SEG vision on making profit from eel

Sustainable *Eel* Group

"The European eel is nearly extinct, and all fisheries must therefore be stopped immediately" – this is an argument we frequently encounter in press and politics. Earlier, we discussed the lack of realism of that 'extinct' – now, we present our vision on the fisheries. Remarkably, this analysis will bring us to the conclusion, that this discussion should better not be held: it distracts attention from the more important factors in eel protection policies (governance, non-fishing impacts). This text thus constitutes a self-negating ring-composition, in which we spell out our argumentation.

Context and core

Over the course of the 20th century, the stock of the European eel (*Anguilla anguilla* L.) has become severely depleted, and policies have been adopted to protect and recover the stock. Those policies address the impacts of the directed fisheries and the impacts of the many other, indirect human influences on the eel. The aim of the Sustainable Eel Group (SEG) is to accelerate those policies through adequate protection and sustainable management, ultimately leading to a recovery of the stock. How then does SEG look upon the ongoing exploitation of the eel, and how do we relate to the commercial fishing sector ourselves? How do we look upon recent calls to close all fisheries across Europe? Rather than fiercely plunging in into those discussions, we prefer to present our comprehensive vision on the subject here, and carefully take position now. Spelling out our lines of thought, this is likely to become a lengthy text in itself – better make our arguments explicit in a coherent text, as food for thought, and for later reference.

This paper is aimed at knowledgeable readers, involved in ongoing political discussions around the eel. For less-informed readers, a short Annex - presenting backgrounds and insights on the Eel Problem - is available at the very end of this paper.

Societal basis, the fundamental aims, our principles

The development of a protection policy for the eel has been a complex and slow process. Long before 1970, voices already arose pointing at diminishing catches and a growing need to protect. Though the earliest of those voices were already heard in the late-1800s, it lasted until 2007 before an international framework was adopted (the EU Eel Regulation, and the CITES listing), which in turn triggered the development of national protection and

management plans. This long delay was primarily due to the initially narrow view on the eel as a fisheries-only problem and the misguided intention to apply well-tried marine methodology in inland waters. The Eel Problem, however, fundamentally deviates from that because of the relevance of both fishing and non-fishing impacts, the extremely fragmented occurrence of the eel and its fisheries, and the lack of a central authority. Hence, discussing the commercial fisheries only – as we do here, ourselves too – runs the risk to return to the inadequate fisheries-only approach, as before. As SEG, we consider it essential to aim for a comprehensive and holistic approach, in an integrated setting, considering fishing and non-fishing impacts alike, even in this discussion of our position towards the commercial fisheries. When the need to protect the eel became clear (end of 1990s), the EU Commission considered the Common Fisheries Policy CFP, the Water Framework Directive WFD, the Flora and Fauna Directive (Natura 2000) and other policies for their adequacy to handle the complex Eel Problem. Although all these policies had some relevance, none could cover the multi-facetted eel-problem as a whole – and hence, a new Eel Regulation was designed, directly linked to the EU Treaty of Rome (1957). That is: the Eel Regulation established an overarching framework, integrating the contributions from each of those other policies. To this end, the Eel Regulation sets a clear target (to quickly reduce mortality to a level that enables the stock to recover, ultimately to 40% of the notional pristine level), assigns a well-specified task to Member States (to develop national protection plans, to achieve this mortality reduction), and creates a post-evaluation process (tri-annual evaluations). Unfortunately, the Eel Regulation failed to set a timetable for implementation of this all, and SEG thus campaigns for achieving the required mortality reduction (minimal 40% survival) in all Member States by 2030 at the latest (#EelDeal2030). And the Eel Regulation fails to use the tri-annual evaluations for feedback, as a learning occasion (despite noting shortcomings, nothing changes) - SEG considers that a dedicated Advisory Commission for Eel is needed, to make up for that. But otherwise, the Eel Regulation functions quite well, as also acknowledged by the EU-Commission and the EU-Parliament.

