

BIM EMFAF Work Programme Project Report 2022

BENEFICIARY:	Bord Iascaigh Mhara
PROJECT REFERENCE NUMBER:	22/SFS/STS-BG010-BR044
NAME OF PROJECT:	Novel Fishing Technologies to improve Environmental Performance
IMPLEMENTATION PERIOD:	1st January to 31st December 2022

Project Scope

This project focused on bycatch of unwanted species in response to the landing obligation, and energy efficiency in response to the energy crisis and longer-term transition away from fossil fuels. Work also commenced on mitigating seabed impacts given a variety of EU policies and regulations which will need to be addressed by the fishing industry.

Objectives

- Complete a minimum of four studies on board Irish fishing vessels which aim to improve the environmental performance of Irish fisheries.
- Develop a new gear advisory service to help Industry optimise performance on novel reduced impact fishing gears.
- Run regional workshops with fishers on technical solutions.
- Develop a system for collating vessel operational efficiency data to empower skippers operate more efficiently and enhance assessment and demonstration of gear-based solutions.
- Develop experimental gear technology methodologies with one new paper submitted for peer reviewed publication.
- Collaborate extensively with key bodies externally and internally to acquire and provide technical insights for the benefit of the Irish Fishing Industry.

Outcomes

The objectives were achieved with four successful gear studies, one survivability study and a new guide on fisheries conservation solutions completed. Summaries and report links for these studies are included below.

- The new gear advisory service was set up with net sensors loaned to a number of vessels seeking to improve efficiency and/or reduce impacts.
- A total of seven regional workshops with industry were conducted at fishing ports around the coast with further development of these engagements planned in 2023.
- Work commenced on procuring the vessel operational efficiency system which will be deployed on two vessels in 2023.
- Substantial progress was made on a paper on experimental gear technologies which will be submitted in 2023.
- Extensive collaboration occurred with industry through the seven regional workshops, four Industry Fisheries Science Research Partnership meets, the Irish Skipper Expo and one-to-one meets during gear trials.



New guide on Fisheries Conservation solutions to reduce unwanted catches

An updated guide on Fisheries Conservation solutions to reduce unwanted catches in Irish fisheries was issued in early 2022 (Figure 1). The useful guide contains one-page summaries of 22 gear modifications, survival exemptions and technical tools, all developed in close collaboration with the Irish Fishing Industry. These solutions help address landing obligation requirements, boost fisheries' sustainability and marine biodiversity by decreasing catches of juvenile, over-quota and non-target species.

<https://bim.ie/wp-content/uploads/2022/02/Fisheries-Conservation-Solutions-to-reduce-unwanted-catches-2022.pdf>

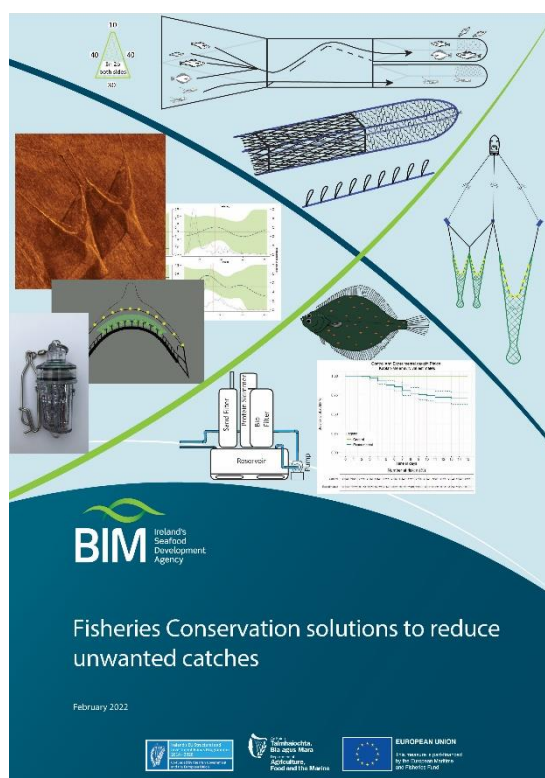


Figure 1. Cover of new BIM guide



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Preliminary assessment of the energy efficiency of a four-panel Nephrops trawl

Building on previous BIM work, this trial assessed the energy efficiency of the box trawl in the Irish Nephrops fishery. The four-panel trawl comprised extensive sections of large mesh in the top sheet and upper wings, and a SELTRA four-panel codend both of which facilitate escape of unwanted fish catches. The greatest operational difference between the box trawl and standard gears was a 10% increase in wing-end spread resulting in a greater swept area and increased Nephrops catches in the four-panel trawl. No increase in fuel or carbon emissions occurred thanks to improved hydrodynamics in the box trawl.

