Murlough Marine Protected Areas Management Plan

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Glossary of Terms

AFBI Agri-Food and Biosciences Institute

AMR Antimicrobial resistance

AONB Area of Outstanding Natural Beauty

ASSI Area of Special Scientific Interest

BSAC British Sub Aqua Club

CEDaR Centre for Environmental Data and Recording

DAERA Department of Agriculture, Environment and Rural Affairs

DUO Demolition of Unexploded Ordnance

DFI Department for Infrastructure

DGNSS Differential Global Navigation Satellite System

EC European Commission

ECC Environment European Commission

EOD Explosive Ordnance Disposal

ET Explosive Trials

EU European Union

EWL Extreme Water Levels

FCL Fish Culture License

Ha Hectares

ICES International Council for the Exploration of the Seas

INNS Invasive Non-Native Species

IPCC Intergovernmental Panel on Climate Change

IVMS In-Vehicle Monitoring System

JNCC Joint Nature Conservation Committee

LA Local Authority

LPG Liquid Petroleum Gas

MarPAMM Marine Protected Area Management and Monitoring

MCA Marine and Coastguard Agency

MCZ Marine Conservation Zone

MITB Multiple Inter Tidal Bars

MLS Minimum Landing Size

MoD Ministry of Defence

MPA Marine Protected Area

NAEXP Naval Authority Explosives

NBS Nature Based Solutions

NGO Non-Governmental Organisation

OSPAR Oslo and Paris Conventions

PADI Professional Association of Diving Instructors

PWC Personal Water Craft

RSO Reconnaissance Systems Officer

SAC Special Area of Conservation

SLR Sea-Level Rise

SWOT Strengths, Weaknesses, Opportunities and Threats

UK United Kingdom

UNESCO The United Nations Educational, Scientific and Cultural Organisation

Executive Summary

The Marine Protected Area Management and Monitoring (MarPAMM) project developed tools for monitoring and managing Marine Protected Areas (MPA) within Northern Ireland, the Republic of Ireland and Western Scotland.

Through the development of six management plans MarPAMM aimed to increase the capacity in and collaboration between Northern Ireland, the Republic of Ireland and Western Scotland for MPA management planning. This will help to enable wider integrated marine planning and management. The following objectives were created to achieve this aim:

- Collate existing best practice on the production of MPA management plans including those on governance, stakeholder engagement, management planning and communications; and
- Focus MarPAMM Management Plans developed within the island of Ireland on:
    - Delivering feature conservation condition benefits.
    - Delivering benefits - from management guidance for marine activity users to co-management and scientific outputs for stakeholders and local communities.
    - Promoting greater integration between MPAs management and wider marine management frameworks; and
    - Identifying the connections between MPAs in the three different jurisdictions.

The management guidance will deliver strategic conservation, building on existing best practice approaches to MPA management (e.g., risk-based, adaptive management) as well as delivery of innovative approaches to aid restorative and adaptive management. This could effectively create resilience and adaptability to protect, maintain and enhance the environs of the Murlough MPA region.

Examinations of the rationale behind the guidance has identified key areas for management considerations such as renewable energy development, recreation and tourism practices and Climate Change. Review of the scientific outputs and stakeholder engagement from the MarPAMM project have helped to identify and devise key recommendations for the current and future management of designated features and adjacent areas within the Murlough management plan area:

1. Results from the MarPAMM research on coastal processes explored ‘Coastal geomorphology and sediment dynamics’ for Dundrum Bay in Northern Ireland. Key findings included:
    a. At a large scale, the sediment (i.e., sand) is moving from Newcastle-Murlough to Ballykinler. This trend has been evident for an extended time, evidenced by both the overall shoreline displacement and the shoreline analyses for each single period.
    b. Large urban areas and improved land of Newcastle, Dundrum and surroundings areas of the inner bay will be most affected by rising sea if the worst case SLR scenarios unfold.
2. A key recommendation from the stakeholder engagement was that future management needs to evolve from Engineered (Hold the Line) to Managed Realignment responses using ‘Nature Based Solutions’.
3. Within the management plan the most prevalent Blue Carbon habitats are those of Atlantic saltmarsh meadows and *Zostera marina* eel grass beds, particularly those found within Inner Dundrum Bay.
    a. The potential for restoration and enhancement of salt marsh and eel grass beds within the Inner Dundrum Bay needs to be explored by DAERA and local marine managers.
    b. The competent authorities should examine and characterise current and future threats to Blue Carbon habitats due to Climate Change and human activities.
4. With the growth of recreation and tourism post COVID, a key recommendation is that activity users need guidelines to help support environmentally friendly practices.
    a. Areas of concern that have been identified are the impacts from fast watercrafts, jet skis and recreational dog walking etc. The management plan recommends users follow codes of conducts such as the WiSe Scheme and Leave No Trace and Share the Shore.
    b. MarPAMM has installed QR codes on posts along the Murlough beach with links to digital videos for promotion of education and awareness on recreational interactions with MPAs.

Through strategic guidance within the management plan, the recommendations are expected to be hierarchical to enable issues to be addressed at either local or regional scales, whichever is appropriate. These recommendations/outputs will be delivered through working closely with stakeholders, other MarPAMM work packages (e.g., Seabird modelling) and sister projects, (e.g., SeaMonitor) to help evidence and support robust management approaches and outputs.

1. Regional setting: location, boundary & context.

1.1. Overview and context of the Murlough SAC area.

Murlough Special Area of Conservation (SAC) is one of six marine SACs designated in Northern Ireland. The Murlough SAC comprises of both marine and terrestrial areas of Dundrum Bay and is roughly bounded by St. John's Point, Glasdrumman, Newcastle and Dundrum. Dundrum Bay lies off the south-eastern County Down coast of Northern Ireland in the Irish Sea, bordered by the Mourne Mountains to the southwest and the sand-dunes of Murlough in the north-west and Tyrella Beach to the north. It is a large, shallow bay with a gentle gradient offshore and is mostly sheltered from the prevailing westerly winds. Murlough SAC includes the largest area of shallow sub-littoral sandbanks in Northern Ireland and extensive inter-tidal sands and muds. The area forms an important haul-out for both harbour (Common) seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*). The Murlough Area of Special Scientific Interest (ASSI) contains key features of sand dunes, mudflats, coastal saltmarshes, Common seal (*P. vitulina*) and wading birds, all of which are designated marine features within the ASSI.

