Northern Ireland Fishing & Seafood Development Programme

Final Report

April 2021

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

The Strategic Investment Board

Report Information

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Citation: Cappell R. (2021). Fishing & Seafood Development Programme Final Report. Strategic Investment Board.

Client: DAERA, NI

Version: Final

Report ref: 1530/R/04/A

Date issued: April 2021

Photo credits: R. Cappell, EU MSP Platform

Acknowledgements:

Sincere thanks to the members of the project steering committee, the stakeholder consultative group and all those that have engaged with this work.

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Abbreviations used

ADG .....Ardglass Development Group
ANDBC Ards & North Down Borough Council
ANIFPO Anglo-North Irish Fish Producers Organisation
BAU .....Business As Usual
CD.....Chart Datum
CFP.....Common Fisheries Policy
CPUE.....Catch Per Unit Effort
DAERA .....Department for Agriculture, Environment & Rural Affairs (NI)
Defra .....Department for Environment, Food and Rural Affairs (UK)
DfE.....Department for the Economy
EU.....European Union
FAO .....Food & Agriculture Organisation (UN)
FSDP .....Fishing & Seafood Development Programme
FTE .....Full Time Equivalent
FUI .....Fuel Use Intensity
GHG.....Greenhouse Gases
GIS.....Geographical Information Systems
GVA .....Gross Added Value
ICES .....International Council for the Exploration of the Sea
IMO .....International Maritime Organisation
IPCC .....Intergovernmental Panel on Climate Change
ISNI .....Investment Strategy for Northern Ireland
KSP.....Kilkeel Strategic Partnership
LAT .....Lowest Astronomical Tide
MMO .....Marine Management Organisation (UK)
MPA .....Marine Protected Area
MSFD.....Marine Strategy Framework Directive
MSY .....Maximum Sustainable Yield
NI .....Northern Ireland
NIFHA .....Northern Ireland Fishery Harbour Authority
NIFPO.....Northern Ireland Fish Producers Organisation
NIGEAE .....Northern Ireland Guide to Expenditure Appraisal and Evaluation
NMDDC .....Newry Mourne & Down District Council
NPV .....Net Present Value
OMF .....Operation & Maintenance Facilities
PBC .....Programme Business Case
PfG.....Programme for Government
PPP.....Public Private Partnership
ROI .....Republic of Ireland
TAC.....Total Allowable Catch
TEV.....Total Economic Value
UK.....United Kingdom
VMS .....Vessel Monitoring System

Executive Summary

Background

The Fishing and Seafood Development Programme (FSDP) was established in response to calls from the Northern Ireland (NI) fishing industry to make significant investments in fishing harbour infrastructure. The FSDP involved a strategic review of the opportunities for developing the sea fishing and seafood sectors in NI as a whole, including the potential role of new public investment in infrastructure. This requires a long-term view as port infrastructure has a long life (50+ years).

The Stage 1 report focused on the current and future needs of Northern Ireland's fishing industry. Stage 2 of the FSDP focused on seafood and other port-based sectors. These reports, along with DAERA assessments of future needs and opportunities resulting from the UK's exit from the EU (specifically the UK/EU Fisheries Agreement and the NI Protocol) contribute the evidence base for the FSDP.

The UK government has committed to replacing EU fisheries funding with an equivalent UK programme. Some of the needs identified for NI's fishing and seafood sector (including support to the private sector in production efficiencies, innovation, marketing and training) can be addressed through a future fisheries & aquaculture support programme. However, with an expected annual funding limit of £4m, this is not of a scale that will fund the infrastructure investment needed to make NI's fishing ports fit for the 21st century. It is also important to recognize that the investments in port infrastructure proposed will benefit other sectors and contribute to growth in Northern Ireland's Blue Economy.

FSDP Vision

Northern Ireland's fishing & seafood industry is fit for the 21st Century. It will be prosperous and sustainable; able to take advantage of new fishing opportunities and green growth. It will be supported by improved fishing infrastructure that also supports growth in the Blue Economy and contributes to thriving coastal communities.

Objectives

Fishing Objective: Fishing operations are sustainable in economic, environmental and social terms: sufficiently profitable to invest in a fleet that can operate efficiently, attract crew and reduce its carbon emissions.

Blue Economy Objective: Northern Ireland grasps future opportunities in the existing and emerging sectors of the Blue Economy.

Harbour Objective: Northern Ireland's fishing harbours are developed to support the needs of the fishing industry and enable growth in other sectors of the Blue Economy.

Kilkeel becomes an Irish Sea Marine Hub: port capacity is increased, making it more accessible with increased water depth, for fishing, vessel repair and offshore services. The harbour estate is increased with additional land for business expansion and new opportunities.

Ardglass harbour capacity is enhanced to secure fishing and processing industries. Harbour properties are acquired to enable coherent harbourside development.

Portavogie harbour is maintained for its fishing industry and the harbour estate is prepared for future Blue Economy opportunities.

Economic context

The economic impacts resulting from the Covid crisis and strategic decisions by international companies to reduce NI manufacturing centres highlight the importance of indigenous industries like fishing that are made up of micro-enterprises and SMEs. Seafood (2.8% of export sales by the food and drink sector) has not experienced the same scale of growth as some agri-food sectors such as beef, milk and poultry, but there has been a steady growth in value. This is based on relatively stable volumes of shellfish and demersal species landed into NI ports and employment in the seafood sector has seen a 10% increase in recent years.

The fishing fleet numbers around 140 over 10m vessels (most trawling for Nephrops, landing whitefish as bycatch and with some scallop dredging); about 200 inshore vessels fishing crab and lobster; and a modern pelagic fleet of three large vessels over 50m in length that fish for mackerel, herring and other small pelagic species. These vessels supply NI's seafood processing sector and together create an annual turnover of around £135m (£90m processing, £45m fishing), support 1,550 FTE jobs (905 in fishing and 645 in processing) and result in an estimated GVA of £55.5million per annum.

Nearly 400 companies contribute to the fishing, seafood and fishing port sectors with £169.5million in turnover, 1,850 FTE jobs and £67.3m in GVA. Three quarters of this comes from enterprises located around the three NIFHA fishing ports. This illustrates the regional economic and social importance of the NIFHA ports to the seafood sector and the communities they support.

Harbour capacity is constraining the fishing fleet

NI is characterized by **a comparatively old fishing fleet,** lacking the re-investment in more efficient vessels seen elsewhere in the UK. This is particularly evident in the demersal fleet, which faces the most significant operational constraints due to port capacity.

The NI fishing fleet has mostly consolidated into the 3 NIFHA fishing ports: Ardglass, Kilkeel and Portavogie. The largest fleet is based in Kilkeel, which faces the greatest operational constraints. The three pelagic vessels are already too large for the NIFHA ports, but continue to make some landings to NI processors from Belfast, with the rest of the catch going to processors outside NI.

Ardglass is home to two of three pelagic processors in NI and has historically been the centre for pelagic landings. However, water depth and length of quayside prevents the new NI pelagic vessels from landing in the harbour. Landings by these vessels into Belfast (an hour away) are delivered by tanker, instead of tankers moving fish from the quayside to factories. There is inadequate provision for the growing inshore fleet. Several properties on the harbour estate are not owned by NIFHA, limiting strategic development.

Kilkeel has considerable constraints in access (water depth, weather and tidal) and overcrowding at the quayside. UK and Irish ports with comparable volumes and value of landings are not so constrained in terms of water depth & access. Nevertheless, there is substantial economic activity from numerous seafood & fleet service businesses. Port capacity and available land are constraining investment and growth in the fishing and associated maritime sectors.

Portavogie has some depth constraints and a narrow entrance, but the fleet is reducing in number. Overall there is adequate quayside space that is in reasonable repair. There is also available space surrounding the harbour to enable an expansion of shore-based services and other opportunities.

Outside the NIFHA ports, the inshore fleet is sparsely distributed at various ports and landing points around Northern Ireland's coast. These assets are managed and maintained by local authorities that tend to prioritise tourism, resulting in limited infrastructure provision for fishing.

NI ports with greater water depth than NIFHA ports (Belfast, Bangor, Lisnahally and Warrenpoint), face several other issues that make it unfeasible for the NI demersal fleet to relocate, including the distance from key fishing grounds (other than Warrenpoint), lack of available quayside space and ancillary services. The economic and strategic focus of these ports is on other maritime sectors.

The Blue Economy needs space to develop

The three NIFHA ports are not only critical to the fishing & seafood sector, but also support other maritime economic sectors in what is termed the Blue Economy. These show **considerable development potential** at the fishing ports.

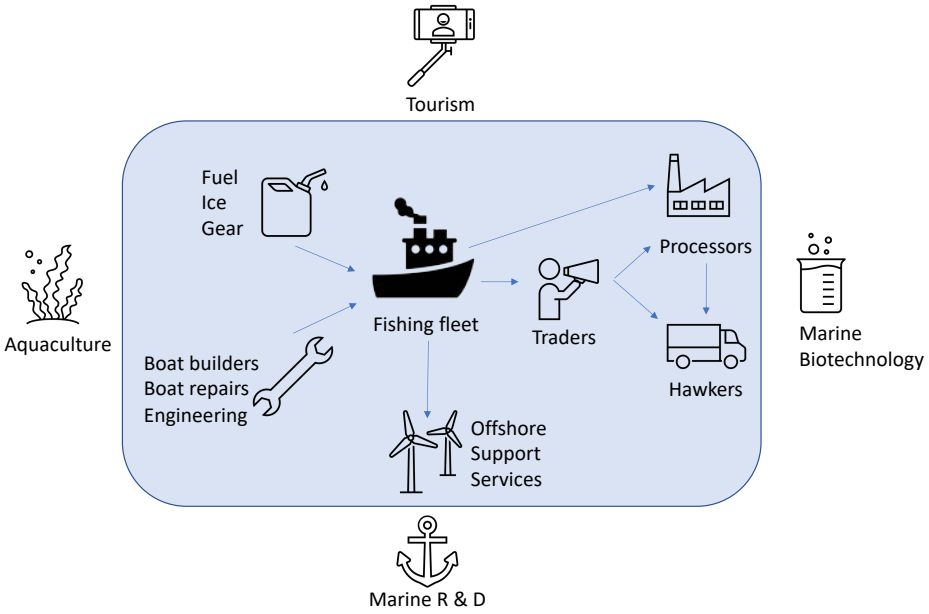


Figure A Blue Economy sectors using NI's fishing ports: existing (blue square) and potential

The ancillary sector (businesses that supply goods and services to the fishing fleet) is present at all three NIFHA ports, with Kilkeel home to a cluster of engineering businesses providing vessel services and repair. The companies making up this cluster in Kilkeel confirm **the most significant constraint to growth is port infrastructure**. Offshore developments (e.g. wind farms, pipelines, cables, and potentially aquaculture) also require vessel services and port-based facilities. Offshore vessel services has grown from a provider of useful additional income to the NI fishing fleet, to a sector in its own right, providing services and expertise well beyond the Irish Sea. Invest NI has identified that with future offshore renewable developments and its established track record, the NI offshore vessel services sector could double over the coming years to more than £20m per annum. As with the fishing fleet, harbour capacity restricts the size of vessels that these companies would ideally invest in for guard work. The NIFHA ports could also be promoted to Irish Sea developers as locations for Operation and Maintenance Facilities (OMF), which provide long-term revenue and employment. However, the current physical capacity of the NIFHA harbours and lack of available land for such developments are a constraint for the offshore services sector.

Other economic sectors within the blue economy present additional potential opportunities. Those sectors include tourism, aquaculture, marine biotechnology and other maritime training and R&D. The future needs of current and potential port-based businesses are difficult to specify, but a lack of space in Kilkeel and multiple ownership of Ardglass harbour properties are clear constraints to the future development of the Blue Economy.

Future prospects

The average volume of seafood landed into NI ports between 2006 and 2018 (around 22,000t), is a similar level to NI landings in the 1990's. The value of landings into NI ports fluctuates, but the overall trend is positive with the first-hand landed value exceeding £30 million in recent years.

The number of vessels may reduce further in the future, but the trend for deeper and wider vessels (providing more storage/handling capacity, safety and comfort) means that current NIFHA port capacities are limiting fleet investment. Additionally, more value to the NI economy can be achieved if port-based companies have the space to expand and new sectors in the Blue Economy can develop. These potential blue economy sectors including tourism, aquaculture, marine biotechnology and maritime training and R&D can be supported following investment in port infrastructure.

Future challenges

It is likely that the UK as a whole will be challenged to achieve Maximum Sustainable Yield (MSY) targets for all fish stocks. Greater emphasis on conserving the marine environment will see additional operational constraints placed on bottom fishing (trawl and dredge), which account for the majority of NI landed value. The spatial displacement of fishing effort should be relatively localized and so would not have significant long-term impacts on the landed value into NI ports. Climate change also brings challenges for the industry with changes to species distributions and in particular, the need to upgrade infrastructure to cope with more extreme and frequent storm events and sea level rise. **The fishing fleet will need to adapt** in response to net zero carbon targets: investing in new technology to reduce its carbon emissions through more efficient engines, reducing gear impact on the seabed and in the long-term, de-carbonisation.

The UK's exit from the EU is of some benefit the NI seafood industry (based on what is agreed for the coming 5 years) with a moderate increase in some Irish Sea resources, mainly *Nephrops*, and comparative advantages for NI exporters over other parts of the UK. The *Nephrops* fishery in the Irish Sea must further reduce incidental by-catches of vulnerable species in order to fully exploit these additional fishing opportunities. There are also challenges related to the NI Protocol and its impacts on east - west movements of fish products.

Consumer trends indicate increasing demand for the seafood landed into NI ports from continental Europe and emerging markets such as Asia. Northern Ireland producers can capitalise on market demands for quality and a growing interest in provenance with relatively short supply chains.