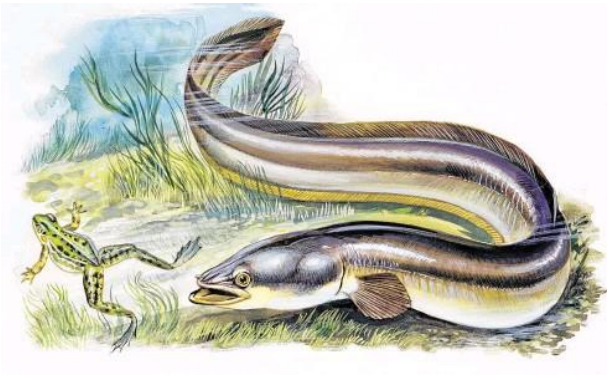
The Eel Regulation, the Common Fisheries Policy, the Water Framework Directive, the Flora and Fauna Directive, the Birds Directive, the Green Energy Policy – the Eel Problem is and remains complex. Rather than getting lost in all details for each of these policies, SEG prefers here to highlight a higher level of Good Governance, that is also behind each of those policies. We therefore focus in particular on the Brundtland-concept of *sustainable development*[1] and

[1] *Our Common Future*, aka the Brundtland Report, World Commission on Environment and Development of the United Nations, 1987, defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

its relation to the *three pillars of sustainability*: Society, Environment and Economy[2] (commonly known as: People, Planet and Profit/Prosperity). We will use these as the basis for our current discussion on making sustainable profit from the eel: let's discuss each of these three pillars in turn.

Planet - the need for urgent protection of the stock

The eel stock is at a historical minimum, and needs urgent protection; the current fisheries are not sustainable. After at least seventy-five years of decline in abundance and diminishing yield, it is absolutely clear that continuation of the current situation will lead to the economic extinction of the fisheries, and ultimately might lead to the demise of the species. It is for that reason that the EU-Commission in 1998 turned towards ICES for advice. Subsequently, ICES 2002 advised to develop an international recovery plan, aiming at a rapid reduction in human impacts, causing a recovery to ultimately 30-50% of the notional pristine stock. This advice has subsequently been implemented in the EU Eel Regulation (aiming at an ultimate recovery to 40% of the notional pristine stock). The Eel Regulation formulates its objectives as "the protection and sustainable use of the stock of European eel"; the aim to recover the stock is mentioned in the title of the Regulation. It is in this context that SEG was established in 2010, with an aim to accelerate the recovery of the eel stock, and to contribute to the implementation of the Eel Regulation.



The development of the Eel Regulation has taken a long time (1998-2007), but once adopted, it has stimulated a rapid development: within few years, national Eel Management Plans were compiled, protective measures developed and implemented all over Europe, and monitoring and assessment set up. In later years, progress slowed down and as of today, the stock still remains insufficiently protected in most Member States – and recovery is not there yet. Consequently, it should not surprise us that the stock has plateaued at the current, low level: the necessary conditions for the recovery have not been fulfilled. SEG considers this unacceptable, and urges all parties involved to achieve the agreed targets as soon as possible: to reduce human impacts to a level that will enable the intended recovery (i.e. 40% survival). SEG campaigns for a deadline for this in 2030 the latest (#EelDeal2030).

Given the current situation of insufficient protection, is there still any space for commercial exploitation of the eel? Despite the adoption of the EU policy for the protection of the eel in

[2] The concept of the three pillars of sustainability was developed gradually over a number of years, amongst a number of authors. It is widely known as *PPP*, for People, Planet, Profit/Prosperity.

2007 and the development of national Eel Management Plans, a further major reduction in human impacts is still needed in most countries – the national Eel Management Plans have insufficiently been implemented. But it is also clear that further reductions in fisheries alone – as effectively done in the past two decades – cannot reduce the human impacts enough (because of the non-fishing impacts), and thus will still not lead to a recovery of the stock. The "space for commercial exploitation" cannot be considered without considering the non-fishing impacts too.