The boundary of the plan area includes all marine areas and extends only into terrestrial areas which include designated features that experience seawater inundation/direct influence i.e., saltmarsh and fore dune complexes. Categorically terrestrial (above the Mean High Water Mark) features such as hinter dune features are not included in the plan area.

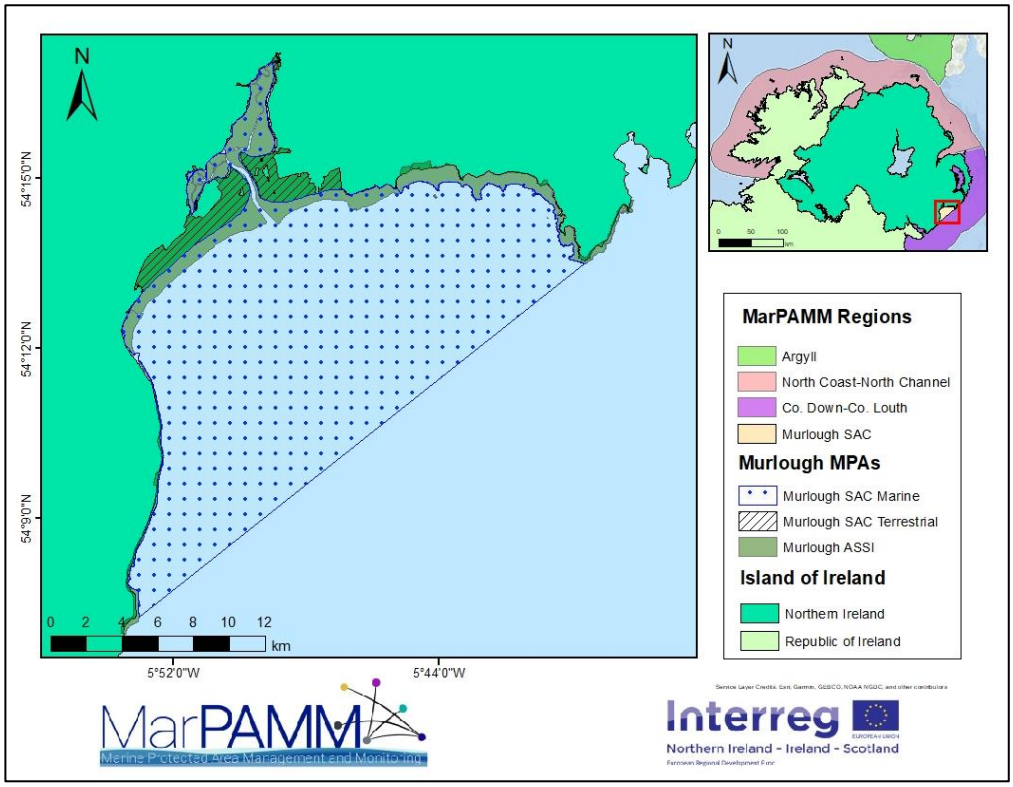

Figure 1: Murlough SAC management plan area (Source: AFBI, 2022).

1.2. Overview of what the plan seeks to achieve.

The ethos behind the development of the MarPAMM Murlough MPA management plan was to provide additional support for the delivery of conservation benefits from MPAs within the site whilst working in parallel with local communities and stakeholders. Input from a Steering Group comprising of a pool of stakeholders from industry, government, non-governmental organisations, and the local community developed a stakeholder - led plan of guidance for the Murlough area. The information presented herein is a combination of aspirational targets and existing legislation developed as a guidance for interested parties. Whilst this guidance is not statutory and as such cannot be fully enforced as a management plan, for ease of reference and discussion it is referred to hereafter as the 'Murlough MPA management plan' or 'management plan'.

The Murlough MPA management plan supports sustainable use of the marine environment within the Murlough SAC and Murlough ASSI with a focus on the designated features, collaboration between stakeholders and the wider governance of marine planning and management. This is achieved through the objectives below:

a. Support delivery site conservation benefits and identify the aspirations of activity users/ local communities for site specific guidance. This guidance may fall outside of legislation, particularly in relation to how it may benefit the MPAs.

b. Planning at a scale which enables site-specific and strategic actions (i.e., Climate Change adaptation) to be applied to create enhanced integration within the wider marine management; and
c. Ensure a focus on the connections between MPAs with assistance for stakeholders to understand that these protected areas are part of an interconnected network and that actions outside of MPAs can still influence the features within them.

Successful and effective management needs to be underpinned with the best available evidence, supported widely and include regular review and updates based on monitoring outcomes and new knowledge. This management plan was developed to support this method and raise awareness of the importance of looking after the Murlough area. This management plan also focusses on how to achieve conservation benefits which enhance sustainability through supporting a well-managed, ecologically coherent, marine and coastal environment.

The intention of this plan is to provide management guidance that is applicable to MPAs and their designated features, as well as adjacent areas outside of designations to help achieve the sustainability of the marine environment. This is a principal output within the MarPAMM management planning process.

The management plan will assist decision makers in developing a consistent approach and understanding of the subject of MPA management and improving the communication of decisions from relevant authorities to stakeholders. It is intended that it will be used as a marine management tool and considered as material for consideration in the determination of activities of marine orientated development. The guidance approaches used to inform the management plan were developed by adapting existing best practice from across the European Union (EU), the United Kingdom (UK) and the Republic of Ireland (RoI). Innovative guidance approaches were also developed using MarPAMM project partner outputs from the four science focused work packages.

The management plan outputs are intended to help inform and aid decisions made by marine managers operating within the management plan area and to support wider marine management associated with marine spatial planning as stated in the Marine Act (2013). This management plan is non-statutory but is being produced in collaboration with the Murlough Steering Group and the NI statutory authority the Department of Agriculture, Environment and Rural Affairs (DAERA). The stated guidance and monitoring from the MarPAMM Murlough SAC MPA management plan

should continue to have effect (where relevant) unless and until such guidance is updated, revised or replaced by new Departmental guidance or a statutory policy.