<https://bim.ie/wp-content/uploads/2022/05/BIM-EnergyEfficiency-4-panel-nephrops-trawl.pdf>

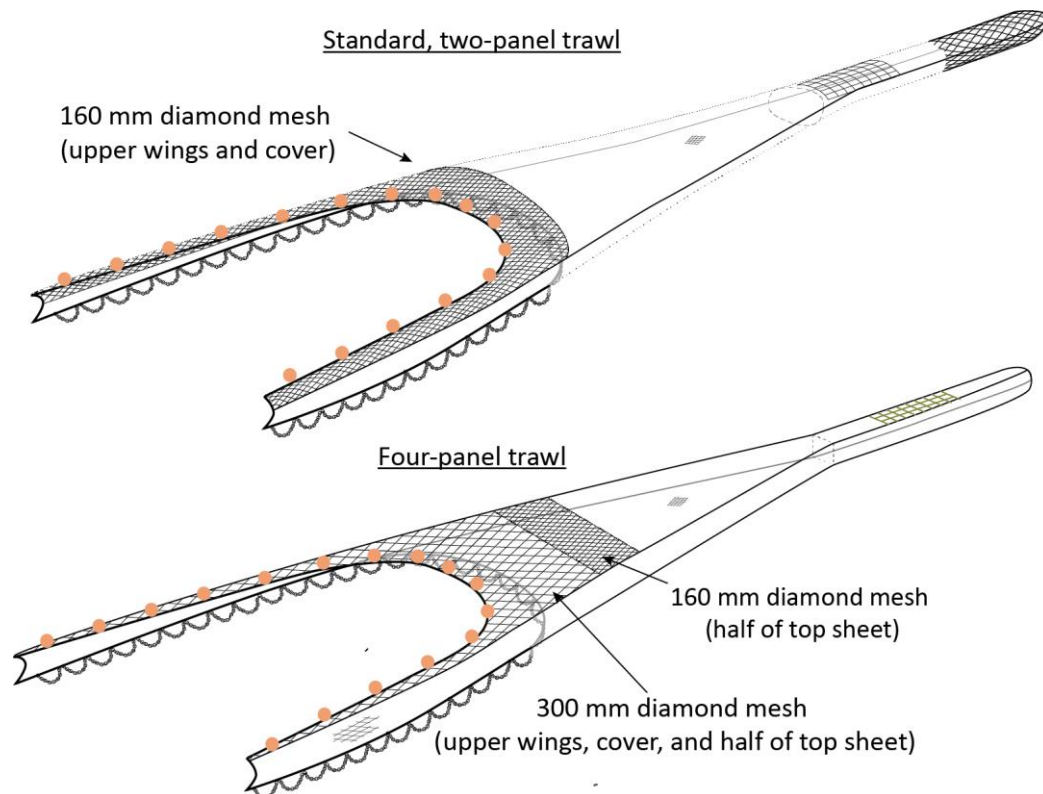


Figure 2. Standard and four-panel 'box' trawl tested in the Irish Nephrops fishery



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Artificial light on the raised-fishing line in a Celtic Sea mixed-demersal fishery trawl

The raised fishing-line is an effective gear option for reducing catches of low-quota cod and vulnerable skate and rays for vessels targeting demersal fish species in the Celtic Sea. A full-scale assessment of lights mounted on and off the raised-fishing line demonstrated a 65% reduction in low-quota cod. In the context of major increases in fuel prices, accompanied reductions in target species suggested that lights were not a commercially viable option at the time of the trial.

<https://bim.ie/wp-content/uploads/2022/06/BIM-Fishing-Gear-Artificial-Light.pdf>