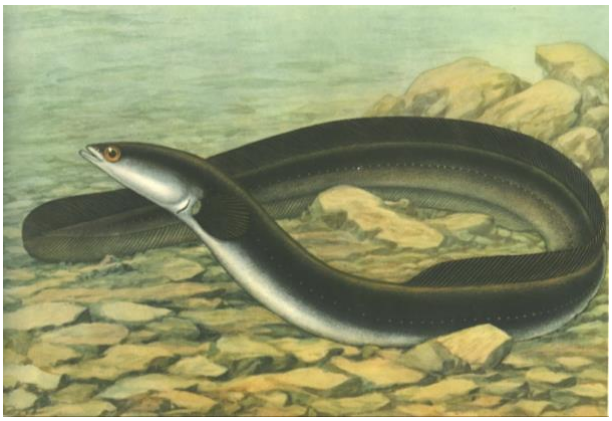
SEG considers that the eel fishery can become sustainable, if and only if the non-fishing impacts are addressed and reduced as agreed in the Eel Regulation too. Without that, the fishery will remain unsustainable, no matter what the fishers do – even closing all fisheries will not lead to the recovery of the stock. Hence, it is not the status of the stock as such that questions the fisheries, but the lack of response and the lack of responsibility in the non-fishing impacts. While there is an urgent need to improve the implementation of the national Eel Management Plans and to bring the protection to the level as defined in the Eel Regulation (i.e. 40% survival), there is a crucial question whether further reductions must be placed on the shoulders of the fishers again, or should now be focused on those other impacts, outside the fishery - we discuss this further under "People", below.

Profit – the responsible use of natural resources, side-effects

The inland fisheries across Europe are small, much smaller than their marine counterparts. Even though eel has a high (yellow and silver eel) to extremely high price (glass eel), the total turn-over in the eel fisheries across the continent is not more than a few hundred million euro – an easily neglected or overlooked contribution to our economy. However, in addition to these fisheries, other human impacts – related to land reclamation, water management, water pollution, hydropower generation, and many more – make a bigger impact on the eel stock, and these impacts are related to considerable economic activities, many orders of magnitude bigger than those created through directed eel fishing. That is: most human impacts on the eel are not targeting the eel directly, but make their profit from other activities - aquatic, or even land-based exploitation - unintentionally having huge side-effects on the eel. This complicates the protection of the eel considerably. It is not just the tiny commercial eel fishing sector we discuss when considering eel protection policies, but the entire human impact on inland waters and all related economic activities. That makes the discussions about eel protection unavoidably complex. Simple fixes (like: reduce fishing by a straightforward

fisheries closure) will not recover the stock, while such a closure would undermine the Good Governance of the Eel Regulation. However, the moral standards of responsible usage of natural resources apply equally well to targeted exploitation by the fisheries, as to unintentional side-impacts from other human activities. Both should actively avoid compromising the ability of future generations to meet their own needs, and thus, both should actively contribute to the protection of the eel.

For the commercial fisheries on eel, SEG has developed the SEG Standard, a "Best Practice Code of Conduct for a Responsible Eel Sector". This code obliges licensed parties to obey the law, to respect and implement the Eel Regulation (and the related national Eel Management Plans), to operate in a transparent way with full traceability of trade, and to fulfil a number of extra conditions defined in the Standard (as fit for the particular type of business). SEG developed this Standard with the aim of giving the scattered and originally unorganized fishers a chance to act responsibly and to prove that to the outer world. The SEG Standard in itself cannot make the fisheries sustainable (and therefore does not intend to do so), since that is out of reach for the fishers (they cannot restrict non-fishing impacts). Instead, creating a sustainable management is the responsibility of the national governments (through their Eel Management Plans, under the Eel Regulation) – but the Standard clearly supports and encourages the governments to do so! The SEG Standard is widely applied in the glass eel fishing sector and the linked aquaculture and trade, but is as yet far less adopted by yellow and silver eel fishers.



