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Harms and the Illegal Wildlife Trade: Political Ecology, Green Criminology and the European Eel

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Abstract
This paper integrates political ecology and green criminology to examine the critical endangerment of the European eel. Using a harms-based approach, our research suggests that the identification of organised crime networks as the central perpetrators of illegal wildlife trade (IWT) and of IWT itself as the main threat to eels, neglects a myriad of practices—many of which are related to legal businesses and activities—that significantly contribute to the endangerment of the species. We suggest that, in order to better protect the European eel, we need more holistic conservation measures that go beyond a focus on fisheries and IWT.

Introduction

The European eel is now critically endangered, and its decline is commonly attributed to the illegal wildlife trade (IWT) to meet demand for human consumption. Though IWT is certainly a contributing factor in this decline, a much more complex web of harms must be taken into account. This paper draws on theoretical underpinnings developed by green criminologists who have expanded our understandings of harms, crimes and social justice as related to wildlife (see Brisman 2017; Cao Ngoc and Wyatt 2013; Sollund 2020, 2022; Wyatt 2022a) and by political ecologists concerned with analysing the power dynamics around defining wildlife crime (see Lunstrum, 2015; Duffy 2022; Iordachescu et al, 2023). Building on this body of literature, this paper contributes a complex case study of a slippery species whose conservation has become challenging due to a variety of scientific, social and political factors. By challenging the predominant focus on IWT as the main source of European eel endangerment, we further develop contributions by researchers

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such as Alonso and Van Uhm (2023) in exploring the wide array of anthropogenic threats that contribute to the decline of the species.

In the past decade or so—particularly since the rise in poaching of charismatic species, notably elephants and rhinos, from 2008—high profile debates on species conservation have tended to focus on IWT and the role of organised crime networks, in what has now been redefined as 'wildlife crime' (Nurse and Wyatt 2021; Massé et al 2020: 25; Gore 2017; Elliot 2016). Donors, national governments and international organisations have also begun to elevate wildlife crime to the status of serious or organised crime (Duffy 2022). Defining IWT as a matter of organised crime diverts attention from the wider context and the complexities of the trade. In this sense, strategies that focus exclusively on tackling criminal actors and behaviours leave aside a myriad of harmful practices that, though not criminalised, significantly contribute to the endangerment of wildlife. In contrast, using a green criminological harms approach to species endangerment allows us to place it in the context of a variety of legal and illegal actors and practices (Wyatt et al 2022a, b; von Essen and Allen 2017; Brisman 2017). This approach can inform policies that go beyond tackling IWT as the main driver of declines in the European eel, and instead produce a more effective response addressing a wider range of harms, including those generated by legal activities.

This analysis comes at a crucial time. Actors such as the International Council for the Exploration of the Sea (ICES) (2021) and the European Commission are acknowledging the urgent need to formulate conservation and stock management plans for the European eel that take into account the wide variety of threats to the species. As outlined in a recent EC communication document: 'it is clear that more efforts are needed to implement the Eel Regulation with a greater focus on non-fisheries impacts' (European Commission 2022: no pg.; also see European Parliament, 2023).

We argue that one of the difficulties in tackling European eel endangerment is the fact that most of the threats straddle the line between legality and illegality. This has implications for monitoring, enforcement, and policy effectiveness. In order to study these il/legal threats, we integrate political ecology and green criminology, each of which offers distinct, yet complementary, analytical approaches. First, we set out the ways that political ecology and green criminology can be integrated; second, we describe the research methods for this paper; third we analyse the question of how legality and illegality are intertwined in the European eel trade; finally, we identify four non-fisheries-related harms against European eels that explain their ongoing decline.

Integrating Political Ecology and Green Criminology

Political ecology's concern with the critical (re)evaluation of narratives around IWT inspired this research's aim of examining Europe as source, consumer and trade route of wildlife products (Iordachescu, et al 2023). In analysing the threats faced by the European eel, we contribute to the task of balancing out some of the geopolitics that inform narratives of IWT, which is often presented as an issue for Asia and Africa (Margulies et al. 2019; Iordachescu et al, 2023).