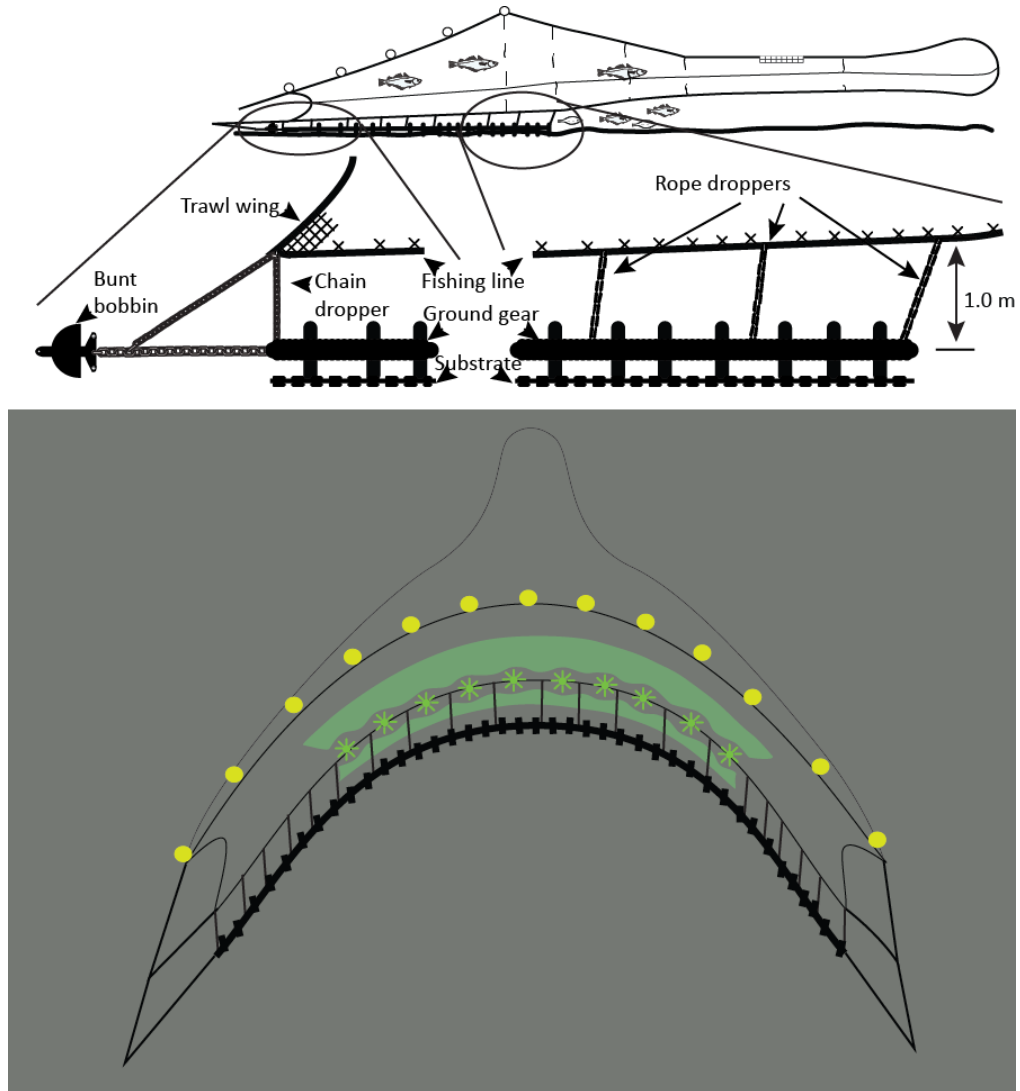


Figure 3. Raised-fishing line with artificial light



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Testing of modified rigging towards reduction of unwanted catches in the Nephrops fishery

Testing of modified rigging and an escape gap between Nephrops trawls demonstrated reductions in catches of large fish such as skates and rays and dogfish and an increase in Nephrops catches possibly due to improved bottom contact associated with the new rigging. The skippers of the trial vessel and another vessel operating in the Irish Sea have continued to use the new rigging thanks to the positive results. Further assessment of bycatch and energy reduction benefits is planned in 2023.

<https://bim.ie/wp-content/uploads/2022/12/BIM-Testing-of-modified-rigging-nephrops-fishery.pdf>