SEG considers that all stakeholders, all parties with a commercial interest linked to the eel (be it a direct interest or an unintended side-effect) have the responsibility to contribute to the protection of the stock, have the responsibility to abstain from reasonably avoidable impacts, and to ensure that overall human impacts rapidly come within sustainable limits (the 40% survival). Though the prime responsibility for the overall protection ultimately is with the national government (through their responsibility for the national Eel Management Plans in the context of the Eel Regulation), each and all impacting parties have their subsidiary responsibilities too.

The SEG Standard for Responsible Fisheries facilitates the complex fishing sector to achieve their responsibilities. SEG considers that its Standard can relatively easily be applied to the remaining commercial fishing sector (yellow and silver eel fishing), and SEG therefore urges all non-certified fishers to apply. Stronger than this: as SEG considers that all parties with an impact on the eel stock have a responsibility to contribute to the protection and recovery, we consider that ultimately all fishers should operate responsibly, for which the SEG Standard then can provide the proof.

For the non-fishing impacts, their substantial and widespread impact necessitates a structural approach, by all companies across all countries in the eel distribution area. The current level of involvement of these sectors – probably having the major impact - in eel protection is worryingly low, challenging the effectiveness of the Eel Regulation, and thus threatening the future of the eel. SEG considers that the development of Standards for reducing or compensating non-fishing impacts might accelerate this process, and SEG is willing to contribute with its experiences. With or without a dedicated Standard, however, the parties exerting the non-fishing impacts on the eel currently have a heavy responsibility to reduce their impacts, to ensure the future of the eel species.

People - equity and equality, responsibility and involvement

The third pillar - People - is more complex, and not as simply quantifiable as the two others (Planet and Profit). This pillar discusses the people, the human capital, social equity, fair and beneficial operations, and involvement of relevant stakeholders. For the eel - with widespread fisheries and so many different (types of) non-fishing human impacts - this considers the interactions between humans and eels, and in particular how this affects the relations between human parties amongst them.

Eels are everywhere, and humans interact with them in many ways and wherever they occur. Although eels and humans live in completely different, parallel worlds, we do live physically very close to each other, and that has many practical consequences. For one thing, we humans have taken much of their habitat and restructured their world. The ultimate protective action - full restoration of those habitats - would require that we abandon major coastal settlements and low-lying areas, which is simply not realistic. For another, the remaining habitats for the eel are typically located in the proximity of human populations, making the eel easily accessible for exploitation and poaching. Unavoidably, eels and humans have frequent and close encounters.

When the import/export of eel was banned for the EU as a whole in 2010 (in follow-up of the CITES listing), widespread trafficking emerged soon after. Where legal eel fisheries have been closed in EU Member States, poaching problems soon emerged and exploded. Though later control operations by national and international agencies have reduced these illegal activities considerably, the many close encounters between eels and humans in all scattered habitats – be it during day or night - makes the presence of trafficking and poaching rather inescapable. To some extent, a realistic question therefore is not “a fishery or not?”, but “a legal fishery or an illegal one?” Thus, many public calls to close all fishing are largely symbolic.

SEG argues for and contributes actively to a well-regulated and responsible commercial fishing sector, operating within the constraints of a sustainable, national Eel Management Plan.

SEG considers it essential that the Eel Regulation achieves an equitable, responsible management of the eel, on a sustainable level. Over many decades, the stock has become severely depleted, and recovery will – if only for biological reasons (long generation time) – take many decades more. Anything less than a stakeholder-inclusive and equitable management is prone to fail over this long period: it will trigger initial but insufficient action and then fall back to a gradual fade-out of efforts and motivations. SEG therefore considers that unilateral action (such as addressing the fisheries only) is simply a contra-productive measure for genuine and real protection, not to speak about preferentially closing fisheries aimed to compensate for other, unrestrained impacts (e.g. closing fisheries to enable hydropower generation and water management). The Eel Regulation specifies a maximal total impact (mortality should be reduced to a level that will allow the stock to recover, i.e. 40% survival at minimum), and thus sets an integral task for all 'impacters' collectively (achieve that 40% survival!) It does not specify how that protection task must be shared by the different parties, or which party must make what contribution. The national Eel Management Plans are the place to harmonise those contributions of all parties involved, in a responsible and equitable way, as fits the national circumstances.

