1. **Context**

In 2020 Irish annual landings of crustaceans and bivalve shellfish by volume and value totaled 16,622MT and €54million, respectively. Three hundred and twenty-nine polyvalent pot fishing vessels target these fisheries. The brown crab fishery is an important component of this métier, with a landed volume and value of 5,335MT and €9.4million, respectively. Likewise, the whelk fishery, with a landed volume of 5,562MT and value of €8.67million is also of significant socio-economic importance to many rural coastal communities. Export values of €34million for brown crab and €19million for whelk in 2020, further highlights their commercial importance

Bait represents a significant cost burden, with anecdotal estimates of close to twenty percent of vessel’s total running costs. It has been estimated by the fishing industry that up to 3,000MT of bait is used by Irish pot fishers annually. For crab fisheries, the bait of choice is often small pelagic species (e.g., horse mackerel), supplemented by fish frames and offal. However, the global competition for raw material has seen prices for small pelagics rise and sourcing has become increasingly challenging. For whelk fisheries, the problem has become more acute, as undersized, and poor-quality brown crab is favored as a bait of choice. Since 2014 Ireland’s Marine Institute has raised concerns regarding the poor stock abundance and reduced recruitment of Ireland’s brown crab fisheries. A range of mitigation measures has been recommended including closed areas and landing of smaller volumes of higher quality crab. In addition, both the MI and industry stakeholders recommended ending the unsustainable practice of using undersized and soft crab as a bait source for the whelk fishery.

Due to the growing concerns outlined above, BIM and the industry, through the FIP, commenced an eighteen-month project in 2017 to develop a formed bait primarily focusing on the whelk fishery. Nofima, a Norwegian Research Institute, was chosen as the primary research partner. The project made reasonable progress. A suite of formed bait products was produced and trialed on both captive whelk and under commercial fishing conditions. Although a cost-effective commercial bait alternative was not developed for the Irish whelk fishery, the main outputs from the project established that:

* It is possible to produce a hydrolyzed bait using crab by-products that is comparable to whole crab. This demonstrates that the hydrolyzing process does not impair performance and is a useful process to produce ingredients for a formed bait.
* Formed bait made from blue mussel enriched with the amino acid taurine, performed better than non-enriched blue mussel. Although laboratory analyses did not identify what are the key small molecule triggers in brown crab bait that elicit a response in whelk, it was shown that taurine has a positive impact, albeit not sufficient to compare to existing conventional baits.
* Various potential effective binders are available that allow for controlled release of attractants without rapid bait degradation. A variety of bait holders were also trialed.
* Behaviour of captive whelks in holding tanks mimic those at sea in terms of response to bait.

The Contractor in conjunction with industry are seeking to build on the baseline knowledge gained during the above research project to complete the development of a viable alternative bait solution for the whelk fishery.

1. **Objectives of this Request for Tender (RFT)**

To develop an alternative viable and sustainable commercial bait for the Irish whelk pot fishery.

1. **Specification and Requirements**

The Contracting Authority is seeking a suitably qualified service provider with the appropriate expertise to develop an alternative, sustainable, cost-effective bait for the Irish whelk fishery. The successful Tenderer will engage with Irish stakeholders through a FIP, BIM, and relevant researchers to clearly identify industry requirements and use current baseline knowledge on alternative baits to progress the most appropriate solutions for the sector. The ideal outcome from the project is the development of a safe, sustainable, cost effective synthetic bait that matches/surpasses the performance of traditional whole crab bait. This will require a capacity to assess whelk behaviour and physiology, undertake appropriate chemical analysis, and the ability to produce and test products that will perform under challenging commercial conditions. If a fully synthetic bait is not developed, an appropriate outcome should be the development of a viable formed bait using sustainable, safe, readily available seafood co-products held with an effective binder and enriched with small-molecule attractants that enhance bait performance.

This project requires multidisciplinary skills as outlined above and importantly the capacity to engage and co-ordinate with industry stakeholders to ensure their maximum input and engagement. It is envisaged that this project will run for eighteen months. A clear project plan must be submitted that details how the project will be set up, managed, who will participate, activity timelines, and clear milestones. Qualifications and experience of proposed Key personnel must be evidenced by way of

Curriculum Vitae(s).

Tenderers must address the following specifications in their tender response:

* Establishing the current state of the art with regard to developing alternative bait solutions for commercial pot fisheries;
* Developing a detailed project plan with clear milestones with industry engagement as a cornerstone;
* Setting up facilities that will allow the holding of whelk under captive conditions that suitably mimic behaviour in natural environments;
* Conducting analyses that will determine the small essential molecules that trigger the necessary foraging response in whelk. In addition to establishing the relevant molecules, the relationship between volume of bait and other attributes in eliciting whelk responses should be resolved;
* Developing and testing a cost-effective synthetic bait based on these molecules;
* Developing and testing bait formats developed from available seafood co-products. During the development of a synthetic bait assessing alternative viable baits using co-product ingredients should be progressed in tandem. This is an important element given that fully identifying the appropriate molecules that trigger the appropriate response may be challenging.
* Rigorously testing the performance of the different baits developed. A clear process of eliminating ineffective ingredients and identifying best-fit single source ingredients or combinations thereof. The use of additive molecules to enhance the performance of co-product baits should be assessed.
* Assessing the performance of binders is essential as the tradeoffs of cost, strength, capacity to disintegrate in a controlled manner are all important in the overall performance of formed bait.
* Testing of additional holding devices e.g. re-usable bait boxes, reusable netting etc must also be considered.
* The usability, ease of storage, shelf-life are all important considerations and must be factored into the performance of bait.
* Ensuring that due consideration is given to viability viz. cost v performance.
* Trialing of bait under commercial conditions must be set up so that their outcomes, scientifically sound and repeatable.
* Although not prime focus, consideration should also be given to the testing of the successful bait as a viable alternative in the brown crab fishery.
* Industry engagement is vital and the communication with industry stakeholders to support and guide the project (e.g. FIP) is essential and the structure/process must be explicit in the project plan.
* Linking with agencies such as the Marine Institute to access observers for onboard trials should be strongly considered.
* Reaching out to international scientific experts with appropriate experience within the field of pot bait formulations is vital.
* The collection of high-quality digital footage, images, and the development of robust interim and final reports.
* Presenting to industry on progress and ensuring that outputs are communicated in a meaningful format for industry.

1. **Proposed Methodology and Approach**

Tenderers are requested to provide their proposed methodology and approach to fulfilling all aspects of this tender as outlined in this RFT (supported by a Project Implementation Plan).

**6. Proposed Key Personnel**

Tenderers are requested to outline qualifications and experience of proposed Key Personnel (evidenced by way of CV’s) to include the following areas:

* Capability of conducting similar technical projects.
* Engagement in commercially focused projects with seafood or comparable agri-food sectors.

**7. Deliverables**

* A project plan that ensures industry buy-in, with clear actions/milestones over the eighteen months.
* The production of a viable, sustainable synthetic commercial bait that meets the needs of the Irish whelk sector.
* The production of a viable, sustainable commercial bait using available co-products, fortified with small molecule, attractants that meets the needs.
* A project that is industry-driven and commercially focused.
* Results that are scientifically robust and coherent.
* The capacity to produce the candidate bait(s) at scale in a cost-effective manner.

**8. Budget**

The anticipated budget for this contract is in the range of €110,00 to €120,000 inclusive of all expenses and exclusive of VAT.

**9. Contract award/contract commencement**

It is anticipated that this contract will be awarded in early August 2021 with the contract commencing late August 2021 ending March 2022.