Future infrastructure needs

Any one of the NIFHA ports could be developed to reduce the operational constraints of the demersal fleet, creating wider benefits for the port concerned and for the sector. However, the creation of new port capacity at one location will not necessarily result in the wholesale relocation of vessels as the fleet and associated businesses have many connections to their home ports. Specific targeted investments at the three NIFHA ports best support future development of the NI fishing and seafood sector. A Business-as-Usual scenario has a major long-term cost: without improved port infrastructure, fishing

and shore-based industries are stymied and will become less competitive than businesses in other UK & Irish ports.

Kilkeel already hosts a maritime cluster of over 129 enterprises, directly employing more than 1,000 FTEs. Increased port capacity (improved access & water depths) will sustain future vessel operations and additional land to expand the harbour estate will enable growth in other port-based enterprises. Kilkeel can then be promoted as the **Irish Sea Marine hub**, supporting seafood and marine industrial services. Port development at Kilkeel is required at a minimum to accommodate the future demersal and inshore fleets and potentially all or part of the pelagic fleet. The full benefit from increased landings by the largest pelagic vessels would require the development of additional pelagic processing capacity. There are risks with this option as it requires commitments from pelagic interests to land sufficient fish to justify the additional investment in port capacity. Alternative funding approaches, such as Public Private Partnership (PPP), could be explored for the extra cost of this larger scale of development.

The inshore fleet in **Ardglass** is poorly served and the creation of a small vessel harbour is needed to alleviate over-crowding, creating more space for the demersal fleet and visiting pelagic vessels in the main harbour. As **NI's pelagic processing centre**, there is a need to secure raw material supplies, by ensuring that port capacity is sufficient to accommodate direct landings. Enhancing port capacity for future (larger and deeper) demersal vessels should be sufficient for landings by the pelagic vessels supplying the factories. There is also a need to secure NIFHA ownership of properties within the harbour estate to facilitate strategic development as part of port master planning.

Portavogie has sufficient port capacity for its future fleet and this should be **maintained as a valuable asset** that will also benefit other maritime sectors. The harbour estate contains available land for future use by other Blue Economy sectors. This needs investment in coastal defences and building refurbishment or removal.

Small scale infrastructure investment is needed to support the inshore sector operating outside of the NIFHA ports and this provision should be included in any future funding programme for the sector. There are numerous other sector development needs that were identified during the FSDP process, as listed in the figure below and described further in section 5. These needs should be addressed through a future fisheries grant scheme.

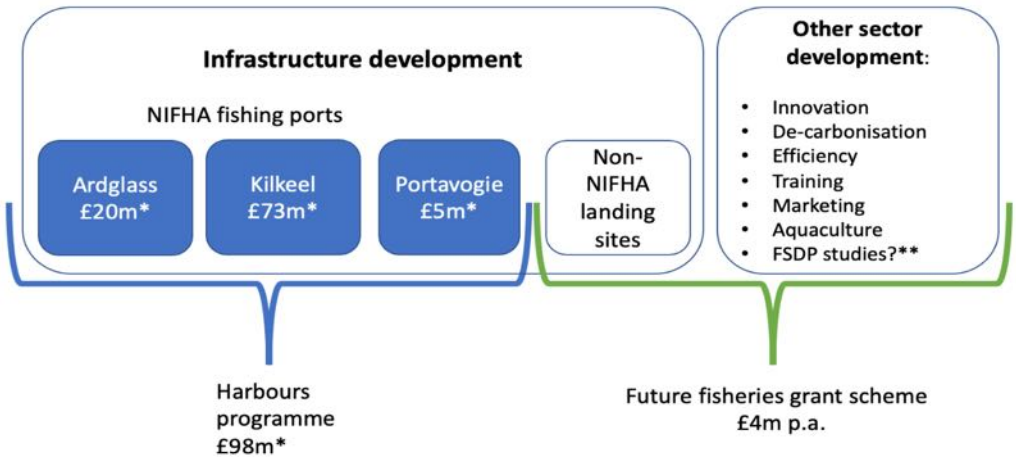


Figure B. FSDP Harbours Programme and Other Sector Development

*indicative costs **FSDP studies include master planning and on Blue Economy opportunities

1. Introduction

1.1 Background to the FSDP

The Fishing and Seafood Development Programme (FSDP) was established in response to calls from the Northern Ireland (NI) fishing industry to make significant investments in fishing harbour infrastructure.

Before embarking on significant capital infrastructure investment DAERA recognised a need to carry out a strategic programme of work to explore the challenges and opportunities facing the NI fishing and seafood sectors. This work will help to shape long term plans to develop the Northern Ireland fishing and seafood sectors, including its infrastructure and enable the sectors to realise their full potential.

A long term view is needed for the FSDP as port infrastructure is intended to have a long time span. The Northern Ireland Guide to Expenditure Appraisal and Evaluation (NIGEAE) suggests at least a 25 year evaluation period, while HM Greenbook suggests that up to 60 years may be appropriate for such long-term infrastructure[1].

1.2 Objective

The overall purpose of the FSDP is to provide a substantive evidence base for the long-term planning of sea fishing and seafood development, including, catching and processing sectors, and associated infrastructure investment, taking account of the UKs transition into an independent coastal state. The output of the FSDP provides a sound basis for future decisions to be taken by NI Ministers.

Going forward, the vision of the FSDP is that:

Northern Ireland's fishing & seafood industry is fit for the 21st Century. It will be prosperous and sustainable: able to take advantage of new fishing opportunities and green growth. It will be supported by improved fishing infrastructure that also enables growth in the Blue Economy and contributes to thriving coastal communities.

Fishing Objective: Fishing operations are sustainable in economic, environmental and social terms: sufficiently profitable to invest in a fleet that can operate efficiently, attract crew and reduce its carbon emissions.

Blue Economy Objective: Northern Ireland grasps future opportunities in the existing and emerging sectors of the Blue Economy.

Harbour Objective: Northern Ireland's fishing harbours are developed to support the needs of the fishing industry and enable growth in other sectors of the Blue Economy.

[1] HM Greenbook "In some cases up to 60 years may be suitable, for example for buildings and infrastructure."

1.3 FSDP process

1.3.1 Stage 1

Stage 1 of the Fishing & Seafood Development Programme focuses on Northern Ireland's fishing fleet and the biological resources on which it depends. It considers the trends and expected future needs of NI's main fleet segments:

- The Demersal fleet (targeting Nephrops, whitefish and scallop on a seasonal basis)
- The Pelagic fleet (targeting small pelagics, mainly mackerel and herring
- The Inshore fleet (targeting mainly crab and lobster)

The operation, trends and issues facing each fleet are detailed in the Stage 1 report, including current port provisions. A summary is provided in Section 2 of this report.

1.3.2 Stage 2

Stage 2 of the FSDP focuses on Seafood and other port-based businesses:

Seafood products and markets: the current situation and trends in supply chains and consumer trends that will inform future market and processing requirements for Northern Ireland seafood.

Other port-based sectors: Sectors directly supporting fisheries & seafood operators such as engineering, vessel servicing & repair, fuel & vessel supplies and other sectors contributing to the maritime economy and coastal communities.

The potential to develop new and under-exploited areas of the fishing & seafood sectors (such as algae or other fish and shellfish species) and other port-based sectors (such as offshore services and emerging sectors like marine bio-technology), are detailed in the Stage 2 report, with a summary provided in Section 3 of this report.

1.3.3 Development Programme (this report)

This development programme is based on the Stage 1 and Stage 2 findings. It sets out the infrastructure investment needs and other support requirements to help the NI sector realise its full potential.

1.4 Policy Context & Strategic Fit

1.4.1 United Kingdom

The UK Industrial Strategy proposes five foundations of productivity, including 'a major upgrade to the UK's infrastructure' (Figure 1). The infrastructure investment proposed under the FSDP will contribute to all five of these foundations by not only supporting the seafood sector, but growth in other sectors of the Blue Economy to help regenerate deprived areas of the UK: the 'levelling up' needed across the regions of the UK[2].

[2] UK 2070 Commission (2020)

Figure 1 The Five Foundations of the UK's Industrial Strategy (source: HM Government, 2017)

UK Maritime 2050: Navigating the Future[3] was published by the Department for Transport in 2019 and envisages for ports and harbour Infrastructure: 'Continued investment and planning ahead to future proof or retrofit infrastructure will ensure ports and harbours are ready to adapt to future changes. This includes the ability to react to disruptors such as severe weather events or potential security threats. Diversification into new activities and business models is also anticipated. The government will incentivise innovation, working with ports to support R&D, foster beneficial partnerships with SMEs and create conditions conducive to testing of new technologies. Stronger links will help leverage the maximum benefits from government and industry investments alike.' There is an inevitable focus on the large-scale UK ports, like Belfast, but smaller ports, such as the NIFHA ports, should follow the same principles of infrastructure investment and diversification to seize the opportunities of the Blue Economy.

The UK Government aims to strengthen the economic recovery from Covid by prioritising jobs and skills; level-up economic opportunity across all nations and regions of the country by investing in infrastructure, innovation and people to make the UK a scientific superpower, including leading the development of technologies supporting the government's ambition to reach net zero carbon by 2050.

Exiting the EU has changed UK trading terms with the EU and the rest of the world and provided opportunities for the fishing industry in terms of increased market share, access to new markets and greater flexibility in reforming fisheries management to achieve sustainable fisheries. Fishing ports are essential infrastructure for the fishing industry and these must be fit for purpose if Northern Ireland is to benefit from these opportunities. Increased port capacity will enable the sector to invest in new technologies to improve the efficiency and environmental performance of the industry.

Specifically on fisheries, the UK Fisheries Act (2020) sets a number of fisheries objectives including a sustainability objective to ensure fisheries are:

(i) environmentally sustainable in the long term, and

(ii) managed so as to achieve economic, social and employment benefits and contribute to the availability of food supplies.

[3] https://www.gov.uk/government/publications/maritime-2050-navigating-the-future

The "national benefit objective" is that fishing activities of UK fishing boats bring social or economic benefits to the United Kingdom or any part of the United Kingdom. Implementation of the Act will help to ensure sustainability of the fish stocks on which the NI fishing fleet depends and the supply of those resources to the seafood sector of Northern Ireland. The FSDP will enable NI vessels to continue to operate from NI fishing ports and visiting vessels can continue to land catch to NI processors.

Recognising the impact and opportunities that exiting the EU present for the fishing sector and its role in coastal communities, the UK government committed 'to maintaining funding for fisheries across the UK's nations throughout the Parliament and support the regeneration of our coastal communities.' A future fisheries grant scheme is certainly needed. However, after decades of under-investment in infrastructure, the scale of investment required for Northern Ireland's fishing ports to support a future seafood sector and other Blue Economy sectors greatly exceeds what will be available from Northern Ireland in a new grant scheme. The intended 50 year lifespan of such public infrastructure also makes it unfeasible to deliver a habour investment programme via a grant scheme.

1.4.2 Northern Ireland

Northern Ireland Executive's draft Programme for Government (PfG)[4] is out for consultation and proposes an Outcomes-based approach. One of the stated outcomes is to 'live and work sustainably – protecting the environment': We need to ensure our infrastructure is integrated, efficient and sustainable and people are encouraged to make environmentally responsible choices (NIE, 2021).

Northern Ireland's new ten-year Investment Strategy (ISNI) is in development to underpin the PfG. It will steer public investment for the coming ten years and, compared to the previous ISNI, it plans to take a longer term strategic view across a range of thematic pillars. A focus on addressing long-term underinvestment in public infrastructure and tackling the challenges of climate change and decarbonisation are anticipated.

DAERA's objectives are[5]:

- **Natural Environment**: To protect and enhance our natural environment now and for future generations whilst advocating its value to and wellbeing for all.
- **Economic Growth**: To enhance our food, forestry, fishery and farming sectors using efficient and environmentally sustainable models which support economic growth.
- **Rural Communities**: To champion thriving rural communities that contribute to prosperity and wellbeing.
- **Exemplar Organisation**: To be an exemplar, people focused organisation, committed to making a difference for the citizens we serve

The Minister announced DAERA's lead on delivering the Green Growth Strategy for the Executive. A draft strategy is planned for later in 2021 with the final strategy and Climate Action Plan finalised in Q1 2022. The aim of Green Growth in Northern Ireland is:

*To **transform** our society towards net zero by 2050, **protect and enhance** our environment and **sustainably grow** our economy.*

[4] https://www.northernireland.gov.uk/programme-government-pfg

[5] https://www.daera-ni.gov.uk/sites/default/files/publications/daera/20.21.020%20DAERA%20Business%20Plan%202020-2021%20final%20V2.pdf

The FSDP will contribute to these aims for the fisheries sector. NIFHA is the executive non-departmental public body (NDPB) of DAERA that has a statutory responsibility[6] for improving, managing and maintaining the three fishery harbours and harbour estates of Ardglass, Kilkeel, and Portavogie and for operating the facilities provided at these harbours. NIFHA's mission is to facilitate sustainable wealth creation in the harbour areas for which it is responsible. To do so requires the infrastructure investment proposed under the FSDP.

Even before the Covid-19 crisis, the Northern Ireland economy lagged behind the rest of the UK with a GVA per head of £21,172 compared to the UK average of £27,555 (ONS, 2019). Since 2009 the annual average growth rate has been around 1.2% in the UK compared to only 0.1% for Northern Ireland. NI also exhibits relatively low pay with 28% of workers earning less than the real living wage and productivity levels are low compared to the UK. Further drops in productivity have resulted from the loss or restructuring of major NI manufacturing companies, which highlights the risk to the NI economy from an over-reliance on relatively few, large manufacturers. It also highlights the importance of Northern Ireland's indigenous industries of farming and fishing, characterised by many micro-enterprises and SMEs. The FSDP proposes public infrastructure investment to support nearly 400 businesses that are located at or reliant on the NIFHA ports, enabling many of them to increase the 1,849 FTEs jobs, £169.5m turnover and £67.3m Gross Value Added (GVA) they currently contribute to NI's economy.

