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Research Evaluation Consulting

Evaluation of the Bluefish Operation

Final Evaluation Report

Bangor University

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Bluefish Evaluation: Final Evaluation Report

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Glossary

Acronym/Key word	Definition
AU	Aberystwyth University
BU	Bangor University
BIM	Bord Iascaigh Mhara
CCT	Cross Cutting Themes
ERDF	European Regional Development Fund
EU	European Union
MI	Marine Institute
MVT	Management Verifications Team
SRA	Southern Regional Assembly
SU	Swansea University
UCC	University College Cork
WEFO	Welsh European Funding Office

Executive Summary

Introduction

i. Bluefish is a joint research operation delivered by a partnership between Bangor University (BU) (lead partner), Swansea University (SU) and Aberystwyth University (AU) in Wales; and Bord Iascaigh Mhara (BIM), the Marine Institute (MI) and University College Cork (UCC) in Ireland.

ii. The Operation is funded through the Ireland Wales Territorial Cooperation Programme 2014-2020 (hereafter the Programme or Ireland Wales Programme) which is delivered by the Welsh European Funding Office (WEFO) in partnership with the Southern Regional Assembly (SRA) and the Government of Ireland's Department of Public Expenditure and Reform (DPER). The Programme focuses on connecting organisations, businesses and communities in the Irish Sea region that face shared economic, environmental and social challenges.

iii. The Bluefish Operation had a budget of €6.6 million, with an ERDF contribution of €5.2 million under Priority Axis 2: Adaptation of the Irish Sea and Coastal Communities to Climate Change.

The overall aim of the Operation was to increase knowledge and understanding of the effects of predicted climate change on commercial fish and shellfish in the Irish and Celtic Seas. It also aimed to provide region-wide adaptation strategies through engagement with coastal communities.

Key Findings

iv. The Operation delivered activities under three key themes:

- Increase understanding and knowledge of the impacts of climate change through research activities
- Awareness raising of the impact of climate change on marine ecosystems and species (in particular fisheries / aquaculture species)
- Cross border collaboration

v. The Bluefish Operation met or exceeded all three of its Ireland Wales operational-level indicators, contributing strongly towards overall targets for the Programme.

Progress against Operational-level (output) indicators under Ireland-Wales Programme, Priority Axis 2, April 2021.

Evaluation reference	Indicator / measure description	Target	Achieved to date (Apr-21)
OP.1	Research institutions participating in cross-border, transnational or interregional research operations[1]	6	6
OP.2	New awareness raising initiatives targeting coastal communities[2]	10	13
OP.3	Organisations co-operating in enhancing the marine and coastal environment[3]	10	10

Source: Bluefish documentation

vi. Despite the impacts of the COVID-19 pandemic, Bluefish recorded good progress against additional outputs as set out in the business plan.

Progress against the Operation's additional output indicators, March 2021.

Evaluation reference	Additional output	Target	Achieved to date (Apr-21)	Expected by project close
OP.4	Reports for activities	12	7	12
OP.5	Workshops	8	5	TBC
OP.6	Publications in peer review journals	12+	21	TBC
OP.7	Conference	1	0	1
OP.8	Final report	1	0	1
OP.9	Guidelines and factsheets for adaptation/mitigation	1	0	1
OP.10	External Evaluation	1	1	1

Source: Bluefish documentation

vii. On the indicators not fully achieved at the time of writing:

- Activity reports are in development, with seven completed and five to be completed by project close. The aim is to provide further information / knowledge of the impacts of climate change through Bluefish conducted research activities.
- five workshops had been conducted against a target of eight. However, given the physical nature of, for example, art roadshows, additional events were not possible because of the COVID-19 pandemic.

viii. The Operation delivered a high level of cross-border co-operation, with six institutions collaborating on project development, implementation, staffing and financing. Partner stakeholders were extremely satisfied with the collaboration, which enabled the sharing

[1] The number of research institutions that participate in cross border, transnational or interregional research projects
[2] The number of new awareness raising initiatives targeting coastal communities which are funded through ERDF intervention.
[3] The number of organisations that cooperate in a project which enhances the marine and coastal environment

of good practice between Wales and Ireland and encouraged project partners to expand their boundaries and explore new areas. Going forward, the partner stakeholders were keen to continue collaborating outside of the Ireland Wales Programme, although there was some concern that Brexit poses a potential threat to future collaborations.

ix. In surveys of businesses in coastal regions of Wales and Ireland, Bluefish was the most recognised of any co-operation programme project in Ireland, and second in Wales.

x. In terms of the counterfactual, the majority of stakeholders felt that collaboration would not have occurred had it not been for support from the Operation.

Conclusions

Evaluation ITT objective	Evaluation summary
Has the operation met its objectives and delivered its intended outputs?	Overall, the Bluefish longer term objectives were ambitious, but there was general confidence from stakeholders that Bluefish had achieved or is on track to achieve its intended objectives. The Operation has achieved its Operational output indicators including surpassing its 'number of new awareness raising initiatives targeting coastal communities', as well as achieving its targets for the number of research institutions participating in cross-border, transnational or interregional research operations and number of organisations cooperating in enhancing the marine and coastal environment.
Has the operation delivered an effective management and governance model?	Bluefish appears to have enjoyed a well-designed delivery approach, which was very comprehensive and able to interlink complementary research themes. The management of the Bluefish Operation was cited by stakeholders as being effective in monitoring progress towards achieving objectives. The governance structure was fit for purpose. There was a stakeholder advisory group, which met twice; in Swansea in 2018 and 2019. Stakeholders, however, highlighted that this was largely not necessary, due to organisations' established links with stakeholders.
Did the operation achieve cross border working between the beneficiaries?	Bluefish was seen as an excellent example of cross border collaboration between Irish and Welsh partners, providing a platform for knowledge transfer and effective collaboration. The claimed indicators however highlighted an imbalance towards Wales or UK-oriented awareness raising activities, compensating for the large Seafest events attended and the Irish art tour associated

	with the project. Hence there was a reasonable balance of collaborations across partner nations.
Has Bluefish contributed to the Ireland Wales programme priority axis 2?	A long-term assessment of the Operation's contribution to the Ireland Wales Programme is beyond this evaluation. However, the feedback from stakeholders suggests the Operation has provided vital knowledge regarding adaptations to climate change.
Has Bluefish achieved integration of its adopted CCT strategies?	From the review of Bluefish documentation and discussions with stakeholders. Bluefish exhibits a good integration of CCTs, in particularly aligning activities with the 17 UN Sustainable Goals.

Recommendations

Programme level:	Need for clarity of understanding of programme and financial requirements from the offset
	Reduce administrative burden and provide feedback on operation reporting
Operation level:	Evaluation to be conducted earlier in operation delivery or at multiple stages
	Further consultation needed with stakeholders for future actions. Government/policy makers, industry, science community (large workshop)
	Opportunity to scale up communication and marketing
	Consider a central live monitoring data access point of Operation data records operation outputs, indicators and additional measures including CCT targets.
	Consider capturing additional monitoring data early in delivery such as long-term economic and societal benefit data, this will ensure outcome / impact can be fully measured
	COVID-19 learning and applications (videoconferencing)

1. Introduction / background

1.1 This report is the output of the evaluation of the Bluefish Operation, hereafter 'Bluefish' or 'the Operation'.

About the Bluefish Operation

1.2 Bluefish is a joint research operation delivered by a partnership between Bangor University (BU) (lead partner), Swansea University (SU) and Aberystwyth University (AU) in Wales; and Bord Iascaigh Mhara (BIM), the Marine Institute (MI) and University College Cork (UCC) in Ireland.

1.3 The Operation is funded through the Ireland Wales Territorial Cooperation Programme 2014-2020[4] (hereafter the Programme or Ireland Wales Programme) which is delivered by the Welsh European Funding Office (WEFO) in partnership with the Southern Regional Assembly (SRA) and the Government of Ireland's Department of Public Expenditure and Reform (DPER). The Programme focuses on connecting organisations, businesses and communities in the Irish Sea region that face shared economic, environmental and social challenges.

1.4 The total budget of the Bluefish Operation is approximately €6.6 million, of which the ERDF contributes €5.2 million. Bluefish aligns against the Programme's Priority Axis 2: Adaptation of the Irish Sea and Coastal Communities to Climate Change, under the Thematic Objective (TO): 'promoting climate change adaptation, risk prevention and management' and further contributes towards the Specific Objective (SO) 'to increase capacity and knowledge of climate change adaptation for the Irish Sea and coastal communities'.[5]

1.5 The Bluefish Operation's overall aim was to increase knowledge and understanding of the effects of predicted climate change on commercial fish and shellfish in the Irish and Celtic Seas. Using this increased knowledge, it aimed to provide region-wide adaptation strategies for the benefit of coastal communities. The risks and opportunities identified by the Operation were communicated to stakeholders (stakeholder groups, SMEs and other interested members of the coastal communities) using a variety of mediums / platforms.

[4] https://irelandwales.eu/what-is-the-programme.
[5] https://irelandwales.eu/sites/default/files/2016-04/150325citizensummary.pdf.

About the external evaluation

1.6 Operations that are supported by European Union (EU) funds through the Welsh Government and Government of Ireland are required to commission an external evaluation.

1.7 In February 2020, Miller Research was commissioned to carry out the evaluation of the Bluefish Operation. This report is the main output of the evaluation, which was undertaken between March - August 2020, then November 2020 - March 2021.

Evaluation report structure

1.8 The remainder of the report is structured as follows:

- Chapter 2 sets out the methodology for the evaluation.
- Chapter 3 to 7 present the findings of the evaluation, including a review of the Operation's context, an assessment of its approach to delivery and management, progress towards its objectives, discussions around the Bluefish Operation's core themes and analysis of emerging outcomes and impact.
- Chapter 8 presents the conclusions and lessons learnt from the Bluefish evaluation.

2. Evaluation approach

2.1 This section sets out the aims and objectives of the external evaluation and the method adopted by the evaluation team.

Aims and objectives

2.2 The main aim of the evaluation was set out in the Invitation to Tender (ITT):

- The aim of this process is to evaluate the efficiency and effectiveness of the project as described in the monitoring and evaluation plan, the impact that the Operation has had or has the potential to have and make recommendations for future work in this area.

2.3 The objectives / key questions of the evaluation are:

- Has the operation met its objectives and delivered its intended outputs?
- Has the operation delivered an effective management and governance model?
- Did the operation achieve cross border working between the beneficiaries?
- Has Bluefish contributed to the Ireland Wales Programme Priority Axis 2?
- Has Bluefish achieved integration of its adopted CCT strategies?

Methodology

2.4 The evaluation methodology was first proposed in response to the tender specification and later revised with members of the Operation's delivery team, to take into account external factors (see below for further discussion of this).

2.5 The evaluation methodology comprised the following tasks:

- A review of Bluefish documentation and policy context to gain an understanding of the Operation and to assess whether the policy needs are satisfied. The findings of the documentation review contributed to the development of the evaluation logic model.
- A review of Bluefish's monitoring and management systems was also conducted to ensure they were efficient and effective and compatible with the evaluation framework, as well as determining the success of the Operation thus far based on delivery against the output indicators and objectives.
- Eight semi-structured scoping interviews with key delivery partners and staff (listed in Annex B). This helped enhance the evaluation team's understanding of the Bluefish Operation from the perspectives of various stakeholders and the importance of key objectives, such as raising awareness of climate change. The

qualitative data from these interviews informed the evaluation logic model and the findings included in section 3 of this report.

- The design of an evaluation logic model. During its development, a logic model workshop with the Bluefish delivery team (Bangor University) was also conducted. This involved reviewing the draft logic model in the context of the Operation, starting with the intended outcomes and short- and long-term impacts of the Operation and working backwards to identify (and map interdependencies and assumptions between) the policy drivers, needs, objectives and activities of the intervention that will contribute to these. The logic model informed the design of the evaluation framework.
- The development of an evaluation framework to build on the descriptive elements of the logic model by identifying direct and proxy indicators that show whether change has occurred.
- The evaluation conducted qualitative, semi-structured stakeholder interviews with 13 stakeholders and beneficiaries via telephone or videocall. These included recontacting Bluefish delivery partners to ascertain the final position of the Bluefish Operation, including lessons learnt (listed in Annex B). The qualitative data from these interviews informed the evaluation findings included in section 3 of this report.
- The preparation of this evaluation report and a presentation of findings to the Bluefish delivery team. The report includes key findings, conclusions, lessons learnt and recommendations for future projects.

Limitations to evaluation

2.6 In the early evaluation stages (March 2020), the coronavirus disease (COVID-19) causing respiratory symptoms was affecting countries across the world. The World Health Organisation (WHO) declared a pandemic on 11th March 2020, after which UK and Irish Governments announced new measures to put the UK and Ireland in a state of lockdown.

2.7 This impacted the Bluefish delivery in particular conducting activities such as fieldwork sampling[6] and access to laboratories, therefore causing delays and changes to delivery. This consequently impacted the evaluation, and Miller Research / Bluefish agreed to provide as much flexibility as possible during a period of uncertainty. The majority of desk-based activities were conducted in Summer 2020 during the initial lockdown; however an agreement was made to pause evaluation activities until the Operation had agreed a no cost extension. This led to the evaluation restarting in late November 2020.

2.8 Additionally, challenges with stakeholder availability and limited access were experienced throughout the fieldwork stage. This was likely due to the impact of externalities such as COVID-19 and Brexit (including the transition period) on the fisheries and aquaculture

[6] A lot of marine fieldwork research is dependent on seasonal cycles.

community. To mitigate this many of the stakeholders were interviewed in early 2021 (post-Brexit transition).

2.9 It was apparent from the evaluation that impacts have been restricted due to events outside of the projects control. Full impact and wider benefits of such projects are often realised after closure.

3. Operation context and strategic fit

3.1 The wider strategic purpose of an intervention is important to consider, to understand the need for the intervention, as well as the benefits it can bring to the wider economy, and how it aligns with relevant policy. Therefore, an important aspect of the evaluation is to review the key policies that influence Bluefish at Welsh, Irish, and European level. The evaluation assesses whether these policies align with the rationale for the existence of Bluefish and if they are coherent with the objectives that Bluefish seek to achieve.

3.2 It is evident from our evaluation that Bluefish has an excellent strategic fit with the policy drivers at the European, Irish and Welsh level.