Additionally, we contribute to debates in both political ecology and green criminology that question the adequacy of adopting a strictly legal understanding of harm in the study of wildlife crime. Political ecologists have promoted a critical approach where law-breaking is placed in a wider historical, economic, political and social context (Lunstrum, 2015;

Massé 2019; Dutta, 2020; Marijnen, 2017). This analytical approach seeks to reveal the power dynamics that trigger wildlife crime and shape the narratives constructed around such violations. Following a similarly critical line of analysis, the overwhelming majority of green criminologists anchor their work on the premise that not all harms are against the law and so all forms of human-triggered environmental harm should fall within the remit of green criminology, regardless of their legal status (see Sollund, 2015, 2019, 2022; Sollund and Maher, 2015; Canning and Tombs 2021; White 2013b; White 2013b; Sollund and Brisman 2017). Harm, then, is brought about by actors and practices that abide by the law, by those that violate the law, and those that straddle the line between legality and illegality (see Hall et al. 2016; Siegel et al. 2020; van Uhm 2016; White and Heckenberg 2014; Wyatt, van Uhm, and Nurse 2020).

Sollund (2020) suggests that harms are facilitated by processes of 'Othering' whereby non-human animals are defined as property and as resources for human benefit. In essence, the harms perpetrated in the legal and illegal trade in wildlife are underpinned by speciesism, the idea that non-human animals have less value than humans. Furthermore, 'hierarchical speciesism' (Flynn and Hall, 2017) means that poaching of charismatic animals like elephants and rhinos gains more public, NGO and media attention than less charismatic species,[1] such as European eels (also see Iordachescu et al. 2023).

Green criminologists have used the concept of *green-collar crime* to explore this overlap, highlighting the processes by which legal businesses engage in the harmful and/or illegal practices that facilitate IWT (van Uhm 2016, 2018a; Wolf 2011). Like political ecologists, green criminologists resist clear cut narratives and accounts, and instead highlight the complexity of the players and processes involved in the production of harm to wildlife—A complexity that is often lost in policy debates which focus on transnational organised crime as the key force behind IWT.

In our analysis of the range of harms that are driving the decline in the European eel population, we draw from green criminology and political ecology perspectives, both concerned with examining the complex local and global contexts in which activities that are harmful to wildlife take place; overlooking these dynamics can lead to one-dimensional accounts and, consequently, to strategies that fail to address the root causes of such harms. We therefore present a multi-dimensional analysis that disregards legal and disciplinary boundaries in order to offer politically-relevant insights that can inform more effective strategies to conserve the European eel.

Methodology

This article draws on primary and secondary data. The primary data consist of 22 qualitative, semi-structured interviews conducted online between September 2021 and April 2022.[2] Interviewees included scientists and other academics (7), people involved in catching and trading eels (4), law-enforcement agents at the national and supranational level (7), and government officials (4), covering a wide geographic territory (France, UK, the

[1] Charisma is defined as attractiveness or charm which can generate emotional responses and translate into increased attention and support for their conservation (Iordachescu et al. 2023 and Hutchinson et al. 2021, for further discussion of how charisma intersects with harms).

[2] This research was part of a wider project on the illegal wildlife trade in European species funded by [funder, grant number, redacted].

Netherlands, Spain, Germany, Norway, Belgium and Japan). Participants were chosen because of their knowledge of European eels, and the topics of discussion were allowed to emerge naturally from their expertise. This approach resulted in a rich dataset that went well beyond IWT and revealed a wide variety of concerns related to the scientific, political, social and economic layers that threaten the European eel. Interviewees' identities are anonymised (code names: P1, P2, etc.) in line with the project's ethics approval.

The European Eel: Status and Regulatory Frameworks

Eels are diadromous, catadromous fish—that is, they move between marine and freshwater environments throughout their life-cycle (Bloom and Lovejoy 2014: 2). They spawn in the Sargasso Sea and then travel to freshwater where they feed and mature for up to 20 years until they are ready to return to the sea to breed and die (Memiş, 2020: 189). Due to the complex biology of the species and the exceptional journey they undergo to breed, spawn and die, the details of their lives remain elusive. It was not until 2022 that the first direct evidence of their migration back to the Sargasso Sea was published (see Wright et al, 2022; Verhelst et al, 2022), following innovations in tracking technologies. The European eel saw a sharp decrease in population at the beginning of the 1980s, and its stock has remained dangerously low since the 2000s (ICES 2018: 8); estimates suggest that recruitment of glass eels (the name given to baby eels) stands between 1 and 10% of pre-1980s levels (Dekker 2016: 6; WGEEL 2008: 24). Several factors have been identified as contributors to this sharp decline, but, the most prominent factor, in terms of policy and media coverage, is overexploitation of the species for human consumption.

