Cabinet Secretary for Rural Affairs, Land Reform and Islands
Mairi Gougeon MSP

Scottish Government
Riaghaltas na h-Alba
gov.scot

T: 0300 244 4000
E: scottish.ministers@gov.scot

Finlay Carson MSP
Convener
Rural Affairs and Islands Committee

Via email: rural.committee@parliament.scot

4 February 2026

Dear Finlay,

The draft Sea Fish (Prohibition on Fishing) (Firth of Clyde) Order 2026

Thank you for the opportunity to provide further details on the proposed Targeted Science Programme (TSP) ahead of my appearance before Committee on 11 February. My officials have developed the programme in collaboration with local fishers, drawing on the best available evidence.

For context, I am including extracts from the letter sent on 3 March 2022 by the Chief Fisheries Advisor for Scotland, Dr Coby Needle, to the RAINE Committee, ahead of the Firth of Clyde Order in 2022. This earlier advice provided the foundation for the scientific approach and management in 2024 and underpins the current 2026 proposal.

> "MSS were asked to consider whether the existing Clyde cod spawning closure was sufficient to achieve the policy objective of protecting spawning cod. Good, consistent, detailed time-series of data regarding the distribution of spawning cod in the Clyde area do not currently exist. Given this, we have taken a risk-based approach. Existing scientific literature highlights the preference for Atlantic cod to spawn in areas of gravel or coarse sand, with sandy mud or muddy sand being less optimal, and fine mud being least suitable. We therefore determined the areas of gravel and sand within the existing closure and developed two new closures which covered these areas, along with small buffers to ensure cod spawning just outside the optimal areas would still be protected. We believe these are likely to give the maximum potential protection to cod during spawning time.

We were also asked to consider the fishing gears which should be included in these closures. Further scientific literature highlights the spawning behaviour of cod, which includes territorial activity and movement up to 10 metres above the seabed. We therefore concluded that any fishing gear that descends to within 10 metres of the seabed has the potential to disturb (and potentially prevent) cod spawning in the Clyde and should therefore not be permitted in the closed areas.

These conclusions are not definitive, and there remains a lack of data and observations specific to the Clyde area. We must consider whether (and how) to address this lack in the near future. In the meantime, our advice takes a risk-based precautionary view and attempts to maximise the likelihood of cod spawning, in an effort subsequently to increase stock biomass and generate a sustainable cod fishery in the Clyde."

Since 2022, further research and methodological improvements have emerged, helping shift the management emphasis towards bycatch reduction, and inform the proposed SSI and TSP for 2026–2028.

- The Strathclyde assessment model has been published, along with further developments and follow-ups (Adão 2025, Cook et al in prep). This is a methodologically comprehensive analysis which confirms that (up to and including 2019) the spawning stock biomass (SSB) of cod in the Clyde was too low and fishing mortality (F) was too high, while also highlighting the potential for cod in the Clyde to recover.
- Marine Directorate (MD) research-vessel survey work in the Clyde has found spawning cod out with the closed spawning area during recent years, albeit in small numbers. This suggests that the aforementioned hypothesis on spawning location may not be robust. It is also noteworthy that the numbers of cod caught in the survey do not yet indicate any significant stock recovery.
- Marine Directorate has also collated new video and observational data on cod caught in creels outside the Clyde. While unsuitable for inclusion in the Strathclyde model, these data highlight the possibility that creel bycatch may be a material—yet currently unquantified—source of mortality.

These factors, along with the original rationale for the closure, inform the responses set out below.

Q1: Given the key priorities for the TSP are not aimed at evaluating the effectiveness of measures to protect spawning cod, why does the Scottish Government consider it necessary to continue and extend the closure for the duration of the TSP to 2028?

The consultation, and the recent Committee's evidence session, raised a broad range of views, including some concerns regarding the seasonal closure, its effectiveness to recover cod in the Clyde and the socio-economic impact on fishers and local communities.

It is correct that there is no direct evidence from the Clyde demonstrating that fishing activity disrupts cod spawning. It's also true that the Strathclyde model suggests the stock maintained relatively high productivity, at least up until 2019, implying that spawning may not be the main problem limiting stock recovery. Finally, the closure was based on a hypothesis about spawning areas (using British Geological Survey benthos data and available scientific literature), and recent observations of actively spawning cod out with the closure have cast some doubt on this hypothesis.

