report the “current biomass of escapees by main maritime area ... from the boundaries of the EMU to marine waters.” In the remainder of this advice, all marine catches are considered.

Question 3: *ICES is requested to assess the extent to which catches of silver eel in marine waters reduce the spawning potential in a manner jeopardising the recovery of the stock.*

ICES response

Four countries (Sweden, Germany, Denmark, and France) dominate marine catches, representing 98% (data request) or 91% (Fides) of the reported total marine catch. For each of these four countries, the marine areas are included in their EMPs, and both data sources do include all their catches in marine waters.

The total catch in marine areas in 2014 is estimated at 580 t (from the February 2017 data request) or 782 t (from Fides), of which at least 573 t or 709 t, respectively, are from areas under an EMP.

Although scientific knowledge is not sufficient to quantify the extent to which marine fisheries for eel jeopardize the recovery of the stock, ICES considers that the marine fishery has an impact on the stock, reducing the chance of stock recovery.

Question 4: *ICES is requested to assess the impact and effectiveness of the following measures against the objective to increase the glass and yellow eel recruitment (as in consider the potential impact on the SSB of eel) by 2020, provided that these measures remain in place until then:*

- a) *Reducing all eel fisheries to 50% of the 2004-06 average in the Union waters seaward from the baselines ('baselines' here refer to the delimitation of Eel management plans – "seaward of the boundary of Eel Management plans" – article 8 par. 2 of the Eel regulation) as prescribed in the Eel regulation;*
- b) *Reducing all eel fisheries to 25% of the 2004-06 average in the Union waters seaward from the baselines;*
- c) *Reducing all eel fisheries to 0% of the 2004-06 average in the Union waters seaward from the baselines.*

ICES response

In the absence of a quantified stock-to-recruit relationship for European eel, it is not possible to estimate the effect of marine-caught eels on subsequent recruitment. Although reduction in marine catches is expected to have a positive impact on the potential spawning stock in the long term, none of the options suggested above would be sufficient to achieve the 40% escapement biomass target of the EC Eel Regulation for any sea basin by 2020. As the generation time for eel is greater than three years, this circumstance will not change materially by 2020.

Question 5: *ICES is requested to further comment on the modalities of the application of the above measures in order to reach the highest effectiveness, e.g. the stages of eels to be subject to the measures mentioned above, the duration of the measures, the seasonal aspect, the geographical area, the gears, the urgency of the need to take the measures etc., taking into account the resulting application of the landing obligation.*

ICES response

Fisheries take place over the whole geographic range, and most often occur as scattered small-scale rural enterprises (Dekker, 2004). Various types of gear are used in commercial and recreational fisheries. Though these fisheries are typically seasonal, the timing of fishing seasons depends on the availability of the target life stage which varies geographically.

Given the diversity of fishing methods used, ICES advises there is no one-size-fits-all approach to designing effective fishery management measures. Management actions in addition to those currently in place, such as seasonal and spatial fishery closures and/or other appropriate technical measures to reduce catches of eels, would help shift mortality levels towards the direction of sustainability. Management measures for silver eels are more likely to have the most immediate effect on the potential spawning stock.

If a TAC were to be set for eel, the landing obligation would apply to catches of eel in any fishery catching eel unless a derogation from the landing obligation is given. There is little information on the level of eel bycatch in other fisheries, but expert knowledge suggests that bycatch, though probably widespread, is in small quantities. Eels are considered to be a resilient fish species; however, a study of eel caught in recreational fisheries by deeply swallowed hooks showed mortality

levels in the range of 27% to 50% (Weltersbach *et al.*, 2016). No specific post-release survival studies of eel from commercial gear have been conducted; however, tagging experiments that used gear other than hooks have not indicated high post-release mortality.

Question 6: ICES is also requested to provide comments on other equally effective measures that could be used as alternatives to achieve respective reductions of fisheries in marine waters as in point 4.

ICES response

Given that fishing is expected to be the dominant anthropogenic impact on the eel stock in marine waters, no other management measures for human activities other than fisheries in the marine environment can be identified. In general, the anthropogenic impact in brackish and freshwater environments is considered to be larger than that in the marine environment.

Question 7: ICES is requested to comment on the impact of glass eel fisheries on recruitment and subsequent adult stock biomass.

ICES response

The glass eel catch for 2016 was estimated by WGEEL to be 59.3 tonnes (ICES, 2016c: Table 2.9).

As the relationship between glass eel abundance and subsequent recruitment and spawning biomass is unknown, the best measure that can be derived of the impact of glass eel fisheries at the international (sea basin) scale is an estimate of the amount of silver eel that might have resulted from the glass eel taken in the fishery, taking into account gains in growth and losses from natural mortality. This measure is in fact the basis of some national eel stock assessments. Tentative calculations indicate a potential silver eel production in the order of a few thousand tonnes, which may be significant for spawning biomass, but these estimates are highly uncertain. This estimate does not account for the existing human-induced mortalities such as yellow and silver eel fisheries, turbines and pumps, etc. It is the lifetime mortality that is of ultimate importance, and this needs to be addressed at the EMU level.

Sources and references

- Dekker, W. 2004. Slipping through our hands; population dynamics of the European eel. Faculteit der Natuurwetenschappen. 186 pp.
- EC (European Council). 2007. Council Regulation (EC) No. 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel. Official Journal of the European Union, L248/17: 1–7.
- ICES. 2016a. European eel (*Anguilla anguilla*) throughout its natural range. In Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 9, Section 9.3.8.
- ICES. 2016b. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eel (WGEEL), 24 November–2 December 2015, Antalya, Turkey. ICES CM 2015/ACOM:18. 130 pp.
- ICES. 2016c. Report of the Working Group on Eels (WGEEL), 15–22 September 2016, Cordoba, Spain. ICES CM 2016/ACOM:19. 107 pp.
- ICES. 2017. Report of the Workshop on Fisheries-related Anthropogenic Impacts on Silver Eels (WKMAREEL), 20 March–18 April 2017, by correspondence. ICES CM 2017/ACOM:46. 30 pp.
- Weltersbach, M. S., Ferter, K., Sembraus, F., and Strehlow, H. V. 2016. Hook shedding and post-release fate of deep-hooked European eel. *Biological Conservation*, 199: 16–24.