

Knowledge Gateway Scheme 2026 Call 1

Call Topics

This call for proposals is focused on specific research topics, as follows:

- Biostimulant development from Irish farmed seaweed
- Ecosystem services of low trophic aquaculture in Ireland
- Improving intake water quality in freshwater aquaculture facilities
- Mussel fouling, settlement dynamics and management strategies
- Zooplankton dynamics and associated risks to Atlantic salmon aquaculture in Irish coastal waters
- Assessing biodiversity in conjunction with oyster farming in Ireland

Each topic is described in more detail below.



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Biostimulant development from Irish farmed seaweed

Context:

The National Strategic Plan for Sustainable Aquaculture Development 2030 identifies priority areas for development of the industry in Ireland. Specifically, an undertaking to support innovation in aquaculture and its proactive co-existence in the Irish blue economy through roadmapping, coordinated research and novel funding.

Seaweed (macroalgae) is regarded as a promising resource with the potential to support new and revitalising industry within a blue economy, whilst delivering significant environmental and social benefits. In 2024, the farmed seaweed sector was valued at €495,000 and produced 496 tonnes. The sector is dominated by the brown seaweed species *Alaria esculenta* and *Saccharina latissima* that produce the majority of biomass (as is the case elsewhere in Europe). These species should form the core of any proposed projects as part of this KGS topic.

Despite this promising future, there are challenges in increasing market share for farmed seaweed products. In 2025, the Seaweed Industry Working Group (SIWG) was established. This group consists of the active growers in the farmed seaweed space. The SIWG has expressed interest in the biostimulants as a viable route to market for farmed seaweed products. Currently, the seaweed derived biostimulants market focuses on the use of wild harvested seaweeds. With market demand for these products the biostimulants sector may need to supplement their raw material from new sources.

Much of the existing research that has been conducted has focused on wild species such as *Ascophyllum nodosum*. There exists a significant knowledge gap in the potential and use of farmed seaweed for biostimulants.

Further information can be found at: <https://bim.ie/wp-content/uploads/2023/05/BIM-IMAS-Strategic-Review.pdf>

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Raw material characteristics and characterisation (seasonality, compounds (e.g., fucoidan, alginates, laminarian etc.)).
- Extraction method development and product formulation.
- Field trials of resultant products.
- Technology transfer to industry.

In line with the IP a project advisory group should be formed by the project team with BIM representatives along with other relevant experts and advisors.



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Ecosystem services of low tropic aquaculture in Ireland

Context:

The National Strategic Plan for Sustainable Aquaculture Development 2030 identifies priority areas for development of the industry in Ireland. Specifically, an undertaking to support innovation in aquaculture and its proactive co-existence in the Irish blue economy through roadmapping, coordinated research and novel funding.

Aquaculture, especially low trophic systems like- seaweed and shellfish, can provide meaningful ecosystem services (ES) when well sited and managed, from nutrient uptake and habitat support to supplying low- carbon, healthy food- and wider public goods for coastal communities. The NSPSAD explicitly frames these benefits and promotes low -trophic development as part of the green transition. The plan calls for research and evidence building, “further develop our understanding of aquaculture -derived ES and interactions with natural capital,” supported by baseline and harmonised environmental monitoring, underscoring the need for targeted studies, clear metrics, and consistent data to quantify and communicate these services. The shellfish sector in Ireland is well established and in 2024 produced a combined tonnage of 23,321, valued at €64,400,000. Cultivated seaweed is a nascent sector and in 2024 was valued at €495,000 and produced 496 tonnes. Both of these forms of aquaculture are regarded as contributing as having wider environmental benefits (mitigation of CO2 emissions, uptake of nitrogen & phosphorous) and ES (creation of new habitat, food supply, nursery grounds for marine species), beyond their already significant contribution to food security and human nutrition.

BIM has previously funded a project through the KGS on shellfish ES, ShellAqua. This project provided data on the carbon, nitrogen and phosphorous removal potential of oyster and mussel production. The results, while positive focused on the supporting services of low trophic aquaculture. There is a need to widen the scope of the work to understand the other services that low trophic and restorative aquaculture can provide – cultural, provisioning, regulating and maintenance.