European policy context

3.3 Bluefish is funded under the Ireland Wales Co-operation Programme 2014-2020, Priority Axis 2 – Adaptation of the Irish Sea and Coastal Communities to Climate Change. The Specific Objective of Priority Axis 2 is 'to increase the capacity and knowledge of climate change adaptation for the Irish Sea and coastal communities'.[7]

3.4 The Operation aligns with the Programme's Specific Objective actions.[8] These include:

- 'sharing of knowledge about risks and opportunities from climate change between stakeholders in Ireland and Wales',
- 'developing assessment tools which assess the impact, risk and vulnerability of the Irish Sea and coastal communities to climate change',
- 'joint research where there are clear gaps in the evidence based on shared climate change impacts on the Irish Sea and coastal communities',
- 'transferring knowledge, expertise and best practice on adaptation measures between the two regions of the Programme area',
- 'developing further knowledge and understanding of the environment of the Irish Sea including its bio-diversity, habitats and species and its vulnerability to climate change', and
- 'joint development of tools to stimulate the cross-border exchange of knowledge and best practices regarding climate change adaptation amongst coastal communities to influence behavioural change which can increase the knowledge base and support the decision-making processes of public sector bodies and the general public'.

[7] EU Funds: Ireland Wales Co-operation Programme 2014-2020, 2015, p. 4.
[8] EU Funds: Ireland Wales Co-operation Programme 2014-2020, 2015, p. 40-41.

3.5 All of these objectives correlate with the activity undertaken by Bluefish which seeks to address knowledge gaps regarding the effects of climate change on commercial fish and shellfish.

The EU Strategy on Adaptation to Climate Change

3.6 This strategy (adopted in 2013) was the EU's framework and mechanism for taking current and future Climate Change impact in the EU to a new level. Aligning with an agreed International aim for global warming to be kept below 2ºC compared to the pre-industrial temperature. The strategy also recognises the need for long-term action to reduce greenhouse gas emissions and take adaptation measures to tackle climate impacts and the resulting economic, environmental and social costs.[9]

3.7 There are three main objectives set out by the EU:

- Promoting action by member states to build adaptation capacities and take action
- Promoting better informed decision making - addressing gaps in knowledge about adaptation, and
- Promoting adaptation in key vulnerable sectors such as fishing.

3.8 The EU adopted a new strategy on adaptation to climate change in February 2021.[10] It sets out how the EU can adapt to the unavoidable impacts of climate change and become climate resilient by 2050. In order to achieve this, the new strategy has four principal objectives, which are underpinned by 14 actions and steps to deliver them. The four objectives include: smarter adaptation, faster adaptation, more systematic adaptation, and stepping up international action for climate resilience.[11]

3.9 Clearly, Bluefish has continued to align with the long-term strategy, aiming to increase knowledge and build resilience through adaptation and aid in devising guidelines to support possible adaptation measures for selected fish and shellfish within the Irish and Celtic Seas. Internal partner stakeholders also reiterated the need for a long-term view to tackling climate change.

European Integrated Maritime Policy

3.10 The Bluefish Operation directly aligns with the high-level overarching Integrated Maritime Policy,[12] and specifically its objectives of 'adapting to climate change in coastal zones' and of providing 'support for research on climate change and its effect on maritime

[9] The EU Strategy on adaptation climate change (2013): Strengthening Europe's resilience to the impacts of climate change.
https://ec.europa.eu/clima/sites/clima/files/docs/eu_strategy_en.pdf
[10] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN
[11] https://ec.europa.eu/clima/policies/adaptation/what_en
[12] Marine Knowledge 2020: From Seabed Mapping to Ocean Forecasting, *Maritime Affairs*, 2012: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/publications/imp-progress-report_en.pdf.

activities, the environment, [and] coastal zones'.[13] Two identified policy strategies of importance within the Integrated Maritime policy include Blue Growth and Marine Knowledge 2020.

3.11 *Blue Growth* is a long-term maritime strategy supporting sustainable growth within the marine industry, and consists of three main components:

- Develop sectors that have a high potential for sustainable jobs
- Essential components to provide knowledge, legal certainty and security in the blue economy
- Sea basin strategies to ensure tailor-made measures and to foster cooperation between countries

3.12 The Bluefish Operation addresses some of the priorities of the *Blue Growth* strategy, particularly the need to foster sustainability, a healthy marine eco-system and a strong blue economy,[14] as well as the *Environmental Protection and the Maritime Strategy Framework Directive*, a policy framework seeking to encourage the sustainable use of marine resources and the marine environment.[15]

3.13 The Bluefish Operation's activities encourage the sharing of knowledge to preserve and enhance the marine and coastal environment, which address the policy concerns identified here, especially those relating to environmental and economic sustainability of the sea and coastal regions.

3.14 The Marine Knowledge 2020 strategy of the integrated maritime policy – which aims to 'stimulate innovation and improve our understanding of the behaviour of the sea', and also to 'provide the knowledge base to facilitate the growth of a sustainable, job-creating "blue economy" ' – states that 'scientific understanding underpins industrial innovation and environmental protection'.[16] This aligns with the Bluefish Operation's aim to better understand the marine environment through modelling and scenarios, filling knowledge gaps in knowledge, and reducing uncertainty regarding climate change.[17]

Atlantic Strategy in the Atlantic area

[13] The Integrated Maritime Policy, *European Parliament*, 2019: https://www.europarl.europa.eu/factsheets/en/sheet/121/the-integrated-maritime-policy.
[14] Marine Knowledge 2020: From Seabed Mapping to Ocean Forecasting, *Maritime Affairs*, 2012, p. 47: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/swd-2017-128_en.pdf.
[15] Marine Knowledge 2020: From Seabed Mapping to Ocean Forecasting, *Maritime Affairs*, 2012, p. 21: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/swd-2017-128_en.pdf.
[16] Marine Knowledge 2020: From Seabed Mapping to Ocean Forecasting, *Maritime Affairs*, 2012, p. 9: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/marine-knowledge-2020-green-paper_en.pdf.
[17] Marine Knowledge 2020: From Seabed Mapping to Ocean Forecasting, *Maritime Affairs*, 2012, p. 9: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/marine-knowledge-2020-green-paper_en.pdf.

3.15 Alignment with the Atlantic Area strategy[18] forms an additional evidence requirement for projects funded under the Programme, and Bluefish demonstrated strong alignment with this. The strategy looks to drive the blue economy through cross-border working around R&D, bringing industry closer to research and enhancing the competitiveness of SMEs. It recognises that modelling, forecasting and the ability to predict and understand how ecosystems function and interact form a vital part of ocean governance and are critical for the sustainable growth of economic activity in the Atlantic area.

Irish policy context

3.16 As noted earlier in the report, the aim of the Bluefish project is to address knowledge gaps regarding the effects of climate change on commercial fish and shellfish (e.g., in terms of exposure to parasites and pathogens, or invasion by non-native species), while also helping to provide adaptation strategies to address these potentially harmful effects. It thus seeks to develop a better understanding of the connectivity of shellfish/finfish and parasite/pathogen populations around the Irish Sea, and how this connectivity might be altered by predicted climate change effects on the physical, chemical and biotic environment, with a focus on the effects of disease, invasion by non-native species and changes to native population distribution and demography. Assessing and disseminating knowledge regarding risks and opportunities for commercial fish and shellfish under climate change impacts, and providing adaptation strategies to address this connectivity, are also expected to benefit coastal communities, stakeholder groups and SMEs in the fisheries sector, address barriers regarding lack of knowledge of the Irish Sea ecosystem and increase capacity in the targeted sectors to undertake necessary climate research.

3.17 Prior to its commencement, the project demonstrated its alignment with prevailing Irish policies and legislation at that time, which included an alignment with:

- national policy on climate change, as articulated in the National Climate Change Adaptation Framework (2012) and the Climate Action and Low Carbon Development Act (2015), which provided the over-arching framework for a strategic national adaptation response to climate change in Ireland, which was intended to identify vulnerabilities to climate change and develop and implement local adaptation plans for same;
- national policies with respect to food production, such as FoodWise 2025, Ireland's 10-year plan for development and expansion of the agri-food and seafood sectors, which included recommendations

[18] https://ec.europa.eu/oceans-and-fisheries/ocean/sea-basins/atlantic-ocean_en#:~:text=The%20Atlantic%20maritime%20strategy%20aims,%2C%20Ireland%2C%20Portugal%20and%20Spain.&text=The%20Atlantic%20area%20can%20make,blue%20economy%20of%20the%20EU.

on improving the environmental footprint of the seafood sector and prioritising research funding for the sustainability of food production;
- wider environmental and marine policies such as “Delivering Our Green Potential” (2012), Ireland’s policy statement on growth and employment in the Green Economy, and “Harnessing Our Ocean Wealth: An Integrated Marine Plan for Ireland” (2012).

3.18 Bluefish also continues to align well with updates or developments in Irish policy in the intervening period. In this regard, for example, the project’s aims and objectives complement several recent policy developments, which are outlined below.

National Adaptation Framework: Planning for a Climate Resilient Ireland

3.19 “National Adaptation Framework: Planning for a Climate Resilient Ireland” (2018) is the updated national strategy to reduce vulnerability to the negative effects of climate change in Ireland. This strategy, like its predecessor, sets out a series of adaptation measures for application in different sectors (including marine and fisheries, which is identified for its vulnerability to the negative impacts of climate change). Of particular relevance, however, as an input to climate change adaptation planning, the framework points to significant progress having been made in advancing the adaptation research agenda in Ireland, and it stresses the essential need to maintain and enhance this work so as to target specific policy areas and new research areas informed by international practice. In this regard, it also explicitly highlights the Ireland-Wales Programme 2014-20 (and the Bluefish project) for its contribution to pertinent research on climate change impacts, risks and vulnerabilities.

Climate Action Plan for Ireland

3.20 The new Climate Action Plan for Ireland (2019) sets out national commitments and courses of action to address the impacts of climate disruption and achieve associated decarbonisation targets. To do this, the new plan has outlined over 180 actions covering carbon pricing, electricity, transport, agriculture, enterprise, the built environment, waste management, public sector and public governance, citizen engagement and community leadership, and adaptation (including sectoral and local adaptation strategies).

Project 2040: National Planning Framework

3.21 The “Project 2040: National Planning Framework” for Ireland (2018) is a planning framework to guide development and investment in Ireland over the medium- to long-term, based on a series of national objectives and key principles, from which more detailed and refined plans are to be developed. In total, the framework includes nearly 80 national policy objectives, among which are included a desire to: develop a sustainable and economically efficient fishing and aquaculture sector; support the sustainable growth and development

of the maritime economy; and support the implementation of climate change adaptation measures in coastal areas.

National Development Plan 2018-2027

3.22 National investment plans for the medium-term, in turn, have been espoused under Ireland's National Development Plan 2018-2027 (2018), which is the investment planning arm of the National Planning Framework. This plan is built around 10 "national strategic outcomes", including National Strategic Outcome 8, which is to transition to a low-carbon and climate-resilient society. This investment outcome, in turn, identifies climate change adaptation as a priority, with commitments being made to prioritise and accelerate Ireland's response to global climate change over the lifetime of the plan.

Welsh policy context

3.23 Welsh policy further supports the aims of the Ireland Wales Programme Priority Axis 2. For example, Wales has a comprehensive climate change strategy dating back to 2010,[19] which includes a set of actions to mainstream adaptation to climate change.

3.24 Similarly to Ireland, Bluefish also aligns with Welsh policies and legislation prior to its commencement, as noted in the evaluation logic model and these include:

- Environment (Wales) Act 2016[20] states the need to build resilience in our environment to extreme weather events, as well as securing healthy, resilient and productive ecosystems.
- Welsh Government's Marine and Fisheries Strategy Action Plan (2013)[21] supports economic growth whilst ensuring sustainable management/utilisation of natural marine and coastal resources. It also recognises the need to support innovation and collaboration between industry and academic research centres in the sector.

The Welsh Government's 'Sustaining a Living Wales' Green Paper (2012)[22] aims to produce adaptation guidelines increasing the resilience of the fish, shellfish and aquaculture industries to future Climate change impacts.

Welsh National Marine Plan

[19] Climate Change Strategy for Wales (2010): https://gov.wales/sites/default/files/publications/2019-04/climate-change-strategy-summary.pdf
[20] Environment (Wales) Act 2016: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted.
[21] Wales Marine and Fisheries, Strategic Action Plan (2013): https://gov.wales/sites/default/files/publications/2018-05/strategic-action-plan-for-marine-and-fisheries.pdf.
[22] Sustaining a Living Wales, Green Paper (2012): https://gov.wales/sites/default/files/consultations/2018-01/120210nefgreenpaperen.pdf.

3.25 The general overarching policies of the Welsh National Marine Plan (WNMP)[23] reflect the core objectives of the Bluefish Operation. The strategy's main objective is to support the sustainable development of the Welsh marine area by contributing across Wales' well-being goals, supporting the Sustainable Management of Natural Resources (SMNR) through decision making and by taking account of the cumulative effects of all uses of the marine environment.

3.26 This is further supported by 12 other objectives, achieving a sustainable marine economy, ensuring a strong, healthy and just society, living within environmental limits, promoting good governance and using sound science responsibly.[24]

3.27 Of particular relevance to Bluefish are the two objectives below:

- Objective 8: Improve understanding and enable action supporting climate change adaptation and mitigation.
- Objective 13: Develop a shared, accessible marine evidence base to support use of sound evidence and provide a mechanism for the unique characteristics and opportunities of the Welsh Marine Area to be better understood.

3.28 Bluefish is a useful asset supporting the WNMP and has provided evidence to policy makers and marine planners on the sustainable development of the Irish Sea and possible protected areas for vulnerable species or stages in species' lifecycles.

Wales Marine Evidence Strategy 2019

3.29 Similarly, the Wales Marine Evidence Strategy 2019 aims to achieve a sustainable marine economy, including in the fisheries and aquaculture sector. The strategy supports the delivery of marine evidence to implement, monitor and evaluate the marine policies and plans of the Welsh Government and Natural Resources Wales (NRW), which look to restore and conserve marine biodiversity, promote sustainable marine use, protect our coastlines and enhance our coastal communities.

3.30 The strategy's priorities below clearly evidence the connection and relevance between the Bluefish Operation objectives and activities. The relevant priorities highlighted include:

- **Aquaculture** - Obtaining best available evidence of current and future aquaculture potential based on environmental and social parameters and other opportunities and constraints.
- **Fisheries** - Identifying opportunities for fishing industry diversification and/or increasing the value of current activities and

[23] Welsh Government (2019): Welsh National Marine Plan; https://gov.wales/sites/default/files/publications/2019-11/welsh-national-marine-plan-document_0.pdf

[24] Welsh Government (2019): Welsh National Marine Plan pg.5, https://gov.wales/sites/default/files/publications/2019-11/welsh-national-marine-plan-document_0.pdf

future planning to address challenges associated with climate change.