1.5 Climate change

Sea level continues to rise at an increasing rate. Extreme sea level events that are historically rare (once per century in the recent past) are projected to occur frequently (at least once per year) at many locations by 2050. The increasing frequency of high water levels can have severe impacts in many locations depending on exposure (IPCC, 2019). By 2080, within the considered timeframes for port infrastructure investment, sea levels are expected to increase by 0.2m to 0.45m along the County Down coastal area (UKCP, 2018). The risk of coastal flooding will increase with sea level rise and more frequent storm surges. Given the revised data presented in the IPPC 2019 report showing that polar ice loss is more rapid than previously thought, these may already be under-estimates of sea level rise for County Down.

In addition to sea level rise, climate change is affecting sea conditions with an increase in average wave height and sea surface temperatures recorded in the Irish Sea. There has also been resulting changes in flora and fauna with more diatoms and dinoflagellates in the phytoplankton, warm water copepod and gelatinous zooplankton species, and increased numbers of warm water fish species and sightings of exotic fish species (Marine Institute, 2009).

The priority climate change impacts for the seafood sector were recently identified by the Irish Government and include 'existing seafood infrastructure may become obsolete or require considerable upgrading' with a consequence of 'Increased maintenance costs over time if infrastructure is not suitably upgraded to take account of impacts such as extreme storm events, siltation and sea level rise' (DAFM, 2019).

The pressing need to tackle climate change has accelerated NI government policy in this area. Northern Ireland Climate Change Adaptation Programme does not mention NIFHA fishing ports managed under DAERA explicitly, but it does state in relation to 'Infrastructure Services', one of five priority areas, that

[6] Northern Ireland Fishery Harbour Authority Order (Northern Ireland) 1973

'adaptation to climate change under this key priority area requires two forms of response: dealing with the long-term effects on infrastructure such as rising sea levels, and also developing resilience to acute and extreme weather events such as flash flooding.' (DAERA, 2019)

The UK government has committed to a Net Zero target by 2050[7], which will require a fundamental shift to decarbonise land and marine transport. In February 2021, the UK government confirmed that it is considering a carbon tax, initially to be applied to the most emission-heavy sectors (including food production such as meat and cheese) by 2025 before being extended to all parts of the economy[8].

Food production is responsible for a quarter of anthropogenic greenhouse gas (GHG) emissions, of which fisheries contributes 4%. The Fuel Use Intensity of fleets targeting crustaceans by trawl [such as the NI prawn fleet] are orders of magnitude higher than those fishing mid-water for small pelagics or operating passive gear (Parker et al, 2018). NGOs are urging the fishing industry to make the move to less fuel-intensive and less impacting gears, actively lobbying governments to require such moves. The potential for Northern Ireland's fleets to change gears and adapt to the future low carbon economy is explored for each of NI's key fleet segments in the Stage 1 report.

While fuel use during harvesting is the largest single contribution to emissions, transport is also a significant part of emissions in the lifecycle of seafood products. The overall carbon footprint of food is likely to come under closer scrutiny in the future, which has implications for Northern Ireland's fishing businesses and export-orientated seafood market.

The fishing industry's contribution to emissions is small compared to shipping and seafood is a relatively low emissions food compared to other animal proteins such as beef & lamb. It will nevertheless be expected to reduce emissions and will face higher taxes if it does not. Future vessels will adopt technical developments in marine engines that improve fuel efficiency and ultimately switch to carbon-free fuel such as electricity or hydrogen cells. Further details on future fuels are given in the Stage 2 report.

Northern Ireland's Green Growth Strategy[9] and Energy Strategy[10], both to be finalised in 2021, show a clear intent to support infrastructure investment to enhance Northern Ireland's economic output; recognising the need to address climate change through decarbonization of the economy and by ensuring that infrastructure is resilient to its effects. These are particularly important aspects when considering port infrastructure with its coastal location and the long-term nature of investments.

[7] https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law

[8] https://www.thegrocer.co.uk/the-grocer-blog-daily-bread/carbon-taxes-could-help-the-uk-achieve-its-net-zero-aim-but-theres-a-catch/652835.article

[9] https://www.daera-ni.gov.uk/news/poots-chairs-first-meeting-green-growth-inter-ministerial-group

[10] https://www.economy-ni.gov.uk/articles/northern-ireland-energy-strategy-2050

2. Northern Ireland's Sea Fishing Sector

This section summarises the analysis and findings from FSDP Stage 1 report.

It shows that the volume of landings into Northern Ireland are relatively stable and increasing in value. The UK/EU Fisheries Agreement has created some additional opportunities for the NI catching sector, but vessel owners have not invested to modernise the fleet at the levels seen elsewhere in the UK and Europe, risking the ability to take up future opportunities. The operational constraints of existing fishing port capacities hinders the introduction of larger and deeper vessels to the NI demersal fleet, leaving it relatively less efficient and less competitive in the long-term.

2.1 Landings

The average volume of seafood landed into NI ports between 2006 and 2018 of around 22,000t, is a very similar level to landing into NI in the 1990's. The value of landings into NI ports fluctuates, but the overall trend is positive with the first-hand landed value exceeding £30 million in recent years. The trendlines shown in Figure 2 show that value of landings fluctuates far more than the volume, but the growth in value is greater than for landed volume. In recent years the value landed in NI ports exceeded £30million. 2019 saw landed value exceed £31million from 20,252t landed.

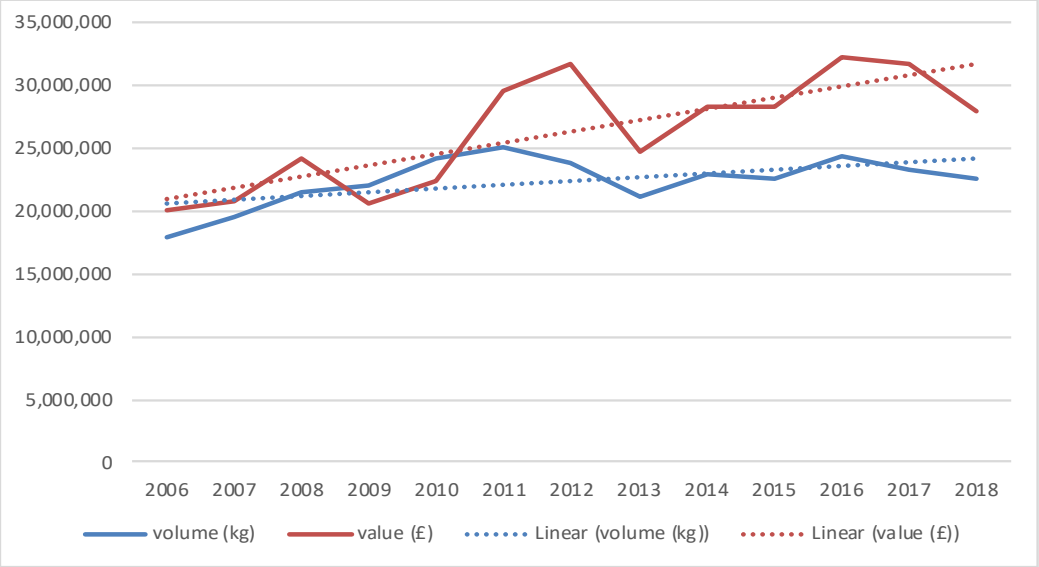


Figure 2 total landings into NI ports by volume (kg) and value (£) 2006-2018 (source: DAERA, 2019)

The total catch by the NI fleet is far greater than the landings into NI ports, amounting to over 52,000t in 2018 with a first-hand sales value of over £57.5 million. The main reason for this difference is the NI pelagic fleet: three large vessels that land much of their catch to processors in Scotland, Ireland, Norway and Denmark. There are also landings by the demersal fleet to ports outside NI when fishing *Nephrops* in the Clyde (some of which returns to NI processors) and SW Ireland or scallops near the Isle of Man.

2.2 Future landings

The future status of the varied resources upon which the **demersal** fleet relies is not possible to predict, but the long term trends indicate that the overall volumes are stable even if the species mix fluctuates. The most important Nephrops functional units for the NI fleet (15, 14 and 13) are considered in good condition and fished at sustainable levels. Improved management of Nephrops and other key stocks through the Multi-Annual Plan; greater attention to scallop fishery management; and improved knowledge and protection of the wider environment should benefit demersal fisheries in the long term.

Pelagic resources are shared stocks that are managed between the EU and independent coastal states, which the UK has recently become. The status of key stocks for the NI fleet (mackerel and Irish Sea herring) remains positive with long term management plans in place with the objective of maintaining stocks at or above MSY.

Inshore shellfish stocks are considered discrete stocks within the inshore waters of Northern Ireland, with resources expected to be fully allocated to the NI fleet as they currently are. The management of inshore resources is wholly under the devolved powers of DAERA. Improvements to inshore management resulting from the 2019 consultation on brown crab management measures have recently been implemented. It is therefore expected that the future prospects of crab and other inshore fisheries are positive.

The UK/EU Fisheries Agreement[11] refers to an overall increase in the UK shares of quota stocks of 25% phased in over the coming 5 and a half years. However shares in some stocks will increase by more than this, and shares in other stocks will remain the same. For Irish Sea quota species, the overall impact is to secure UK fishing activity at the level it was prior to the Brexit referendum with gains in some stocks that were negatively affected by the application of the "Hague Preference" whilst the UK was a member of the EU (Table 1).

Table 1 UK % shares of Irish Sea quotas & Area 7 Nephrops 2021-2025

Stock	UK RS Share	UK RS -HP	2021	2022	2023	2024	2025
Herring	**73.90**	73.90	88.99	91.50	94.00	97.01	**99.01**
Cod	**42.70**	28.80	43.95	44.16	44.37	44.63	**44.80**
Haddock	**47.87**	47.87	52.76	53.58	54.39	55.37	**56.02**
Whiting	**52.80**	38.70	57.73	58.55	59.37	60.35	**61.00**
Nephrops	**32.80**	32.80	38.32	39.24	40.16	41.26	**42.00**
Plaice	**51.11**	43.70	51.11	51.11	51.11	51.11	**51.11**
Sole	**22.20**	20.80	22.86	22.97	23.08	23.21	**23.30**

- Stocks to which Hague Preference (HP) applied in red

Source: DAERA

[11] https://ec.europa.eu/info/files/eu-uk-trade-and-cooperation-agreement_en

For the NI fleet, the greatest potential gain is a 28% increase in quota for *Nephrops*, which remains Northern Ireland's most important fishery, accounting for 51% (£16m) of landed value in 2019. For 2021, the only year for which additional opportunities have been allocated, these amount to an estimated additional £5.1m of Irish Sea stocks that could be landed into NI ports, along with an additional £1.6m in gains for the NI pelagic fleet.

Future allocation uncertainties remain, including the outcome of future UK/EU negotiations after 2026 and evolution of arrangements agreed between the devolved UK nations. There are also technical challenges to ensuring additional Nephrops quota can be caught in line with landing obligation requirements on the bycatch of whitefish species. However, a key issue is that there needs to be a demersal fleet that is capable of taking up these future opportunities and landing this fish into Northern Ireland. There has been a decline in vessel numbers in recent years and the older vessels in the fleet do not have the fishing capacity to catch extra quota efficiently. The increase in UK Nephrops quota should be a clear indication to the demersal fleet operators that investment in modern, efficient vessels with greater storage capacity makes commercial sense. But operationally this is difficult to achieve as the NIFHA ports cannot currently easily accommodate these larger, deeper vessels.

There are also gains in pelagic species. A 34% increase in Irish Sea herring is a positive outcome for the NI pelagic fleet, although the impact on landings may be less marked. A significant amount of the EU quota was held by Ireland and its vessels already land their catch to NI processors. The 7% gain in western mackerel is welcome, but may not create significant changes to landings as pelagic landings can fluctuate far more with annual quota and not all of the NI vessels' mackerel catch will be landed into NI processors.

2.3 The fleet

Compared to the rest of the UK fishing fleet, NI's is old (Figure 3), with relatively less investment in modern, more efficient vessels. There are about 140 over 10m vessels (most trawling for demersal species: *Nephrops*, landing whitefish as bycatch and with some scallop dredging); around 200 inshore vessels fishing crab and lobster; and a modern pelagic fleet of three large vessels over 50m in length fishing for mackerel, herring and other small pelagic species.

A growth in landings in the 1970's led to fleet expansion in the 80's and the fleet has since contracted to pre-expansion levels. The last 10 years has seen a slight reduction in demersal fleet capacity with fewer, but relatively larger and more powerful vessels, and growth in pelagic fleet capacity with upgrades to the three pelagic vessels.

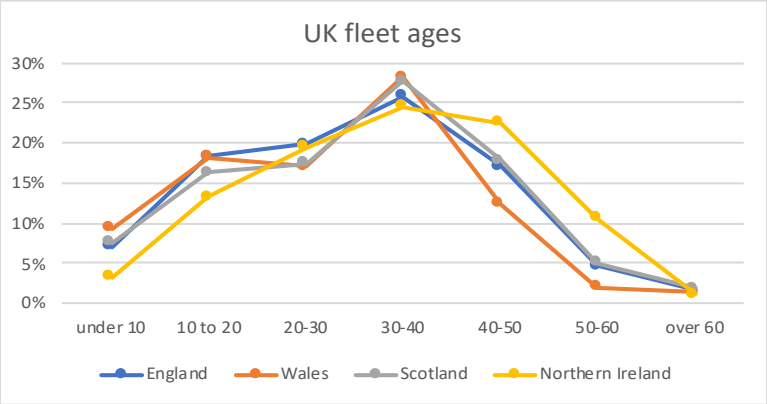


Figure 3 The age of UK fishing fleets (source: MMO, 2019)

The NI fleet has mostly consolidated into the 3 NIFHA fishing ports: Ardglass and Portavogie (both showing recent reductions in the over 10m fleet and increases in the inshore fleet) and Kilkeel (a stable over 10m fleet in recent years, but some reduction in inshore vessel numbers). The fleet sector facing the most significant operational constraints due to port capacity in the NIFHA ports is the demersal fleet. The largest fleet is based in Kilkeel and this faces the greatest operational constraints.