The People-pillar comes with yet another dimension: the cultural traditions around the eel, including gastronomy and regional traditions. This ranges from culture-aware commercial exploitation, to fully cultural events for no profit at all, both found all over the continent (many regions claim to have a special relation with the eel). The question arises whether this raises any new issues to the discussions above, or just widens the 'stakeholder-engagement' to some non-commercial categories. SEG considers the People-pillar (and stakeholder-involvement) to be so important for the eel, exactly because it concerns the bonds between eels and humans. For that reason, SEG opposes a cynical profit-only view on eel management, and SEG thus stresses the need for extensive and credible stakeholder-involvement, as complex as it might be due to its wide range, from purely commercial to deeply cultural.

Making profit from eel? Adding up the arguments.

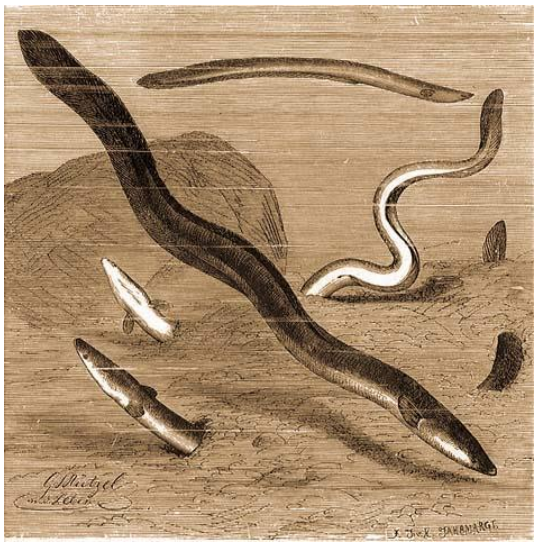
In the paragraphs above, we discussed what we consider the relevant background for the central question: should one make profit from the eel, now that the stock is in dire straits and needs so urgent protection? Is it acceptable to exploit the eel? Is it acceptable to make profit

in inland waters from any other means (water management, reclaimed land, pollution, many more), with a detrimental side-effect on the eel stock? Our arguments above included a mix of principled positions, common approaches and pragmatic limits – but where do we end?

First, it is absolutely clear that the eel needs protection, and the Eel Regulation clearly defines a target for that (a mortality that permits the stock to recover to 40% of its pristine biomass, in the long run). So that is a "Yes, provided that you achieve the 40% survival limit".

Secondly, there is unfortunately an unavoidable lower level to the fisheries: when legal fisheries are closed, illegal fishing (poaching) takes over. SEG considers a legal and controllable fishery absolutely preferable. Better a controlled exploitation than uncontrollable poaching, which boils down to "Yes, to avoid worse". We accept that substantial poaching cannot truly be stopped completely – and we prefer to be realistic.

Thirdly, recovery of the depleted eel stock would be greatly accelerated when all human impacts were rapidly reduced to zero. That requires that all waterworks are broken down, all pollution is stopped, all lost habitats re-submerged, etcetera - but is that realistic? SEG realises that society does not give such unilateral priority to the protection of the eel and its habitat. To what degree the eel protection is prioritised is clearly a matter for broad discussion in society. However, SEG stresses the minimum level for protection (40% survival, ultimately resulting in a stock of 40% of pristine biomass) that needs to be achieved to avoid further depletion and avoid ultimate extinction. SEG considers that to be the absolute limit for any profit made in eel habitats. "Yes, but absolutely only if".