- **Fisheries** - Improve our understanding of where people fish (including recreational anglers) and why, how fishing patterns are changing, and why, and what the socio-economic implications are from displacement of fishing activities.
- **Fisheries** - Improve the availability of routine stock assessment data for fisheries as required, particularly in relation to fish and shellfish fisheries of key importance to the Welsh fishing industry.
- **Fisherie**s - Improve our understanding of diadromous fish and their migrations through the marine environment.
- **Wider Supporting Evidence** - Understanding how to improve biosecurity to prevent impacts from invasive non-native species.
- **Safeguarding marine ecosystem resilience** - Understanding resilience and the impacts of key pressures in Welsh marine ecosystems
    - In particular, improving our understanding of the potential impacts of climate change on marine ecosystems, in particular in relation to fish stocks (including disease and aquaculture)
- **Safeguarding marine ecosystem resilience** - Developing our knowledge of the spatial distribution of Welsh fish stocks including the distribution and sensitivity of fish migration, feeding, breeding (spawning and nursery grounds) and associated habitats. Focus species will be those identified as having high ecological or economic importance.
- **Protect, conserve, restore and enhance marine ecosystems** - Improving our ability to monitor marine biodiversity to allow us to assess the condition and health of our marine ecosystem more effectively and efficiently, enabling us to better understand trends and the influence of human activities on the marine environment and to support management
- **Protect, conserve, restore and enhance marine ecosystems** - Improving our understanding of the effectiveness of current management interventions in the Welsh marine environment.

3.31 The strategy also highlights the need for collaborative working with partners outside of Wales in order to achieve shared aims and objectives.

3.32 The Operation also supports the Well-being of Future Generations Act as it works towards the principles of prosperity, resilience and global responsibility.[25] In addition to this the cross-border Operation has a strong alignment with the international 17 United Nations (UN) Sustainable Development Goals,[26] which contribution is further analysed below in section 4.

[25] Well-being of Future Generations (Wales) Act, 2015, p. 4: https://futuregenerations.wales/wp-content/uploads/2017/01/WFGAct-English.pdf.
[26] https://sdgs.un.org/goals

Needs and objectives

Situation / need

3.33 To justify the resources inputted into an intervention, there needs to be a clear rationale for the Operation. The need for Bluefish was identified through the review of policy documents and discussion with stakeholders, whilst its objectives were contained in its Business Plan and discussed with the Operation delivery team and other stakeholders.

3.34 The individual elements of the need for Bluefish are contained in the evaluation logic model (Annex A). Looked at collectively, the rationale for the Operation is as follows:

- To understand climate change induced impacts to marine ecosystems and their functions / services across the Irish and Celtic Seas
- To address vulnerability of commercial fish and shellfish to the impacts of climate change across the Irish and Celtic Seas
- To understand potential ecosystem resilience and adaptation to climate change and need for long term environmental protection
- To ensure future sustainable management of natural resources and climate action
- To improve knowledge flow between academia, businesses/industry and coastal communities of the impact of climate change on fisheries and aquaculture
- To encourage sustainable economic blue growth by securing opportunities for future generations, through policy development

3.35 The rationale for the Bluefish Operation is underpinned by a universal need to address the negative impact that climate change is having on the world's oceans and coastlines. In recent years, several countries have declared climate emergencies including UK/Wales[27] and Ireland[28] which recognizes the need to go further in tackling climate change and its threat to the health, economy, infrastructure and our natural environment.

3.36 The consequences of climate change's impact on marine ecosystems have been evident across the world's oceans and coastlines.[29][30] The Bluefish Operation is a response to serious changes that climate change will bring to the Irish and Celtic seas. The fishing industries in Ireland and Wales will be affected by changes in sea temperature, increased acidification, and the greater prevalence of zones of low

[27] https://gov.wales/welsh-government-makes-climate-emergency-declaration
[28] https://www.theguardian.com/environment/2019/may/10/irish-parliament-declares-climate-emergency
[29] World Meteorological Organisation (2020) State of the Global Climate 2020, https://library.wmo.int/doc_num.php?explnum_id=10618
[30] Marine Climate Change Impacts Partnership (2020): Marine Climate Change Impacts Report Card 2020, http://www.mccip.org.uk/media/1999/mccip-report-card-2020_webversion.pdf

oxygen or ‘dead zones’ in the seas. The fishing industry is socially and economically important to coastal communities on either side of the Irish Sea. On both the south-east and north-east of Ireland’s coast, the fishing industry provides 5 per cent of coastal employment, and 6 per cent of employment on the south coast.[31] In 2018, €370 million worth of seafood was landed in Irish ports.[32] The value of landed seafood in Wales in 2017 was £15.3 million[33] and the industry had 753 fishers employed in 2016.[34]

3.37 In response to the challenges faced by coastal communities on the Irish and Celtic Seas due to climate change, the Bluefish operation aims to promote climate change adaption, risk prevention and management through encouraging the cross-border sharing of knowledge, expertise and best practise between the participating universities and institutes.

3.38 As a result, stakeholders engaged with as part of the evaluation were satisfied that there is a strong rationale for the existence of Bluefish, highlighting the Operation to be driven by both science, which is evidence by the Operation addressing knowledge gaps and building on scientific recommendations produced as part of the previous INTERREG funded project SUSFISH.[35]

3.39 Many stakeholders highlighted a collaborative approach was needed, as climate change impacts can affect ecosystems at both small and larger scales. Similarly, like many other marine resources, species distribution does not adhere to human-made marine zones / borders.

3.40 Shared resource is highly influential to the growth of the industry. Therefore, the understanding of connectivity of shellfish / finfish and parasite / pathogen populations around the Irish Sea, and how this connectivity might be altered by predicted climate change effects is vital to increasing volume and profitability fisheries and aquaculture businesses. Not only will it lead to growth but also opportunity for sustainable management of key species. The increased knowledge from scientific data, both spatially and temporally recorded can be highly advantageous for both cross border countries.

Objectives

3.41 The core objectives of the Bluefish Operation were as follows:

[31] The Business of Seafood 2018: A Snapshot of Ireland’s Seafood Sector, *Bord Iascaigh Mhara*, 2018, p. 8: http://www.bim.ie/media/bim/content/publications/corporate-other-publications/BIM-Business-of-Seafood-2018.pdf
[32] The Business of Seafood 2018: A Snapshot of Ireland’s Seafood Sector, *Bord Iascaigh Mhara*, 2018, p. 1: http://www.bim.ie/media/bim/content/publications/corporate-other-publications/BIM-Business-of-Seafood-2018.pdf
[33] UK Sea Fisheries Statistics 2017, *Marine Management Organisation*, 2018, p. 42: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/742793/UK_Sea_Fisheries_Statistics_2017.pdf.
[34] Brexit and Welsh Fisheries, *In Brief by Senedd Research*: https://seneddresearch.blog/2018/06/28/brexit-and-welsh-fisheries/
[35] https://research.bangor.ac.uk/portal/en/researchprojects/susfish(3720a519-95f7-417e-a6c7-d349878c9ec7).html.

- Priority Axis 2, Specific Objective: To increase capacity and knowledge of Climate Change Adaptation for the Irish Sea and coastal communities
- To reduce knowledge gaps and increase understanding on effects of climate change on the Irish/Celtic Sea
- To utilise new knowledge gained and share with coastal communities, industry and influence policy
- To analyse predictive scenarios, and assess potential effects of climate impacts on fisheries and aquaculture activities in the Irish/Celtic Seas
- To support the development of policy measures on improved food security, well-being and health, and adaptations to climate change for the Irish Sea-Celtic Sea area
- To support future cross border and international collaborations with improved knowledge transfer

3.42 In doing so, the Operation aimed to contribute to an increase in the Priority Axis 2 of the Ireland Wales Programme result indicator 'Levels of knowledge of adaptation to climate change amongst communities and businesses'. As a condition of its funding, Bluefish was also required to work to achieve its Ireland Wales Operational-level indicator targets.

3.43 Delivery of Bluefish's work packages and their respective aims and objectives formed an important part of the Operation. So too did the delivery of the CCT objectives of gender mainstreaming and equal opportunities, sustainable development and tackling poverty and social exclusion.

3.44 Overall, the Bluefish objectives were ambitious, but there was general confidence from stakeholders that Bluefish had achieved its intended objectives. However, it was highlighted that a long-term outlook was needed to fully understand the implications of climate change.

3.45 Furthermore, at this stage the Operation has surpassed its goal of 'number of new awareness raising initiatives targeting coastal communities', as well as achieving its targets for the number of research institutions participating in cross-border, transnational or interregional research operations and number of organisations cooperating in enhancing the marine and coastal environment.

4. Operation design, delivery and management

4.1 This section of the report presents the evaluation findings concerning the design, delivery and management of the Bluefish Operation and its integration of the Cross-Cutting Themes (CCTs).

Inputs and resources

4.2 Inputs are the resources available to an operation to carry out its activities. The evaluation aimed to identify the key inputs / resources that are available to Bluefish and whether these enabled the Operation to carry out its activities to achieve its objectives effectively.

Finance

4.3 The Operation was funded by €5.3 million from the ERDF at an 80 per cent intervention rate and €1.3 million in match-funding from partners.

4.4 Stakeholders were generally positive that the Operation had spent its money well and spend was on target throughout Operation delivery. However, the relationship between WEFO's Management Verifications Team (MVT) and some Operation's partners was identified as very problematic by stakeholders.

4.5 The evaluation team understands that during the delivery phase, disputes arose regarding financial claims relating to vessel costs. The Operation delivery team reported that costs were unjustly challenged and forensically scrutinised, ultimately leading to penalties being imposed, but subsequently resolved. Prior to delivery, no issues were identified. Many stakeholders understood the need for inspection of public finances; however, it was perceived that processes were not communicated well from the outset to achieve a common understanding, and this caused significant levels of concern between Welsh and Irish funding bodies / representatives.

4.6 Stakeholders also felt that monitoring issues significantly impacted the Operation to a point of almost stalling delivery and potentially damaging the relationship between cooperating partners. There was a risk at this point that partners would have withdrawn, impacting the Operation.

4.7 Although a partial resolution has been found to the financial issues, a potential extension to the Operation was rejected in 2019 because of MVT issues and Irish partners being unwilling to work with WEFO – although enthusiastic about continuing the relationship with Wesh delivery partners. Partners reported offering to become involved, with no extra financial support needed.

4.8 This was considered a major lesson learnt for many stakeholders involved, which could have been avoided if clear aims, structure and financial arrangements were communicated at the start. This was also highlighted in the Ireland Wales Programme mid-term evaluation recommendations, which stated (Recommendation 1) that the

Managing Authority should continue with the open/rolling call process for project applications but seek to increase communication with applicants, around the expected time taken for applications and to provide deadlines by which time applicants can expect feedback.

4.9 The delivery team was, however, clear in its gratitude for the support and understanding received from their Ireland Wales Officer (IWO).

Skills, knowledge and experience

4.10 The Operation utilised the skills and knowledge of staff at BU, AU, SU, UCC, BIM, MI and also industry/government stakeholders. Stakeholders were highly complimentary about the skills and knowledge provided by the Operation partners and delivery teams. Many stakeholders described the sharing of knowledge (including data) arising from the partnership as being a core strength of the Operation, and not only skills in Operation-critical areas but also wider skills and knowledge.

4.11 The cross-border collaboration is further explored in section 6 below.

Assets

4.12 The assembled consortium of partners possesses complementary skills, experience and facilities with regard to the study of climate change impact on fisheries, aquaculture and ecosystem services. Resources and technology utilised by Bluefish included research vessels, specialist equipment for monitoring and other purposes, and ICT.

4.13 Stakeholders were generally happy that the Operation had sufficient resources and technology available to it, for what was seen as a large, complex Operation.

Activities

4.14 Activities are what an intervention does to produce outputs, which contribute to the achievement of its objectives.

4.15 Bluefish was developed to expand on work conducted from the previous successful INTERREG funded project SUSFISH.[36] This collaborative project was part-funded by the ERDF through the Ireland Wales Programme 2007-13 and included four of the same partner organisations (BU, AU, UCC and SU).[37].

4.16 The addition of partners BIM and MI for Bluefish, which have strong connections with Government and Industry, represented the needs of the Operation and provided a strong partnership of three Irish and three Welsh organisations across the Irish Sea. Bluefish also implemented lessons learnt and recommendations from the SUSFISH

[36] https://research.bangor.ac.uk/portal/en/researchprojects/susfish(3720a519-95f7-417e-a6c7-d349878c9ec7).html.
[37] Previous Ireland Wales Programme.

project by realising and identifying where evidence gaps and challenges were.

4.17 The Bluefish Operation's core activities were delivered through six work packages (WPs) and a further 14 sub-packages (Table 4.1), each with individual aims and objectives.

4.18 The work packages aimed to be interlinked with climate change as an overarching theme, and were divided between the six cooperating partners. Each work package had an assigned lead (Table 4.2) and subsequent support organisation. The lead and support organisation were also from different Irish / Welsh cooperating partners, further enhancing the cross-border approach to delivery.

4.19 Stakeholders were extremely satisfied with the design/delivery of the Bluefish Operation, and it was highlighted as very comprehensive and able to interlink complementary research themes, providing a platform for partners to share knowledge across the Irish Sea.

Table 4.1: Bluefish Operation work package activity breakdown

Work package	Sub-package
WP1: Project Management	Project management of the Bluefish Operation
WP2: Ecosystem Understanding	2.1: Understanding trophic interactions in aquaculture
	2.2: Mapping predators
	2.3: Shellfish and climate change
	2.4: Ecosystem goods and services
WP3: Ecosystem Resource Sustainability	3.1: Scallop stocks and fisheries
	3.2: Seabass stocks and fisheries
	3.3: Mussel populations and larval settlement
WP4: Ecosystem Health and Well-being	4.1 Invasive species
	4.2: Cockle health
	4.3: Disease connectivity
	4.4: Toxins and pathogens under climate change
WP5: Ecosystem Change	5.1: Models and scenarios
WP6: Communication and Dissemination	6.1: Dissemination of information and knowledge to wider scientific community, stakeholders and Coastal Communities

Source: Adapted from Bluefish documentation

Table 4.2: Matrix of the Bluefish Operation Partner Leads for each work package

	WP1	WP2	2.1	2.2	2.3	2.4	WP3	3.1	3.2	3.3	WP4	4.1	4.2	4.3	4.4	WP5	WP6
Bangor University	■				■						■				■	■	■
Aberystwyth University													■			■	
University College Cork											■	■					
Swansea University		■		■										■			

Bord Iascaigh Mhara			■				■			■							
Marine Institute		■				■	■	■	■								

Source: Adapted from Bluefish documentation

Management and governance

4.20 Bangor University was the lead beneficiary with AU, SU, UCC, BIM and MI joint beneficiaries (which made up the Project Management and Monitoring Group). The management of the Bluefish Operation was cited by stakeholders as being effective in monitoring progress towards achieving objectives. The monitoring and evaluation processes were seen as proactive, coherent and well organised.

4.21 Regular quarterly Project Management and Monitoring Group meetings were held and the pre-existing working relationships between senior researchers in Ireland and Wales (partly established during the SUSFISH and Irish Sea Portal Pilot (ISPP)) were also seen as a key component in making sure there was sufficient collaboration and communication throughout the Operation.