The practices involved in fishing, transporting and storing European eels for human consumption are not necessarily against the law, and the act of catching and trading glass eels is not invariably forbidden. The difference between legal and illegal catch can depend on, for instance, where the animals were caught. For example, in Andalucía, there is a ban on glass eel fishing; in the UK, in contrast, regulated fishing of glass eels with dip nets is permitted on, amongst others, the River Severn. Similarly, the trading of glass eels can be legal or illegal: buying and selling within the EU is allowed, but moving glass eels outside EU borders is, in principle, prohibited. In all of the cases mentioned, laws and enforcement can be porous; key actors therefore often engage in both legal and illegal activities. As we discuss in more detail in the final section of this paper, the key harms faced by European eels are not exclusively fisheries-related and are often the result of legal activities.

Despite some signs of levelling-off since 2011, the recruitment of glass eels remains 'extremely low' (WGEEL 2020: 19). There have been efforts to curb further declines, most notably two important regulatory developments in 2007: the inclusion of the European eel in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);[3] and the adoption of EU Council Regulation 1100/2007, which

[3] CITES operates through listing species on Appendix I (trade is banned), Appendix II (trade is permitted but strictly regulated and monitored) and Appendix III (species that are protected in at least one range state and that government has requested CITES support). To trade in a CITES-listed species, member states must provide a Non-Detriment Finding (NDF) as evidence that trade will not have a negative effect on species. For more information on CITES NDF see Non-Detriment Findings|CITES (accessed 10.06.22).

set the legal foundation for the implementation of eel management plans (EMPs) for the protection of the species in the EU.[4]

It is difficult to assess what impact these measures have had. The complex biological nature of the European eel, including long life-cycles and hard-to-track trans-Atlantic migrations, poses challenges in terms of tracking individuals and measuring the impact of interventions. Generational change can only be observed every couple of decades, which means that scientists, law-makers, industry and other interested parties cannot rely on robust, longitudinal findings about the state of the species in order to inform management measures and assess their effectiveness (Wright et al, 2022; Alonso and Van Uhm, 2023).

Given these uncertainties, it is important to recognise that some conservation measures may be more informed by political and economic considerations than by careful analysis of the drivers of the species' endangerment or assessment of policy effectiveness. If we are to take stock of the web of threats facing the European eel, we need to take a step back from legal frameworks and portrayals of 'the eel problem' as IWT. Instead, it is important to take a holistic view by using analytical perspectives offered by green criminology and political ecology to understand the social, political and economic practices that threaten the species and the mechanisms that shape conservation strategies.

Who are the Criminals?

As Alonso and Van Uhm (2023) point out in their article about European eel trade, the fact that the lines between legality and illegality are porous means that it is difficult to distinguish legal actors from illegal. These authors explore each of the operational stages of the eel business, from fishing to retail distributors, and highlight the fact that in the eel business legitimate actors often engage in illegal activities (similar dynamics can be observed in the caviar trade, see Van Uhm and Siegel, 2016; Van Uhm 2016: 117–160; Dickinson, 2022). Our research suggests that this particularity of the trade allows for the emergence of racially loaded narratives that cast European participation in the trafficking of European Eel as less criminal than the participation of Asian actors in the trade. As some respondents noted:

> *It is Asian criminals driving the trafficking. (...) There are [European] fishermen willing to sell to illegal exporters, but are they criminals? (...) Partly, but it is not [their intention] to be criminal, they just fish (...) and they don't know that it is going to be illegal (Scientist, P6).*
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> *The moment that official traders give [the eels] to the cartel, this is the point where the illegality starts (...) When I speak about the cartel people, I speak about the Asian cartel people (…). Big [businesses] in Europe (...) are just helpers, supporters, they are middlemen at most (EU official P7).*
>
> *[Supplying the illegal market] would need to be a coordinated [effort]. (...) It has to be serious organised crime (...). From our enforcement efforts, I think we would pick up if there were groups of fishermen [in Europe] who were not supplying the normal trade (Government official, P20).*

[4] The CITES listing of the European eel in appendix II was implemented in the EU by adding the species to Annex B of Council Regulation (EC) No. 338/97, which mirrors the CITES listing system.

