

Impact case study (REF3)

Institution: University of Stirling		
Unit of Assessment: 6. Agriculture, Food and Veterinary Sciences		
Title of case study: Changing EU Fisheries Policy to benefit the environmental and economic sustainability of prawn fisheries		
Period when the underpinning research was undertaken: 2015 to 2018		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Amaya Albalat Bruce McAdam	Senior Lecturer Lecturer	2013 – Present 2012 – Oct 2020
Period when the claimed impact occurred: January 2019 – December 2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact		
<p>Research led by the University of Stirling showed that a high proportion (>50%) of discarded prawns that were required to be landed under the 2014 reformed EU Common Fisheries Policy (CFP) can survive if returned at sea. This research led to the following impacts:</p> <p>Impact 1: Our research provided key evidence that led the European Commission to grant a ‘high survivability exemption’ within the EU CFP implementing regulations.</p> <p>Impact 2: The exemption has benefited the viability and avoided additional costs for fishers, estimated at around GBP3,200,000 over the claimed period (Jan 2019-Dec 2020).</p> <p>Impact 3: The exemption also avoided law enforcement and security practices that would have been needed if landing discarded prawns was implemented.</p> <p>Impact 4: The environmental and future sustainability of the prawn fishing industry has benefited from the more than 105,000,000 prawns per annum that are now returned to Northern European fishing grounds, reducing increased overall mortality in a key commercially exploited stock.</p>		
2. Underpinning research		
<p>In 2014, the EU Common Fisheries Policy (CFP) introduced a discard ban, which enforces the landing of all caught, commercially regulated species. Landed ‘discards’, which previously were disposed of at sea, are mainly composed of small and unmarketable animals. Under this latest CFP, undersized landed discards cannot be sold directly for human consumption but nevertheless need to be landed by law. While such a policy encourages selectivity, the landing of discards with high survivability is contra-productive from a conservation perspective, and would be an economic and practical burden to the fishery that would have to deal with the storage and disposal of these animals and for regulators as new law enforcement mechanisms would be required.</p> <p>Within this context, research led by the University of Stirling investigated the survival of discarded prawns (<i>Nephrops norvegicus</i>) from commercial trawling vessels operating in the North Sea (ICES Area 4) and the West of Scotland (ICES Sub-area 6a), key grounds where most of the UK quota is allocated (note that the UK prawn fishery accounts for more than 50% of total EU landings). In 2015, a number of trials led by Stirling in collaboration with Scottish Association for Marine Science (SAMS) were conducted in the West of Scotland using a commercial trawl-vessel that was supplying to the live market (<i>Research funded project ‘Post-catch survivability of discarded undersized Norway lobsters (Nephrops norvegicus): Towards a regional and ecosystems-based approach’</i>). The physiological condition and initial behavioural responses of discarded prawns from this vessel were used to estimate survival after 48 hours. Results from this study showed that although short-term survival was high (around 90%), survival was negatively affected by a number of factors such as the level of physical damage and the animal’s post-catch physiological condition which was more compromised in the summer season (R1-R2). If such factors were taken</p>		

into consideration a conservative estimate for discard survival was around 63-88%. This Stirling research demonstrated that the initial survival estimates for trawl-caught *Nephrops* used by the CFP (25%) were too low and highlighted the need for more accurate estimates of survival. Furthermore, the *Working Group on Methods for Estimating Discard Survival* (WGMEDS) from the International Council for the Exploration of the Seas (ICES), which provides impartial advice to governments, recommended that discarded animals should be monitored for a longer time period and that trials should take place using vessels that are representative of the wider fleet, which targets high-volume catches.

Further research at Stirling estimated survival of discarded prawns in the wider fleet in West coast and North Sea grounds (*Research funded project 'Post-catch survivability of discarded Norway lobsters (Nephrops norvegicus): Further investigations within the large-scale fleet operation'*). Survival estimates of over 3,000 discarded *Nephrops* were obtained using the captive observation method with monitoring periods of up to 13 days. Data from the wider fleet was obtained in collaboration with the Scottish Fisheries Federation observer's programme. The research established that survival of discarded prawns was consistently above 50% (**R3-R4**). Furthermore, observations using a remotely operated underwater vehicle (ROV) indicated that discarded undamaged prawns were capable of exploring their immediate surroundings within 10-15 min of being discarded and would be able to find shelter if released in suitable grounds (**R3**).



Fig. 1. (A) Catch in the hopper, (B) recovery tanks used for the monitoring of survival and (C) still picture taken from the behavioural observations performed using an ROV (Forum Subsea Technologies, UK) showing a typical *Nephrops* ground and *Nephrops* that have just been returned at sea.

3. References to the research

University of Stirling authors in **bold text**.

R1. Albalat A, McAdam B, Fox C. 2015. Post-catch survivability of discarded under-sized Norway lobsters (*Nephrops norvegicus*): Towards a regional and ecosystems-based approach. <https://fiscot.org/wp-content/uploads/2019/06/fis007.pdf>

Funding: A study funded by Fisheries Innovation Scotland (FIS) and supported by The European Maritime and Fisheries Fund and The Scottish Government (Funding GBP74,956; PI Albalat). This report was anonymously peer reviewed by a review panel appointed by Fisheries Innovation Scotland.