Further information can be found at: <https://bim.ie/wp-content/uploads/2023/05/BIM-IMAS-Strategic-Review.pdf> and <https://assets.gov.ie/static/documents/draft-national-strategic-plan-for-sustainable-aquaculture-development-2030.pdf>

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Develop a national ES measurement framework for low-trophic and restorative aquaculture.
- Value and communicate ES: socio-economic appraisal, snapshots, and claims guidance.
- Geographic, regional and species differences in ecosystem potential.
- Potential to integrate ES into spatial planning and digital systems and build capacity.

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Improving intake water quality in freshwater aquaculture facilities

Context:

The National Strategic Plan For Sustainable Aquaculture Development 2030 identifies priority areas for development of the industry in Ireland. Specifically, an undertaking to support innovation in aquaculture and its proactive co-existence in the Irish blue economy through road mapping, coordinated research and novel funding. Ireland's freshwater aquaculture sector is a vital component of the national seafood industry. In 2024, output reached 1,329 tonnes—up 19% from 2023—with over 122 people employed across 15 production units. Salmon and rainbow trout dominate production, mostly in traditional flow-through systems, many established on old mill races. Water quality is critical for these sensitive species with optimal oxygen, pH, temperature, and low contaminant levels supporting metabolism, immunity, and growth. Poor water quality can stress fish, reduce feed efficiency, slow growth, and heighten disease risks, leading to significant economic losses. Maintaining high-quality water also reduces handling stress and improves survival and overall farm sustainability.

However, Ireland's water quality has been declining, with national assessments showing a continued downward trend in rivers, lakes, and estuaries. The EPA reports that only 52% of surface waters meet good or high ecological status—down from 54%—meaning nearly half of monitored waters are now in unsatisfactory condition. Improving river water quality in Ireland is essential for protecting biodiversity, safeguarding drinking-water sources, and supporting sustainable aquaculture, agriculture and industry. Healthy rivers are vital for communities, recreation, and tourism, and they play a crucial role in climate resilience by supporting natural flood management. Addressing pollution and water quality decline is key to restoring these ecosystems so they can continue to provide long-term environmental and economic benefits.

Until this decline is addressed, ensuring optimum conditions for freshwater production increasingly means providing filtration and treatment systems at farm intake. Mitigation measures can include management practices, mechanical treatment and other treatment procedures.

Further information can be found at: <https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/national-strategic-plan-for-sustainable-aquaculture-development-2030/>

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Deployable systems including technology for the prevention and reduction of fish health challenges, particularly *Saprolegnia*
- Improved water quality treatment systems for freshwater farm intakes. Treatment systems should be applicable for commercial abstraction volumes of the sector.
- Improved monitoring of intake water quality

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Mussel fouling, settlement dynamics and management strategies

Context:

Rope-grown mussel (*Mytilus edulis*) aquaculture is an integral part of Ireland's shellfish sector, contributing significantly to coastal economies and export value. In 2024, total mussel output was 9,479 tonnes with a sales value of €7.5 million. Rope culture uses specially designed ropes 'long lines' suspended in the water column from barrels, to which wild mussels naturally attach. To harvest, the ropes are hauled out of the water and the mussels are removed, often using specialized equipment. Mussels typically take around two years to reach market size, although this can extend to three years depending on growing conditions in specific bays. Mussels are typically sold fresh (live) directly to consumers or processors.

In recent years there have been frequent reports of fouling causing concern among Irish growers. Fouling reduces product quality, increases labour costs, and leads to batch downgrading or discard. During spring and summer season Mussel shells act as a growth substrate for biofouling organisms such as barnacles and tube worms. While barnacles can be removed from mussel shells relatively easily, tube worms are much more difficult and costly to remove. The presence of the tube worms or barnacles does not cause the mussels to be inedible, but their appearance and smell when cooked can make the mussels unappetizing to the consumer. These issues serve to undermine the stated ambition of the National Strategic Plan for Sustainable Aquaculture Development 2030 (NSPSA) which explicitly highlights the further development of low trophic aquaculture species such as mussels as a key action for 2030, aiming to support a low-carbon, sustainable, and diversified marine industry.

Previous studies in Scotland indicate that settlement intensity, mussel size, density, and environmental patterns strongly influence fouling events. Understanding how these mechanisms operate in Irish growing areas is critical for developing effective mitigation strategies.

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Quantify tubeworm and barnacle settlement patterns across several major Irish mussel-farming bays.
- Identify environmental and biological drivers of settlement timing and intensity (e.g temperature, depth, salinity, flushing rate, site, age).
- Assess the influence of mussel size, stocking density, and other husbandry practices on fouling severity.
- Evaluate the role of conspecific presence as a settlement cue on Irish mussel farms.
- Explore potential control techniques under commercial Irish culture conditions.
- Develop site-specific fouling risk indicators and propose practical management strategies for industry adoption.