OSPAR and next steps.

The OSPAR convention considers MPAs as sites for which conservation measures have been created making use of protective, restorative, and precautionary governance to protect and conserve species, habitats, ecosystems, or ecological processes in the marine environment (OSPAR, 1998). The OSPAR commission provides a mechanism through collaborative governance with EU and non-EU members to protect the marine environment of the North-East Atlantic. This encompasses a wide array of marine issues from work on pollution and dumping at sea to the conservation of marine biodiversity (OSPAR, 2006).

NI's commitment to the objectives of the OSPAR commission is through marine conservation work undertaken by DAERA within SACs, SPAs and MCZs (DAERA, 2021). NI has committed to developing and maintaining a network of well-managed MPAs through the application of management plans to help steer activity use approaches within the area. The actions developed through this management plan will operate alongside other management plans developed by the MarPAMM project which could act as an essential tool in delivery of the OSPAR objectives. All marine SACs and SPAs in NI are OSPAR MPAs. All MCZs within NI are also OSPAR MPAs except the Strangford Lough MCZ.

1.3. Co- management, social-ecological system and stakeholder engagement.

Conventional approaches to marine protection and management (SPAs and SACs) across the island of Ireland are often based on top-down resource management. However, this approach is considered "often blind to users social, economic and cultural conditions" (Berkes, 2009). Increasingly, co-management is implemented into governance regimes due to failures of historical approaches; this provides a mechanism for engagement and collaboration with fishers and other stakeholders in governance (Wilson et al. 2003, Kooiman et al. 2005). Co-management refers to shared authority and decision making between parties, often a combination of local communities and stakeholders, Non-Governmental Organisations (NGOs) and the government (Berkes, 2010). This governance approach enables the sharing of power and responsibility for local resource uses, maintenance and sustainability between government departments and local stakeholders instead of at a regional governmental level.

The Murlough management plan was developed with the focus on designated species and habitats. Collaborations with marine stakeholders and project partners identified issues considered important in the context of this strategic management plan, including activities and issues influencing the various biological, environmental, economic, social and ecosystem services. A co-management governance approach was taken as it enables the sharing of authority and decision making between all involved parties and maintains sustainability between government departments and local stakeholders instead of a regionalised government approach (Berkes, 2010). This management plan was developed in conjunction with existing best practice methods for marine management and delivers conservation benefits by providing a tool to apply efficient and sustainable marine management practices, which in turn will lead to the enhancement of a structured, ecologically coherent, well-managed network of MPAs.

The Social-Ecological Systems Framework (Ostrom, 2009) has been used as a tool to aid examination of challenges in human-environment interactions (Nagendra and Ostrom, 2014). In this context, MPAs can be viewed as complex social-ecological systems where human activities and nature overlap and interact. The complexity of MPA designation overlaps between different features and habitats and requires a governance framework that embeds co-operation and collaboration to create more inclusive and participatory outputs. Mounting evidence suggests that organisational, economic and social factors determine the overall success or failure of a MPA (Chaigneau and Brown, 2016; Bennett *et al*., 2020). In addition, effective responses to resource management within MPAs needs to have greater inclusion of stakeholder engagement (Freeman *et al*., 2018). The MPA management project officers created a stakeholder engagement strategy for the Murlough management plan area (Appendix 1).

The stakeholder engagement strategy focussed on a pool of stakeholders with regional and local knowledge of marine and coastal functions. It was essential that stakeholders held roles with direct association to these environments to better shape and evolve policy guidance and aspirations for the project, agree potential benefits with plan partners and identify potential gaps within data collection. The role of the Steering Group was to advise on spatial use of areas by sectors, illustrate perceived and observed interactions and provide detail on any formal/informal management practises implemented by the sector. The Steering Group also examined the development of guidance approaches by interpreting modelling and scientific discussions from MarPAMM technical work packages and providing critical comment on management plan drafts. This helped create innovative solutions to relevant issues

in areas within and adjacent to MPAs and provided an opportunity for stakeholders to draw on their experience and knowledge. In September 2020, stakeholder mapping (Figure 2) was undertaken to ensure a wider representation of marine stakeholders.

From March 2021, the members of the Steering Group worked with MarPAMM MPA management policy officers to explore and examine the critical issues and pressures that should be addressed to support effective and robust management of the Murlough management plan area. These discussions led to the identification of key themes that were developed into stakeholder objectives. These objectives represent the key components that Steering Group members wanted the Murlough MPA management plan to achieve and include:

a. Aid the sustainability of the Murlough SAC through the application of a proactive ecosystems approach to enhance healthy biodiversity and seas.
b. Create a MPA management plan that is evidenced on robust species and habitats data with the creation of a dynamic tool to aid biodiversity restoration where appropriate and provide guidance on climate adaptation.
c. Actively promote sustainable recreation, tourism and economic development within the SAC and adjacent areas, whilst considering the economic and tourism importance of Newcastle.
d. Develop awareness and information sharing with marine/coastal users on the impact from activities within the Murlough SAC.
e. Create a management plan which fosters empowerment of stakeholders at the core of the process whilst bestowing local ownership.

These objectives were further developed into a stakeholder benefits mapping exercise which was analysed through a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. The analysis examined issues/pressures identified through Steering Group meetings in terms of frequency and consensus for relevant management considerations. The SWOT analysis outputs were modelled into a ‘Benefits Realised’ infographic, which was reviewed and refined by stakeholders. The threats and weaknesses were subsequently modelled into key management guidance criteria areas:

- Climate Change and marine infrastructure,
- Commercial fishing,
- Aquaculture,
- Recreation & tourism (Shoreline, surface and sub aqua), and
- Military and defence

These criteria form the policy areas that will provide additional support for delivery of conservation benefits from Murlough MPAs and surrounding areas.