With the exception of the pelagic fleet, mid-sized trawlers (16-22m in length) dominate landings by the NI fleet, accounting for around half of the volume and value landed over the past ten years.

Demersal (*Nephrops*/whitefish and scallop) vessels dominate the NI fleet. These are reducing in number, but landed volumes have not declined significantly and the landed value has increased over the last ten years. On average *Nephrops* trawlers have seen consistently positive, but fluctuating levels of operating profit that are most closely related to export prices. Even though this average economic performance is positive, some further fleet consolidation can be expected.

The issues facing the demersal sector are inter-related: a lack of investment in port infrastructure; limited investment by fishing operations; and an inability to attract crew and new entrants. Some NI licenses are being sold to Scottish fishing interests that are investing in larger vessels, often by skippers reaching retirement age without clear succession plans. Several old vessels have been abandoned in the fishing ports and the issues this causes to other harbour users will worsen unless 'End of Life' responsibilities are enforced and viable decommissioning facilities are available.

The modern, three-vessel **pelagic** fleet is highly profitable: it has seen multimillion-pound investment and has no problem attracting and retaining local crew. These new vessels are already too large for the NIFHA ports, but two acting as a pair team land most of their catch (all herring and most mackerel) into Belfast for sale to NI processors. The largest vessel catches larger volumes as well as other species that are not sought by NI processors. It is processing capacity, not just port capacity that means most of its catch is landed into the major European pelagic ports.

The **Inshore** fleet is mainly a potting fleet using environmentally friendly static gear with relatively low operating costs. It is differentiated between the Down fleet (the great majority of the fleet) and the North Coast fleet (widely dispersed with a concentration of ten currently operating from Greencastle, Co. Donegal). After an increase between 2008-2013, vessel numbers have decreased to just below 200, with much of the fleet aggregating in a few ports, particularly Kilkeel and Ardglass where space for the inshore fleet is inadequate. New vessels designs such as catamarans are wider to give more deck space for more efficient and safer operation; this requires more port space than older vessels. Management of the inshore target stocks is now receiving more attention, but action is urgently needed to address the recent effort increases that have resulted from high crab prices.

2.4 Future fleet

New vessels are getting larger and deeper to make them more efficient (in terms of fuel, fishing and catch handling); less weather dependent (more able to operate in adverse weather); and more comfortable (important for attracting and retaining crew).

Northern Ireland private investment in new vessels has been more limited in the demersal fleet compared to the pelagic and inshore fleets. Traditionally second-hand vessels are purchased, mainly from Scotland, which is similarly dominated by the whitefish/Nephrops trawl segment, but more recently from Ireland and France. However, this is becoming problematic as new vessels are being designed

deeper with a larger draught as well as wider. These new vessels may face too many operational constraints to be suitable for the current water depths and tidal constraints of NI fishing ports. The trend for wider and deeper vessels extends to the under 10m sector, which makes the over-crowding currently experienced by the inshore fleet, particularly at Ardglass and Kilkeel, more acute.

If fishing port capacity constraints perpetuate, under-investment is likely to continue in the demersal fleet and the few NI operators that do invest in new vessels may operate these from other ports (as seen with the pelagic fleet and the larger NI prawn freezer vessels fishing out of ROI ports). Without investment in suitable replacements, NI's demersal fleet is becoming relatively less efficient and so less competitive than other demersal fleets. They will also be unable to take up the opportunities that have been identified from the UK/EU fisheries agreement.

Northern Ireland's pelagic vessel owners have many ties to County Down ports, not least being home to the owners and most crew, but the vessel owners decided some time ago that catching efficiency was paramount and invested in vessels that could not operate from the NIFHA ports. NIFHA's port capacity constraints create more of a problem for demersal vessels than the pelagic fleet, which fishes far fewer days targeting seasonal fisheries that are often much further afield.

Without an increase in NIFHA port capacity there is a real risk that many demersal vessel owners will choose not to re-invest and those that do invest in vessels that cannot effectively operate from the NIFHA ports.

2.5 Summary

A recent review of marine sectors, including commercial fishing, around the UK presented a comparative analysis between home nations (Table 2). It supports the findings of the FSDP, highlighting the relatively weak growth shown by the NI fishing sector compared to elsewhere in the UK. The report also notes that 'there has been a degree of renewal and replacement in the fleet, with fishing businesses seeking to drive efficiency gains and more selective, sustainable catching methods. Indeed, anecdotal and industry evidence suggests that there has been an increase in vessel-building activity in recent years.' This is not the case in Northern Ireland, with investment levels lagging behind the rest of the UK.

Table 2 At a glance sector assessment for commercial fishing

	Business base	Employment	Turnover/ landing	GVA	Trade	Impact distribution
UK	++	-	++	++	-	+
England	++	++	++	++	N/A	+
Northern Ireland	-	-	-	++	N/A	+
Scotland	++	-	++	++	N/A	+
Wales	++	–	++	++	N/A	+

Key	++	Strong growth; widespread distribution of impacts	+	Weak or no growth; weak distribution of impacts	-	Weak negative growth; poor distribution of impacts	–	Substantial negative growth; very poor impact distribution	N/A	No data available

Source: Ekosgen, 2020

Of the three main NI fleet segments (demersal, pelagic and inshore) the demersal fleet faces the most significant operational constraints due to port capacity in the NIFHA ports. The largest fleet is based in Kilkeel which faces the greatest operational constraints. This has limited private sector investment and resulted in NI's ageing fleet. The competitiveness of the NI demersal fleet will worsen in the future as other UK operators invest in larger (deeper) modern vessels that are more fuel & operationally efficient, safe and comfortable for crew. It may also limit the ability of the NI fishing sector to take up the additional fishing opportunities presented by the UK/EU Fisheries Agreement.

The trend for wider and deeper vessels extends to the under 10m sector, which will worsen the over-crowding currently experienced by the inshore fleet, particularly at Ardglass and Kilkeel.

3. Seafood and other fishing port businesses

This section summarises the analysis and findings from the FSDP Stage 2 report, which assessed the prospects and needs of the wider seafood sector and other port-business based at the fishing ports. It identified that the three NIFHA ports are not only critical to fishing & seafood (hosting businesses that account for three quarters of the turnover and employment in the sector), but are also supporting other maritime sectors in what is termed the Blue Economy.

As Figure 4 shows, several sectors making up the Blue Economy are often interconnected with other port-based sectors. Some (those within the blue square) already operate from and are dependent on the fishing ports. Others are Blue Economy sectors that have the potential to be developed at the fishing ports.

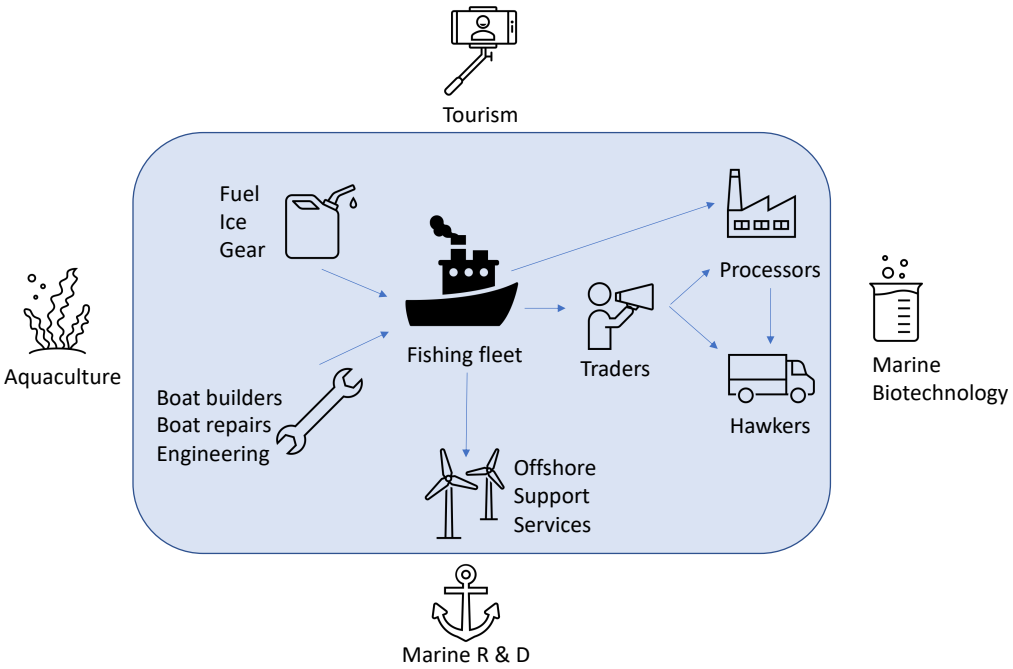


Figure 4 Current (blue square) and potential Blue Economy sectors using NI's fishing ports

3.1 Economic contribution

In 2018 the NI food and drink processing sector accounted for 2.3% of GVA compared to 1.5% at a UK level. Fish is a relatively small sub-sector with just 2% of the total gross turnover, £99 million in 2018. The sector has recovered from the decreases during the 2006-08 economic crisis, but it has not shown the growth rates seen in other NI agrifood sectors (Figure 5). Seafood made up 2.8% of export sales by the food and drink sector and over the last five years employment increased by 10% (DAERA, 2019).

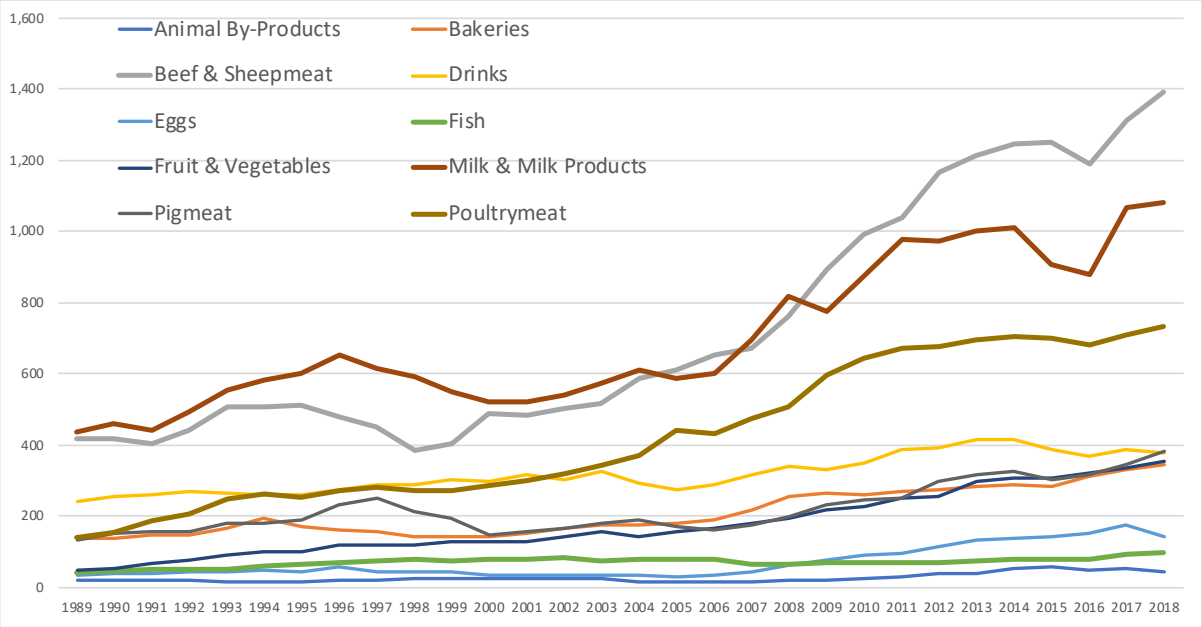


Figure 5 Gross Turnover (million £) in NI food and drink processing sectors 1989-2018 (source DAERA, 2019)

The total estimated direct impact from fishing and seafood processing in Northern Ireland comes from 341 enterprises with a turnover of £135m (£90m processing, £45m fishing) and 1,550 FTE jobs (905 in fishing and 645 in processing). These result in an estimated GVA of £55.5million. Three quarters of this comes from enterprises located at and around the three NIFHA fishing ports.

The NIFHA ports also host a range of other maritime businesses that together amount to 240 businesses with a turnover of £129m, a GVA of over £50m and directly employ over 1,400 FTE jobs. The 1,029 FTEs employed in enterprises at Kilkeel port is around 13% of employment in the District Electoral Area.

These figures illustrate the regional economic and social importance of the NIFHA ports to NI's seafood sector, wider maritime economy and the communities they support.

3.2 Seafood processing

There is substantial trade between NI & GB (imports that reflect consumer preferences for the 'big five': salmon, tuna, cod, haddock and warm water prawns) and exports of landed shellfish. In addition to this intra-UK trade, Northern Ireland exported £61.7m of seafood in 2019 (mostly to the EU) and imported around half that (£31.1m).

NI's contribution to UK scampi production and langoustine exports is considerable, both from direct landings and from raw material coming into NI processors from the rest of the UK and Ireland. Nephrops remains Northern Ireland's most important fishery, accounting for 51% (£16m) of landed value in 2019. The scampi processing sector has seen growth following a period of consolidation, with the largest processor continuing to invest in Kilkeel as its centre for UK scampi production as expansion at its premises was possible and, most importantly, Kilkeel offered a skilled local workforce.

Growth in other seafood processing sub-sectors is constrained by the ability of NI processors to compete for available raw material. New local raw material sources could emerge in the short term with recovery of Irish Sea whitefish stocks, specifically haddock, and in the long-term through the development of the aquaculture sector in Northern Ireland.