4.22 The governance and stakeholder governance of Bluefish involved the institutional governance of BU (its Executive Group and Major Projects Group) and Operation governance (the Bluefish Programme Board).[38] Many stakeholders were generally satisfied with the governance arrangement, although it was felt by one stakeholder there should have been a clearer distinction between the programme board and the project management group, as these included similar stakeholders.

4.23 Stakeholders lightly commented on the Operation's stakeholder advisory arrangements, suggesting that they were largely not required or functional. This can be attributed to stakeholder fatigue / accessibility[39] and partner organisation utilisation of already established stakeholder links.

Communication and marketing

4.24 It was clear from the nature of the Operation's objectives and targets; communication and marketing would be a key aspect of raising awareness of the impact of climate change. The Operation's communication and marketing appeared to be effective (a view shared by stakeholders), as the Operation aimed to engage with stakeholders through a wide range of activities, such as events, workshops, conferences etc.

4.25 Bluefish set up communication platforms such as the Bluefish website[40] and Twitter[41] account and actively promoted news, events, publications and other interactions.

[38] Bluefish Business Plan, pg.69.
[39] In particular, senior government officials.
[40] http://bluefishproject.com/./
[41] https://twitter.com/bluefish_eu?lang=en.

4.26 The Operation has also received wider, international recognition and publicity. Most notably, early 2020 saw the Duke and Duchess of Cambridge visit the MI as part of their first official visit to Ireland,[42][43] which included discussions of MI work on the Bluefish Operation and working with coastal communities in Ireland and Wales on the importance of the ocean to their livelihoods and the impacts of a changing climate. Other publicity included televised broadcasts of Bluefish research on ITV Wales[44] and a ministerial visit from the now First Minister of Wales – Mark Drakeford, as reported on the BBC.[45]

4.27 Stakeholders were generally satisfied with the communication / marketing, however it was felt that improvements could still be made, in particular with the website, e.g. improvements to the content on the webpages to reflect the breadth of research / activities that the Bluefish Operation has conducted.

4.28 The communication and marketing plans are also linked to the awareness raising initiatives and indicators, and is explored further in section 5 and 6 below.

Addressing cross-cutting themes

4.29 The Cross-Cutting Themes (CCTs) or horizontal themes are issues that relate to general principles such as equality and sustainability. They aim to improve the quality and legacy from operations supported by EU Structural Funds and add value to operations. They require action in multiple fields and must be embedded into the design and delivery of all operations.

4.30 The Ireland Wales Programme sets out two core CCTs that operations must work towards in addition to main delivery.

- The Sustainable Development CCT aims to ensure that programmes and operations/projects work to meet social, economic and environmental objectives simultaneously.
- The Equal Opportunities and Gender Mainstreaming CCT aims to reduce injustice and promote social cohesion by providing the opportunity for all eligible beneficiaries to participate. In Wales, this Theme includes promotion of and support for speakers of the Welsh language.

4.31 Overall, the Bluefish Operation appears to have successfully addressed CCTs through its activity. The Operation delivery team and Bangor University's Sustainability Lab[46] (a department dedicated to sustainability within Bangor University) have worked together from the beginning to propose how the Operation could maximise the potential to contribute to CCT goals. This included the Bluefish Sustainable

[42] https://www.marine.ie/Home/site-area/news-events/press-releases/duke-and-duchess-cambridge-meet-marine-institute-during-first.
[43] https://twitter.com/MarineInst/status/1235501841812766721.
[44] https://twitter.com/BlueFish_EU/status/1321103080046419968.
[45] https://twitter.com/BlueFish_EU/status/894869932374204417.
[46] Bangor University Sustainability Lab https://www.bangor.ac.uk/sustainability/about-us.php.en.

Officer conducting a Well-being of Future Generations Workshop at an early partner meeting in 2017, to ensure that the principles of the Well-being of Future Generations Act (WFGA) were embedded in all aspects of the Operation, thereby delivering on the CCTs as described in the Business Plan.

Sustainable Development

4.32 The nature of the Operation, which aims to address needs such as the transition to a future of sustainable management of natural resources and climate action, naturally aligns with the Ireland Wales Sustainable Development CCT. In addition, the project's planned activities also strive to adopt wider practices that promote sustainable development, where possible, although these tend to be practices that are being more commonly adopted in general. The Bluefish Operation has integrated / conducted the following CCT activities:

- Promotion of ICT
  - The Bluefish Operation had implemented the use of videoconference for partner meetings to alleviate the need for travel and reduce carbon footprint
  - Bluefish was therefore well adapted to this way of working when countries were forced to work from home as a result of the COVID-19 pandemic
- Developing and displaying Eco codes / Well being codes
  - Codes were developed in the early stages of delivery and displayed in prominent areas in the institutions
- Development of a single-use plastic minimisation policy in research laboratories
- Awareness raising outreach events
  - A core aspect of Bluefish delivery - awareness raising of the impact of climate change on marine ecosystems and species through conferences, workshops, events and festivals
  - Development of sustainable event checklists
- Promoting alternative travel
  - Development of sustainable travel policies (such as Cycle to Work Scheme) and monitoring of meetings attended but not travelled to

4.33 In table 4.3 below, the evaluation assessed Bluefish activity against the United Nations 17 Sustainable Development Goals.

Equal Opportunities and Gender Mainstreaming

4.34 As an Operation in the Science, Technology, Engineering and Mathematics (STEM) sector, Bluefish is heavily affected by the existing gender imbalance within the STEM workforce.[47] However, Bluefish has been very successful at promoting women in science and early career scientists through the course of its delivery.

[47] https://www.wisecampaign.org.uk/statistics/2019-workforce-statistics-one-million-women-in-stem-in-the-uk/./

Figure 4.1: Bluefish highlighting their success in promoting women in science and early career scientists at full team meeting, Galway 2018

Source: Bluefish progress claim report, July to December 2018

4.35 In addition, a number of outreach events targeting STEM with the public and young children have also been conducted, although these slowed in 2020 due to COVID-19 impacts. Swansea University was also able to support an early career female team member to receive training from leaders in the field of metabarcoding of trophic interactions, and many of the Operation's decision-making roles have been occupied by women.

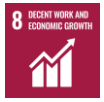
4.36 During the COVID-19 pandemic, many workers transitioned to working from home, and closure of schools and day care facilities resulted in increased caring responsibilities for many of those juggling childcare with full-time working. The pandemic thus highlighted inequalities within the workforce, in particular for working mothers who take up a large proportion of caring responsibilities.[48] Bluefish understood the challenges of this and new working patterns were adopted to take into account the change to a home working environment and the needs of those with caring responsibilities.

4.37 The Operation has also taken a reasonable approach to integrating the Welsh language into its delivery: its website, email signatures and social media platforms are bilingual, and other promotional materials are available in Welsh.

4.38 To further support Welsh Language provision, many staff attended arranged Welsh language classes, which were continued during COVID-19 as online sessions.

[48] https://www.nber.org/papers/w26947.

Table 4.3: Bluefish alignment with the 17 UN Sustainable Development Goals

	Bluefish supports the development of a skilled and well-educated population by generating and safeguarding jobs in Wales and Ireland. Specifically, by collaborating with businesses / organisations through activities, Bluefish supports generating wealth in the wider economy and provides secure and decent employment opportunities.		Bluefish supports a transition to an innovative, productive and low-carbon society. Bluefish research can indirectly support understanding for renewable energy initiatives. For example, through its modelling of target species distribution changes under future environmental conditions.		The nature of the Operation aims to strengthen the global response to the threat of climate change through the research conducted and through awareness raising on the impact to climate change among coastal communities
	Bluefish supports the food and agriculture sector through research conducted that can offer potential solutions for sustainable management of key marine species for future generations.		Bluefish supports the development of a skilled and well-educated population by generating and safeguarding jobs in Wales and Ireland. Bluefish supports generating wealth in the wider economy and provides secure and decent employment opportunities.		Bluefish supports the sustainable management of essential natural resources. Research conducted aims to provide region-wide adaptation strategies for the benefit of coastal communities. This will help support governments to ensure the Irish Sea / Celtic Sea is effectively managed and well-resourced and regulations in place.
	Bluefish ensures healthy lives and promoting the well-being for all at all ages, which is essential to sustainable development. In particular it aligns with key policies such as WFGA (Wales) and Project 2040 (Ireland).		The focal point of the Operation is to 'future-proof and expand the existing industry' and is therefore linked inextricably with sustainability, prosperity and resilience.		Climate change is a global challenge, so the raising awareness activities conducted by Bluefish highlights its importance and need for actions which will not only affect our oceans but our coastlines / land also.
	Bluefish has more than 20 people employed, which represents a strong expertise. The Operation supports early career researchers / students, establishing a synergistic relationship between individuals and the Operation to develop research, skills and knowledge.		Bluefish supports a society that enables people to fulfil their potential no matter what their background or circumstances (including their socio-economic background and circumstances) by creating highly skilled jobs in the R&D sector. In particular, providing opportunities for Welsh Language speakers in Wales.		Bluefish established a strong cross-border, mutually beneficially collaboration, which has created a platform for partners to share knowledge across the Irish Sea. This includes connecting Welsh and Irish strategic organisations to understand common challenges.
	A core aspect of Bluefish CCT activity is towards promoting women in STEM. The project goes out to showcase its work to support young women and girls – including STEM outreach events.		Through Bluefish activities and awareness raising initiative to coastal communities. Also supporting small town and village communities, historical and sustainable fisheries – both Welsh and Irish culture		A core aspect of Bluefish and the Ireland Wales Programme is to bring together cross-border institutions in partnership from across the Irish Sea to tackle common challenges together.
	Bluefish supports water quality research and analysis of toxins and pathogens, which indirectly relates to this goal. This research is vital in ensuring sustainable / healthy food supply.		Bluefish supports the sustainable management and monitoring of natural resources within the fisheries / aquaculture sector, ensuring a sustainable food supply consumption.		

Future Opportunities

4.39 Based on the documentation review and discussions with Bluefish stakeholders, the Operation has made good progress towards addressing CCTs, although improvements could be adopted for future projects, including suggestions such as:

- Ensure the Operation has a detailed CCT delivery plan, including tangible targets that focus activities in key areas, whilst also further embedding the principles of the WFGA and UN 17 Sustainable Development Goals across all aspects of the Operation.
- Share best practice and lessons learnt from other public funded Operations across Ireland and Wales.
- Create synergies with other public funded operations and develop joint CCT activities that mutually benefit both operations. For example, link up a European Social Fund (ESF) Operations tackling poverty and social inclusion
- Understand if COVID-19 has presented opportunities / barriers for future working or addressing CCTs
- Operations should consider looking beyond CCT themes / indicators, and address other CCT challenges within the Operation's sector for example in relation to Bluefish promoting gender equality in the fisheries and aquaculture industry

External Factors

4.40 As part of the evaluation, it is important to understand potential negative (and positive) impacts that affect an operation's activities, outputs, outcomes and impacts. During the development of the Bluefish evaluation logic model, key external factors were identified (logic model reference EF). The two most notable impacts for the Operation and evaluation are included within this section.

COVID-19

4.41 A new coronavirus disease (COVID-19) causing acute respiratory symptoms was first identified in Wuhan, China, in December 2019. As global COVID-19 cases began to accelerate the World Health Organisation (WHO) declared a global pandemic on 11th March 2020.

4.42 In response, countries around the world began to introduce new measures to slow the spread of COVID-19. The UK and Irish Governments introduced a state of lockdown on the 23rd and 27th March respectively.

4.43 As a result of this, the Bluefish delivery team and staff (like many others across the UK and Ireland) transitioned to working from home. The delivery team / researchers adapted well to new practices and the way of working. COVID-19 however impacted project laboratory work and fieldwork due to be conducted in 2020 and contributed to delays in the project timeline. As such many fieldwork activities (such as use of marine vessels for sampling) were postponed / delayed.

This also resulted in the Operation outputs and indicators to also be disrupted.

4.44 With the COVID-19 pandemic still ongoing, and Wales and Ireland continuing to implement lockdowns, the lasting impacts on the project are yet to be fully realised.

Brexit

4.45 Since the inception of Bluefish, discussions over the UK's exit from the EU have been at the forefront of the political agenda.

4.46 The UK officially left the EU on the 31st January 2020, entering into an 11-month transition period which ended on the 31st December 2020. This process, and the uncertainty involved with the lead up to the UK's exit from the EU has had a range of implications on the fishing industry and the Bluefish Operation.

4.47 The European fishing industry has become a key area of debate over the UK's withdrawal from the EU. While the impacts of Brexit are still manifesting themselves on the UK and Irish fishing industries, early implications include difficulty with and slowdown of export for UK-based fisheries and re-routing exports straight to the EU for Irish fisheries. For Bluefish this has caused some difficultly in engaging with the industry, which has been preoccupied with concerns over possible implications of Brexit negotiations.

4.48 Furthermore, while Bluefish partners have expressed interest in continued collaboration, the viability of continued funding is uncertain as a result of Brexit. Without funding of the Ireland Wales Programme / Bluefish Operation, collaboration would likely not have been possible. Continuation of climate change capacity and knowledge development across the Irish Sea is therefore uncertain given the position regarding future funding.

4.49 While the UK government has announced the replacement of EU Structural Funds with a successor arrangement known as the UK Shared Prosperity Fund, the precise arrangements remain unclear and no specific allocation of funds for cross-border collaboration has been identified to date.

5. Operation progress

Progress against Operation-level indicators

5.1 The progress of the Bluefish Operation is measured by three Ireland Wales Programme operational-level indicators, and seven additional output indicators as set out in table 5.1 and 5.2. Below we explain the output (where necessary) and provide an analysis of its achievement.

5.2 At the summative stage of the evaluation, the Bluefish has made significant progress towards the indicators, delivering on or above target profile.

Table 5.1: Progress against Operational-level (output) indicators under Ireland-Wales Programme, Priority Axis 2, April 2021.
Operation forecast/target, achievement to date, and expected achievement by operation close

Evaluation reference	Indicator / measure description	Target	Achieved to date (Apr-21)
OP.1	Research institutions participating in cross-border, transnational or interregional research operations[49]	6	6
OP.2	New awareness raising initiatives targeting coastal communities[50]	10	13
OP.3	Organisations co-operating in enhancing the marine and coastal environment[51]	10	10

Source: Bluefish documentation

OP.1: Research institutions participating in cross-border, transnational or interregional research operations - 6

5.3 The first operational indicator was claimed at the project inception, this included the six Bluefish Operation delivery partners. In total six research institutions participating in cross-border, transnational or interregional research operations included three Welsh institutions; Bangor University, Swansea University and Aberystwyth University and three Irish institutions; University College Cork, Bord Iascaigh Mhara and the Marine Institute.