Fourthly, there is a real problem that – in contrast to the decisions in 2007-2010 – it is predominantly the fishery that has been reduced under the Eel Regulation, while an integrated and holistic policy was adopted in which both fisheries and other human impact sectors would take their responsibility. SEG considers this unilateral realisation to be insufficient, unjust and asking for poaching trouble. SEG therefore urges a more balanced and equitable approach: now that fisheries have been reduced, it is time for the non-fishing impacts to make their move. The major reductions in fisheries increase the moral weight on the other impacters to make their contribution to protection and achieve sustainable operations too. As said, SEG considers that the minimal agreed mortality limit (40% survival)

should be reached in all areas/countries, by 2030 the latest - #EelDeal2030. That boils down to a “Yes to fisheries, but there is more to do”.

“Yes, if conditions are met”, “yes, to avoid worse”, “yes, but absolutely only if”, “yes, but there is more to do”. All in all, SEG works hard to transform the commercial fisheries across Europe into a responsible sector, which then can be respected for that. Their impact is a fact of life, that cannot be annihilated (poaching will replace). Refocusing political discussions on the commercial fisheries over and over again (as happened so often in the ongoing polarised debates during the almost two decades after the Eel Regulation was adopted) distracts attention from the non-fishing impacts, making a bigger impact than the fisheries and so far, contributing less to protection. Hence, the question whether there should be a fishery at all feeds a distracting non-discussion on symbolic actions, not a realistic discussion on effective eel protection.

Near is my skirt – the relation between the commercial sector and SEG itself

SEG is financed from voluntary contributions, most of which come from the commercial sector. Certification under the SEG Standard requires that companies are involved in stock protection and make a financial contribution to an Eel Stewardship Fund, which in turn supports SEG. In a way, we thus make “profit” from the eel ourselves. However, we note that anyone involved in eel protection and management does so, directly or indirectly – even the advocates of a complete fishing-stop indirectly thank their income to the existing fishery. And we realise that our funding has not influenced our position: SEG has put adequate protection first, even where that goes beyond commercial interests. However, adequate protection is not the only issue SEG considers, since only a comprehensive and just governance (PPP) makes a chance to last long enough for the eel stock to recover. In our view, the commercial sector is not to be blamed for financing SEG, but is to be credited for their stewardship-role, for their wider-looking contribution to our integrative work to accelerate achieving of sustainable management for the eel.

Uitgeest, 2026-Apr-02, Willem Dekker, scientific advisor of the Sustainable Eel Group SEG. WillemXDekker@me.com

Summarising SEG's vision on making profit from eel

In summary, SEG considers that:

1. The management of the eel across Europe must achieve a sustainable development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987).
2. The discussions on the exploitation of the eel must be considered in a broad context, a holistic approach, including all aspects of People, Planet, Profit/Prosperity (as in the Brundtland-report).
3. Management of the eel stock relates to the Common Fisheries Policy, the Water Framework Directive, the Flora and Fauna Directive, the Birds Directive, the Green Energy Policy, and more – with the Eel Regulation in an overarching position, focused on the net effect of all.
4. The current implementation of the Eel Regulation falls short, as the current protection level does not yet allow the stock to recover - for that recovery, 40% survival is needed, at minimum, as adopted in the Eel Regulation. Hence, SEG considers that a renewed effort must be made to achieve the agreed targets of the Eel Regulation (at least 40% survival in all Eel Management Units) by 2030 the latest (#EelDeal2030).

5. To protect and recover the eel, all stakeholder parties involved in the protection of the eel, including recreational and commercial fisheries, as well as all other human impacts, should contribute to the implementation of the Eel Regulation and the national Eel Management Plans, in line with Brundtland sustainability thinking.
6. Though the prime responsibility for the overall protection ultimately resides with national government (through their responsibility for the national Eel Management Plans in the context of the Eel Regulation), each and all impacting parties have their subsidiary responsibilities too.
7. Since the adoption of the Eel Regulation, most restrictions have been imposed on fisheries – other impacts (water management, hydropower generation, pollution, etcetera) have contributed far less. In the context of equitability, it would be unfair to drive the commercial fisheries – and the livelihoods of those depending on them - further into oblivion without addressing those other impacts first.
8. A responsible and sustainable eel fishery can be accommodated, if and only if the non-fishing impacts are reduced as agreed in the Eel Regulation. It is not the status of the stock as such that now questions the commercial eel fisheries, but the lack of responsibility and lack of problem-ownership by the non-fishing impacts.