The Scottish Government does not disagree with these points. However, there are several factors to consider. While there are no observations from the Clyde to show that fishing disturbs spawning, there is also no evidence that it does not. We have previously set out the evidence on disturbance, and to assume that cod can carry on spawning in the presence of fishing activity would be presumptive. Spawning closures are a well established management tool and in place in other areas for example the UK national North Sea cod avoidance plan - gov.scot.

It is noted that the Strathclyde assessment has not been updated to recent years, and available information for the years 2020-25 (RV surveys) indicate the cod stock remains at a very low level. While this is the case, it would be appropriate to maintain a seasonal closure and seek to minimise disturbance.

Finally, it is important to note that there will be some fishing activity in the area - both creel and trawl vessels will be permitted access (under certain conditions) to the area for scientific reasons under the TSP.

While the ecological benefits of the current closure are uncertain, scientific advisers agree it may help prevent further decline by reducing localised fishing mortality. One of the priorities of the TSP is to investigate the efficacy of the closure area. Retaining the closure at this stage provides alignment with the objectives of the Fisheries Act 2020 and is a precautionary and proportionate measure.

Q2: the specific research questions and hypotheses the TSP will seek to address (if identified)

Q3: an indicative timescale for each phase of the TSP (research design/stakeholder engagement, data collection, analysis, reporting and implementation)

Q4: details of funding, staff and resources that will be allocated to ensure the Marine Directorate has capacity to implement the TSP effectively

Q5: details of how stakeholders will be involved in the design and implementation of the TSP

Q6: details of support (financial, technical or operational) that will be made available to fishers in designing, trialling and delivering the TSP and how industry knowledge will be meaningfully incorporated into the programme

Answers to questions 2-6 are grouped and provided below.

The draft SSI enables delivery of a three-year TSP, designed to strengthen the evidence base for future management. While the programme will evolve as evidence emerges there are a number of priorities for increased data collection and analysis that Marine Directorate Science wish to put in place earlier (in some cases, in time for the 2026 area closure). These are summarised below.

Adding survey hauls during SCOWCGFS

Historically, the Scottish Groundfish West Coast Survey (SCOWCGFS), which is conducted using the FRV *Scotia* and takes place in Q1 and Q4, has included 3-4 hauls during each survey in the Clyde area. The survey uses a generalised groundfish gear.

Marine Directorate will increase the number of hauls conducted in the Clyde on both surveys (Q1 and Q4). The exact number will depend on the weather and other operational factors, but it is envisaged that 8-12 hauls should be possible on each survey without impinging significantly on the remainder of the West Coast survey work. A survey derogation will be implemented to enable fishing both inside and out with the closed area.

The principal benefits of increased survey work will be: a) a more robust and representative abundance index to use in the stock assessment; b) a more precisely defined estimate of the spatial distribution of cod (as well as other demersal species such as haddock and whiting); and c) observations to help determine the location of cod spawning (Q1) and juvenile (Q4) areas in the Clyde.

Spatial data and/or Remote Electronic Monitoring (REM) data from creel vessels

The intention is that all creel vessels taking part in the TSP and fishing the Clyde will be fitted with low-cost vessel trackers. These will provide data on the spatial distribution of vessels and possibly fishing effort to inform vessel selection for scientific data collection and enable evaluation of the representativeness of collected scientific data.

Bycatch data have previously been collected from the *Nephrops* trawl fleet through the standard Marine Directorate observer programme, and these data have formed the basis of the Strathclyde assessment model. However, we cannot extend the observer programme to creel vessels, as in many cases these are single-handed and are not able to carry observers.

The following approach for REM data collection targeting cod bycatch in the Clyde is planned. Portable REM-enabled tablet systems will be provided, which offer a single camera and vessel positioning system data. These are suitable for monitoring fish bycatch in creels, and could, if required, also support self-sampling monitoring by fishers.

Portable REM systems offer the greatest flexibility in sampling design as they can be deployed across multiple vessels in rotation. With low upfront and installation costs they can also be rapidly deployed. These systems are often used for short-term trials/research projects, and Marine Directorate has experience applying them in inshore projects in collaboration with fishers.

Marine Directorate would support the analysis of fishing activity: the number of vessels to be monitored, how vessels are selected (e.g. fishing grounds, ports, vessel configurations), and how regularly activity is recorded.