OP.2: New awareness raising initiatives targeting coastal communities - 13

5.4 The overall target for the second Ireland-Wales indicator is for 10 new awareness raising initiatives targeting coastal communities. As of April 2021, the Bluefish Operation has conducted 13 new awareness raising initiatives across Wales, Ireland, UK and abroad. The new awareness raising initiatives involved disseminating research /

[49] The number of research institutions that participate in cross border, transnational or interregional research projects
[50] The number of new awareness raising initiatives targeting coastal communities which are funded through ERDF intervention.
[51] The number of organisations that cooperate in a project which enhances the marine and coastal environment

engaging with individuals at a range of conferences, workshops and at outreach events.

5.5 As part of this indicator, case studies were developed, summarising the type of event and the audience, which are explored in more detail below, including a full list of engagement activity (Table 6.2). Further initiatives were planned for 2020, however COVID-19 restrictions impacted the indicator progress as this caused cancellations to several events.

5.6 The Bluefish delivery team also highlighted that they would continue contributing to the number of new awareness raising initiatives after the Operation's final conference (OP.7).

OP.3: Organisations cooperating in enhancing the marine and coastal environment - 10

5.7 The Bluefish Operation has achieved its Ireland Wales indicator target of 10 organisations cooperating in enhancing the marine and coastal environment. As of April 2021, 10 cooperation partnerships were established from the Operation. These include the following:

- Swansea University & Liverpool University
- Swansea University & Exeter University
- Swansea University & RSPB
- Bangor University & Met office
- Bangor University & Salford University
- BIM & VOCAB, University of Ireland (NUIG), Galway
- BIM & Environmental Protection Agency (EPA)
- Marine Institute and Bournemouth University
- Marine Institute, Fisheries Ireland and Loughs Agency

5.8 Again, the impact of COVID-19, Brexit and the Operation reprofile, have hindered further progress against this indicator.

Additional output indicators

5.9 In addition to the core operational-level indicators, Bluefish recorded progress against additional outputs as set out in the business plan.

Table 5.2: Progress against the Operation's additional output indicators, March 2021.

Operation forecast/target, achievement to date, April 2021 and expected achievement by operation close

Evaluation reference	Additional output	Target	Achieved to date (Apr-21)	Expected by project close
OP.4	Reports for activities	12	7	12
OP.5	Workshops	8	5	TBC
OP.6	Publications in peer review journals	12+	21	TBC
OP.7	Conference	1	0	1
OP.8	Final report	1	0	1
OP.9	Guidelines and factsheets for adaptation/mitigation	1	0	1
OP.10	External Evaluation	1	1	1

Source: Bluefish documentation

OP.4: Reports for activities - 7

5.10 As part of the Operation delivery, the Bluefish team aimed to produce 12 standalone reports to summarise activity conducted within each work package. The activity reports are in development, with seven completed and five to be completed by project close. The aim is to provide further information / knowledge of the impacts of climate change through Bluefish conducted research activities.

5.11 The reports will be made available at the final conference for all stakeholders attending.

OP.5: Workshops - 5

5.12 In total five workshop have been conducted to date. The aim of the workshops are for Bluefish partners to disseminate knowledge of risks and opportunities for commercial fish and shellfish within predicted climate change impact scenarios to stakeholders, SMEs, coastal communities and interested parties in both Ireland and Wales. Workshops were conducted in multiple locations across Ireland and Wales including:

- Welsh Government Fisheries
- BIM Castletownbere June 2018
- Arch UK July 2018 – joint event with Bluefish
- Art roadshow/tour Ireland August 2018
- Art roadshow/ tour Wales October 2018

5.13 The impacts of COVID-19 restrictions / Brexit have limited what Bluefish workshops could be organised in the last 6/12 months. The Bluefish delivery team were aiming to incorporate a workshop into the final conference, but this was unfortunately not possible.

OP.6: Publications in peer review journals – 21

5.14 In order to raise awareness within the scientific community, Bluefish aimed to produce publications alongside activities. As of April 2021, Bluefish have developed 20+ peer reviewed journal publications.

OP.7: Conference - 0

5.15 The Bluefish final conference was expected to be a face-to-face conference in September 2020, but as a result of COVID-19, the conference was moved to an online format. The conference will take place on 24th and 25th June. Stakeholders are invited to attend and delivery partners will showcase science / activities conducted by Bluefish.

OP.8: Final report - 0

5.16 The final report aims to be engaging and accessible to a wide range of stakeholders. The final report will likely include summary and guidelines for policy makers in respect of Climate Change, background and aims of the Operation in relation to each workpackage, results, discussions, conclusions and further work. The report will be completed after the final conference.

OP.9: Guidelines and factsheets for adaptation/mitigation - 0

5.17 The guidelines and factsheets for climate change adaption/mitigation are being developed in conjunction with the final report. The delivery team are aiming to include factsheets and/or infographics that will be shared with stakeholders at the conference.

OP.10: External Evaluation - 1

5.18 The external evaluation of Bluefish was commissioned by the delivery team in advance of its closure phase. The evaluation team recommends that the external evaluation is commissioned earlier or at multiple stages of any future operation's delivery, so that it can help identify potential issues with indicator data and support it being captured.

5.19 This evaluation report constitutes the evidence for the external evaluation additional output.

6. Operation Key Themes

6.1 As part of the evaluation process, three attributes were identified as core elements - key themes of the Bluefish Operation. These themes underpin the Operation's key to success and run throughout the rationale for the operation and logic model:

- Increase understanding and knowledge of the impacts of climate change through research activities
- Awareness raising of the impact of climate change on marine ecosystems and species (in particular fisheries / aquaculture species)
- Cross border collaboration

6.2 These themes are explored in more detail below, including considering any external factors that may impact them now and in the future.

Increase understanding and knowledge of the impacts of climate change through research activities

6.3 Within the Ireland Wales Co-operation Programme 2014-2020 supporting documentation,[52] it states that:

> *'The Priority will support activity aimed at reducing knowledge gaps, the transfer of that knowledge amongst key stakeholders and the wider dissemination within the scientific community and the wider communities of the cross-border region.*
>
> *The maritime nature of the border between Ireland and Wales provides an opportunity to increase capacity and knowledge of climate change adaptation across the Irish Sea and its coastal communities by commissioning joint research, sharing existing research and expertise and monitoring the impacts of climate change'.*

6.4 As noted in Section 3, the Bluefish Operation exhibits a strong strategic fit with policy and need, and the above statement reiterates this. The Operation was design to address the Ireland Wales Programme's Specific Objective: *To increase capacity and knowledge of climate change adaptations for the Irish Sea and coastal communities*. To do this, Bluefish built on the institutions' experience and the previous SUSFISH Operation, which included recommendations.[53]

6.5 There was confidence from stakeholders that knowledge and understanding had increased as a result of the Bluefish research activities. One most notable example was that many stakeholders

[52] EU Funds: Ireland Wales Co-operation Programme 2014-2020 Summary Document, p.3; https://irelandwales.eu/sites/default/files/2016-04/150315summaryirelandwales.pdf.
[53] Bluefish Business Plan, pg.9

highlighted that the increase in understanding of species population distributions at a genetic scale was highly valuable.

6.6 The importance of this is that this level of detailed information of population distribution had previously been unavailable, allowing further understanding of the migration and interconnectivity of species across the Irish and Celtic Seas.

6.7 A key indication of contributing to the Operation's aim to increase capacity and knowledge of climate change adaptations is the evidence from research resulting below as part of work package 3.2: Seabass stocks and fisheries:

- *An increase in temperature (via predicted climate change) will not affect sea bass abundance and distribution as sea bass appear to have a wide temperature threshold.* [54]
- *Sea bass however will be affected by increased rainfall*[55] *reducing salinity in estuaries and this might have significant effects on juvenile stages with more research required*.[56]

6.8 A government/industry stakeholder noted that the information from Bluefish was very important and useful for Government to prepare and plan for climate change. For example, through Bluefish research, projections and monitoring the Government can identify potential 'trigger points' or look at areas that are currently outside scope, such as targeting other species for market opportunity.

6.9 This highlights the importance of Bluefish information for two aspects; firstly, the sustainable management of natural resources (fish stocks) but also opportunities for economic opportunities to support the industry. The latter is especially crucial for Wales to manage the impact of Brexit, as the industry looks to identify new export markets. The information obtained has also further supported the fisheries/aquaculture industry through knowledge of mitigations to reduce stress and subsequent mortalities as a result of climate change impacts.

6.10 One partner stakeholder felt that there was much better understanding of natural resources in the Irish Sea and climate change for the next 50 years. This had created the foundations for further research and mitigation of threats to marine ecosystems.

6.11 Stakeholders highlighted the need for further knowledge and understanding, suggesting that the Irish Sea would benefit from a co-ordinated management and monitoring system which could assist in explaining why things happen, how they can be avoided and how to take action accordingly. One industry stakeholder, however, felt the Operation needed to do more in terms of identifying knowledge gaps to support industry to deal with changes.

[54] Bluefish Science Report June – December 2020
[55] Climate change is linked to extreme weather events and increase heavy rainfall
[56] Bluefish Science Report June – December 2020

6.12 Some stakeholders noted that there was a clearer understanding of climate change and its impact on the Irish Sea both at a macro level, supported by the cross-border collaboration, but also at a regional-level which has helped to understand different species' behaviour and relationships. Hence individual partners have gained knowledge and understanding, as well as the collective understanding of the wider project.

6.13 The examples above support outcomes and impacts OC.2, OC.3 IM.1, IM.4, IM.8. Although with the data available we cannot definitively state that Bluefish has achieved its impacts, there is evidence that suggests the Operation has made a substantial contribution towards achieving its outcomes. There is, however, a need for longer-term monitoring for climate change research.

Awareness raising of the impact of climate change on marine ecosystems and species (in particular fisheries / aquaculture species)

6.14 Another core aspect to Bluefish delivery was to utilise new knowledge gained and to share this with coastal communities and industry, to influence policy and raise awareness of the impacts of climate change.

6.15 The evaluation analysed evidence from documentation and stakeholder conversations to discover the extent of awareness raising activities conducted by Bluefish partners and whether these activities contributed to the Operation's intended outcomes. The awareness raising activities can be divided into different stakeholder group categories; Government/policy, industry, scientific community and the general public.

6.16 Overall Bluefish has made excellent progress towards raising awareness amongst coastal communities in Ireland and Wales. The Operation has delivered a range of activities that go beyond the Ireland Wales Operation indicators.

6.17 Table 6.2 includes a full list of engagement activity claimed against Operation indicators and additional output targets. The Bluefish Operation is also providing further information on coastal community engagement within the activity report summaries.

Government / policy and Industry

6.18 Prior to the start of the Operation, during the preparation and planning stage, Key Bluefish partners engaged with several government and industry stakeholders. This is evidenced by the organisations and stakeholders listed within the business plan.[57] The addition of the MI and BIM, who are both regulatory bodies in Ireland, also supported a wider network with government / industry.

6.19 One Stakeholder stated the Ireland Wales Programme / Bluefish Operation facilitated a natural communication line between Welsh Government and the Irish Government. Which provided the opportunity to raise research findings with both.

6.20 On the other hand, a small number of stakeholders felt that there could have been more done to engage with industry, in particular at the project's inception. It was felt that the Operation would have benefited from closer involvement from industry during the development of the Operation, to understand industry needs and avoid repetitiveness, replication and saturation. This was suggested as a potential improvement for future operations.

> *Stakeholder - Need fisheries / aquaculture in from the start of the project. Not necessarily involved in the bid but just need to consult them. Maybe industry driven and really look for industry wants.*

[57] Bluefish Business Plan, pg.26

Stakeholder - what would industry find beneficial? Would have strengthen it [the Operation]

Stakeholder –communication needs to be key. Its not that the research is not useful its that industry don't know about them. Also, for the industry there are lots of projects like it. They are very similar and repetitive of information. The same information / research from a different angle, far too many projects looking at the same thing.'

6.21 Despite this, the Operation conducted several engagement activities with government and industry stakeholders. There were especially highlighted by OP.5 workshops which included Welsh Government Fisheries workshop, BIM Regional Fisheries Centre industry workshop and the ARCH-UK joint event with Bluefish which saw representatives from Bangor Mussel Producers Ltd, Food Standards Agency (FSA), Environment Agency (EA), Dŵr Cymru Welsh Water (DCWW), Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Natural Resources Wales (NRW) and UKRI.[58]

6.22 In addition to this Bluefish staff and researchers attended multiple conferences and events which enabled the Operation staff to disseminate findings to stakeholders associated with each work package.

6.23 Despite the minor concerns about industry engagement, many stakeholders were confident there had been sufficient engagement with government and industry stakeholders throughout delivery. It was highlighted by some stakeholders that challenges such as stakeholder fatigue, along with disruption due to the impact of Brexit and COVID-19 had hindered further engagement. In particular, the Bluefish final conference was noted as a good method to engage with all stakeholder groups at the end of the Operation, although the conference moving to online might inhibit discussions and networking.

6.24 The Marine Institute Bluefish roadshow of the art around coastal communities in Ireland and Wales has not happened due to COVID-19 and Operation staff are looking for funding to undertake this.

6.25 The evaluation cannot confidently attribute causality between Bluefish activities and wider benefits, as the true impact will not be fully realised until the guidelines and factsheets for adaptation/mitigation are shared with stakeholders. In terms of whether the research/engagement contributed to identified outcomes/impacts including the development of new policies / strategies, it is too early to say.

58

https://static1.squarespace.com/static/59662d71197aea598d1455a0/t/5c13e155032be456f35087a5/1544806743268/Innovative+approaches+to+the+detection+and+remediation+of+human+health+issues+relating+to+shellfish+consumption.pdf

6.26 From discussions with interviewed stakeholders, however, it was noted the engagement had categorically supported and benefitted the Operation.

> *External stakeholder - Bluefish had good engagement with the fishing industry on a ground level.*
>
> *Partner stakeholder – The mussel aquaculture workshop was a big positive. It was a direct link to the aquaculture industry and gained access to vital industry knowledge.*

Scientific community

6.27 Dissemination of findings to the scientific community varied from attendance at international conferences/events to scientific publications. Naturally, with four academic institutions involved in delivery, the Bluefish Operation had a strong influence within the scientific community, and this was demonstrated by the number of publications produced relating to Bluefish activities. As of April 2021, 21 peer-review publications had been published, which is significantly above the additional output target of 12+ (OP.6).

6.28 A quantitative measure to consider is a citation analysis on Operation publications. Although it is too early to recognise the relative importance / impact of Bluefish publications, a key comparative indicator would be to assess the number of citations from the previous Ireland Wales Operation SUSFISH. The previous Operation achieved approximately 802 citations from 27 publications since 2011 (Table 6.1). From this we can infer that Bluefish could be on a similar trajectory, but this will not be evident until beyond the funding period.

Table 6.1: Operation publication citations, April 2021

Operation	Total (Publications)	Total (Citations)[59]	Years
SUSFISH	27	802	2011-2015
Bluefish	21	58	2018-2021

Source: Miller Research Analysis

6.29 Many stakeholders involved in the Operation highlighted the positive results that the Bluefish research had delivered. As noted in the key themes section above, it had increased the understanding of the impacts of climate change on shellfish / aquaculture species and the disseminated findings will benefit those working within the scientific community.