9. Only a fair and equitable approach, in which all parties contribute and no single party is burdened fundamentally more than the others, has a chance to last long enough to make the eel recover.
10. The commercial sector has made concerted efforts to prove their responsible behaviour, by adopting the SEG Standard for Responsible Eel Sector. This Standard has been adopted by most glass eel fishers and traders and by the aquaculture and processing sectors, but much less so by yellow/silver eel fishers – it would come to their honour if they did adopt it soon.
11. Development of comparable Standards for non-fishing impacts on the eel would expedite the protection of the eel. SEG is willing to share its expertise from the SEG Standard with the relevant sectors, too.
12. The extensive spatial overlap between humans and eels, in scattered rural areas across the continent, elicits a wide-spread fishery – legally or illegally. SEG prefers a well-regulated fishery over out-of-control poaching.
13. Refocusing political discussions on the commercial fisheries over and over again (as in recent years) distracts attention from the non-fishing human impacts, that make the bigger impact, but so far contributed less to protection.

14. SEG considers that making profit from the eel (either by direct exploitation, or from other means having a negative side-effect on the eel) can be justified, if all parties involved jointly fulfil the obligations of the European protection plan - the Eel Regulation - achieving adequate protection and sustainable exploitation.
15. SEG considers there is an urgent need to address the imbalance between the fisheries and the other human impacts, because protection of the eel now leads to the fishery being victimised for impacts made by others. The eel will not survive that.

Annex: Eel biology, population trends, and protection policies

Some background to the Eel Problem – insiders can safely skip this. We sketch the eel scene.

The stock of the European eel (*Anguilla anguilla* L.) is at a historical minimum, after a slow but very long-lasting decline in abundance over most of the 20th century. Throughout that period, many inland habitats were drained, blocked or polluted, and this severely reduced the eel stock. Local fishers coped with that by means of technical innovation, increasing their effort and catches - but from 1960 onwards, they could not keep pace and fishing yield started sliding down gradually (5% down per year on average from 1965 until current). Then, from 1980 to 2010, recruitment of young eels from the ocean crashed quite rapidly (15% down per year, from 1980 until 2010), most likely due to a fatal depletion of the spawning stock. The eel - the most widespread fish in Europe - has been one of the more abundant species (and still is, in many areas), but its abundance was rapidly fading. If nothing had stopped the declining trends, extinction would have ultimately loomed. In 2007 however, the EU adopted the 'Eel Regulation', a policy setting a framework for protection across Europe, to recover the stock to its historic level of abundance in the long run - since 2011, the recruitment decline has halted (still at a low level, it varies a lot now). It is in this context, that we discuss the position of the commercial fisheries for eel. Is it morally acceptable that anyone makes profit from an endangered species like eel, for which efforts are made to protect and recover the stock?

Fisheries for eel are found throughout the distribution area (almost the whole of Europe and the Mediterranean Sea area), directed at all life stages, and in all habitats where eel occurs (some coastal waters, many lagoons, all inland waters – if and only if still freely accessible from the sea). Although these fisheries have served as a local food source for centuries, their commercial expansion essentially commenced only in the late-19th and early-20th century. Until the mid-20th-century, that expansion has undoubtedly increased their impact on the stock. The decline since has costed most fishers their livelihood, which in turn has reduced their impact considerably. For the glass eel fisheries (exploiting the youngest life stage), however, newly developed in-door aquaculture techniques led to sharply rising prices and increasing efforts - though eventually, the decline in recruitment had its consequences for these fishers too. Given those rising prices for the glass eel (100's € per kg first hand), the legal export to eastern Asia converted into a major industry of trafficking (now illegal), completely beating the remaining legal market, lately.