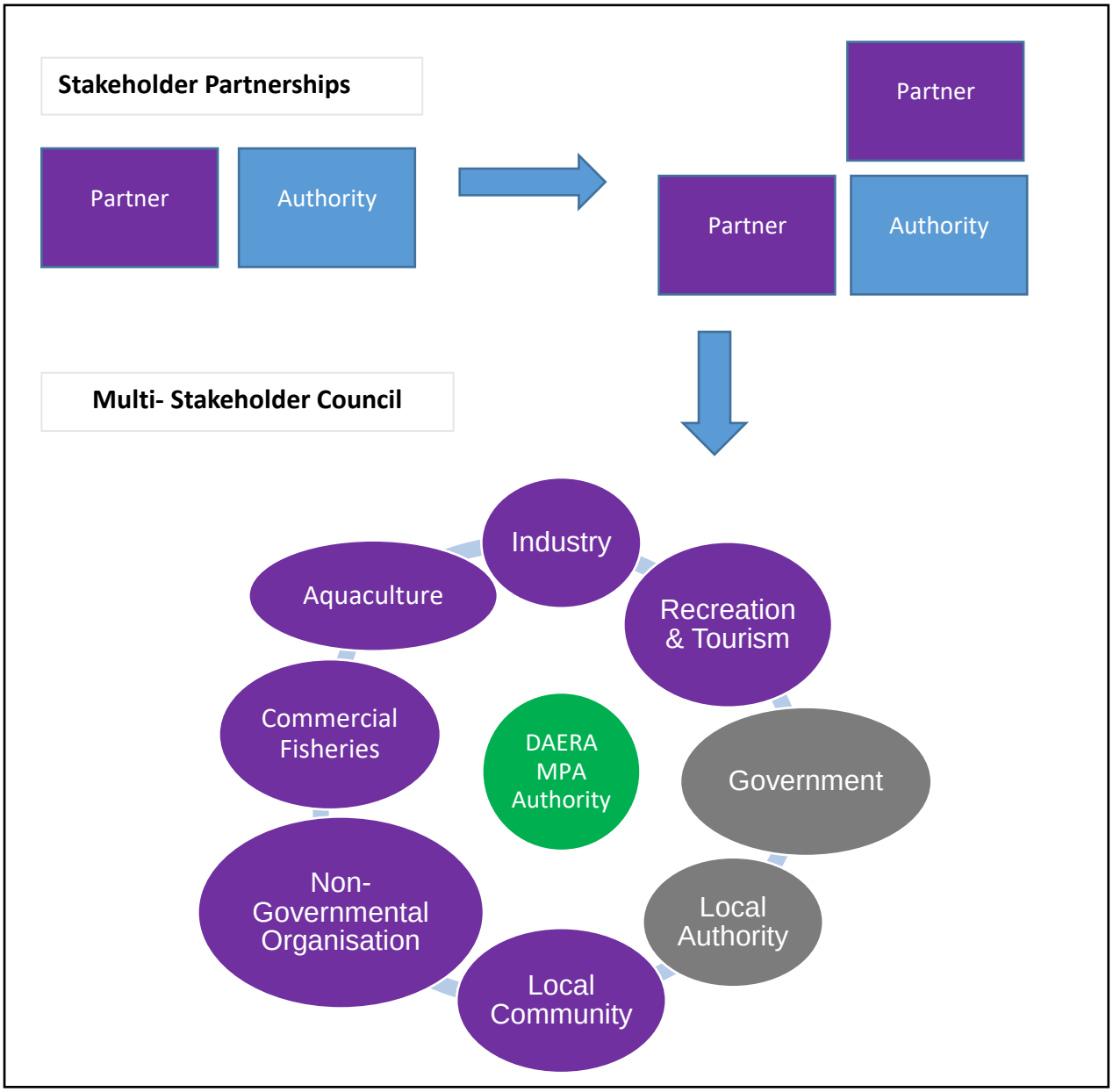

Figure 2: Evolution of the Murlough MPA management plan Steering Group (Adapted from Brumbagh, 2017).

2. Description of the site and its features.

2.1. Conservation value of the site.

The Murlough SAC components that are contained within the plan area are important because they comprise the largest area of shallow sub-littoral sandbanks

in Northern Ireland as well as extensive inter-tidal sands and mud (DAERA, 2017). Transitioning from marine to terrestrial environments, the SAC supports 8.5 hectares of saltmarsh and major dune systems of Murlough and Ballykinler with intact low dunes at Royal Down golf course (ibid, pg 4). The study of contemporary coastal processes at Murlough is of international importance for earth science research. This is related to the unique geomorphology and composition of geological features at the site which could provide understanding of post-glacial sea level rise for both the local area and the wider area of the British Isles (DAERA, 2017). The SAC supports important breeding populations of both grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) due to several key haul-out locations, such as Minerstown beach, within the boundary of the SAC. The Murlough SAC has the highest count of harbour seals across the coastline of Northern Ireland (Morris and Duck, 2018).

Within the plan area, there is also an ASSI designated for coastal flora, fauna and physiography. The Murlough ASSI consists of beaches and dunes at Ballykinler and Murlough, as well as beaches at Inner Dundrum Bay and Newcastle. These help to form an important coastal system in biological terms for plant (Atlantic salt meadows *Glauco-Puccinellietalia maritimae)* and animal communities (wintering wildfowl and waders) present (DAERA, 2017).

2.2. Features of the Special Area of Conservation and Area of Special Scientific Interest.

The Conservation Objectives for the features within the Murlough SAC management plan area are: To maintain (or where appropriate, restore to a favourable condition) the:

- Atlantic salt meadows (*G. maritimae)*,
- Mudflats and sandflats not covered by seawater at low tide,
- Sandbanks which are slightly covered by sea water all the time,
- Shifting dunes along the shoreline with white dunes (*Ammophila arenaria),*
- Marsh Fritillary (*Euphydryas aurinia)*, and
- Harbour (common) seal (*P. vitulina).*

DAERA (2021) define the "*maintain"* objective as indicating that feature is in a favourable condition and will, subject to natural change, remain at its condition at designation. A "*restore"* objective indicates that the feature is degraded and will require active management to help reduce or eliminate negative impacts to facilitate recovery.

Table 1: DAERA SAC feature condition status (DAERA pers. comms).