6.30 Another notable outcome for Bluefish research was the Operation's inclusion in the Committee on Climate Change Report of Research Findings: Adaptation actions in the natural environment – what works?[60]

[59] As noted on Google Scholar in April 2021

[60] Committee on Climate Change (2018) Report of Research Findings: Adaptation actions in the natural environment – what works?

General public / other

6.31 The Bluefish Operation attended and supported several awareness raising activities which included engagement with the general public. These included festivals and events across Ireland and Wales. Most notably, Bluefish were involved in the following:

- Ireland's national marine festival SEAFEST[61] 2018 and 2019 the largest free maritime festival.
  - Bluefish had organised to attend again in May 2020 but due to COVID-19 the festival was cancelled. In 2019, approximately 100,000 people visited the festival.
- Swansea Science Festival 2018 and 2019, outreach events to introduce children and adults to the research being undertaken as part of the Bluefish project. Approximately 5,000 – 7,000 visitors each day.

6.32 When engaging with various stakeholders, it is important to tailor activities to different individuals to ensure the science is communicated effectively and has the desired impact. One avenue that Bluefish explored was the use of art and film to communicate awareness of climate change impact. It was identified by several stakeholders that the Bluefish artwork was a unique strength of the Operation.

6.33 As part of the WP2.4 – Ecosystem Goods and Services, the Marine Institute staff, along with urban sketcher Róisín Curé visited 11 communities around the Irish Coast and 8 across the Welsh coast. The engagement entitled; Linking Art and Marine Science: Art of Coastal Communities aimed to capture their interaction with the sea. This included two workshops which facilitated conversations with individuals and businesses to discuss the importance of the ocean to their coastal communities. The workshops gathered insight through questions such as;

- What does climate change mean to you?
- How do you think climate change is going to affect your life/business?
- How do you benefit from the ocean?

From this a series of watercolour illustrations captured the importance of the ocean to coastal communities in Ireland and Wales.[62] The roadshow of the art around coastal communities in Ireland and Wales of the art has not happened due to covid and project staff are seeking funds to showcase the art to both contributors and the wider coastal community.

6.34 The Operation employed several other artists/illustrators (from both Ireland and Wales) to the produce impactful artwork.

6.35 Simon Royer is a professional artist who specialises in natural history. He talked about his commissioned pieces and was invited to attend a

[61] https://www.seafest.ie/en/
[62] https://www.youtube.com/watch?v=pVresHIduf0

seminar with university representatives including professors, who presented their case about fishing / mussels. The scientific information provided at the seminar was very informative but also very technical and Simon confessed that he felt 'bogged down' by the technical information and was confused by the seminar. From this, however, he took the idea and aimed to just simplify it, resulting in the artwork in figure 6.1 below.

6.36 In addition to this, a box artwork was created which included a hidden narrative. The concept was the basis behind the artwork on fishing and seashore. The box artwork was fitted under the seashore painting and unveiled hidden pollution. Amongst the seaweed was fishing line / plastic pollution highlighting the impact of marine litter on the oceans. The artwork is displayed at the Marine Institute and gained significant media attention (Figure 6.2). The box artwork was also used at engagement events.

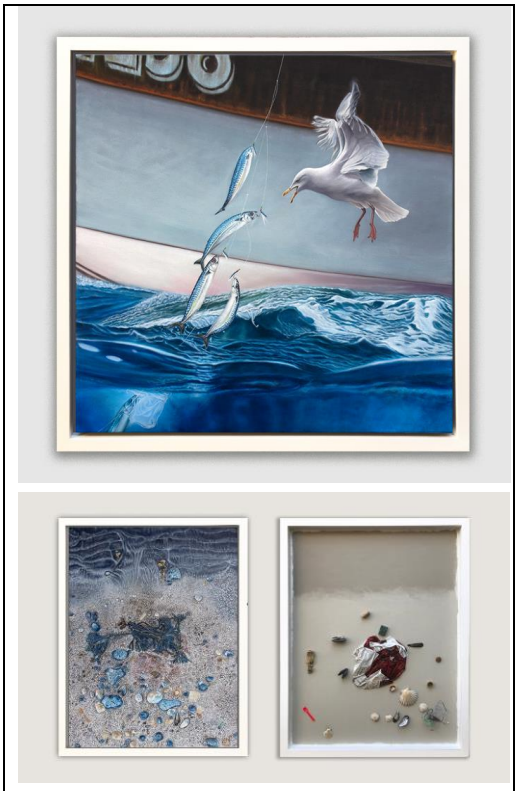
6.37 Karen Nolan is a graphic designer / illustrator who was also commission by Bluefish to create an illustrated poster. The poster included aspects related to socio-economic, environmental and commercial factors that influence the Celtic and Irish Seas. The poster worked as a pull up and was used by Bluefish at several public engagement events and displayed to several stakeholders (Figure 6.1. The second element to Karen's involvement was the design of Bluefish work package icons.

6.38 Additionally, the Operation produced several informational videos promoting Bluefish research and activities. These included a "mapping predators" video – seabirds and fisheries in the Celtic Sea.[63] This was a form of community engagement to explain research in lay terms across the world.

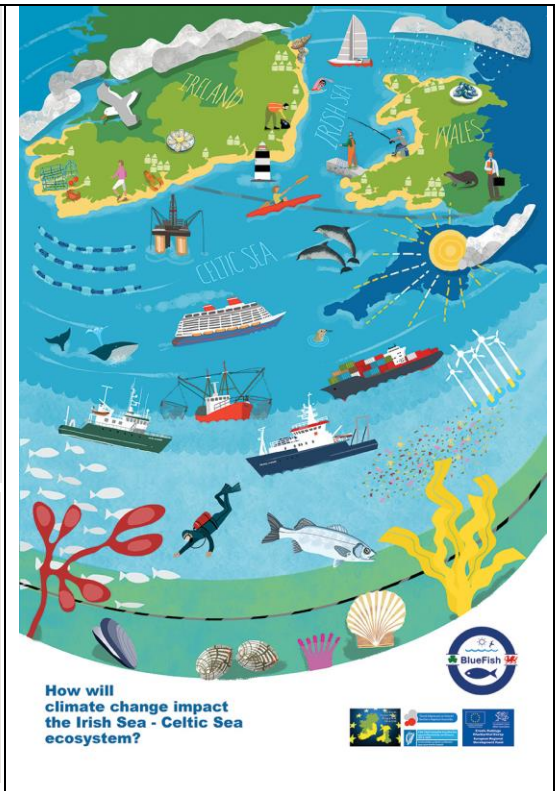
6.39 Also, in connection with the artwork, Swansea University found success with Bluefish artwork winning the 2018 Research as Art competition. The image of infected crustacean blood won and was subsequently toured in the US (Figure 6.3).

[63] https://www.youtube.com/watch?v=EiecZf3LyqY

Figure 6.1: Examples of commissioned Bluefish artwork
Left: Simon Royer artwork, showcased at the Marine Institute; Right: Karen Nolan poster artwork which was displayed at multiple engagement events.



Simon Royer[64]



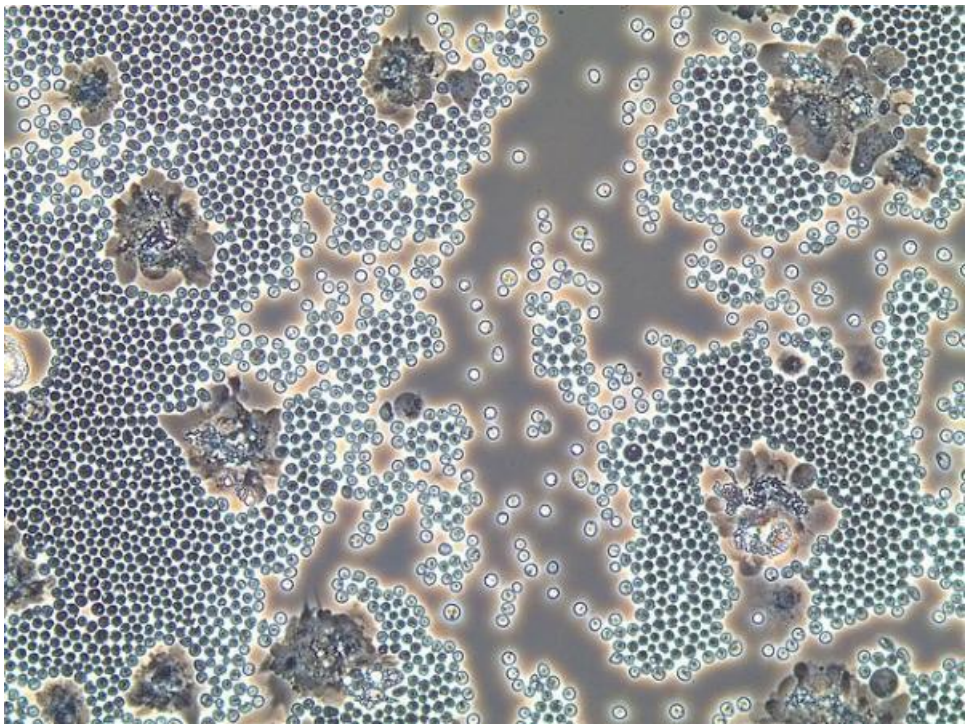
Karen Nolan[65]

Figure 6.2: Dr. Paul Connolly, Marine Institute CEO and the Norwegian Ambassador against the backdrop of the Bluefish artwork by Simon Royer.

Source: Bluefish documentation

[64] https://simonroyerartist.com/
[65] https://mizzwinkens.com/the-blue-fish-project

Figure 6.3: "Crab blood and collaborations", a microscope image of crab blood, Research as Art Winner 2018



Source: Frances Ratcliffe, Swansea University[66]

Social media

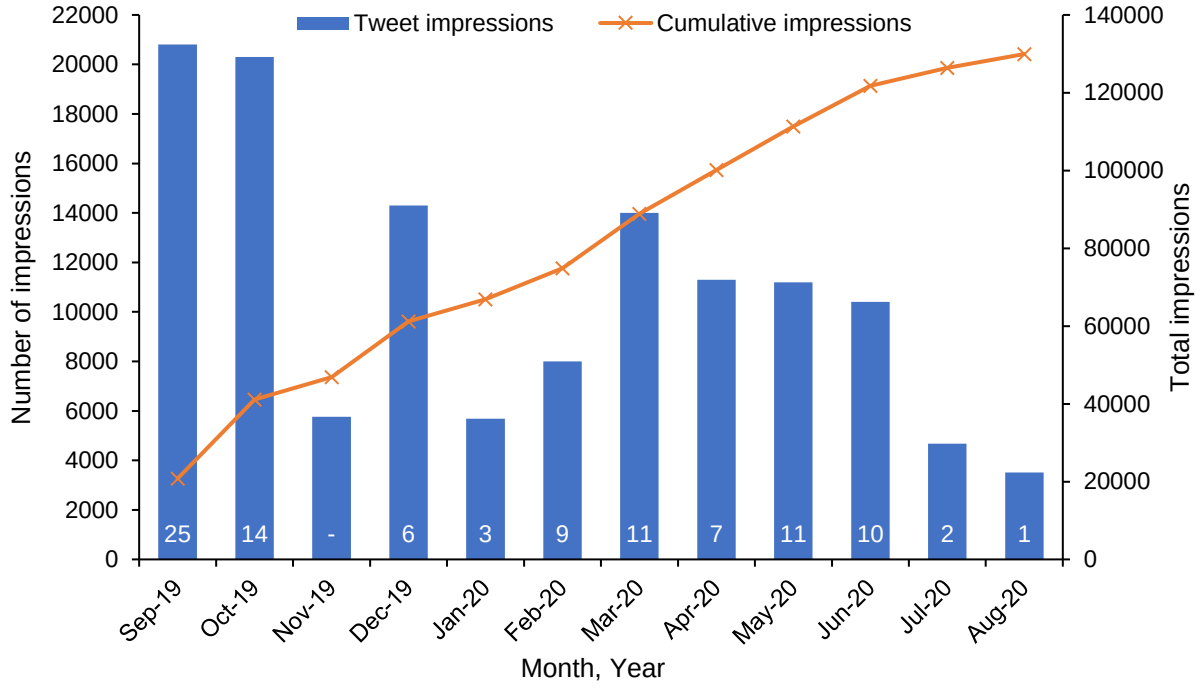
6.40 Over the course of the Operation delivery, Bluefish has communicated via a range of channels. One notable aim to raise awareness of Bluefish activity was evident through the use of social media and for Bluefish this was mainly through the Twitter handle: @BlueFish_EU.

6.41 From data collected through Bluefish Twitter data from September 2019 to August 2020 recorded approximately 130,000 total impressions from approximately 99 tweets. Impressions on Twitter are calculated by taking the total times tweets have been seen by users. This includes not only the number of times a tweet appears in a followers' timeline but also the times it has appeared in searches or as a result of someone "liking" the tweet.

6.42 Although this is a small window of the Operation delivery timeline, the data evidences Bluefish's continued efforts to promote and raise awareness, and was seen by many individuals and businesses.

[66] https://www-2018.swansea.ac.uk/press-office/news-archive/2018/winnersof2018researchasartcompetitionannounced.php

Figure 6.4: Number of tweet impressions from September 2019 to August 2020.
Inside bar numbers is the number of tweets that month. Unknown for November 2019



Source: Bluefish twitter data, Miller Research analysis

6.43 To summarise, Bluefish has demonstrated strong alignment with its overall aim to increase knowledge and raise awareness of the impacts of climate change, through disseminating information to rural coastal communities across the Irish Sea maritime borders. In doing so, it adapted its information when communicating with various stakeholder groups. It identified new avenues through the use of artwork to uniquely communicate science.

6.44 However, with the evidence available, the evaluation can not be certain about the extent to which the Operation is responsible (compared to other factors) for any socio-economic impacts, but based on its progress, it is likely that the Operation has had a positive effect.