On the one hand, the interviewees discussed 'Asian criminals' who are characterised as law-breakers that incite trafficking through their organised crime networks. On the other, they presented European actors who only facilitate—sometimes even oblivious to the fact that they are breaking the law—such trafficking. Some respondents deployed this type of narrative even as they were relaying events that are unequivocally criminal. For example, interviewee P6 mentioned the case of a fisher who was illegally catching eels and, to unload the stock, would land their ship in a prohibited area that was never patrolled:

> *Because [unloading stock in this area] was not allowed, there was no control and he could do it in open daylight. (...) It was done on purpose, (...) but this was not intentionally breaking the law, he was just finding a way to make a living (Scientist, P6).*

These narratives reveal a willingness to recognise the complex interface between legality and illegality in the trade of glass eels, but perhaps just to the extent that such a recognition can attenuate the criminal label that could otherwise be applied to European actors. The ways that interviewees labelled Asian actors, as primarily criminal, stand in contrast to the more nuanced accounts of this business as it unfolds in Europe:

> *You cannot criminalise all of the sector [just] because some of the members are conducting illegal activities and procuring [glass eels] from illegal fishers (Enforcement officer, P15).*

The accounts presented above can be read in light of race-based othering: 'The Chinese' are portrayed as criminals, European actors depicted with more nuance and moral ambiguity. The legality of a person's act did not necessarily lead to the application of the tag 'criminal'; the rationale that determined the ascription of such a label was influenced by race-informed perceptions of 'the other'. These respondents depicted Chinese law-breakers as more unequivocally criminal, while tolerating a higher degree of moral ambiguity when talking about white Europeans who were breaking the law. Narratives about the European eel trade business are not exempt from the anti-Asian racism that often steers debates about wildlife crime (Margulies et al. 2019).

Another aspect that has influenced the way in which European actors' role in the (il) legal trade of eels is perceived, has to do with the connotations that have been traditionally attached to this business. This, often intergenerational, livelihood has been legal for centuries and so there have been no negative connotations associated with it. As phrased by respondent P7 (EU official), 'we have a tradition of eating [glass eels] so people don't see why it is wrong—eating them or selling them'. However, when restrictions came into effect, a practice that has endured for centuries in Europe was suddenly tinged with criminality, prompting an uncomfortable state of cognitive dissonance in some people: 'my grandpa ate glass eels and he is not a criminal', argued P4 (enforcement officer). Everything related to the business now exists in the liminal space between the legal and the illegal, thus the need to clarify that their grandpa *does not* participate in the illegal side of things—a clarification that has become necessary given the mixing of legality and illegality right across the trade, starting with how eels are fished. As described by one interviewee:

> *The glass eel fishery operates at night, in the dark, in very remote places with characters who don't always pay their normal taxes. It is almost set up for a kind of underground trade in eels (Government Official, P13).*

Despite the traditional lack of negative socio-cultural connotations attached to the fishing of glass eels, then, the set-up of this practice easily lends itself to illegality, once again illustrating the tension between the perceived role of European actors in the illegal trade of

glass eels, and their actual participation in it (for wider discussion see Van Uhm, 2016; Van Uhm and Siegel, 2016; and Dickinson, 2022).

Nevertheless, some respondents do recognise that the intricate connection between legal and illegal practices can make some European actors outright illegal traders. As one interviewee suggested 'there is no trader who has never trafficked' (Scientist, P5); another pointed out that, in order to make a profit in the illegal glass eel business, 'companies are more or less obliged to participate in both official [dealings] and smuggling' (Enforcement Officer, P8). Respondent P18 (Enforcement Officer) further commented that the 'big Chinese traders' rely on European businesses to supply them with glass eels, since other means—such as establishing relationships with all the individual fishers, or sending their own personnel to catch eels—would be too conspicuous and very unlikely to succeed. In this sense, the respondent says, 'it is easier for [Chinese traders] to deal with [European] companies that conduct legal and illegal dealings'.

An important point made by several interviewees is that it was not difficult for legal European businesses to begin to engage in illegal dealings, given that the relationships between them and Asian traders were already well established before the ban, and such relationships just continued to exist afterwards. The next section further expands this issue, discussing the transition from what was once a legal business into a significantly restricted sector.