Feature type	Feature	Size	Last status update
Habitat	Sandbanks which are slightly covered by sea water all the time	10000.0 ha	**Favourable, Maintain**
Habitat	Mudflats and sandflats not covered by seawater at low tide	785.0 ha	**Unfavourable, Restore**
Habitat	Atlantic salt meadows (*G. maritimae*)	8.5 ha	**Unfavourable, Restore**
Habitat	Shifting dunes along the shoreline with white dunes *(A. arenaria)*	4.5 ha	**Unfavourable, Restore**
Species	Harbour (common) seal (*P. vitulina*)	309 individuals	**Favourable, Maintain, (Morris and Duck, 2018)**
Species	Marsh Fritillary (*E. aurinia)*	N/A	**Favourable, Maintain**

The responsible authority for SAC management, DAERA, have identified component objectives for each of the SAC features (Table 2). These objectives include a series of attributes, measures and targets which are assessed to determine the future status of whether a feature is in a favourable or unfavourable condition.

Table 2: SAC component objective (DAERA, 2017).

Feature	Component objective
Sandbanks which are slightly covered by sea water all the time	• Allow the natural processes which determine the development, structure and extent of sandbanks which are slightly covered by sea water all the time, to operate appropriately. • Maintain and enhance, as appropriate, the species diversity within this habitat. • Maintain the extent and volume of sandbanks which are slightly covered by sea water all the time, subject to natural processes.
Mudflats and sandflats not covered by seawater at low tide	• Maintain the extent of mudflats and sandflats not covered by sea water at low tide. • Allow the natural processes which determine the development, structure and extent of mudflats and sandflats not covered by sea water at low tide, to operate appropriately. • Maintain and enhance, as appropriate, the species diversity within this habitat.

Atlantic salt meadows (*G. maritimae*)	• Maintain or extend, as appropriate, the area of saltmarsh, subject to natural processes. • Maintain or enhance, as appropriate, the composition of the saltmarsh communities. • Maintain transitions between saltmarsh communities and to other adjoining habitats. • Permit the continued operation of formative and controlling natural processes acting on the saltmarsh communities
Shifting dunes along the shoreline with white dunes (*A. arenaria*)	• Maintain and enhance the extent of white dunes subject to natural processes. • Allow the natural processes which determine the development and extent of white dunes to operate appropriately. • Maintain and enhance, as appropriate, the species diversity within this community
Harbour (common) seal (*P. vitulina)*	• Maintain (and if feasible enhance) population numbers and distribution of harbour (common) seal. • Maintain and enhance, as appropriate, physical features used by harbour (common) seals within the site.
Marsh Fritillary (*E. aurinia*)	• Maintain (and if feasible enhance) population numbers and distribution. • Maintain (and if feasible enhance) the extent and quality of suitable Marsh Fritillary breeding habitat, particularly suitable rosettes of the larval food plant (*Succisa pratensis)*.

DAERA have identified pressures and threats from both on-site and off-site activities which could influence the Murlough SAC area at this current time or in the future. Pressures and threats arise within MPAs from the impacts of Climate Change, military activities, disruption to natural sediment regimes and impacts from recreational activities within Murlough, Ballykinler and the Royal Down golf course. Additional threats arise from changes in surrounding land-use from agriculture, changes in drainage and coastal development etc. which could cause detrimental impacts. The details of these marine related pressures and threats are listed in Appendix 3.

Murlough Area of Special Scientific Interest.

The Murlough ASSI is located within the area covered by the Murlough SAC management guidance plan and contains features including, sand dunes, coastal salt marsh and over wintering wildfowl and waders. These features include shoreline dunes which are important habitat for flora and fauna in the area. Sand dunes develop where sand is blown from the terrestrial beach and is deposited above the high-water mark, accreting into large geomorphological structures (DAERA, 2015). Additionally, saltmarsh areas can be located in sheltered parts of the upper intertidal mudflats and commonly shows a progression from lower marsh communities to upper marsh communities, depending on tidal inundation (DAERA, 2015). The ASSI is an important area for migratory wader birds and supports feeding and nesting

populations of birds including Great Crested Grebe (*Podiceps cristatus*), Common Scoter (*Melanitta nigra*) and Red-breasted Merganser (*Mergus serrator*). Wildfowl and waders use the open water and surrounding open habitats, including mudflats, beaches, and saltmarsh for feeding (ibid, pg 4).

Table 3: Murlough ASSI feature condition status (DAERA pers. comms).

Feature type	Feature	Last status update
Habitat	Shifting dunes along the shoreline with *A. arenaria*	**Unfavourable, Restore**
Habitat	Subtidal Mudflat	**Favourable, Maintain**
Habitat	Atlantic salt meadows (*G. maritimae*)	**Unfavourable, Restore**
Species	Common seal (*P. vitulina*)	**Favourable, Maintain**
Species	Common Scoter (*M. nigra*), wintering	**Unfavourable, Restore**
Species	Dunlin (*Calidris alpina*) wintering	**Favourable, Maintain**
Species	Great Crested Grebe (*P. cristatus*) (Winter)	**Unfavourable, Restore**
Species	Knot (*Calidris canutus*) wintering	**Favourable, Maintain**
Species	Lapwing wintering (*Vanellus vanellus*)	**Unfavourable, Restore**
Species	Light-bellied Brent Goose (*Branta bernicla hrota*), wintering	**Favourable, Maintain**
Species	Mute Swan (*Cygnus olor*) wintering	**Unfavourable, Restore**
Species	Oystercatcher (*Haematopus ostralegus*) wintering	**Favourable, Maintain**
Species	Red-breasted Merganser (*M. serrator)*, wintering	**Unfavourable, Restore**

Species	Redshank (*Tringa totanus*) wintering	**Favourable, Maintain**
Species	Shelduck (*Tadorna tadorna*) wintering	**Unfavourable, Restore**
Species	Marsh Fritillary (*E. aurinia)*	**Favourable, Maintain**

The responsible authority DAERA have identified management approaches for each of the ASSI features (Table 4). These outline management principles with objectives for maintenance or restoration of ASSI features within the ASSI in Murlough.

Table 4: DAERA ASSI Feature Management Approach (Source: DAERA, 2015).