The table below presents a recent assessment of the UK seafood processing sector and shows the consolidations seen in the business base, including in Northern Ireland. It shows a reduction in turnover, but this is based on the wider food manufacturing sector and does not reflect the growth shown in Figure 5 above. A rise in seafood processing employment is identified, 'driven by strong growth in England in particular, whilst job numbers in Northern Ireland, albeit low, have doubled over this period'.

Table 3 At a glance sector assessment for seafood processing

	Business base	Employment	Turnover*	GVA	Trade*	Impact distribution
UK	--	++	+	++	--	-
England	-	++	+	++	N/A	-
Northern Ireland	--	++	--	++	N/A	-
Scotland	--	+	++	++	N/A	-
Wales	+	+	+	++	N/A	--

Source: Ekosgen, 2020

NI processors face other common issues including labour (costs and availability) and waste. In the long-term labour challenges, particularly for the prawn fleet, should be addressed through automation, which is actively being explored by some processors and such innovations should be supported.

On waste, economies of scale are difficult to achieve with varied waste streams, but the relatively close proximity of most processing facilities around the NIFHA ports creates the potential for a collective approach to increasing value from by-products. Moving towards a circular economy should link with and underpin the development of NI's marine biotechnology sector in using seafood by-products.

Consumer trends indicate that there will be increasing demand for the seafood landed into NI ports from continental Europe's higher spending seafood consumers and emerging markets such as Asia, that have the volume of consumers willing to pay a premium for high value seafood products. A focus on quality for NI's key shellfish products is consistent with a growing interest in provenance, linked to responsible sourcing. Northern Ireland producers should be able to capitalise on this interest with supply chains that involve relatively short distances and few transactions.

The recent introduction of the Northern Ireland Protocol is currently causing issues for east-west trade with GB, but it does give NI exporters a comparative advantage over their GB competitors. With more paperwork required for GB products to show compliance with EU standards there are non-tariff barriers to trade. This is a positive situation for the export-dependent NI seafood sector, without the admin burden or the delays faced by GB exporters that impacts freshness and so price. There is the possibility this could change as discussions over the Protocol continue and after four years the NI Assembly will vote on its continuation. The expected long-term situation is either comparatively beneficial for NI seafood exporters or there is re-alignment to put NI exporters on a par with other parts of the UK.

3.3 Ancillary sector

The ancillary sector (businesses that supply goods and services to the fishing fleet) is present at all three NIFHA ports, with Kilkeel home to a cluster of engineering businesses that provide vessel services and repair. The availability of maintenance and repair facilities for the fishing fleet around the Irish Sea is limited and Kilkeel could build on its reputation for good quality work at a reasonable cost. However the companies making up this cluster in Kilkeel identify the port's infrastructure as most significant constraint to growth. The availability of slipway space and space adjacent to the slipways limits the number of vessels that can be serviced at any one time. With the trend towards larger vessels for both fishing fleets and guard vessels, the physical limitations of the slipways will increasingly limit the potential market available to the vessel services sector.

3.4 Other port-based industries

Offshore developments (e.g. wind farms, pipelines, cables, and potentially aquaculture) require vessel services and port-based facilities. Offshore vessel service companies have grown from being a provider of useful additional income to the NI fishing fleet, to a sector in its own right providing services and expertise well beyond the Irish Sea. Invest NI has identified that with future offshore renewable developments and its established track record, the NI sector could double over the coming years to more than £20m per annum. As with the fishing fleet, harbour capacity restricts the size of vessels that these companies would ideally invest in for guard work. Larger vessels can be deployed further offshore, in more challenging conditions, for longer periods and have more space for crew comfort, which is important for contracts lasting several weeks.

Given the growth in guard vessel services, the NIFHA ports could also be promoted to Irish Sea developers as locations Operation and Maintenance Facilities (OMF). The Sustainable Kilkeel 2020 report identified both Kilkeel and Portavogie as 'good prospects' for hosting OMF for Irish Sea developments. It states that the single most important factor for Kilkeel in relation to developing its economic output is the upgrading of the harbour facilities so that it can service larger fishing vessels and those associated with the Operation & Maintenance activities of the offshore renewable energy industry (SWC, 2012). It remains the case that the constraints posed by the harbour are likely to impact future development of the offshore services sector as well as the fishing sector.

The table below provides a comparative assessment of recent performance in the offshore renewables sector, which has been driven primarily by offshore wind developments in England (91% of turnover) and to a lesser extent Scotland (9% of turnover). Northern Ireland's offshore wind sector is still to emerge. The capacity and experience based at NIFHA ports that has grown significantly in recent years is based on other Irish Sea offshore developments and exporting that expertise to elsewhere in the UK and further afield. It represents an important foothold in the sector that can be capitalized on when Irish Sea wind developments progress.

Table 4 At a glance sector assessment for offshore renewables

	Business base*	Employment *	Turnover	GVA	Trade	Impact distribution
UK	++	++	++	++	-	+
England	++	+	++	N/A	–	+
Northern Ireland	+	+	++	N/A	+	+
Scotland	+	++	++	N/A	++	+
Wales	+	-	-	N/A	–	+

Source: Ekosgen, 2020

A recent review found that wind farm developments around the NI coast are unlikely to emerge in the short term due to expected objections [and consequently NI waters were excluded from the recent licensing round], but developments are more likely to progress with the emergence of future technologies, such as floating wind farms, that could be positioned further offshore. (DoE, 2019)

3.5 Potential Blue Economy sectors

Other economic sectors within the blue economy present many potential opportunities. Those sectors include tourism, aquaculture, marine biotechnology and other maritime training and R&D. Balancing the interests and needs of tourism with working ports is notoriously difficult to achieve, but port investment plans should recognize the benefits from tourism and ensure adequate visitor provision. Aquaculture demand for port infrastructure is most likely to come from the development of offshore aquaculture (stand-alone sites or co-located within wind farms), requiring servicing by vessels and port-based operations and maintenance facilities in much the same way as offshore energy. Marine biotechnology, training and R&D associated with the ports is likely to emerge from linkages with commercial partners, e.g. processors seeking solutions to waste streams or the vessel services cluster seeking targeted training. Workspace and support for business incubators (as seen with Iceland's Ocean Cluster) would help to kick-start these sectors in the NIFHA ports.

3.6 Summary

NIFHA ports require sufficient port capacity and land-side space to enable the private sector to take up future opportunities in the Blue Economy. A cluster of seafood processing and vessel services is already evident at Kilkeel, which accounts for the majority of turnover and employment, but is limited by port capacity.

The port capacity needs of the boat repair and offshore services are consistent with the fishing sector, namely increased accessibility and water depth to accommodate larger vessels. More land is required adjacent to Kilkeel harbour for current enterprises to grow and for new sectors to establish.

The future needs of current and potential port-based businesses are difficult to specify, but a lack of space in Kilkeel and multiple ownership of Ardglass harbour properties are clear constraints to future development.

4. Port Infrastructure

4.1 Current status

A recent assessment of UK marine sectors for Defra identifies 'infrastructure challenges in ports and harbours as a market failure in the catching sector'. This failure is particularly severe in Northern Ireland, representing a 'major market failure' (Table 5).

Table 5 Assessment of UK sector constraints for commercial fishing

	Human/skills	Environmental/ Natural	Infrastructure	Financial	Technological	Political/co-ordination	Community/ social
UK							
England							
Northern Ireland							
Scotland							
Wales							

Key	No challenge, or addressed through existing activity	Minor challenge impacting somewhat on growth	Major impact or market failure with impact on growth	Major market failure with significantly constraining sector growth

Source: Ekosgen, 2020

The lack of adequate port infrastructure is a result of limited access to finance in some cases, and co-ordination failures between different interest or user groups in others – i.e. significant costs or barriers to co-ordination or collaboration on port development, but not single group able to make a financially viable port without the contribution of other users (Ekosgen, 2020). However, it is possible to progress developments for multiple users. Stornoway in the Outer Hebrides is a recent example of a major development for a small port that will serve several different parts of the Blue Economy[12].

Around 80% of NI's over 10m fishing fleet is based at one of the three NIFHA ports of Ardglass, Kilkeel and Portavogie (**Appendix B** presents maps showing the NIFHA-owned port areas).

NI's three pelagic vessels land and berth elsewhere and there is a small cluster of NI-registered vessels at Greencastle, Co. Donegal. Approximately 40% of the under 10m inshore fleet is also based at one of these three ports, with the remainder dispersed around the NI coast at a range of small landing sites and harbours, often under Local Authority ownership (see Stage 1 report for further details).

4.1.1 Ardglass

Ardglass harbour has three primary areas; the fish dock within the South Pier, the marina to the west of the main harbour behind an isolated breakwater and the Inner Harbour which dries out at low water. The inner harbour is useful for vessel maintenance but not utilised as extensively as the outer harbour due to limited water depth. The main basin / berthing pocket level along the south pier (approx. 180m length) is approximately -2.5mCD to -3.0mCD. The main harbour is accessed by a 30m wide approach channel with a typical depth of -3.5mCD (RPS, 2020).

12 https://www.theconstructionindex.co.uk/news/view/work-set-to-start-on-49m-stornoway-port-project

A recent survey found that 'in general the harbour walls are considered in reasonable condition for a working harbour. The condition of the harbour walls is such that some repairs may be required within the next 1 to 2 years for general harbour operations. The condition of the quay walls will not prevent future harbour deepening provided that the faces of the quay walls are stabilised and protected from undermining prior to dredging operations. This would include the finger pier which may be strengthened by the piling works.' (RPS, 2020)

Ardglass is home to two of NI's pelagic processors and has historically been the centre for pelagic landings. However, the current water depth and length of quayside prevents NI's pelagic vessels from landing in the harbour. Tankers deliver fish from the NI vessels landing in Belfast (an hour away) and there continues to be direct landings at Ardglass of mackerel and Irish Sea herring by the smaller ROI vessels operating in the Irish Sea and North Channel[13]. One consequence of the UK / EU deal is that Ireland's share of Irish Sea herring quota will reduce from 11% of the TAC to just 1%. It may no longer be viable for the ROI vessels (that land directly to Ardglass) to operate in the fishery and the additional UK tonnage would likely be taken by the NI fleet currently landing into Belfast.

There is inadequate space for the growing inshore fleet as the quayside is dominated by the larger demersal fleet and occasional visiting pelagic vessels, while the marina is only for leisure vessels.

A constraint to the landside development of Ardglass' harbour estate is the mixed ownership of existing properties. This prevents NIFHA from having full control over activities (or under use of buildings) in the port and limits the ability to plan strategically.

4.1.2 Kilkeel

Kilkeel Harbour is a man-made harbour lying SE/NW dredged to at least 1.5 meters with a narrow entrance channel dredged to 1.0 meters. The small artificial harbour extends 600 metres inland from its pierheads. The entrance to the inner harbour is via a 13m wide channel and the main harbour entrance is only half as wide again. This makes it a very sheltered harbour but the entrance is virtually inaccessible when the wind is in the East through to South above Force 5. There is also a problem in that the channel running in to the harbour entrance is liable to silting (KSP, 2016).

The 2021 Notice to Mariners reiterate that 'Access dangerous during winds force 5 or above from 105ºN to 225ºN i.e. from E to SW due to need to turn across the sea on entering harbour when there is a risk of 'broaching. NIFHA recommends that extreme caution is taken on entry or exit to Kilkeel Harbour when winds are force 5 or above from 105 ºN to 225 ºN i.e. from approximately E to SW.' and that ' The depth of the channel entering the harbour is reduced due to build-up of the sand bank at the entrance of the harbour.[14]

Kilkeel hosts the largest fishing fleet of around 90 vessels and a cluster of ancillary businesses, but the harbour entrance has considerable constraints in access (water depth, weather and tidal) and there is overcrowding around the quayside.

13 A report on the 2019 sinking of a 23m ROI pelagic trawler at the entrance to Ardglass harbour13 found that the initial grounding had a number of causative factors, including entering Ardglass Harbour two hours before high tide in a loaded condition. This illustrates the operational constraints of the harbour. https://thefishingdaily.com/featured-news/dillon-owen-sinking-at-ardglass-highlights-navigation-planning/

14 https://nifha.net/kilkeel-ntm/

UK and Irish ports with comparable volumes and value of landings are not as constrained by water depth & access as Kilkeel[15]. Harbour capacity is constraining investment and growth in the fishing sector and associated maritime sectors including vessel repair. The existing slipways are booked up some months in advance and they have the capacity to service demersal and inshore vessels up to 16.5m in length[16] from the NI fleet and visiting vessels.

4.1.3 Portavogie

The harbour has a narrow entrance along the shoreline and there is a 10 metres wide entrance to the main harbour's Middle Basin and the harbour has a maintained depth of 3m throughout[17]. Between 2014 and 2016 NIFHA undertook a refurbishment of the Portavogie outer breakwater, Portavogie Quay wall repairs and the removal and disposal of contaminated sediment from Portavogie. The harbour has some depth constraints for the current fleet and a relatively narrow entrance, but the fishing fleet is reducing in number and overall there is adequate quayside space that is in reasonable repair and a useable slipway.

There is available space surrounding the harbour to enable an expansion of shore-based services and the development of other sectors of the Blue Economy. However there are numerous disused buildings and a need to increase the protection of potential development sites from coastal flooding.

4.1.4 Other ports

Outside the NIFHA ports, the inshore fleet is sparsely distributed at various multi-use ports and landing points around Northern Ireland's coast. These assets are managed and maintained by the local authorities that tend to prioritise tourism, resulting in limited infrastructure provision for fishing.

A few NI ports currently have greater capacity in terms of water depth (Belfast, Bangor, Lisnahally and Warrenpoint), but these ports are not feasible alternatives for the NI demersal fleet to relocate: all, other than Warrenpoint, are substantially further from key fishing grounds; the ports lack available quayside space for the number of vessels in the fleet; there is very limited, if any, supporting infrastructure and ancillary industries.