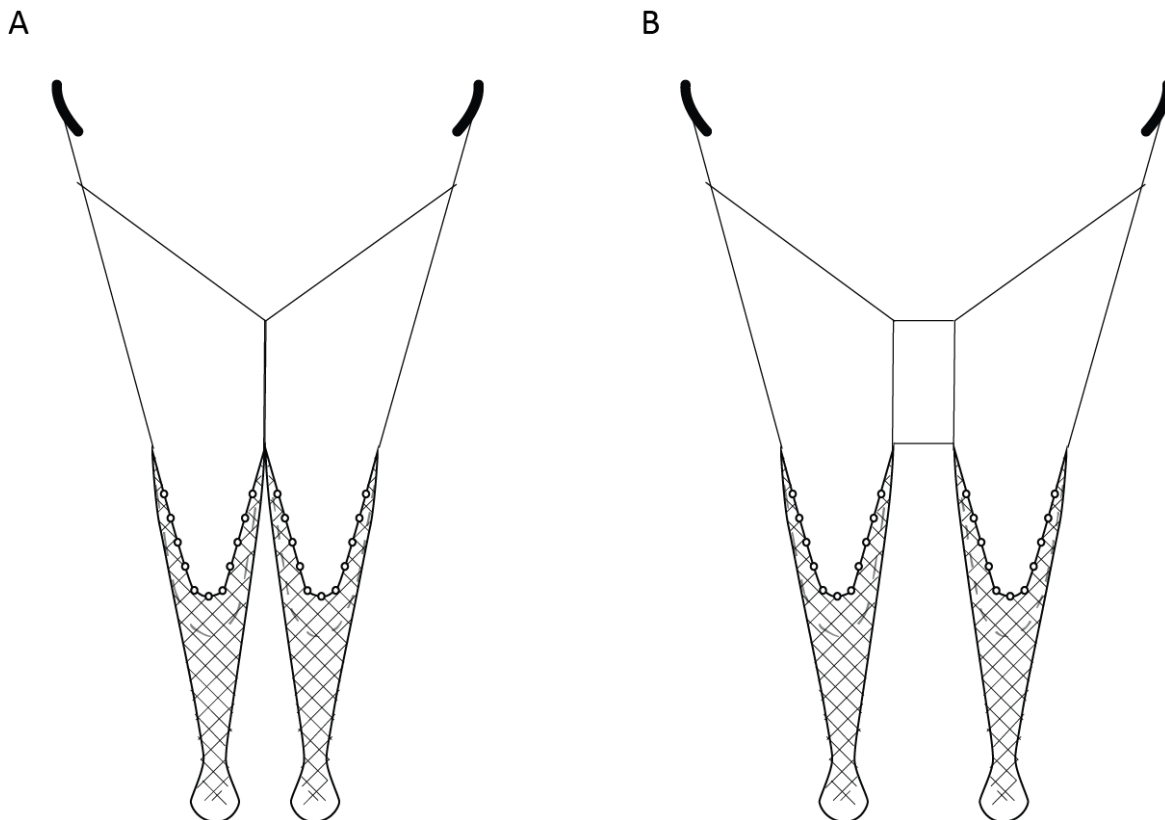


Figure 4. Illustration of modified rigging



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Assessment of pair fishing towards more efficient targeting of demersal fish species

This trial primarily aimed to improve energy efficiency with supporting biological information collected to assess any potential impacts on unwanted catches. The pair vessels reduced their fuel use by 40% during fishing. Catch rates were 29% greater due to increases in swept area and fish herding. Resulting reductions in variable costs and increases in revenue provided an estimated 32% increase in profitability at trip level. The method was found to have minimal impact on unwanted catches and has major potential for scale-up in Ireland's whitefish sector.

<https://bim.ie/wp-content/uploads/2023/02/Assessment-of-pair-fishing-towards-more-efficient-targeting-of-demersal-fish-species-.pdf>