The Criminalisation Process: From Legal to Illegal and in Between

The legal and illegal trades in wildlife are intertwined across global trading routes that link producers and consumers. Van Uhm (2016) provides an important analysis of the complex relationship between what he calls 'the underworld' and 'the upperworld' in the caviar business. He highlights the fact that criminal organisations often do not operate entirely outside the legal world; instead they can operate through legally registered companies which hide and facilitate their illegal businesses (Van Uhm, 2016: 17–160; Van Uhm et al, 2018b; Van Uhm et al, 2021; Van Uhm and Siegel, 2016; Dickinson, 2022). Following a similar line to Van Uhm, our research illustrates how 'the underworld' of criminal organisations is firmly embedded in 'the upperworld'. The CITES listing of European eels and the EU regulation did not put an end to IWT. The fact that a certain level of legal international trade in eels is permitted under CITES, and the fact that there exists legal trade of the species within the EU has prompted the emergence of 'grey markets' in which legal and illegal trades mix. The CITES listing has triggered a complex and porous process of criminalisation: trade in European eel has a new potential for being classified and prosecuted as criminal, while maintaining the possibility of being conducted legally (also see Dickinson, 2022). This has had several implications for the way in which the illegal market is structured, and the law enforcement strategies that can be implemented to curtail it.

As mentioned above, one key aspect that has hindered a smooth transition from a legal market to a highly restricted market is the fact that existing business relationships between Asian and European businesses made it relatively easy to maintain trade flow after the ban, albeit in more 'creative' ways than before. Interviewee P6 illustrates how this process unfolded:

> *At the moment we have a problem because businesses are half legal, half illegal; you never know what is what. What strikes me most is that the legal [export] channels became illegal. They are not new channels, [but old channels that are now controlled]. (Scientist, P6).*

To maintain the international business relations that were in place before the ban, new ways of concealing the (now) illegal trade were implemented. These methods of circumventing and breaking trade regulations fit well with the definition of green collar crime, because the actors and practices straddle legality and illegality (Wolf, 2011; Alonso and Van Uhm, 2023; Iordachescu et al, 2023). For example, interviewee P6 (scientist) comments that methods like transporting eels via commercial flights, and in plastic bags inside suitcases, started as a means of circumventing the new controls. Glass eels are also exported in shipments that are deliberately mislabelled as legally tradable fish species (see Alonso and van Uhm, 2023 for a discussion of other methods of trafficking European eels). The illegal business is so profitable that taking chances with these methods is deemed worthwhile: those involved in the trade expect a certain proportion to be intercepted by customs and law enforcement officials and therefore include 'busted cargo' in their profit calculations (NGO representative, P1; Scientist, P5).

Controlling the illegal trade in glass eels has been so challenging in part because both regulation and enforcement of the law are rendered more complex when some legal trade is permitted (for wider discussion see Gore 2017; Duffy 2022: 29–55; Dickinson, 2022). As noted by one of the interviewees, 'the existence of a legal market makes it very easy to conceal illegal activities within it' (P15, Enforcement Officer). Another interviewee states:

> *You can't have a police officer per fisher. So it is difficult to control. How can we be sure that the legal fishermen are only giving their catch to a legal entity, which will then bring it into the legal market? (...) whatever is legal can turn illegal at any point' (EU Official, P7; also see Enforcement Officer, P11; Enforcement Officer, P12; Government Official P13; Enforcement Officer, P18).*

Other interviewees mentioned that the excuse that there is an internal market for glass eels in the EU is exploited by legal actors who claim to be supplying this market but in reality are not. 'At the moment, in Europe, you basically have this disparity between what is required and what is actually caught' states P2 (scientist), arguing that the reasons for these policy decisions were, of course, a socioeconomic as well as a political issue. As stated by P4 (Enforcement Officer) this is a problem because, 'when there is a legal catch quota, it is nearly impossible to investigate.' Restocking schemes can inadvertently allow more fish to be taken than is required by demand, making them good cover for illegal dealings (P4, Enforcement Officer). Furthermore, the benefits of this practice are heavily contested:

> *One of the major reasons that restocking occurs comes from the EU Eel Regulation, where it is specifically written that if you have a fishery, you have to make 60% of your glass eel catch available for restocking. (...) [But] what does 'make available' mean? Do you have to just put it on the open market and if nobody buys it, then you can do whatever you want with it? (Scientist, P2)*

Defining restocking is not straightforward; it can mean different things to different people. Interviewee P2 (scientist) suggested that restocking takes place when you catch eels in one place and move them to another place, not within the same river. When you move them within the same river past barriers such as weirs and hydropower plants, the respondent says, that is assisted migration, not restocking. Restocking, then, can happen within the same country, but it often happens across countries. For this reason, this practice–which can also be referred to as repopulation–presents itself as a good opportunity to justify the movement of large quantities of eels across the EU, which can easily be used to supply the illegal market. This is a clear example of green collar crime in which actors and practices are a mix of legal and illegal. For example, interviewee P7 (Enforcement Officer),

explained that it is very challenging to monitor what happens with stock that is destined for repopulation because it is difficult to verify how many eels were caught and whether they were actually released in the appropriate destination:

> *Let's say [you claim that you will] release 200 kilos in a big lake in Germany. You can put half in the lake and give the other half to somebody who is waiting in a little car to drive it to the eastern border. (...) [Making sure that things are] being done legally is basically impossible (EU Official, P7).*

Interviewee P4 (Enforcement Officer) illustrated the same issue with another example: it is possible to report the transportation of X kilograms of eel to the Netherlands for restocking and, upon reaching the destination, one can say that half of them died. This can be 'proven' to the authorities by showing them a stack of dead eels in a freezer. This dead stock could have been frozen several years ago but can be used to conceal the fact that half the restocking catch has been diverted to the illegal market.

In addition to the opportunities that restocking presents for trafficking, its efficacy as a conservation measure is uncertain:

> *The impression that I have of restocking (...) is that it has become more of a goal [in itself] instead of a [proper] measure (Scientist, P21).*
> *In the context of it being beneficial to the population as a whole, there's not really that much evidence for [restocking] (Scientist, P2).*

For some fishing communities, there is an argument that eels are abundant, and because glass eel mortality is very high, there is a conservation benefit in capturing as many of them as possible for restocking initiatives. Interviewee P14 (Fisher) expressed discontent with the fact that ICES advocated a total ban: 'they don't want to come out and see what's being done here. We have done a lot of work over the last 15–20 years to get these fish numbers back up [through restocking]' (P14). According to this interviewee, UK Glass Eels have established that 90% of the fish would die if left in the river because they cannot get through human-made barriers (though we have not been able to find a record of this figure in UK Glass Eels documentation). In a similar vein, respondent P19 says:

> *[It would be good for] people to understand that there is a surplus of glass eels in the West Country. I mean, even DEFRA have given us a Non-Detriment Finding.* (Eel Industry, P19)

The lack of clear evidence of restocking as an effective measure could support the view that restocking initiatives may be a means of sustaining eel fisheries as their ability to fish and trade in eels becomes more heavily regulated and curtailed. As expressed by an interviewee, 'there isn't the scientific evidence to suggest that [eels] are increasing stocks [due to restocking], but what it definitely does, is it perpetuates the fishery' (Government Official, P13). The issue of restocking is complex and illustrates the difficulties involved in implementing measures that allow people to straddle the line between legal and illegal practices in the glass eel business.

Another factor hindering the effective enforcement of glass eel trading regulations is the difference between the amount of effort and resources allocated to tackling other illicit trades, like narcotics, compared with illegal wildlife trade. One respondent stated: 'trafficking glass eels is not frowned upon. It is not the same as trafficking drugs. Because [eels] are fish, it isn't so bad' (Enforcement Officer, P4). As reported by interviewee P7 (EU Official), illegal trade in people, drugs and arms is, understandably, taken extremely seriously, and significant resources are dedicated to their detection and prosecution: 'everybody

understands if you send 100 officers on a big cocaine case, but they would never send 100 people on an eel case'. Even within IWT, eels get even less attention, claimed interviewee P2 (Scientist): 'the panda, the tiger, elephants, you know those [animals] get so much money thrown at them' but not the eel. What this means is that combating illegal glass eel trade is not necessarily a priority, and instead the focus remains on charismatic wildlife (Wyatt et al 2022a, b; Flynn and Hall, 2017). Even people and organisations keen to report illegal fishing of eels face barriers to reporting because of a lack of interest or capacity from law enforcement agencies. For example, one interviewee stated:

> *I sent something like 150 different emails to the various regulatory authorities, and they did absolutely nothing. There was trade happening here in 2015, right under their noses—a completely illegal set up. They did nothing about it (Eel Industry, P19).*

The lack of interest in the issue is only exacerbated by the fact that enforcement efforts are uneven across member states. One of the key challenges for CITES implementation is that it relies on enforcement at the national level, and the levels of capacity and commitment vary across member states (Duffy 2016). This variability affects the eel trade. For example, the Nature Protection Service (SEPRONA) of the Guardia Civil in Spain is widely regarded as an enforcement agency that does an excellent job tackling IWT, but this is not the case in other CITES member states. As one interviewee remarked:

> *SEPRONA [is] one of the most advanced (...). They are a dedicated unit and have resources, while others [do not]. (...) The trouble is, if you have no lobby and no will to enforce it, what can you do? (...) For politicians it's not interesting, it's not sexy, it's not cute. It has no importance (EU Official, P7).*

In addition, different agencies can be responsible for enforcement, including customs, police and tax authorities, which means that sometimes they cannot share information with each other or with supranational organisations such as OLAF, EUROPOL and INTERPOL (Wyatt, 2022b; also see EU Official,P7 and Enforcement Officer, P8).