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Zooplankton dynamics and associated risks to Atlantic salmon aquaculture in Irish coastal waters

Context:

Irish salmon aquaculture is a high-value, export-driven sector worth over €135 million in 2024, specialising in 100% organically certified Atlantic salmon grown primarily along the west coast. Production standards emphasise low stocking densities, sustainable feed, and strict animal welfare, forming a central part of Ireland's premium seafood reputation. However, salmon health and welfare are increasingly threatened by biological stressors, particularly gelatinous zooplankton such as jellyfish.

These organisms can:

- Damage gill tissue through nematocysts and mechanical abrasion
- Induce acute stress, reduce feeding, and lower immunity
- Lead to mortality events during blooms
- Contribute to oxygen depletion, amplifying the stress on farmed fish

Despite the critical ecological function of zooplankton in nutrient cycling and food-web regulation, Ireland currently lacks the systematic, long-term, spatially comprehensive monitoring needed to understand population dynamics. Present monitoring relies largely on ad-hoc local studies and limited offshore transects from the Continuous Plankton Recorder (CPR), which overlook major aquaculture bays. This creates a substantial knowledge gap for managing biological risks in fish farming.

The National Strategic Plan for Aquaculture Development emphasizes optimising production and safeguarding the welfare of farmed animals through natural conditions, careful husbandry, and robust monitoring. A deeper understanding of zooplankton distribution and bloom dynamics is essential to anticipating and mitigating risks—thus directly supporting national policy objectives.

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Develop a baseline zooplankton community structure at selected aquaculture sites (Donegal, Galway, Kerry, and Cork).
- Design and implementation of a zooplankton sampling programme
- Establish the impact of seasonal variations on species occurrence and abundance
- Establish the risks posed by species identified at different abundances, specifically nuisance species to finfish.
- Development of practical protocols and guidelines to enable aquaculture operators to implement their own site-level zooplankton surveillance programmes, fostering greater resilience and responsiveness to emerging risks.
- Assessing the viability of automated technology for quantification and identification of zooplankton species relevant to Irish Finfish aquaculture

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Assessing biodiversity in conjunction with oyster farming in Ireland

Context:

The National Strategic Plan for Sustainable Aquaculture Development 2030 (NSPSA) identifies priority areas for development of the industry in Ireland. Specifically, an undertaking to support innovation in aquaculture and its proactive co-existence in the Irish blue economy through road mapping, co-ordinated research and novel funding.

The need for action on biodiversity is now being recognised in the same way as climate action. The seafood sector both impacts upon biodiversity and is also wholly reliant upon it for its existence. Addressing the challenges of biodiversity is not only important for the fundamental survival of the seafood sector but also for licensing/quotas, social licence, reputation, and market access.

The EU adopted the new 2030 biodiversity strategy in 2020 which aims to put Europe's biodiversity on the path to recovery by 2030 (EU, 2020). Ireland's National Biodiversity Action Plan aims to address the loss of biodiversity in Ireland and Ireland's 4th National Biodiversity Plan was published in 2024. Added to this is the national and international commitment to designating more Marine Protected Areas (MPAs).

To focus on biodiversity at National and International level, a more in-depth biodiversity services provided by shellfish aquaculture would be timely. While the narrative to date is largely focused on impacts, research shows that aquaculture can also make important positive environmental contributions. Such assessment could allow for optimal alignment of aquaculture within the marine environment and help contribute to meeting the conservation objectives for protected areas. It could inform all marine stakeholders of the value of these services and also allow for optimisation of the ecosystem services themselves. Applying what is currently understood regarding shellfish ecosystem services and its economic value to Irish shellfish aquaculture along with further research in the knowledge gaps, and better use of data, could facilitate more informed spatial planning, a better acceptance across marine stakeholders and development of goods and services across this sector.

Call Objective and Outputs:

Project(s) proposed under this topic could consider addressing a number or all of the following objectives/outputs:

- Development of appropriate metrics for measuring and reporting on biodiversity and demonstrating the value of oyster farming to biodiversity
- Contribution of aquaculture towards nature restoration and structure and function of habitats
- Explore opportunities towards approaches for nature positive farming.
- Geographic, regional and species differences in biodiversity across Irish oyster farming sites.

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