Table 6.2 Activities connected to raising awareness, against indicator and additional outputs, April 2021

Activity	Type	Location	Year	Claimed Indicator	Additional output	Case study / documentation	Evaluation reference
14th International Seabird Group Conference	Conference	Liverpool, England	2018	✓		14th International Seabird Group Confe	OP.2
British Ecological Society Annual Event	Event	Birmingham, England	2018	✓		British Ecological Society Annual Event	OP.2
Fisheries Society of the British Isles Conference	Conference	Norwich, England	2018	✓		Fisheries Society of the British Isles Confe	OP.2
The 6th Annual ICES (International council for the Exploration of the Sea) Scallop Working Group meeting	Meeting	York, England	2018	✓		ICE Working Group Meeting	OP.2
Seafest Ireland	Event	Galway, Ireland	2018	✓		Seafest Ireland 2018	OP.2
Swansea Science Festival	Event	Swansea, Wales	2018	✓		Swansea Science Festival	OP.2
Aquaculture Research Collaborative Hub UK (ARCH-UK) Finfish and Shellfish Microbiome Workshop	Workshop	Aberdeen, Scotland	2018	✓		ARCH-UK Workshop, Aberdeen	OP.2
19th International Conference on Diseases of Fish and Shellfish	Conference	Porto, Portugal	2019	✓		International Conference on Diseas	OP.2

Activity	Type	Location	Year	Claimed Indicator	Additional output	Case study / documentation	Evaluation reference
Festival of Discovery	Event	Anglesey, Wales	2019	✓		Festival of Discovery	OP.2
Fisheries Society of the British Isles Conference 2019	Conference	Hull, England	2019	✓		Fisheries Society of the British Isles Confe	OP.2
Super Science Sunday	Event	Swansea, Wales	2019	✓		Super Science Sunday Swansea	OP.2
Swansea Science Festival 2019	Event	Swansea, Wales	2019	✓		Swansea Science Festival 2019	OP.2
VIVALDI Conference	Conference	Brest, France	2019	✓		VIVALDI Conference 2019	OP.2
Welsh Government Fisheries	Workshop	Aberystwyth, Wales			✓	Bluefish Workshop Report 2017-2018	OP.5
BIM Castletownbere June 2018	Workshop	Castletownbere, Ireland	2018		✓		OP.5
ARCH-UK joint event with Bluefish, July 2018	Workshop	Swansea, Wales	2018		✓		OP.5
Art roadshow tour Ireland August 2018	Workshop	Irish Coast	2018		✓		OP.5
Art roadshow tour Wales October 2018	Workshop	Welsh Coast	2018		✓		OP.5
The insect, *Galleria mellonella*, is a compatible model for evaluating the toxicology of okadaic acid. Cell Biology and Toxicology[67]	Publication	N/A	2018		✓	Access online	OP.6

[67] Coates, C.J., Lim, J., Harman, K., Rowley, A.F., Griffiths, D.J., Emery, H. & Layton, W. 2019. The insect, Galleria mellonella, is a compatible model for evaluating the toxicology of okadaic acid. Cell Biology and Toxicology, 35 (3).

Activity	Type	Location	Year	Claimed Indicator	Additional output	Case study / documentation	Evaluation reference
Spatial and temporal disease dynamics of the parasite *Hematodinium sp*. In shore crabs, *Carcinus maenas*. Parasites and Vectors[68]	Publication	N/A	2019		✓	Access online	OP.6
Host range of the mikrocytid parasite paramikrocytos canceri in decapod crustaceans. Pathogens[69]	Publication	N/A	2019		✓	Access online	OP.6
Biotic and abiotic factors influencing haplosporidian species distribution in the cockle *Cerastoderma edule* in Ireland[70]	Publication	N/A	2020		✓	Access online	OP.6
Fine-scale seascape genomics of an exploited marine species, the common cockle *Cerastoderma edule*, using a multimodelling approach[71]	Publication	N/A	2020		✓	Access online	OP.6
Diagnosis and prevalence of two new species of haplosporidians infecting shore crabs *Carcinus maenas*: *Haplosporidium carcini n. sp*., and *H. cranc n. sp.* Parasitology[72]	Publication	N/A	2020		✓	Access online	OP.6
Mycosis is a Disease State Encountered Rarely in Shore Crabs, *Carcinus maenas*. Pathogens[73]	Publication	N/A	2020		✓	Access online	OP.6
Novel insights into the marine phase and river fidelity of anadromous twaite shad *Alosa fallax* in the UK and Ireland. Aquatic Conservation: Marine and Freshwater Ecosystems[74]	Publication	N/A	2020		✓	Access online	OP.6
Climate driven threshold effects in the natural environment. Report to the Climate Change Committee[75].	Publication / report	N/A	2020		✓	Access online	OP.6

[68] Davies, C.E., Batista, F.M., Malkin, S.H., Thomas, J.E., Bryan, C.C., Crocombe, P., Coates, C.J. & Rowley, A.F. 2019. Spatial and temporal disease dynamics of the parasite Hematodinium sp. In shore crabs, Carcinus maenas. Parasites and Vectors.
[69] Edwards, M., Coates, C.J. & Rowley, A.F. 2019. Host range of the mikrocytid parasite paramikrocytos canceri in decapod crustaceans. Pathogens, 8 (4).),
[70] Albuixech-Martí, S., Lynch, S.A. & Culloty, S.C. 2020. Biotic and abiotic factors influencing haplosporidian species distribution in the cockle Cerastoderma edule in Ireland. Journal of Invertebrate Pathology.
[71] Coscia, I., Wilmes, S.B., Ironside, J.E., Goward-Brown, A., O'Dea, E., Malham, S.K., McDevitt, A.D. & Robins, P.E. 2020. Fine-scale seascape genomics of an exploited marine species, the common cockle Cerastoderma edule, using a multimodelling approach Evolutionary Applications.
[72] Davies, C.E., Bass, D., Ward, G.M., Batista, F.M., Malkin, S.H., Thomas, J.E., Bateman, K., Feist, S.W., Coates, C.J. & Rowley, A.F. 2020. Diagnosis and prevalence of two new species of haplosporidians infecting shore crabs Carcinus maenas: Haplosporidium carcini n. sp., and H. cranc n. sp. Parasitology.
[73] Davies, C.E., Malkin, S.H., Thomas, J.E., Batista, F.M., Rowley, A.F. & Coates, C.J. 2020. Mycosis is a Disease State Encountered Rarely in Shore Crabs, Carcinus maenas. Pathogens.
[74] Davies, P., Britton, R.J., Nunn, A.D., Dodd, J.R., Crundwell, C., Velterop, R., Ó'Maoiléidigh, N., O'Neill, R., Sheehan, E.V., Stamp, T. & Bolland, J.D. 2020. Novel insights into the marine phase and river fidelity of anadromous twaite shad Alosa fallax in the UK and Ireland. Aquatic Conservation: Marine and Freshwater Ecosystems, 30 (7), pp. 1291-1298.
[75] Jones, L., Gorst, A., Elliott, J., Fitch, A., Illman, H., Evans, C., Thackeray, S., Spears, B., Gunn, I., Carvalho, L., May, L., Schonrogge, K., Clilverd, H., Mitchell, Z., Garbutt, A., Taylor, P., Fletcher, D., Giam, G., Aron, J., Ray, D., Berenice-Wilme, R. 2020. Climate driven threshold effects in the natural environment. Report to the Climate Change Committee.

Activity	Type	Location	Year	Claimed Indicator	Additional output	Case study / documentation	Evaluation reference
Northward establishment of the Mediterranean mussel *Mytilus galloprovincialis* limited by changing climate. Biological Invasions[76]	Publication	N/A	2020		✓	Access online	OP.6
Laccase and catecholoxidase activities contribute to innate immunity in slipper limpets, *Crepidula fornicata*. Developmental and Comparative Immunology[77]	Publication	N/A	2020		✓	Access online	OP.6
A drop in the ocean: Monitoring fish communities in spawning areas using environmental DNA[78]	Publication	N/A	2020		✓	Access online	OP.6
Rapid quantitative assessment of fish larvae community composition using metabarcoding[79]	Publication	N/A	2020		✓	Access online	OP.6
Prevalence and histopathology of the parasitic barnacle, *Sacculina carcini* in shore crabs, *Carcinus maenas*[80]	Publication	N/A	2020		✓	Access online	OP.6
Marine Heatwaves Favor an Invasive Over Native Seaweeds[81]	Publication	N/A	2020		✓	Access online	OP.6
The stress-immunity axis in shellfish[82]	Publication	N/A	2020		✓	Access online	OP.6
The role of invasive tunicates as reservoirs of molluscan pathogens. Biological Invasions[83]	Publication	N/A	2020		✓	Access online	OP.6
Climate change accelerates range expansion of the invasive non-native species, the Pacific oyster, *Crassostrea gigas*[84]	Publication	N/A	2020		✓	Access online	OP.6
Detection of haplosporidian protistan parasites supports an increase to their known diversity, geographic range and bivalve host specificity[85]	Publication	N/A	2020		✓	Access online	OP.6

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Activity	Type	Location	Year	Claimed Indicator	Additional output	Case study / documentation	Evaluation reference
Biotic and abiotic factors shaping the genome of cockle (Cerastoderma edule) in the Northeast Atlantic: a baseline for sustainable management of its wild resources[86]	Publication	N/A	2020		✓	Access online	OP.6
Immunomodulatory and antiviral effects of macroalgae sulphated polysaccharides: Case studies extend knowledge of their importance in enhancing shellfish health, and the control of global viral pathogen ostreid herpesvirus-1 microVar[87]	Publication	N/A	2021		✓	Access online	OP.6

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Cross border collaboration

6.45 The Ireland Wales Programme requires that operations supported demonstrate collaboration and joint working in four areas:

- Project development.
- project implementation,
- project staffing and
- project financing.

6.46 Considering that the Operation involves the formal collaboration of six institutions, which included the addition of two institutions for the first time, and evidence indicates that joint working occurred in all four of the above areas, it seems that Bluefish has strongly delivered this outcome.

6.47 The cross-border collaboration has brought together Welsh research institutions with Irish government and industry institutions, and the Operation reports that this has enabled the academic institutions to work with industry experts with a unique and valuable viewpoint on shared challenges.

6.48 Partner stakeholders were extremely satisfied with the collaboration and some felt it was a key strength for the Operation. The cross-border collaboration has enabled the sharing of good practice, both from Wales to Ireland and Ireland to Wales, and has encouraged various project partners to expand their boundaries and explore new areas.

6.49 The assembled delivery partners had complementary skills/expertise and stakeholders and found that a main benefit to the working relationship was the openness of data/sample sharing, skills and knowledge transfer among all partners. All expressed a desire to see future collaboration.

6.50 The Ireland Wales Programme also facilitated cross-border collaboration between delivery partners and collaborating enterprises / other stakeholders, and between the collaborating enterprises / other stakeholders themselves.

6.51 The evaluation highlighted, however, that there was an imbalance with claimed indicators between Ireland and Wales/UK. For example, a larger proportion of Organisations cooperating in enhancing the marine and coastal environment (OP.3) were claimed by Welsh partners (6 Welsh, 4 Irish). This could be partly due to Welsh partners all being universities, which might be more accustomed to establishing such partnerships.

6.52 It is also noticeable in table 6.2 above that there were 18 awareness raising events listed, excluding publications. Thirteen of these events were located in the UK, three were in Ireland and two in Europe. Some of these, however, could be attributed to the location of the (external) conference / event and beyond the control of the Operation.

Despite this, the Operation must consider a shared equality of activity across Ireland and Wales.

6.53 The six institutions involved are established organisations within the marine sector and utilised already existing stakeholder and industry links to engage with the sector, and this is not fully reflected in the output target indicators.

6.54 One partner stakeholder praised the access to industry knowledge offered by the Operation, referring to the value of workshops such as the mussel aquaculture workshop, held in Castletownbere, Ireland. This led to further understanding of the differences between Irish and Welsh fisheries / aquaculture industries and facilitated the opportunity to develop new approaches and ideas.

6.55 External stakeholders reiterated the importance of cross-border collaboration, identifying the Irish Sea as an enclosed sea area with shared resource. It was stressed that management of this has to be approached holistically and collaboratively.

6.56 There was some concern that Brexit poses a potential threat to future collaborations. As mentioned above stakeholder fatigue, Brexit and COVID-19 impacts hindered collaboration and cooperating activities with industry. There is continued uncertainty around how collaborations between Welsh and European partners will be affected and whether a similar cross-border programme could occur in the future.

6.57 Going forward, the partner stakeholders are keen to continue collaborating outside of the Ireland Wales Programme, should other funding sources be found.

7. Impact / counterfactual assessment

7.1 A key aspect of any evaluation is to consider the additionality of an intervention - that is, the net benefit over and above what would have happened anyway (the deadweight or counterfactual).

7.2 The effects of the Bluefish Operation include its outcomes (the medium-term change arising from the outputs of its activities) and its impacts (the longer-term and much more indirect changes, partially arising from the Operation). The outcomes and impacts included in the evaluation logic model were identified through engagement with stakeholders and the Operation delivery team.

7.3 At noted in section 6 above, it is possible to link (qualitatively) Bluefish activities and outputs to some of the outcomes and impacts, such as:

- The increased levels of knowledge of adaptation to climate change amongst stakeholders and coastal communities across the Irish/Celtic Sea (OC.2) and
- Increased sustainability / efficiency of knowledge transfer and support for greater cross-border collaboration (OC.5).

7.4 It was apparent from the evaluation that there was limited quantitative data available to measure the true impact of Bluefish activities, and that the full impact and wider benefits of such a project are unlikely to be fully realised during its funded lifetime.

7.5 Despite this, the evaluation extrapolated quantitative evidence for Bluefish's wider impact through the Operation's contribution towards the Ireland Wales Programme and Programme-level indicators.

Contribution to Ireland Wales Programme-level Indicators

7.6 The evidence available at this point in time suggests that Bluefish is contributing to the target for the Ireland Wales Programme-level indicators, most significantly the number of research institutions participating in cross-border, transnational or interregional research operations (Table 7.1 and Figure 7.1).

7.7 The Bluefish Operation recorded:

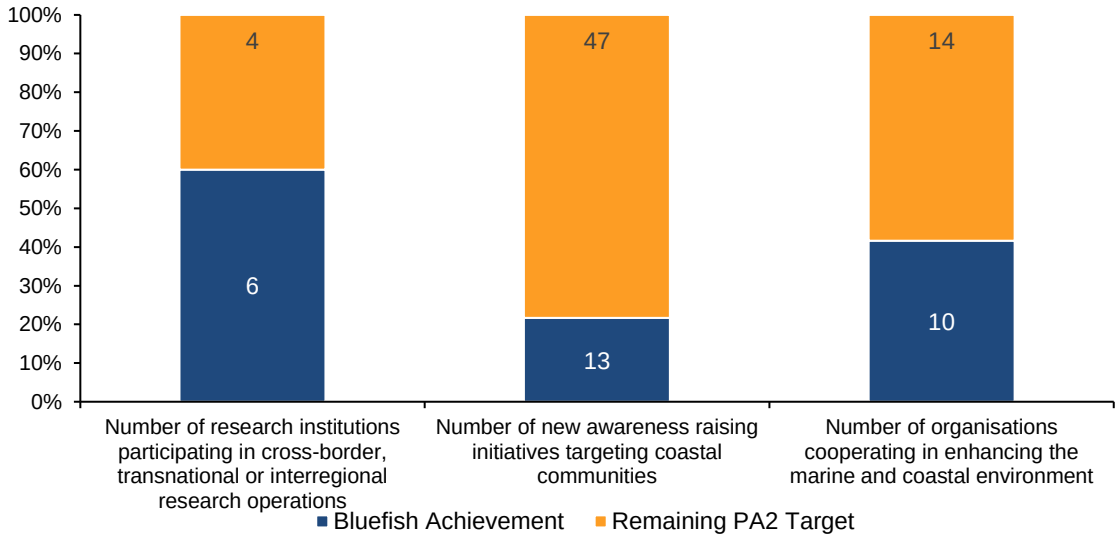
- a 60 per cent contribution towards Ireland Wales Programme-level target: the number of research institutions participating in cross-border, transnational or interregional research operations (6 achieved, target:10).
- approximately 21 per cent towards the number of new awareness raising initiatives targeting coastal communities (13 achieved, target: 60) and
- 42 per cent towards the number of organisations cooperating in enhancing the marine and coastal environment (10 achieved, target: 24).