So far we have focused on the harms produced by the mixing of legal and illegal trades in European eels. As noted at the beginning of this article, however, it is imperative to address other actors and practices that pose a serious threat to the species; we will outline some of these in the following section.

Invisible Harms?

Although our research focused on illegal wildlife trade in European eels, it quickly became clear that eels faced a much wider range of threats: our interviewees drew attention to issues such as climate change and habitat loss as key drivers of harm to the species (see also Dekker 2016: 2443; Kettle et al. 2011). The focus on illegal wildlife trade and the framing of it as perpetrated by organised crime networks renders invisible, and diverts attention from, these and other threats to European eels. Moreover, this focus leads to policy responses anchored in crime prevention, policing and enforcement to tackle European eel endangerment, which are not necessarily helpful to address other (mostly legal) drivers of population loss. Taking this into account, we expanded the boundaries of our research to consider harms that are not related to fisheries and which can be produced by individuals, governments and private businesses conducting legal practices.

In examining this wider range of threats, the key issue that surfaces is that eel populations are declining for a range of reasons, and their recovery and conservation relies on addressing the underlying drivers of continuing losses. Some interviewees questioned the role of fisheries in the decrease of European eel population–an issue that has been central to eel management and conservation plans–and were keen to place the spotlight on other threats:

> *For some reason this whole 'critically endangered eel' has become a very emotive thing and it's been politicised. I'm sure people (...) set out with the best intentions (...) and there's no doubt that the eels have declined in numbers, but it's not to do with the fishery. It's all these barriers and the huge amounts of habitat that have been destroyed. (Private Sector, P19)*

Below we set out four key, inter-related harms that need to be tackled in order to conserve the species, and that cannot be addressed if we maintain the focus on illegal wildlife trade as the central problem for eel survival.

First, habitat loss is a major problem for eels. Since they move between the sea and freshwater, wetlands are critical habitats for them; however, the estimated global loss of wetlands since 1900 is 64–71%; wetlands are threatened by land reclamation, resource exploitation, hydrological modifications and pollution (Lefebvre et al. 2019: 547; also see Kingsford et al. 2016: 901). This is exacerbated by climate change, which leads to sea level rises and alteration of rainfall as well as rates of evaporation, which affect wetland water levels (Kingsford et al. 2016: 907).

Second, relatedly, river courses have been changed through human intervention. These include the development of barriers such as dams and weirs, diversion of original water courses, and canalization of rivers (see European Parliament, 2023: 7). Such alterations can produce significant harms for eels, affecting their ability to migrate from the Sargasso Sea to rivers to grow, or to return to the Sargasso Sea for spawning. For example, when rivers are straightened and embanked with dykes this can create a river with a singular depth and limited aquatic vegetation, which results in the loss of nursery habitats for juvenile fish (Verhelst et al. 2021: 400). Indeed, the European Parliament stated in its most recent draft report on plans for recovery of the European eel, that human made barriers constitute a threat to eels (European Parliament, 2023: 8). In interviews when discussing restocking initiatives, the issue of 'escapement' was mentioned regularly (Scientist, P2; Scientist, P21). Escapement refers to the capacity for adult eels to 'escape' the freshwater and return to the sea; if they have been moved across a barrier (such as a weir) in a restocking operation, then they need to be able to get back over it to spawn. For example, one interviewee remarked:

> *Glass eel restocking occurs in systems where they aren't actually able to reach the sea. For instance, upstream hydropower stations (...). Actual issues of migration barriers [are] not tackled properly (Scientist, P21).*

Several interviewees identified declining quality of and pressures on the eel's aquatic habitats. For instance, there is competition for clean water supplies, as one interviewee expressed it:

> *Agriculture, for instance, needs water to put it on the land, and industrial activities as well. Then you also have a lot of pollution because sewage systems are not well connected. So it's very difficult [for politicians] (...) to make it work for everyone and to find the budget to implement it in the short term. Because in the end budgets can be spent*

on different kinds of things and nature and ecology are not always on the top of the [agenda]' (Scientist, P21).