Feature Type	Feature	Management principle	Specific Objective
Habitat	Sand dunes-Shoreline based within coastal interface	• Coastal processes are complex, and the management of sand dunes should consider the need to maintain or restore where necessary, the natural processes and dynamics of dune development and succession. • Many of the vegetation types on sand dunes are fragile, and heavy disturbance can lead to loss of cover and soil erosion. However, where recreational and other pressures are not severe, the impact of activities such as light trampling can be beneficial.	• Management of amenity beaches can affect the initial stages of dune formation by removing the strandline that helps to trap blown sand and to develop new dune ridges. • Where appropriate, encourage management practices which allow the development of a natural strandline.
Habitat	Coastal Saltmarsh	• Coastal processes are complex, and the management of saltmarshes should consider the need to maintain or restore, where necessary, the natural processes of	• Overgrazing should be avoided as it may result in a reduction in species diversity and cause poaching. Where there has not been a history of grazing, the saltmarsh should

		sediment movement and the dynamics of saltmarsh succession. • Where saltmarshes are managed, this is usually by grazing; it helps to provide a variety of different habitats, particularly important for wintering bird species. If grazing ceases on these sites, there may be a loss of botanical diversity as rank grasses become dominant. However, not all saltmarshes require active management to retain their conservation interest, particularly where there has not been a history of grazing.	normally be left to maintain itself, as grazing-sensitive species are likely to be present. • Due to its position, coastal erosion can be particularly damaging to saltmarsh. Where possible, management should favour the natural processes of sediment movement and the dynamics of saltmarsh succession. • Maintain the diversity and quality of the saltmarsh by ensuring that there is no application of fertiliser, slurry, or herbicide.
Species	Wading Birds	• Waders feed predominantly on shellfish and burrowing invertebrates in intertidal mudflats and other wet areas. Accumulations of seaweed along the tideline may also contain significant prey resources for waders. • Secure roost sites, free from disturbance, are essential to allow the birds to conserve energy when food resources are unavailable, as at high tide. • The quality of feeding areas is, however, susceptible to the influence of operations.	• As feeding habitats, including beaches, mudflats, and shellfish beds are critical to the birds' well-being, DAERA would not wish to see any operations undertaken that would reduce either their area or the food resources they hold for wintering wader birds. • Disturbance minimised around known roost sites, especially those used by birds at high tide and at frequently used feeding areas.

3. Legislative Framework.

The Northern Ireland Executive, through DAERA, is committed to the continued development and enhancement of a well-managed and ecologically coherent network of MPAs from a devolved perspective and through the UK's contribution to the OSPAR network. In Northern Ireland, multiple MPAs have been designated under both international and national legislation and are maintained to satisfy these obligations. These have been summarised in the table below, with full policy details attached in Appendix 4.

Table 5: MarPAMM Murlough SAC Policy Summary.

	Policy	Summary
International	**OSPAR Convention 1992**	Aims to develop an ecologically coherent network of well-managed MPAs and provides a mechanism to protect the marine environment of the North-East Atlantic.
	Marine Strategy Regulations 2010	Sets out a comprehensive framework for assessing, monitoring and enforcement across the UK's seas to achieve the shared vision for 'clean, healthy, safe, productive, and biologically diverse ocean and seas'.
	The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009	Manages flood risk from floods of all flood types (fluvial, pluvial, sea water, groundwater, artificial water bearing infrastructure.
	The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017	Sets out the management of the 'water environment' including rivers, lakes, transitional waters, groundwater and coastal waters out to 1 nautical mile (12 nautical miles for chemical status, i.e., for territorial waters).
	The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019	Habitats Directive requires Member States to take measures that contribute to the conservation of biodiversity by maintaining or restoring certain habitats and species at a favourable conservation status. SACs are designated for habitats and species listed under Annex I and II.

National	**The Marine Act (Northern Ireland) 2013**	The Marine Act (Northern Ireland) 2013 establishes a strategic system of marine planning within the inshore region (out to 12 nautical miles) and helps to streamline the process of marine licensing.
	Marine and Coastal Access Act 2009	In Northern Ireland DAERA's Marine and Fisheries Division has the responsibility for licensing of activities related to construction, deposition or removal of any substance or object as the marine planning process.
	Marine Policy Statement 2011	The framework for preparing Marine Plans and taking decisions affecting the marine environment.
	The Environment (Northern Ireland) Order 2002	Provides protection of nationally important flora and fauna within Northern Ireland through ASSIs.
	Water (Northern Ireland) Order 1999	Under the Water (Northern Ireland) Order 1999, the discharge of trade or sewage waste to any waterway, or any water contained underground requires the consent of DAERA. This includes waste from any commercial, industrial, or domestic premises not connected to the public sewer.
	Nature Conservation and Amenity Lands Order (Northern Ireland) 1985	Provides the legislation to designate Areas of Outstanding Natural Beauty (AONB)
	The Wildlife (Northern Ireland) Order 1985 (the Order) and amendment The Wildlife (Amendment) (Northern Ireland) Order 1995	Prohibits the intentionally killing, taking, or injuring of certain species of wild birds and animals or the intentional destruction, uproot or picking of certain wild plants. It is an offence to release into the wild non-native invasive species as listed in Schedule 9 Part II of the Order. Public Bodies have due care and responsibility for biodiversity as required by Section 1 of WANE.

4. Management Tactics.

Table 6: Policy Summary Table for Murlough MPAs management plan.

Policy Area	Section Page Numbers	Management Summary
Climate Change, Coastal Processes and Shoreline Change	4.1 - pg 17 4.2 - pg 25	Sets out the background for work undertaken by MarPAMM on the growth of risk from Climate Change. Provides an oversight into potential responses which focus on managed realignment using 'Nature Based Solutions' and the use of Blue Carbon for carbon sequestration. Additionally creates guidance measures to aid environmentally friendly responses to risk which could aid and enhance species and habitat integrity within MPAs and adjacent areas.
Commercial Fishing	4.1 - pg 20 4.2 - pg 29	Provides an oversight of statutory commercial fisheries regulations within Dundrum Bay from DAERA Marine and Fisheries Division. Additionally creates guidance for non-statutory management measures to enhance MPA integrity from commercial fishing activities.
Aquaculture	4.1 - pg 21 4.2 - pg 31	Sets out a contextual background for commercial aquaculture operations within Inner Dundrum Bay. Provides an oversight of statutory aquaculture regulations from DAERA Marine and Fisheries Division. Additionally creates guidance for non-statutory management measures to enhance MPA integrity from commercial aquaculture, including farming and intertidal activities.
Recreation and Tourism	4.1 - pg 22 4.2 - pg 33	Sets out the key recreational activities that occur within MPAs and adjacent areas within the Murlough MPAs region. Provides an oversight of statutory policy implications recreational users should follow. Additionally creates guidance and existing codes of conduct for non-statutory management measures to enhance MPA integrity.
Military and Defence	4.1 - pg 24 4.2 - pg 42	Sets out a contextual background for military and defence operations within the Region. Provides an oversight of statutory regulations from Departments in UK and NI.