With the exception of Bangor, which is owned by the Borough Council, the above non-NIFHA ports are trust ports. Following a review of NI's trust ports in 2007[18], these ports received extended commercial powers to invest and develop the ports in general commercial activity that are considered to be profitable and of benefit to the port. Each has developed and implemented an independent commercial strategy. It is clear that while the existing limited use by the fishing vessels may continue[19], the strategic focus of these ports is not on fishing, but other Blue Economy sectors.

The three NIFHA ports are the only NI ports that can operate under a collective strategy to develop the harbour areas. NIFHA's stated mission is to 'facilitate sustainable wealth creation in the harbour areas for which it is responsible' and its stated aim is to provide a 'range of facilities and services which meet the needs and aspirations of its key stakeholders'. There is no doubt that the needs and aspirations of

15 The FSDP Stage 1 Report presents a comparative analysis of NI, ROI and other UK ports of a similar scale.

16 https://www.iannewell.co.uk/about-us

17 https://eoceanic.com/sailing/harbours/115/portavogie_harbour

18 http://archive.niassembly.gov.uk/regional/2007mandate/responses/Ports_Policy_Response.htm

19Warrenpoint's provision for the Carlingford Lough mussel dredgers and Belfast's accommodation of two NI pelagic vessels

the fishing industry, NIFHA's key stakeholders, now exceed the existing capacities of the NIFHA ports. It is also evident that there are no suitable alternative NI ports that will accommodate the NI fleet.

4.2 NI Infrastructure needs

The FSDP Stage 1 report presents evidence that Northern Ireland's fishing industry is significantly constrained by fishing port infrastructure, particularly the demersal fleet. The need for infrastructure investment is evident at numerous landing points used by the industry, but the need for increased port capacity is evident at the NIFHA fishing ports, which hosts the great majority of the demersal fleet.

The FSDP Stage 2 report identifies that three quarters of the seafood and associated businesses are based around the three NIFHA ports. There are numerous opportunities for growth in these and other Blue Economy sectors, but the growth of these enterprises is also constrained by port capacity and available space for development.

The focus of infrastructure needs under the FSDP is therefore on the three ports under the NIFHA ownership. It is expected that the infrastructure needs of the fishing industry elsewhere around the NI coast can and should be supported through a future sectoral support programme.

NIFHA operates an annual Maintenance and Minor Capital Works Programme supported through the DAERA budget and made a number of applications for EU-funding to support additional capital projects. NIFHA annual income amounted to £2.2m in 2017 and 2018. Revenues increased in 2019 with improved volumes and prices, but would have been severely impacted in 2020 with the Covid crisis.

The infrastructure needs identified are for an increase in NIFHA port capacity, which should be maintained and remain operational for more than 50 years. The scale and longevity of this infrastructure requires capital investment that cannot be provided through annual budgeting or grant support programmes; a specific development programme is needed to deliver the required investment in infrastructure.

NIFHA has a statutory responsibility for all three fishing ports and should plan strategically across its three harbour estates. It is evident that each port is socio-economically important to its local area. The historic development of the ports' fishing fleets and associated businesses shows that there are too many links to a home port for vessels to switch from one port to another. Therefore, the aim is for each port to continue to provide facilities and services to the fishing industry and that each port be well placed to benefit from future opportunities provided through the Blue Economy. These ports should be viewed as infrastructure assets that are important to local livelihoods and can make a major contribution to Northern Ireland's Blue Economy.

There are additional infrastructure needs at numerous landing sites around the NI coast to support the safe and efficient operation of inshore vessels. It is assumed that the level of demand and scale of investment in infrastructure at these non-NIFHA landing sites could be accommodated in a future sector grant scheme. The FSDP focuses on infrastructure investment at the three NIFHA ports of Ardglass, Kilkeel and Portavogie as detailed below.

4.2.1 Ardglass

Ardglass harbour is home to a demersal fleet, an inshore fleet and it receives direct landings from relatively small (below 30m) pelagic vessels from the ROI. It is also the location of the two largest pelagic processors in Northern Ireland (the third being in Kilkeel).

The Ardglass Harbour Development report (RPS, 2020) set out a range of options focused on increasing depth in the outer harbour to -9m CD and the inner harbour (also known as 'the sawpit') to -2m CD. There would also have to be a dredged transition area sloping between the two harbour areas. Dredging of the inner harbour would be required to create a 'Small Craft Harbour' using finger pontoons and pile guide restraints. The design specification given by Ardglass Harbour Development was to accommodate 18 vessels of up to 13.3m in length. This should be sufficient for the operational inshore fleet as the total number of licensed under 10m vessels with Ardglass identified as home port is 22, of which some will be highly seasonal. The RPS report presents a plan (Figure 6) that incorporates most of the specified elements to accommodate inshore vessels (green area), the demersal fleet and the large NI pelagic vessels (blue area).

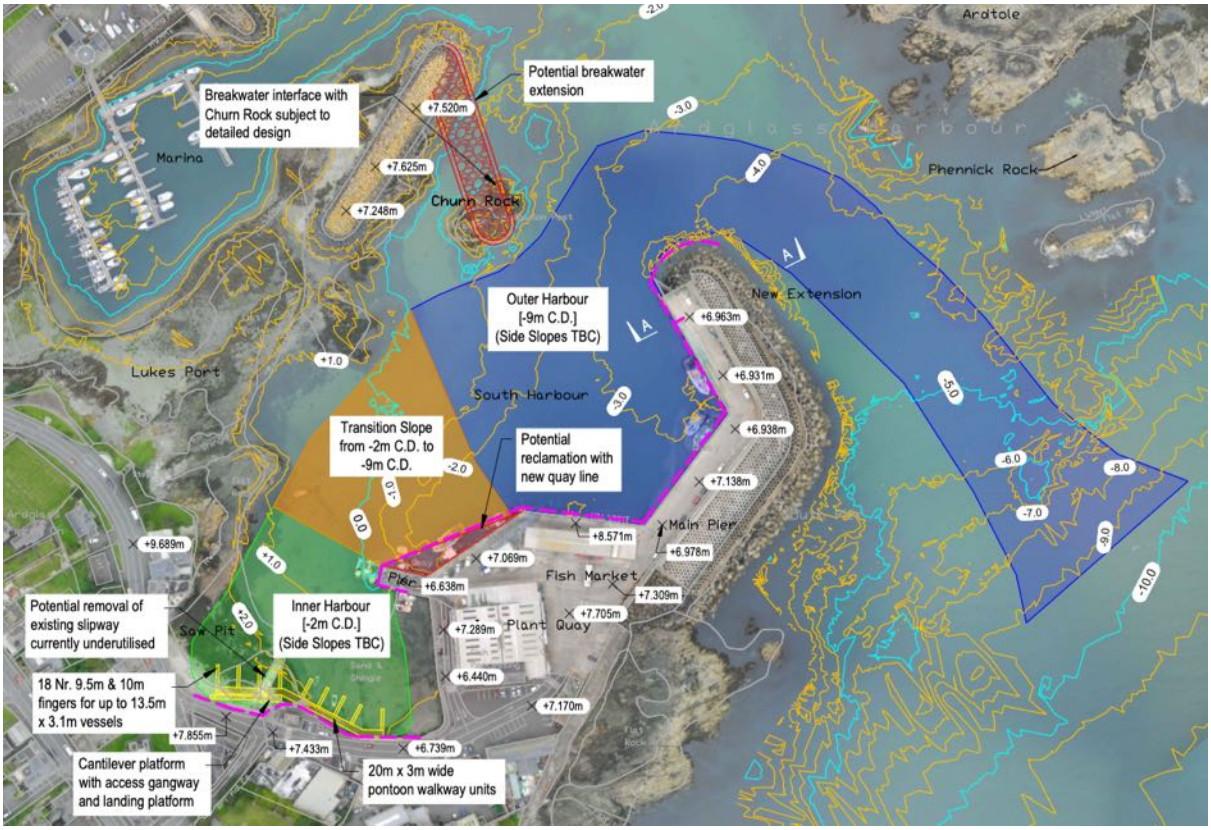


Figure 6 Ardglass Potential Harbour Development Plan (source RPS, 2020)

A critical decision for the Ardglass development is the extent and depths of water at quaysides and approach channels, particularly as this is likely to involve the removal of rock rather than dredging sand. The current plan proposes main harbour quayside depths and an approach channel to -9m CD. Based on assumed rock levels the cost of harbour dredging alone is estimated at £24m along with £16m of protective piling works, bringing the total estimated construction costs for the planned development to £45m (RPS, 2020). A bathymetric survey has been commissioned to determine actual rock levels enable cost estimates to be refined.

The Ardglass harbour plan currently proposes a development that could accommodate landings by the largest NI pelagic vessel (requiring -9m of water depth). However, the depth requirements for a future demersal fleet, the smaller ROI pelagic vessels that currently land to Ardglass (and occasional landings by the NI pelagic pair team) are substantially less, at approximately -5m CD. The creation of the small

vessel harbour would ease over-crowding to better accommodate these occasional landings. The cost of this reduced scale of development will be refined using information from the bathymetric survey.

In addition to the port capacity increase, the FSDP Stage 2 report identified that, while the harbour estate had adequate space for development, the multiple ownership of buildings on that land could be a constraint to its planned development. The FSDP therefore includes a budget estimate of £1m to purchase properties and prepare buildings and land within the harbour estate for redevelopment.

A total capital cost of **£20m** is estimated for a development that creates a small vessel harbour at The Sawpit, with more space and sufficient depth created in the main harbour for the home demersal fleet and visiting ROI pelagic vessels. The estimate for the development to accommodate all NI pelagic vessels remains at **£45m** until this can be revised following the bathymetric survey.

4.2.2 Kilkeel

Port capacity constraints at Kilkeel are well documented. Access to the harbour is treacherous in certain wind directions and sea conditions. The poor wave climate at the harbour mouth, requires the outer harbour to have a 'spending beach' to absorb wave energy, which reduces the areas useable for the fleet. This along with the water depths throughout the harbour also constrain the fleet, leading to over-crowding. The port capacity constraints have contributed to a lack of investment in more efficient modern vessels that require more space and deeper water to operate effectively. More details are provided in the FSDP Stage 1 report, which includes a comparison with other UK & Irish ports landing similar volumes of fish, illustrating the relatively limited port capacity facing the Kilkeel fleet, which risks long-term decline without infrastructure investment to enable fleet investment.

NIFHA has made regular investments to maintain operations and facilities, including maintaining the fabric of the existing harbour infrastructure. The most recent significant upgrade of facilities was a slipway carriage and winch system. The last significant shore-side investment was 2014-2016 with £2m investment (of which DARD contributed £1.45m) for regeneration projects around the harbour area. These have included the Nautilus Centre and car park improvement scheme, two fish processing units constructed in Binnian Enterprise Park and a Small-Boat Pontoon Berthing Facility. However, Kilkeel remains an operationally constrained and over-crowed harbour with landside development constricted by a lack of land within the harbour estate.

Kilkeel requires a harbour with improved water depth to accommodate the anticipated fewer, but larger demersal vessels and an entrance that allows safe access for these and existing demersal and inshore vessels. Several designs have been proposed over many years to create a useable outer harbour and a realigned harbour entrance. These have all proposed new breakwaters extending seawards into deeper water to create a new outer harbour, rather than dredge deeper areas in the existing harbour. This is because less dependence on maintenance dredging will cost less in O&M over the long term and creating more space can also address the issues with harbour access and overcrowding.

The FSDP also seeks to address the landside constraints facing Kilkeel port businesses with the purchase of land to the north of the harbour (Figure 7)and its preparation for development. This would be in addition to any land that can be reclaimed using the dredge spoil.

The latest design iteration for a new harbour is presented in Figure 8. This includes a new harbour entrance; an approach channel and dredged basin at -4m CD; a deep berthing pocket and turning circle at -10m CD to accommodate the Voyager, and an extensive area of reclaimed land (green area) that utilises a proportion of the dredge material where a fish processing factory could be sited (pink box) and

hard standing areas for small (blue box) and larger vessels (red box); a dry dock and boat hoist. The estimated cost for this indicative design was estimated to be £34m (KSP, 2016). This has been re-estimated by engineers based on current prices and a review of design requirements to give a total of £73m (Dornan Engineering, 2021). The substantial increase in cost from the 2016 estimate is due to the engineers identifying the need for higher breakwaters to provide adequate protection from predicted wave heights as well as higher unit costs.