Research on creel catchability

In addition to the above monitoring, a research component will be incorporated in the TSP to investigate the likely catchability of cod for the type of creels used by local Clyde creel fleets, and to recommend measures to reduce any cod bycatch from this fleet. A Marine Directorate project (CodScape) has been planned to this end.

CodScape aims to investigate the behaviour of cod in relation to commercial creels in terms of approach, entry behaviour, behaviour inside the creel and escape attempts. It will identify and test potential creel modifications that could reduce cod catches in creels while maintaining the catch of target species, primarily lobster but also crab. While better estimates of bycatches are required (as noted above), reducing or eliminating cod from creels would have a positive impact on the health and sustainability of cod stocks, while also improving fish welfare by minimising the harm to individual cod unintentionally caught as bycatch.

CodScape plans to conduct a series of laboratory experiments to help build a baseline understanding of cod behaviour around commercial creels. This information will help develop and test modifications to creels that could alter behaviour and exclude them from commercial creel catches. These modifications will likely be either aimed to reduce entry rates or assist in the escapement of cod and will be tested in further laboratory experiments. Any changes in the observed behaviour compared to the baseline will be used to assess the effectiveness of any modification and indicate their potential benefit if applied commercially.

Observers on Nephrops vessels

As noted above, the Clyde *Nephrops* fleet (in common with similar vessels around Scotland) is covered by the Marine Directorate observer programme. Under this, observers join randomly determined trips (with the consent of skippers) and sample the fish and shellfish discarded from the vessels to estimate the overall number discarded from the fishery.

In many cases these discarded animals do not survive the process, and discard estimates are important in order that estimates of abundance and mortality are appropriate. We propose to continue to include the Clyde *Nephrops* fleet in the Marine Directorate observer programme. There is an option to increase (to a certain extent) the amount of coverage, but this will be considered as part of the wider observer coverage.

Critical to the success of this component of the TSP is buy-in from all relevant fleet sectors to engage in the science programme, and to collaborate through allowing access of observers to vessels.

Collation of further historical catch data

The current implementation of the Strathclyde stock assessment model is a development by Dr Robin Cook (Cook *et al* in prep) of the model developed by Dr Ana Adão for her doctoral thesis (Adão 2025). This model uses all the fishery and survey data that were made available to Strathclyde, but there remain significant gaps in this dataset which mean that some strong assumptions need to be made in the model. Access to extant further historical catch data would reduce the degree to which such assumptions need to be made and improve the accuracy and precision of the model estimates.

Much of the missing data is on paper and has never been digitised. These records need to be accessed, digitised and analysed, and resource will be made available to allow this.

Updates to the stock assessment model

The current implementation of the Strathclyde assessment model (Cook *et al* in prep) only includes data up to 2019 and hence can only provide biomass and fishing mortality estimates to that year. For the model to be used to provide management advice, it needs to be updated to the most recent available year (2025), and this will be done under the TSP.

Science-industry survey

Scientific trawling by industry vessels in the Clyde could be used to augment the enhanced data collection from research vessels and thereby improve information on the abundance and distribution of cod in the Clyde. This would need to be undertaken under a derogation to fish in the closed area during the closure period, but also at locations throughout the wider Clyde. Consideration would need to be given to the nature of the gear to be used to ensure consistency and coverage, a scientist would need to be on board to assess the catch composition and take biological samples, and there would need to be a long-term commitment to continuing the survey. Marine Directorate would specify the survey design and would receive all data and biological samples: however, this component of the TSP would likely be procured and resourced from outside Marine Directorate and may therefore constitute a longer-term goal.

TSP management

From the start of the TSP, a small Working Group consisting of local fishers, Marine Directorate officials and external scientists will be formed to help develop the science programme. This group will monitor progress and help shape and adapt research on the ground, thereby ensuring best value during the three-year period.

The Scottish Government will cover the costs of additional science work including survey and sampling, as well as associated costs of REM.

Q7: Given that the Marine Directorate/Strathclyde assessment is considered the best available evidence, and indicates that Nephrops trawl bycatch is the main barrier to cod recovery, why does the Scottish Government consider that measures to reduce Nephrops bycatch are contingent on first improving understanding of creel bycatch?

The Strathclyde model represents the best currently available indication of stock dynamics for cod in the Clyde. However, it has significant shortcomings. Firstly, it is lacking key data for the pre-2002 and post-2019 periods – this is to be addressed under the TSP.