4.1. **Management Goals and Objectives.**

This management plan is a tool that statutory and local authorities can use to help ensure the requirements established through the UK Marine Strategy, OSPAR agreements and the Habitats Regulations are fulfilled when making future management decisions. It is also a reference for those wishing to develop or use the area, to determine if their proposed activities are compatible whilst considering the multiple social and economic dependencies of the plan area.

MarPAMM MPA Management Plans are non-statutory but work with existing statutory and non-statutory marine and coastal management governance, i.e., Draft Marine Plan 2018, Marine and Coastal Access Act 2009 and UK Marine Strategy 2011. This will help to establish management guidance for the Murlough MPAs management plan area as well adjacent areas, whilst integrating wider marine management through marine spatial planning and coastal zone management. The management guidance considers activities that have the potential to impact the conservation interests of the area. It identifies current legislative policy relating to the regulation of each activity and provides suggestions, based on the existing legal framework, as to the future management of each activity within the site.

The plan has a holistic view on sustainable development and resilience, considering the needs of all users of the marine environment to support more informed decision-making. Cross-disciplinary policy guidance criteria were developed through stakeholder engagement and supported by outputs from all technical work packages of the MarPAMM project. The process by which the plan was created has built partnerships and opened lines of communication between those who have a direct interest in the site. The plan has been developed in such a way that it is a 'living document' that can be adapted to reflect changing needs and circumstance of the Murlough MPAs management plan area.

The plan utilises an ecosystem management approach defined by Sardá *et al*., (2017) as “the conservation of the species, habitat or ecosystem structure and functioning to maintain long-term and resilient ecosystem services.” This can help to safeguard the long-term sustainability of an ecosystem to continue to provide key services to the environment and society during periods of unprecedented risk or change. The interdisciplinary approach creates a management profile which recognises the integration of human influences, governance principles and ecological requirements within complex social-ecological systems. This is evidenced through the benefits mapping infographic for the Murlough area, with stakeholders exploring the importance of different ecosystem services within MPAs.

Management - Strategic Guidance.

Strategic Guidance 1: Climate Change, Coastal Processes and Shoreline Change.

Impacts of storm events, sea-level rise, and shoreline change.

The Coastal Processes work package/WP of the MarPAMM project explored 'Coastal geomorphology and sediment dynamics' for Dundrum Bay in Northern Ireland. Dundrum Bay exhibits a succession of sandbars located within the intertidal beach profile which are separated by channels – these are known as 'multiple intertidal bars' (MITB) features. Part of the Coastal Processes WP work under the MarPAMM project examined the positional changes of the coast over a 187-year period. The data extracted from multiple datasets such as historical maps, aerial photos, orthophotos and Differential Global Navigation Satellite System (DGNSS) surveys. The shoreline variations were compared with coeval physical forces (hindcast storms and recorded extreme water levels), present details of sediment erosion or accretion at various sections of the coastline and show long-term trends in shoreline behaviour for the site.

Despite the general retreat trend affecting Murlough, especially in the last 100 years (since 1920), the strongest and episodic phases of coastal retreat occurred between 1920 and 1951 and from 2012 to 2014. The period from 2012-2014 was not the most energetic period in terms of storm activity. These episodic coastal retreat phases seem to have been driven by a combination of prolonged and consecutive Extreme Water Levels (EWLs) with a cluster of storms. The golf course was the area least affected by shoreline changes, mainly due to the difference in the topography between the golf course foredune and the adjacent beach. In fact, the rock armouring-built decades ago to protect the seaward most part of the golf course had also prevented any natural sediment exchange between the dune and the adjoining beach.

At a larger scale, the sediment (sand) is moving from Newcastle to Murlough to Ballykinler. This trend has been evident for an extended time, evidenced by both by the overall shoreline displacement and by the shoreline analyses for each single period. In fact, the foredune in Ballykinler in the period 1963 - 2014 gained twice the volume of sand that was lost from the Murlough foredune in the same period. This suggests that the sediment filling Ballykinler is not just coming from the Murlough foredune but is also provided by a more complex local sediment dynamics made by sub-cells of sediment transport that are feeding the inlet area from both sides (Biausque *et al*., 2022). For more details, please examine "Report on coastal geomorphology and sediment dynamics" by Grottoli *et al*. (2022a).

To assess the potential of flooding through elevated sea levels from the current position on the coastal area of Dundrum Bay, twelve different Sea Level Rise (SLR) scenarios were analysed (Grottoli *et al.* 2022b). All scenarios were built by the basic raising of the present sea level over future decades overlain on the current 3D surface topography of the study site. All twelve scenarios are examined by adding projected SLR values for the Belfast area to current sea levels (Highest Astronomical Tide (HAT) and Mean High Water Springs (MHWS)) using the data published in the last Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report (AR6) (IPCC, 2021).

If the worst case SLR scenarios unfold during future decades, Dundrum Inner Bay will be more affected by inundation compared to the coastline in the outer bay. In fact, large urban areas and improved lands of Newcastle, Dundrum and surroundings areas of the Dundrum Inner Bay will be most affected by rising sea level both from the inlet channel and from the Shimna River entrances. Less damage is expected for the Royal County Down golf course, Murlough and Ballykinler beaches where the higher topography provided by the coastal dunes seems to be more effective in limiting potential inundation from sea-level-rise. Within the outer bay, natural areas like Murlough and Ballykinler, although more impacted by the SLR scenarios, appear far more resilient in the longer term compared to the golf course or the urban areas of Newcastle.