Table 7.1: Progress against Ireland-Wales Programme, Priority Axis 2 target values, February 2021.

Indicator / measure description	PA2 Target	Bluefish Target	Achieved to date (Mar-21)
Number of research institutions participating in cross-border, transnational or interregional research operations	10	6	6
Number of new awareness raising initiatives targeting coastal communities	60	10	13
Number of organisations cooperating in enhancing the marine and coastal environment	24	10	10

Source: Adapted from documentation

Figure 7.1: Bluefish Operation indicator contribution to overall Ireland Wales programme result indicator targets: by Priority Axis 2 (PA2) indicators, April 2021.



Source: Miller Research Analysis

7.8 The Ireland Wales Programme, Specific Objective 2 also has an overall result indicator of: Levels of knowledge of adaptation to climate change amongst communities and businesses. As part of the Ireland Wales Cooperation Programme mid-term evaluation,[88] data was gathered to assess the Programme's progress towards its result indicator targets, and quantitative surveys of businesses and communities in the Programme area were conducted.

7.9 For this evaluation, three surveys were undertaken:[89]

[88] https://gov.wales/ireland-wales-territorial-cooperation-programme-2014-2020-mid-term-evaluation
[89] Ireland Wales Territorial Cooperation Programme 2014-2020: Mid-Term Evaluation Report, pg.82

- Beaufort Research undertook a Computer Aided Telephone Interviewing survey of business decision makers within SMEs based in the Welsh local authorities in the Ireland Wales Programme area. The sample achieved was 249.
- Beaufort Research undertook a Computer Aided Telephone Interviewing survey of SMEs based in the Irish counties in the Ireland Wales Programme area. The sample achieved was 100.
- YouGov's Welsh Omnibus survey was used to survey 1000 Welsh adults aged 18 and over, and a YouGov partner panel survey was used to survey 1000 Irish adults aged 16 and over.

7.10 In table 7.2, results from the Beaufort Research survey were analysed to assess Bluefish's awareness amongst surveyed businesses in Ireland and Wales. Although the number of businesses responding was relatively low, Bluefish recorded the highest (Ireland: 10 per cent) and second highest (Wales: 3 per cent) awareness of any funded operations.

7.11 Based on the information in the table below, it seems that Bluefish has increased awareness of Operation activities and enhanced partner institutions' (already strong) reputation for research in these fields.

7.12 External awareness is difficult to directly measure and validate directly through an evaluation of this nature. However, it is a good indication that Bluefish, who have frequently interacted with wider stakeholders, receive a positive assessment in terms of raising awareness of climate change impacts on coastal communities.

Table 7.2: Bluefish awareness amongst surveyed businesses[1] in Ireland and Wales, 2019

Percentages, ascending

Project	Ireland (%)	Project	Wales (%)
Bluefish	*10*	Celtic Routes	*4*
Celtic Routes	*9*	Bluefish	*3*
Dwr Uisce	*6*	Irish Sea Portal Pilot	*2*
Ecostructure	*5*	CATALYST	*2*
piSCES	*4*	Ecostructure	*2*
Acclimatize	*4*	Dwr Uisce	*1*
CATALYST	*2*	CALIN	*1*
BUCANIER	*2*	piSCES	*1*
CHERISH	*2*	Acclimatize	*0*
Irish Sea Portal Pilot	*1*	More Than A Club	*0*
CALIN	*1*	BUCANIER	*0*
STREAM	*1*	CHERISH	*0*
More Than A Club	*1*	STREAM	*0*

Source: Adapted from Ireland-Wales Mid-term Evaluation Survey, Miller Research / Beaufort Research

Base = Ireland (100) and Wales (250) surveyed businesses

1. Respondents were asked ‘Which, if any, of the following Ireland-Wales European Territorial Co-operation programme projects are you aware of?’. Respondents were asked to select multiple answers from the projects listed in the table.

Counterfactual appraisal

7.13 Assessing the additionality of any intervention is difficult given the high level of externalities that can also influence the expected outcomes. A particular concern for any impact evaluation is the attribution of impacts, which by their nature are distanced from the direct influence of the Operation itself. However, in the agreed logic model for the Operation, a pragmatic approach has been taken to identifying impacts with a reasonable line of sight back to the Operation itself.

7.14 A self-assessment approach was considered for this evaluation to understand the counterfactual impact the Operation may have had, albeit from qualitatively assessed opinion.

7.15 The core aspect of a self-assessment is to simply ask the treatment group (those within the intervention) the extent to which the intervention resulted in the observed change. Although this ‘self-assessment’ is a weaker form of evidence, it is widely used as the best available alternative (in the absence of more robust—yet more costly or more complex alternatives).

7.16 The typical self-assessment questions are based around the extent of deadweight (aka counterfactual):

- Deadweight 1—the extent to which the university would have made similar research and development outcomes
- Deadweight 2—the extent to which the observed results are entirely due to the intervention received.

7.17 A key question posed to stakeholders, as part of the self-assessment was: Do you believe the collaboration would have occurred, if there was no I/W funding? Will you collaborate again in the future?

7.18 Many stakeholders stated that the collaboration would likely not have occurred if the Ireland Wales funding was not available.

Partner stakeholder - ‘99 per cent would not have happened without the funding’.

Stakeholder - Like to think it would have [the collaboration] – given that we [Ireland and Wales] are geographic neighbours.

Stakeholder - Doubt the cross-border collaboration would have occurred without the funding.

7.19 The addition of the BIM and MI for the first time, would have not occurred and led to the vital sharing of research and data.

7.20 Many partner stakeholders noted from their experience in previous Operations and other research projects that the full strategic impact

and wider benefits of a project are often not fully realised during its funded lifetime.

8. Conclusion, lessons learnt and recommendations

8.1 This section presents the conclusions of the evaluation of Bluefish and lessons learnt / recommendations for future operations. The conclusion is structured against the Operation's evaluation objectives set out in the Bluefish Invitation to Tender.

Conclusion against objectives

Table 8.1: Conclusions on progress towards evaluation objectives

Evaluation ITT objective	Evaluation summary
Has the operation met its objectives and delivered its intended outputs?	Overall, the Bluefish longer term objectives were ambitious, but there was general confidence from stakeholders that Bluefish had achieved or is on track to achieve its intended objectives. The Operation has achieved its Operational output indicators including surpassing its 'number of new awareness raising initiatives targeting coastal communities', as well as achieving its targets for the number of research institutions participating in cross-border, transnational or interregional research operations and number of organisations cooperating in enhancing the marine and coastal environment.
Has the operation delivered an effective management and governance model?	Bluefish appears to have enjoyed a well-designed delivery approach, which was very comprehensive and able to interlink complementary research themes. The management of the Bluefish Operation was cited by stakeholders as being effective in monitoring progress towards achieving objectives. The governance structure was fit for purpose. There was a stakeholder advisory group, which met in Swansea in 2019. Stakeholders, however, highlighted that this was largely not necessary, due to organisations' established links with stakeholders.
Did the operation achieve cross border working between the beneficiaries?	Bluefish was seen as an excellent example of cross border collaboration between Irish and Welsh partners, providing a platform for knowledge transfer and effective collaboration. The claimed indicators however highlighted an imbalance towards Wales or UK-oriented awareness raising activities, suggesting that future collaborations should be careful to achieve a geographic balance across partner nations.
Has Bluefish contributed to the Ireland Wales programme priority axis 2?	A long-term assessment of the Operation's contribution to the Ireland Wales Programme is beyond this evaluation. However, the feedback from stakeholders suggests the Operation has provided

	vital knowledge regarding adaptations to climate change.
Has Bluefish achieved integration of its adopted CCT strategies?	From the review of Bluefish documentation and discussions with stakeholders. Bluefish exhibits a good integration of CCTs, in particularly aligning activities with the 17 UN Sustainable Goals.

Improvements / recommendation for future projects

8.2 Following the evaluation, and the information collected and analysed, we have proposed a series of recommendations at both a Programme and Operational-level to improve the delivery of future cross-border operations.

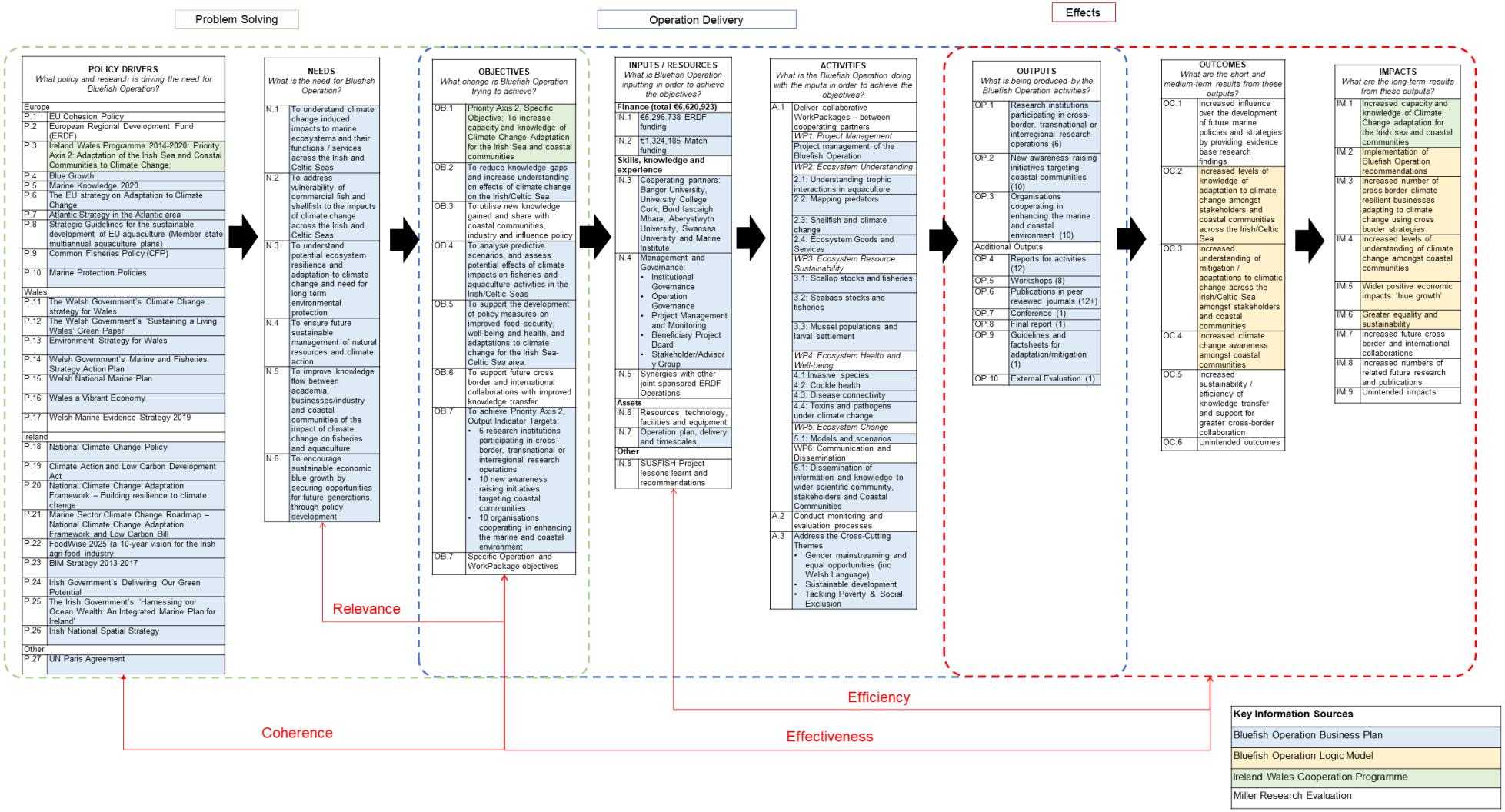
Table 8.2: Evaluation recommendations

Programme level:	Need for clarity of understanding of programme and financial requirements from the offset
	Reduce administrative burden and provide feedback on operation reporting
Operation level:	Evaluation to be conducted earlier in operation delivery or at multiple stages
	Further consultation needed with stakeholders for future actions. Government/policy makers, industry, science community (large workshop)
	Opportunity to scale up communication and marketing
	Consider a central live monitoring data access point of Operation data records operation outputs, indicators and additional measures including CCT targets.
	Consider capturing additional monitoring data early in delivery such as long-term economic and societal benefit data, this will ensure outcome / impact can be fully measured
	COVID-19 learning and applications (videoconferencing)

Annex A: Bluefish Evaluation Logic Model

Bluefish Operation: Evaluation Logic Model

Version 1, June 2020



Annex B: Bluefish Evaluation Stakeholders/Interviewees

Name	Organisation	Position / Association
Dr Shelagh Malham	Bangor University	Operation Director
Esther Howie	Bangor University	Operation Manager
Karen Tuson	Bangor University	Operation Support/Manager[90]
Prof Andrew Rowley	Swansea University	Operation Partner
Dr Christopher Coates	Swansea University	Operation Partner
Prof Paul Shaw	Aberystwyth University	Operation Partner
Patricia Daly	Bord Iascaigh Mhara	Operation Partner
Dr Ronan Browne	Bord Iascaigh Mhara	Operation Partner
Prof Sarah Culloty	University College Cork	Operation Partner
Dr Sharon Lynch	University College Cork	Operation Partner
Felicity Donnelly	Marine Institute	Operation Partner
Dr. Oliver Tully	Marine Institute	Operation Partner
Dr. Niall O'Maoileidigh	Marine Institute	Operation Partner
Paul Jones	Marine and Fisheries Division Welsh Government	Fisheries Science Officer
Bethan Thomas	Welsh European Funding Office (WEFO)	Ireland Wales Officer
Breda Curran	Southern Regional Assembly (SRA)	Ireland Wales Operations Officer
Eunice Pinn	Seafish	Marine Regulatory Advisor
Teresa Morrissey	Irish Farmers Association (IFA)	Aquaculture Executive
Karen Nolan	Karen Nolan Winkens	Illustrator
Simon Royer	Simon Royer	Artist

[90] Took over from Esther Howie in February 2021.