Figure 7 Satellite view of Kilkeel harbour and surrounding land (source: googlemaps)

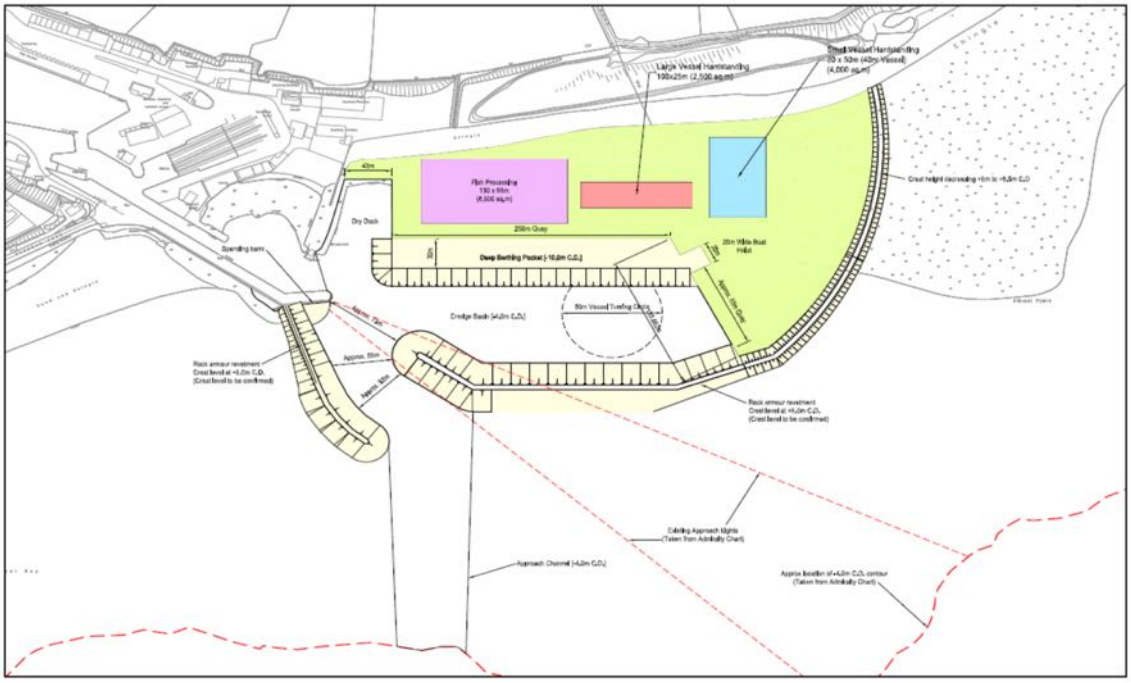


Figure 8 Kilkeel Outer Harbour Indicative Design (source: KSP, 2016)

The Programme Business Case accompanying this FSDP report considers two short-listed options that include one option where the harbour expansion accommodates a future demersal fleet and another where expansion is at a larger scale to accommodate both the demersal and pelagic fleets. The preferred option will be further refined through consultation and workshops to inform environmental & technical studies and the next business case iteration.

The port capacity increase to accommodate demersal vessels and land expansion together amount to an estimated capital cost of **£66m**. The option with additional capacity (increased dredged water depth and quaywalls) to accommodate pelagic vessels creates an estimated additional £7m in capital costs, bringing the total to **£73m**. As the benefits resulting from this additional pelagic capacity depend on commitments from individual commercial interests, an alternative approach to funding this portion of the build should be explored, such as Public Private Partnership (PPP).

The overall development will enable Kilkeel and its cluster of maritime businesses to grow into a Marine an Irish Sea Marine Hub: a centre of excellence for seafood, vessel servicing and offshore services.

4.2.3 Portavogie

In contrast to the other two ports, port capacity is not a significant issue at Portavogie, which has seen a prawn fleet diminishing in number in recent years. The harbour is considered to be in a reasonable state of repair and this should be maintained.

There is ample landside space within the harbour estate to allow for development. However, there are several substantial disused industrial buildings, the largest being at the Parkgate site, that are likely to require removal (rather than renovation/repurposing). This preparatory work will create harbourside sites that can be developed for various Blue Economy sectors (vessel decommissioning, seafood processing, offshore OMF, or even land-based aquaculture). The area north of the harbour will require additional rock armour to ensure the site is future-proofed against coastal flood risk. These land works and workshop developments are estimated at **£5m**.

Figure 9 Satellite view of Portavogie harbour and surrounding land (source: googlemaps)

5. Sector development needs

In addition to the NIFHA port infrastructure needs identified in the previous section, the FSDP identifies other development needs for the fisheries sector. To address these needs, a future fishing and aquaculture grant scheme should be introduced, including (but not limited to) the following:

- Fishing
- Aquaculture
- Markets
- Innovation (incl. gear & waste/biotech)
- Career development, training
- Infrastructure maintenance and development

5.1 Fishing

The investment in fishing ports under the FSDP should stimulate industry investment in the medium-term and this could occur more quickly with additional support. The UK Government has pledged £100million to help the modernization of its fishing fleets. In reality, once distributed around the devolved administrations (e.g. £10 million to NI in proportion with previous UK sector support), this will not in itself rejuvenate the ageing NI fleet. However, it could be a useful stimulus for private sector investment, not only be through the usual grant aid, but through more innovative financial instruments such as improved access to credit and loan guarantees.

The current labor-intensive nature of the NI Nephrops fishery must be addressed, as this affects the profitability of the fleet and makes employment less attractive, which makes it difficult for the sector to retain crew. Enabling investment in larger vessels will not only increase efficiency (and so profitability), it creates the opportunity for further investment in onboard catch handing, storage and processing technology to improve quality as well as greater crew comfort to address these labour issues.

Continued improvement in the environmental performance of NI fisheries should also be supported, particularly in relation to gear selectivity and fuel efficiency.

There is pressure on the UK fishing industry to achieve Maximum Sustainable Yield targets for all fish stocks as quickly as possible. In the Irish Sea Nephrops fishery further improvements in gear selectivity and by-catch avoidance to further reduce the incidental by-catches of vulnerable species, if additional fishing opportunities arising from EU exit are to be fully exploited.

Improvements in fuel efficiency and investigation of alternative propulsion systemswill help the sector to respond to societal pressure and government targets for net zero carbon by 2050. Fuel is the largest operating cost in most fisheries, particularly those operating mobile gear. The value of carbon emissions saved from gains in fuel efficiency have been estimated to amount for £98m up to 2050 and 30% of such savings are attributable to improvements in the UK nephrops fleet (RPA, 2020). Research and innovation is needed on fuel efficiency technologies (engines, vessels and gear) and alternative energy systems in line with decarbonization targets. The uptake of innovations by the fleet can be accelerated with grant support.

5.2 Aquaculture

The aquaculture industry in Northern Ireland is comparatively modest in scale, in 2018 producing 2,969 tonnes of shellfish (mussels & oysters) valued at £4.8 million and 1,109 tonnes of finfish (salmon and trout) valued at £6.8 million. In total the aquaculture sector directly employs 88 full time and 26 part time

employees. At present there are 78 licenced fish farms (covering 88 sites), of which 45 are licenced for the cultivation of shellfish (44 marine and 1 land-based) and 33 for the cultivation of finfish (31 inland and 2 marine)[20].

Globally an increased demand for seafood will be served by growth in aquaculture production rather than increases in wild capture fisheries. The demand from the processing sector for consistent raw material supplies and the preference of the restaurant trade for products with local provenance, all point to an important role for aquaculture in future NI seafood supply.

A range of production systems are possible and it is anticipated that offshore sites (which could be integrated with offshore energy development) will develop in the long-term. In the short-term, growth in shellfish production could be encouraged as an environmentally friendly product and land-based Recirculating Aquaculture Systems (RAS) could be introduced. Coastal sites are not essential for RAS, but access to natural seawater is still a benefit. The potential for land-based aquaculture could be developed at the Portavogie harbour site for example where under-used land & buildings in the north part of the harbour estate sit adjacent to the open sea.

For aquaculture to grow in Northern Ireland, current operators and prospective new developers need support. Those seeking to invest need assurances to reduce development risk and this can be in the form of site identification, increasing certainty and timeliness of licensing, extraction/discharge consent & planning permissions. Northern Ireland needs to be promoted as a region where aquaculture development can happen and investment here makes commercial sense. An approach that may suit the objectives and scale of Northern Ireland sector is a 'one-stop shop' like the Dorset and East Devon Aquaculture[21], which promotes aquaculture development in the region, provides information and links prospective developers to investors and regulators.

5.3 Markets

Consumer trends indicate that in the long term there will be increasing demand for the seafood landed into NI ports. A small proportion of UK consumers are appreciative of high quality, locally produced seafood, but the greatest demand for seafood landed into Northern Ireland will continue to come from the continent and emerging markets such as Asia, that have the volume of consumers willing to pay a premium for high value seafood products.

A focus on quality for NI's key shellfish products is consistent with a growing interest in provenance and linked to responsible sourcing. Northern Ireland producers should be able to capitalise on this interest with supply chains that involve relatively short distances and few transactions. This is in part linked to sustainability considerations that are of increasing importance to European seafood buyers.

With the UK's new trading arrangement and Northern Ireland's unique place within it, processors will certainly require help in identifying and accessing new opportunities, as well as adjusting to new arrangements in existing markets.

5.4 Innovation

A review of UK gear trials, including the NI gear trials, made several recommendations including the production of best practice guidance for future trials (Seafish, 2021). Future sector funding should

[20] https://www.daera-ni.gov.uk/articles/introduction-aquaculture

[21] https://www.dorsetaquaculture.co.uk/

support the trialing of selectivity and other technical measures that look to address the challenges faced by the NI fleet. This may well become more pressing with the varied quota opportunities. As stated above, it is also important that a funding scheme supports the uptake of any successful gear adaptations and technologies that emerge from research.

Plastic waste has emerged as a major pollutant in marine ecosystems. Waste fishing gear is estimated to account for up to 27% of beach litter in the EU. This gear waste, along with other waste resulting from fishing operations (e.g. fish boxes, gloves, rope, bindings, etc.), needs to be both prevented e.g. through Extended Producer Responsibility schemes and through material and design innovations that support the circular economy.

Innovation is also critical to the by-products resulting from seafood processing. Waste disposal is a common issue for NI seafood processors. Most fish waste is taken by road across to Killybegs, with the transport cost roughly matching the price paid for the material. However these arrangements may alter with the UK's exit from the EU and producers should be supported in seeking cost-effective solutions. As exemplified in Iceland, this raw material should be re-considered in terms of potential by-products, rather than as a waste problem. Some NI processors are exploring the treatment of shell waste to produce bio-plastics with numerous applications being identified. There are clear economic and environmental benefits to establishing treatment/by-product production close to source. To do so there is a need to facilitate links and support initiatives between NI producers and biotechnology expertise to help establish a marine biotechnology research base in Northern Ireland.

5.5 Career development & training

The FSDP will deliver fishing ports that will support the needs of a future fishing industry, including its ancillary industries of vessel maintenance and repair, as well as other port-based industries, such as offshore services. Kilkeel already has a cluster of businesses supplying a range of engineering expertise, exemplified by Kilkeel Harbour Works. The port businesses offer numerous maritime careers and their future growth as an Irish Sea Marine Hub will require a supply of suitably skilled employees. This should be supported through career development and training that facilitates collaboration between the private sector and training providers across the Blue Economy[22].

5.6 Infrastructure maintenance & development

There are numerous non-NIFHA ports around the NI coast that host fishing activities. At some of these even basic infrastructure and services are lacking. Many would benefit from quayside winches for the loading and unloading vessels in a safe manner.

There is also a need to introduce suitable collection and disposal facilities at fishing & aquaculture sites for all marine waste, including plastic waste.

5.7 Future Fisheries Fund

Until now the primary source of fisheries sector support has been EU-funded programmes. The UK government has made a commitment to provide equivalent funding, but to date provision has only been

[22] Examples of training initiatives include the Cornwall Marine Network and Deep Blue (Western Mediterranean).

confirmed for 2021/22. If future funding is in line with previous funding and NI Protocol fisheries State Aid exemption limits, the scale of this support for Northern Ireland could be assumed to be around **£4m** per annum.

Work under the FSDP has identified the above needs. The programme to deliver this funding is still to be designed by DAERA and will be be subject to a separate business case as well as stakeholder consultation.

6. The FSDP Harbours Programme

6.1 FSDP Vision

Northern Ireland's fishing & seafood industry is fit for the 21st Century. It will be prosperous and sustainable; able to take advantage of new fishing opportunities and green growth. It will be supported by improved fishing infrastructure that also enables growth in the Blue Economy and contributes to thriving coastal communities.

6.2 Objectives

Fishing Objective: Fishing operations are sustainable in economic, environmental and social terms: sufficiently profitable to invest in a fleet that can operate efficiently, attract crew and reduce its carbon emissions.

Blue Economy Objective: Northern Ireland grasps future opportunities in the existing and emerging sectors of the Blue Economy.

Harbours Objective: Northern Ireland's fishing harbours are developed to support the needs of the fishing industry and enable growth in other sectors of the Blue Economy.

Kilkeel becomes an Irish Sea Marine Hub: port capacity is increased, making it more accessible with increased water depth, for fishing, vessel repair and offshore services. The harbour estate is increased with additional land for business expansion and new opportunities.

Ardglass harbour capacity is enhanced to secure fishing and processing industries. Harbour properties are acquired to enable coherent harbourside development.

Portavogie harbour is maintained for its fishing industry and the harbour estate is prepared for future Blue Economy opportunities.

6.3 FSDP Harbours Programme

The FSDP Harbours Programme consists of three projects at each of the NIFHA harbours:

- Kilkeel harbour expansion
- Ardglass harbour enhancement
- Portavogie harbour estate preparation

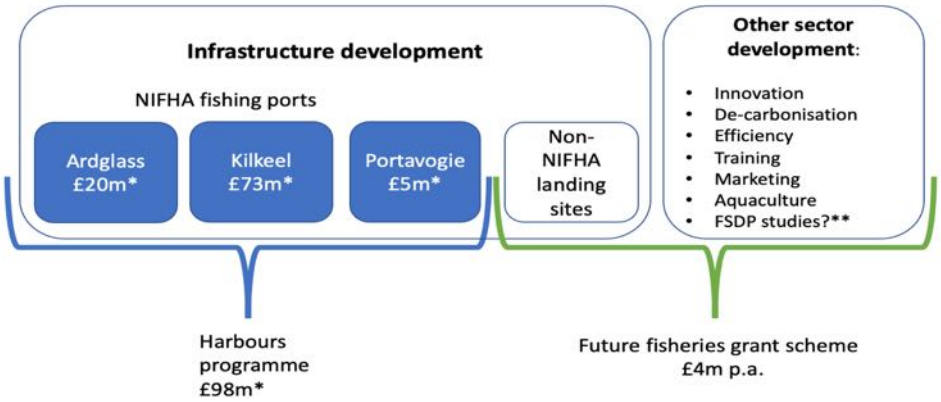


Figure 10 The FSDP Harbours Programme and Other Sector Development

*indicative costs **FSDP studies include master planning and on Blue Economy opportunities

The designs for each project will be refined based on the requisite environmental and technical studies, including port master planning. As the figure above indicates, the capital cost of the FSDP harbour programme is much larger than could be accommodated by a post-EMFF future fisheries grant scheme and is therefore considered as a separate programme with a separate business case. It is expected that infrastructure development at non-NIFHA landing sites and various other areas of sector development would be supported by such a grant scheme. A future fisheries grant scheme could include the funding of studies that support delivery of the FSDP Harbours Programme, directly with the environmental and technical studies for the port projects and indirectly through studies to identify & develop Blue Economy opportunities.