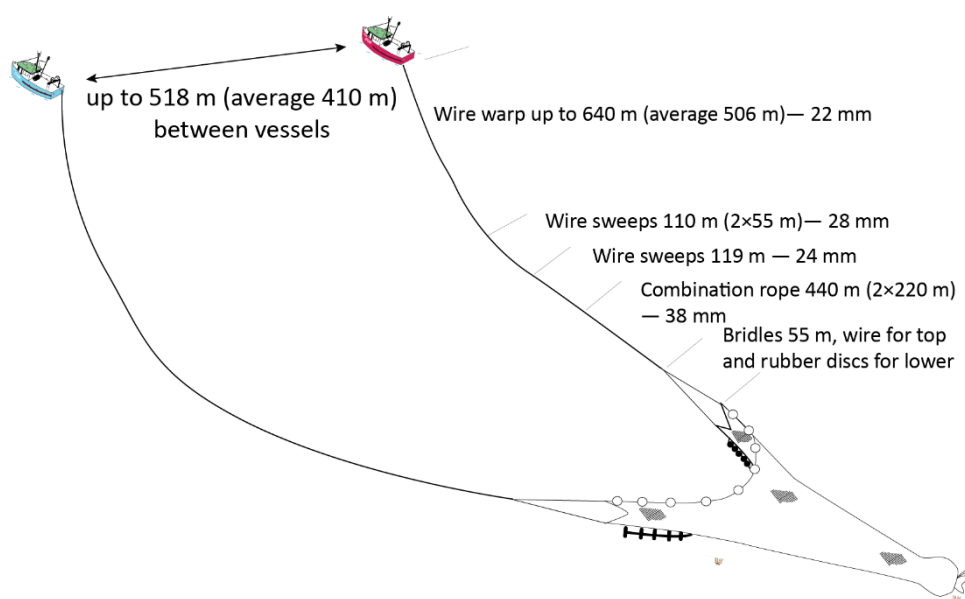


Figure 5. Pair-trawl configuration



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Assessment of cod survival in the Irish seine-net fishery using pop-up satellite archival tags

Assessment of cod survival in the Irish seine-net fishery using pop-up satellite archival tags. 10 cod caught under normal fishing conditions were tagged and released on board an Irish seine-net vessel. Tag deployment periods ranged from 2 to 21 days with an average survival period of 10 days. Generally, a minimum survival probability of 50 % after 15 days or longer is needed before a case can be made towards a survival exemption and overall survival results fell well short of that level. Caused by hauling of the net from depth, barotrauma was likely the main reason behind cod mortalities. Measures to mitigate barotrauma are currently commercially unviable in the Irish seine net fishery. The study delivered an innovative new survival assessment technique with potential applications to other fish species.

<https://bim.ie/wp-content/uploads/2022/12/Assessment-of-cod-survival-in-the-Irish-seine-net-fishery.pdf>

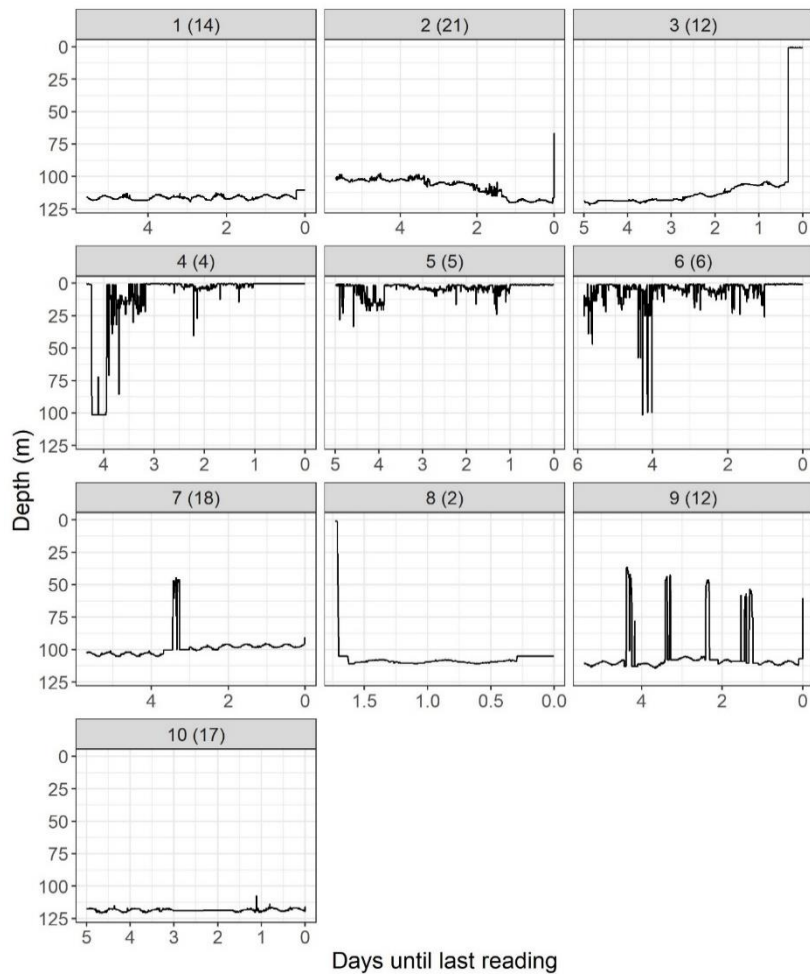


Figure 6: Vertical behaviour for tagged cod up to six days prior to tag pop off. Figure headings consist of fish ID number with total deployment period in brackets



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Summary of Project Spend

Summary of Spend	
Total Approved Costs	€524,000
Total Eligible Expenditure	€524,000
EMFAF Eligible Expenditure	€262,000
Exchequer	€262,000

Report by: Ronan Cosgrove

Date: February 2023



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