For example, opening tidal slew doors to allow glass eels to pass from the sea into rivers can lead to seawater seeping into rivers. While this is beneficial for eels, it can be detrimental to other fish species and agricultural interests and where rivers are a source of drinking water (Scientist, P21).

Third, pollution is a threat to eel populations, and like hydropower development and draining of wetlands, is often the result of legal activity. One example is contamination by persistent organic pollutants (POPs), which remain in the environment and accumulate through the food chain (Couderc et al 2015: 199). Juveniles, common in rivers, estuaries and coastal lagoons, are relatively stationary and territorial; they feed on sediments and benthic invertebrates which can be contaminated with POPs. Since POPs accumulate in the bodies of eels, they have been identified as one of the reasons for declining eel stocks (Corsi et al. 2005; Dzintars et al. 2016), as this reduces their migration efficiency and their breeding success (Corsi et al. 2005: 247; also see Lorenzo et al. 2019; Couderc et al. 2015).

Fourth, hydropower development, also a legal activity which is often presented as an important source of clean energy to address climate change, can have significant negative effects on biodiversity. Building hydropower facilities, including dams and turbines, constitute barriers for migratory fish (Verhelst et al. 2021: 397), and opening turbines can result in serious harms including injuries and mass fish kills. Fish ladders can be installed to assist migratory fish, such as salmon, to navigate their way around hydropower installations, but these are not suitable for eels. Furthermore, experimenting with turbine design to reduce fish injuries and mortality has so far not been successful (Verhelst et al. 2021: 398). The development of hydropower facilities in rivers that European eels travel through or mature in has therefore had a negative impact on eel populations.

The impact of hydropower on European eels is also not a high policy priority, compared with regulating fishing. The hydropower industry is politically and economically powerful, and is often promoted as part of green energy transitions. One interviewee explained that targeting fishing and eel trading for regulation and management was the easy option compared with tackling the impacts of hydropower, which are arguably much greater:

It's very easy for politicians to say stop fishing, because there are (...) not that many people fishing for eels anymore (...). But, when you ask politicians to stop building hydropower dams, the so-called renewable energy, or to stop big industry and agriculture from polluting rivers, that's a whole different ball game. And then I had the impression that this is just politicians saying 'we'll just go for the easiest solution'. (Scientist, P21)

In highlighting these wider harms, produced by a complex inter-relationship between legal and illegal activity, it is clear that the focus on illegal wildlife trade renders these wider harms much less visible and diverts policy attention towards policing and law enforcement. Tackling the illegal trade in eels is vitally important to their long term survival, but on its own it seems unlikely to prevent continuing declines in eel populations produced by habitat loss, climate change, building of barriers and pollution.

Conclusion

This paper contributes an important case study on the complexities of wildlife endangerment and conservation. To develop our analyses we integrated green criminology and political ecology: political ecology encourages us to pay attention to the socio-political contexts that inform the adoption of certain conservation measures (such as focusing on regulation of fisheries); green criminology makes us acutely aware of the dangers of limiting our focus to the exploration of illegal practices leaving aside harm that have been legally produced. Grounded in these analytical rationales, our approach gives account of the wider context and complexities of the endangerment of the European eel, and how threats to the species emerge at the intersection of legality and illegality, while highlighting the power dynamics that have guided the formulation and implementation of conservation strategies.

Our research suggests that the identification of organised crime networks as the central perpetrators of illegal wildlife trade (IWT) and of IWT itself as the main threat to eels, neglects a myriad of practices—many of which are related to legal businesses and activities—that significantly contribute to the endangerment of the species. The formulation of the 'eel problem' as one that is fuelled mainly by fisheries renders wider non-fisheries-related harms invisible, and it ignores the reality that the ongoing decline in European eels is the result of a complex web of pressures, both legal and illegal. The policy implication of our analysis is that there needs to be a much greater effort to tackle pollution, habitat loss, human-generated changes in water courses and hydropower development to conserve remaining eel populations in Europe. Such a shift in our thinking about the 'eel problem' is timely, as the European Parliament (2023), the European Commission (2022) and ICES (2021) have recently acknowledged the need to develop management plans for European eels which take account of these wider threats.

This paper thus contributes to the reframing of European eel endangerment and conservation that has been gaining traction in the past couple of years (European Parliament 2023; European Commission 2022; Alonso and van Uhm, 2023). Our research has rendered a complex picture of harms and threats which will hopefully inform policies and strategies to tackle species endangerment in ways that go beyond the common narratives about organised crime and illegal wildlife trade.

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