A further key element missing from the evidence base is observations on whether creel vessels have a bycatch of cod, the abundance and length distributions of these fish, and their fate once removed from the creels. Data on any creel-caught cod are important for the stock assessment process, as not including such fish could have led to underestimation of stock abundance and may affect estimates of fishing mortality. It is also very important for us to understand the bycatch from all relevant fleet sectors to provide appropriate management advice.

In summary: bycatch estimates across all fleet sectors are essential to allowing management measures that are both proportionate and fair.

Q8: How does the proposed SSI address the best available evidence that the principal threat to cod recovery is excessive fishing mortality from bycatch, be it from trawls or creels?

The SSI prohibits fishing activity within the closure area of the Firth of Clyde for all vessels without a valid track record during 2026, 2027 and 2028 in order to help prevent further increases in cod mortality.

The SSI also helps to facilitate the TSP which has two main aims. The first is improved estimation of bycatch mortality and understanding of fleet dynamics across all sectors, areas and quarters; and the second is improved estimation of spawning and juvenile distributions to more accurately position any future closure. These improvements will enable more effective, targeted management measures.

Concerns have been raised about the potential for changes in natural mortality to be misinterpreted as increases in fishing mortality. In common with many ICES assessments, the natural mortality model used in the Strathclyde assessment is based on a relationship between natural mortality and fish growth. However, the Strathclyde work also included sensitivity analyses exploring different assumptions about natural mortality, and these did not show a significant impact on the overall conclusions of high fishing mortality and low spawning stock biomass.

Q9: What research is Marine Directorate doing to improve selectivity in prawn fisheries? Will this be part of the TSP?

A consultation on Scotland's Future Catching Policy will shortly be launched. Developed closely with key stakeholders, this consultation takes a sector-by-sector approach (which includes west coast *Nephrops* trawlers) and contains a range of proposals for technical fisheries management measures designed to improve selectivity and reduce unwanted fish catch. In addition, Marine Directorate is also commencing an extensive project (CodScape) on creel bycatch evaluation and mitigation (as noted above). There is also existing work on selectivity measures in trawls which will be considered in the context of Clyde cod.

Q10: Stakeholders at the Committee's roundtable spoke of challenges in ensuring adequate observer time on vessels. How will the Marine Directorate ensure that the TSP will be capable of monitoring cod bycatch to determine discard rates across all fishing sectors?

It is acknowledged that improved observer coverage is desirable, and we expect that the TSP Working Group (which will include local fishers) will assist with this, helping with contacts for skippers, and generally greater involvement by the relevant fleet sector. We also plan to implement REM systems on creel vessels as noted above.

Q11: Was this [creel bycatch] evidence provided to Marine Directorate and University of Strathclyde scientists during development of the Clyde cod stock assessment? If not, why was it not made available?

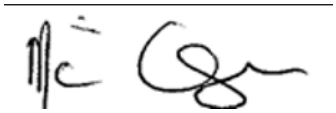
Marine Directorate scientists have observed many instances of cod (and other whitefish) being caught in creels. This is anecdotal, qualitative evidence that suggests creel bycatch is worthy of consideration. This is evidence gathered by Marine Directorate observers, REM, and through bespoke projects.

The evidence was not provided to scientists at the University of Strathclyde because these observations are not from the Clyde, they were not gathered for stock assessment purposes, and they are not in a suitable format for assessments. However, they are significant enough to conclude that further consideration of creel cod bycatch in the Clyde is warranted. The results of any work in the Clyde can then help inform the merits of further research in this area.

I'd like to conclude by emphasising that this is a three-year programme of research. The length of the programme was based on advice from our scientists and will provide a degree of certainty. Importantly, where new evidence becomes available through research this will be incorporated and help inform future management. It is also the intention to provide an annual progress update to the Committee.

I trust this information is helpful and look forward to discussing the Order with the Committee on 11 February.

Yours sincerely,



MAIRI GOUGEON

References

A. C. V. Adão (2025) The role of discarding in the dynamics of the demersal fish community of the Firth of Clyde. PhD thesis, University of Strathclyde, 274 pp. https://stax.strath.ac.uk/concern/theses/cz30pt38z.

R. M. Cook, A. C. V. Adão and M. R. Heath. (in prep) An assessment of cod in the Firth of Clyde. Preprint available from 10.2139/ssrn.5435777