This brief description of the eel fisheries is complemented with a short discussion of other, non-fishing human impacts on the stock, because these impacts reduce the habitats for the eel, and suppress their abundance tremendously, indirectly affecting the fisheries. These impacts include habitat loss (drainage of wetlands, straightening of rivers, filling in of marshland), migration barriers, pollution, water management works, and many more. Clearly, this relates to very diverse human impacts, with varying geographical patterns and differing temporal trends. In southern countries, rivers are blocked by irrigation dams, while in more

northern countries, rivers are blocked for hydropower generation. In low-lying countries, large water surfaces have been reclaimed by blocking water out; higher up, hydro-dams and irrigation works block water in; and throughout, navigability has been improved by adjusting natural river courses – and all of these hinder the eel migration. All in all, many migration routes of the eel have been blocked, and much habitat area has been lost since the industrialisation began. Estimates of the overall effect of these impacts on the eel are incomplete (most countries ignored these non-fishing impacts in their assessments, because they are so difficult to assess), but the currently-incomplete assessments already estimated the non-fishing impacts almost as high as the impact of all fisheries combined. Clearly, no discussion of eel protection or fisheries can be complete without considering fisheries and non-fisheries alike, in an integral view.

Having briefly discussed the fishing and the non-fishing human impacts on the eel stock in the paragraphs above, there is one aspect that all of them have in common, and that is their geographical distribution. All of these are widespread (continental, ~5000 km), but extremely scattered (local habitats, ~5 km or less). Wherever you go, you will find the eel in a small setting, with only local impacts of small magnitude on a low number of eels – but taking all areas on the continent together, we talk of the widest-spread fish stock in Europe, of thousands of fishers, of incredible economic interests in the non-fishing impacts. Continent-wide, and very local - it is this contrast of scales, that has complicated adequate management of the eel stock for so long. In the Eel Regulation, a system of distributed control is implemented: a jointly agreed objective (protection and recovery) and defined target (a reduction in anthropogenic mortalities to enable recovery to 40% of pristine) are implemented by means of national (or regional) Eel Management Plans – central objectives, local action. This distributed control system addresses widespread objectives, while adjusting local measures to national circumstances – the best of both scales. For the current discussion – on the exploitation and side-impacts of other human actions on the eel – this contrast of scales influences our ability to steer developments in the field in detail, but it does not affect the principles and objectives, nor our moral choices.

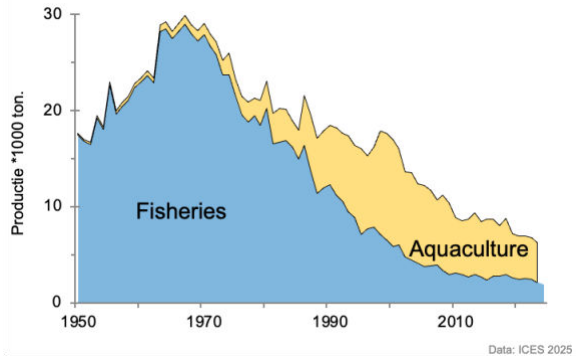


Figure 1 Trend in fishing yield and aquaculture production, over the decades. This graph shows the European totals (reconstructing the non-reporting countries).

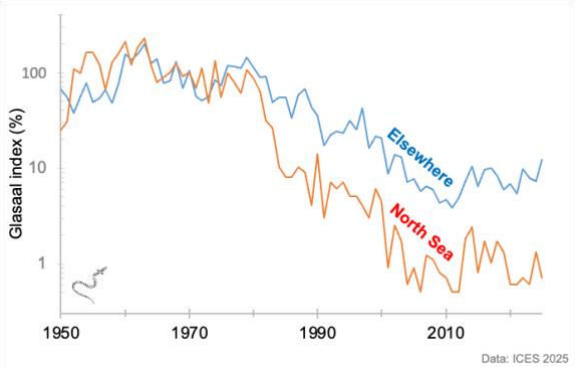


Figure 2 Trends in glass eel recruitment, over the decades. Indices are shown for the North Sea area and Elsewhere separately, though that geographical distinction is questionable. Note that the vertical scale is logarithmic.