R2. Albalat A, Collard A, McAdam B, Coates CJ, Fox C. 2016. Physiological condition, short-term survival and predator avoidance of discarded Norway lobsters (*Nephrops norvegicus*). Journal of Shellfish Research 35, 4: 1053-1065. DOI: [10.2983/035.035.0428](https://doi.org/10.2983/035.035.0428)

R3. Fox CJ, Albalat A. 2018. Post-catch survivability of discarded Norway lobsters (*Nephrops norvegicus*): Further investigations within the large-scale fleet operation. <https://fiscot.org/wp-content/uploads/2019/06/fis015-revised.pdf>.

Funding: A study funded by Fisheries Innovation Scotland (FIS) and supported by The European Maritime and Fisheries Fund and The Scottish Government (Funding GBP217,714; PI Albalat). This report was anonymously peer reviewed by a review panel appointed by Fisheries Innovation Scotland.

R4. Fox C, Albalat A, Valentinsson D, Nilsson H, Armstrong F, Randall P, Catchpole T. 2020. Survival rates for *Nephrops norvegicus* discarded from Northern European trawl fisheries. ICES Journal of Marine Science fsaa037. DOI: [10.1093/icesjms/fsaa037](https://doi.org/10.1093/icesjms/fsaa037).

4. Details of the impact

Impact 1: Informing EU Policy makers on implementation of fisheries legislation

The reformed CFP allows Member States to elaborate joint recommendations for regional management measures that are specific to their fisheries (Article 18). Joint recommendations can be submitted to the European Commission for policy adoption via delegated acts. Marine Scotland used our report (**R3**) as the evidence base to demonstrate to the European Commission that the current discard ban negatively affected the *Nephrops* fishery. The report contains all the survival trials performed in both West Scotland and North Sea and showed that more than 50% of the discarded animals survive according to current practices in these fleets. As quoted by Paul McCarthy, Policy officer, Discard Team at Marine Scotland:

'we are going to use your report as [the] evidence base to argue for a high survival exemption for Nephrops caught in trawls in both the North Sea and North Western waters.' (**S1**)

Therefore, data presented in **R3** was directly used by the North Sea (**S2**) and North Western Waters (**S3**) Regional Groups, from which the UK take most of the quota, to argue for an exemption in their Joint Recommendations that were sent to the EU Commission.

Before Joint Recommendations from all regional groups are assessed by the EU Commission, reports and associated evidence, including **R3**, were evaluated by the Scientific and Technical and Economic Committee for Fisheries (STECF) (**S4**), which highlighted:

'the supporting scientific information [R3] is of good scientific quality and is based on state of the art methods (as recommended by ICES WKMEDS). Furthermore, the approach chosen to try to validate how representative the captive survival estimates were of the wider fleets is commendable.' (**S4**)

Following the independent assessment by STECF, the European Commission approved and published in October 2018 delegated regulations specifying details of the implementation of the landing obligation in the North Sea (**S5**) and in North-Western waters (**S6**) for the period 2019-2020, which included a **discards exemption based on high-survival for Nephrops** underpinned by **R3**. The link to our research (**R3**) informing the European Commission decision is here acknowledged by Marine Scotland:

'without this data Marine Scotland would have been unable to demonstrate to the Regional Groups, EU Commission and the Scientific, Technical and Economic Committee for Fisheries (STECF) that returning the smaller Nephrops as per the derogation did not affect the mortality and the 'de minimis' exemptions that were in place at the time were no longer needed to enable fishers to continue activity and remain viable.' Policy officer, Marine Scotland (**S7**)

The impacts of research projects **R1** and **R3** were independently evaluated by researchers from Anderson Solutions Consulting and O'Herlihy & Co, who were commissioned by the projects' funding body Fisheries Innovation Scotland (FIS). Results from this evaluation (**S8**) concluded that:

'this research had moved out of the research phase and had been followed by action by government.' (FIS07, **R1** and FIS015, **R3**) (**S8**)

Marine Scotland provided feedback to FIS regarding the impact that the FIS-commissioned research had:

'The research from FIS was a key component of the case that Marine Scotland put forward to argue for a High Survival exemption for Nephrops caught in trawls with a mesh size greater than 80mm in both the North Sea and North Western Waters. The FIS research formed the evidence base on which we were able to show that more than 50% of discarded Nephrops did survive and were capable of contributing to the overall biomass. The complete report from FIS was sent to STECF where it was reviewed. STECF assessed it as methodologically sound and its conclusions were considered convincing. Without the FIS research we would not have been able to secure the Nephrops high survival exemptions.' (S9. Quote given in writing by Paul McCarthy, Policy officer, Marine Scotland to the Executive Director of Fisheries Innovation Scotland, Feb-19)