The Programme Business Case for the FSDP Harbours Programme shows the current preferred option includes an expanded Kilkeel harbour that can accommodate the demersal fleet and landings by the largest NI pelagic vessel with land provision for the necessary associated processing facilities. This preferred option is dependent on (a) updated cost estimates for the Kilkeel and Ardglass developments and (b) securing the necessary private sector commitment for pelagic facilities. The commitments from these pelagic interests include the landing and processing of a sufficient proportion of the catch and exploring alternative funding routes such as public private partnership (PPP) to cover the additional costs for this larger scale of development.

6.4 Risks & mitigation

6.4.1 Demersal vessel options

The FSDP Stage 1 analysis supports a prevailing industry view that, if port capacity permits, the NI demersal fleet would seek to increase efficiency by investing in larger, deeper vessels that are fewer in number. Planning for a future fleet inevitably has uncertainties over the pace and scale of changes, which are dependent on multiple variables. Ideal operating conditions for a vessel may be for access at all states of the tide and a quayside berth without ever resting on the bottom. However, the cost of this ideal would be excessive and therefore compromises are needed. It may be that some parameters, such as the length of available new quayside, will be designed for berthing a certain number of large demersal vessels 2 deep as standard. However, there may be a need for 3-deep berthing for specified periods, such as when pelagic landings are expected, and recognising that skippers may choose to berth elsewhere in the harbour for a variety of reasons (for maintenance, provisioning etc.)

Uncertainties are to be mitigated by engagement with the fishing industry and other port users to refine harbour designs. This will identify what operational conditions are acceptable and how benefits can be maximised in the most cost-effective way.

6.4.2 Pelagic vessel options

The business case short-listed three options along with the ‘Business As Usual’ option:

a) Increase port capacity and available land & property at Kilkeel & Ardglass, improve Portavogie estate

b) Increase port capacity at Kilkeel (including for pelagic vessels) & Ardglass and available land & property, improve Portavogie estate

c) Increase port capacity at Kilkeel & Ardglass (including for pelagic vessels), and available land & property improve Portavogie estate

The current preferred option (based on estimated capital costs for Kilkeel) is Option (b), which includes accommodating the largest pelagic vessel, Voyager, at Kilkeel. However sufficient benefit The benefits

The KSP report recognised that 'the value to the NI economy is heavily dependent on the commitment of the Voyager to land its catch at [Kilkeel] harbour and reported a commitment to landing at least 33% of Voyager's landings at Kilkeel. Sensitivity analysis shows that the benefit/cost ratio for this option remains positive with 10% of Voyager's catch landed and processed in NI, but it is then on a par with the benefit/cost for Option (a), which only increases capacity to accommodate the future demersal fleet.

At least 16% of the annual pelagic catch needs to be processed in Kilkeel to ensure the gross value added is sufficient to justify the expenditure on the full harbour. Also, 'If Ardglass harbour is developed to allow the Stefanie M and Havilah vessels access to land, the additional value of Option 5 development is reduced by 49%.' (KSP, 2016) These conclusions support the short listed options that include port capacity increases for pelagic vessels at either Ardglass or Kilkeel, but not at both.

The risk to either option accommodating pelagic vessels is that (a) additional pelagic landings are not made and (b) added value of that catch are not processed. To mitigate against this risk, it is proposed that the additional spend to enable additional pelagic landing and processing be financed through public and private investment, namely pelagic fishing and processing interests. This will make the financial case for these options more viable and create an economic incentive to make additional landings and to develop the processing capacity needed to add value to those increased landings.

6.4.3 Harbour estate development

The FSDP Stage 2 report found that a variety of fish processing and ancillary businesses had significant growth potential, but were constrained by port capacity (e.g. vessel services limited by slipway capacity and water depth) or available harbour-side space. It also identified several future development opportunities for other maritime sectors, such as renewable energy OMF, aquaculture, tourism and marine biotechnology. However, the timing, location and extent of such developments across the three harbours is unknown as this is dependent on (a) there being sufficient land available to accommodate developments and (b) government support for the development of these emerging sectors (e.g. offshore energy development in NI waters). To mitigate against these uncertainties, the FSDP will ensure the availability and readiness of sites within the harbour estate, but not the specific end use.

The business case includes the evident market opportunities reported for offshore vessel and repair services with increased port capacity, but it does not attempt to quantify other sector opportunities that are expected, but reliant on wider policy decisions.

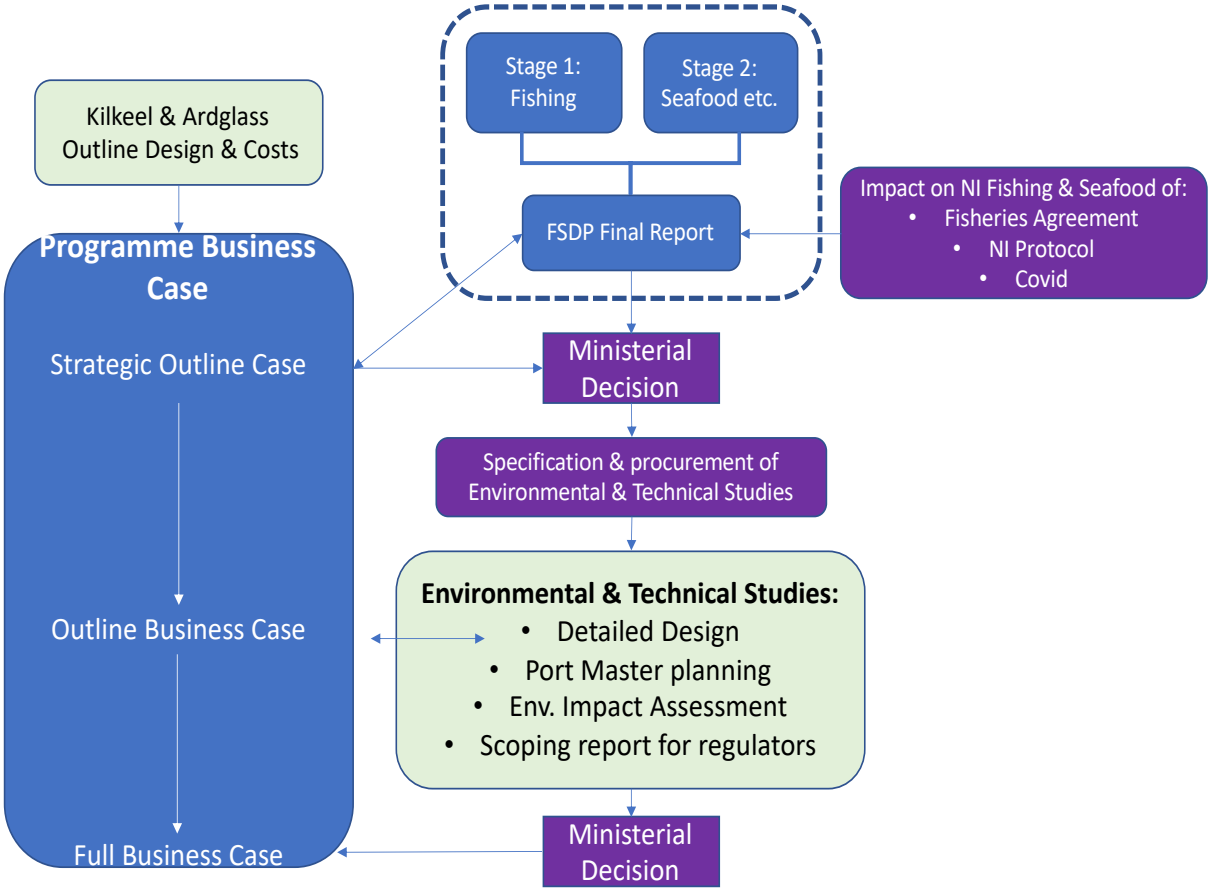
6.5 Implementation

Error! Reference source not found. illustrates the proposed steps to implement the FSDP Harbours Programme. This will be supported by a Programme Business Case (PBC), which is following HM Treasury guidance on the five case model, as required by the Department of Finance[23]. The PBC is currently at the Strategic Outline Case (SOC) stage in which the strategic and economic cases for the FSDP Harbours Programme are most developed. The PBC will be further developed as the environmental and technical studies and associated costings for the projects at the three harbours are undertaken.

[23] https://www.finance-ni.gov.uk/articles/better-business-cases-ni

The Programme Business Case will enable a ministerial decision to be made. If a decision to proceed is made, the next step is to develop the specification and procure the environmental and technical studies required for the projects through the Department of Finance's Construction and Procurement Delivery (CPD). It is estimated that these studies could be commissioned for commencement in Q4 2021 with completion in Q4 2022. As recommended in the Stage 2 report, port master planning should be conducted as part of the technical works to deliver designs that ensure the needs of local residents, current port businesses and potential port-based sectors are given due consideration. These studies will develop detailed designs to further develop the PBC and for planning and marine licensing decisions to be made. With these in place, there would be a ministerial decision to proceed and seek Executive Approval. With all necessary approvals and funding in place, construction could commence on the FSDP Harbour Programme projects in 2023.

Figure 11 FSDP Harbours Programme Next Steps



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Appendix B: NIFHA Fishing Port Maps

Figure 12. Ardglass harbour area, source: NIFHA

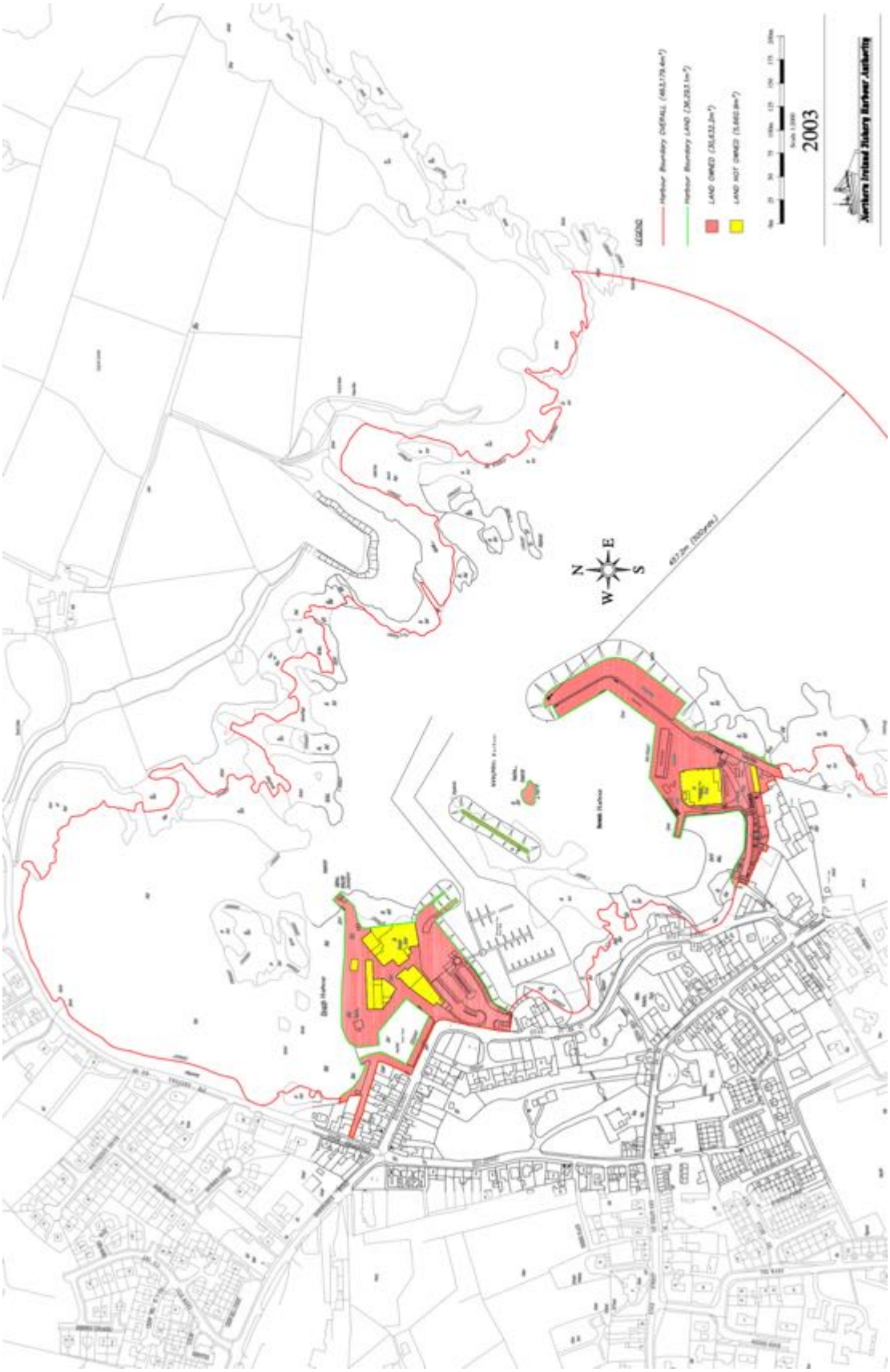

Figure 13 Kilkeel harbour area. source: NIFHA

Figure 14 Portavogie harbour area. source: NIFHA