Impact 2: Ensuring prawn fishing viability and reduction of costs

As acknowledged by Marine Scotland in S7, the change in policy *'enable fishers to continue activity and remain viable'*. The landing of small unmarketable animals had been identified by the industry as an economic burden. According to a study by the Centre of Environment, Fisheries and Aquaculture Science (Cefas) from the UK government it was estimated that the average costs across the industry for disposing discards would be GBP9,900 per fishing vessel per year (Mangi and Catchpole, 2014: doi.org/10.1017/S0376892913000532). Costs could be higher for geographically remote landing ports such as the ones in the west of Scotland. Given that there are 164 *Nephrops* trawlers in the waters where this exemption applies, an estimated saving of GBP1,600,000 across the fleet was achieved in 2019. While it is impossible to accurately estimate savings made in 2020 because of disruption to the activities of the *Nephrops* fleet due to Covid-19, this may have amounted to a further GBP1,600,000. This cost was highlighted as a key concern to the economic viability of the sector. For this reason, initially as the reformed CFP was being implemented, Marine Scotland applied for a *'de minimis'* exemption to the landing of discarded *Nephrops*. That allowed fishers to discard up to a maximum of 6% in 2018. This *'de minimis'* exemption was approved by the European Commission who agreed that increases in catch selectivity were very difficult to achieve in a short-time frame and that there was supporting information on the disproportionate costs of handling the discarded catch (Commission delegated regulation EU 2015/2438).

Impact 3: Law enforcement and security practices do not need to be changed

Prior to the *Nephrops* discard exemption that relied on our evidence, the enforcement of the discard ban would have represented a challenge to both governments and industry. If discarded *Nephrops* were to be landed new enforcement strategies would have had to have been implemented. Evidence of this research leading to **avoidance of negative outcomes** is here acknowledged by a fisherman:

'The derogation has been a keystone in maintaining our ability to continue fishing unhindered. (...)

The project has stopped the realistic possibility of a large financial burden for cameras and disposal of any catch. The mental burden of having to comply with unworkable burdens should not be underestimated.' (S10. Quote from Mr Ian Wightman, Fisherman from the Clyde Fishermen's Association)

And, also by Marine Scotland:

'The granting of this derogation was particularly useful for all those involved. By combining the derogations into one it made things simpler for stakeholders to follow and comply with, reducing the possibility of enforcement action and any confusion as to which derogation was being utilised at the time of inspection. The simplification also benefitted policy colleagues as it made negotiations simpler by referring to one exemption.' (S7. Policy officer, Marine Scotland)

Impact 4: Natural resource-use efficiency

Although the main objective of the 2014 reformed EU CFP is the exploitation of living marine biological resources at levels that contribute to long-term sustainable environmental conditions, landing organisms that show high survivability makes no conservation sense because landing those individuals would increase overall mortality rates. The approved discard ban exemption based on high survival means that >50% of *Nephrops* now being returned at sea are contributing to current stocks **improving their sustainability**. According to our research (R3), on average around 800 *Nephrops* are discarded per trawl. On average, each vessel conducts 4 trawls per day and given the fact that there are around 164 *Nephrops* vessels in the area this exemption applies operating 200 days/year, this translates into around 105,000,000 *Nephrops* being returned at sea every year due to this change in policy. Animals that otherwise would have been landed and killed due the landing obligation policy.

5. Sources to corroborate the impact

- S1.** Correspondence with Mr Paul McCarthy, Policy officer, Marine Scotland.
- S2.** Joint recommendation document of the Scheveningen Group 'Discard Plan for demersal fisheries in the North Sea' where request for survival is based on our research (highlighted in yellow; see annex H from this document regarding the exemption for trawl gears with a cod end larger than 80 mm and within 12 miles of coastlines).
- S3.** Joint recommendation document of the North Western Waters High-level group 'Discard Plan for demersal fisheries in the North Western Waters for 2019' where request for survival is based on our research (highlighted in yellow; see annex II from this document regarding the exemption for trawl gears with a cod end larger than 80 mm and within 12 miles of coastlines).
- S4.** Report of the Scientific, Technical and Economic Committee for Fisheries (STECF)- Evaluation of the landing obligation joint recommendations (STECF-18-06) where our research (R3) is evaluated.
- S5.** Commission delegated regulation (EU) of 18.10.2018 specifying details of the implementation of the landing obligation for certain demersal fisheries in the North Sea for the period 2019-2021.
- S6.** Commission delegated regulation (EU) of 18.10.2018 specifying details of the implementation of the landing obligation for certain demersal fisheries in North-Western waters for the period 2019-2021.
- S7.** Correspondence with Policy officer, Marine Scotland.
- S8.** Results from the project 'Evaluation of effectiveness of Fisheries Innovation Scotland research, FIS029' <https://fiscot.org/wp-content/uploads/2019/06/FIS029.pdf>.
- S9.** Quote given in writing by Mr Paul McCarthy, Policy officer, Marine Scotland to the Executive Director of Fisheries Innovation Scotland.
- S10.** Statement from Mr Wightman, Fisherman from the Clyde Fisheries Association the Scottish Fishermen Federation (SFF) stating the impact of this research to the industry.