For more information about this work, see “Report on coastal flooding potential” by Grottoli *et al*. (2022b).

The effects of anthropogenic vulnerabilities associated with the impacts of Climate Change are a growing threat within the Murlough SAC Region. The coastal processes WP detailed the past and potential impact from extreme events, sea level rise and increased erosion incidents. These present current and future challenges for species and habitats within MPAs and adjacent areas. The vulnerability impacts that will be experienced through severe storm weather and flooding events, increased rates of erosion and sea level rise impacts will ultimately jeopardise the sustainability of all habitats, species, services, infrastructure, housing, businesses, and industries.

The general pattern for future climatic change is likely to be the further replacement of cold-water species with warm-water species, with the rate of change dependent on Climate Change scenario and regional sensitivities (CCRA3, 2022). Current and future projections of Climate Change scenarios indicate that impacts will become more severe. To mitigate these effects, the Murlough SAC area needs to have an adaptive approach to address negative vulnerabilities associated with events that will change over time. Further examination and analysis of managed realignment response using nature-based solutions could help to reduce the risks associated with

climatic change through the creation of soft engineering responses, including shoreline stabilisation or the development of new intertidal habitats (e.g., saltmarsh). This approach could help aid mitigation by using natural approaches for shoreline protection that incorporates habitat restoration and increases habitat value. Green and blue mechanisms for coastal protection are becoming recognised as a shoreline management “panacea” for coastal change, but in some exceptional scenarios grey infrastructure may be appropriate. Therefore, in these exceptional cases engineering and nature-based adaptation responses in combination could be complimentary management solutions. To aid adaptation and mitigation against Climate Change, shoreline landowners and statutory regulators are encouraged to follow the actions in 4.2.

Blue Carbon Habitats.

Marine carbon storage habitats or “Blue Carbon” habitats are mainly composed of salt tolerant marine vegetation and sediments that can store quantities of carbon. Marine plants can transfer carbon into the sediments where they grow, sequestering carbon through natural processes. These Blue Carbon habitats are very efficient carbon sinks and can store significantly more carbon than terrestrial equivalent habitats of similar size’s (forests, heathlands, grasslands, etc.), making them a significant asset for the mitigation of Climate Change. Blue Carbon habitats provide wider biodiversity and protection against coastal erosion and flooding, binding of sediments and bioremediation.

Within the management plan the most prevalent Blue Carbon habitats are those of Atlantic saltmarsh meadows and *Zostera marina* eel grass beds, particularly those found within Dundrum Inner Bay. These areas provide nursery grounds for commercially important fish species, foraging and breeding grounds for wintering birds and have societal wellbeing benefits.

DAERA are developing a Blue Carbon Action Plan in conjunction with key stakeholders, which will help to steer how Blue Carbon habitats are protected, managed, and restored in NI. Additionally, the EU Habitats Directive provides protection to important salt tolerant plant habitats that in turn support other rare species of plants and animals within the area. It is therefore essential that there is sufficient protection for these habitats to enable renewed growth within the management plan area. This approach will help ensure that these habitats will be conserved, restored if declining and established in new areas deemed appropriate using the Actions in 4.2.

Strategic Guidance 2: Commercial Fishing.

Within Dundrum Bay the implementation of the “Inshore Fishing (Prohibition of Fishing and Fishing Methods) Regulations (Northern Ireland) 1993” has prohibited the use of mobile fishing gear such as trawls, dredges, and seine nets within the sea area to the landward side of a hypothetical line drawn from the Chapel (near Miner’s Town, County Down) at Rossglass Bay to Roaring Rock.

Pot fishing has a long tradition in the area and is recognised as an important national supplier of high-quality seafood. Fishing vessels from Newcastle, Annalong and Ardglass regularly fish the area using static fishing gear to target shellfish including crabs and lobsters. Landings of these commercial shellfish species are provided on a monthly basis to DAERA through the Monthly Shellfish Returns form. Landings are attributed to the ICES (International Council for the Exploration of the Seas) statistical rectangle. Dundrum Bay falls into ICES rectangle 37E4, a 3628 km^2 rectangle which runs from approximately Kilkeel to Portavogie. Whilst landings of brown crab, velvet crab and lobster from this rectangle make up a considerable proportion of all landings from Northern Ireland waters with a monetary value of £1.5 million in 2021, the actual landings taken from within Dundrum Bay are unknown.

The level of static gear fishing activity taking place in Murlough SAC is considered low and has been highlighted by the inshore fisheries management consultation as having a moderate impact on the sandbank feature within the SAC (DAERA, 2021).

At present, there is no evidence to suggest that fishing activities within MPAs in the Northern Ireland inshore region are having an adverse impact on the harbour (common) seal feature. Tools to assess sensitivities of marine mammals are currently being developed through Marine Life Information Network (MarLIN, 2021).

Commercial pot fisheries operators should aim to mitigate against the risk of unintended or inadvertent by-catch of non-target species within or adjacent to the SAC and ASSI included in the management plan area. Competent authorities such as DAERA, AFBI and/or Local Councils should work with industry to introduce mitigation measures to limit adverse impacts within the Murlough SAC area.

Members of the commercial fishing industry should adhere to the actions laid out within Section 4.2.

Strategic Guidance 3: Aquaculture.

Aquaculture within the Dundrum Inner Bay area occurs within two licensed areas. These areas are licensed under one Fish Culture Licence (FCL). Shellfish culture has been undertaken within these areas since 1980, and the latest FCL was issued in 1994. The operator is authorised to cultivate the non native Pacific oysters (*Magallana gigas*), Native oysters (*Ostrea edulis*), mussels (*Mytilus edulis*) and clams (*Venerupis semidecussata (acc. Ruditapes philippinarum)*) but in practice only Pacific oysters and mussels are cultured. The locations of these licensed areas are shown in

Figure *3*. The ownership of this licence was transferred to a new company in 2014, however, the conditions outlined within the FCL issued in 1994 remain unaltered. Trestle culture is permitted within the area marked as DB1 (Figure 3), an area within the main channel whilst only bottom culture is permitted within the DB2 area (

Figure *3*). In both areas cultivation is restricted to within the charted channels.

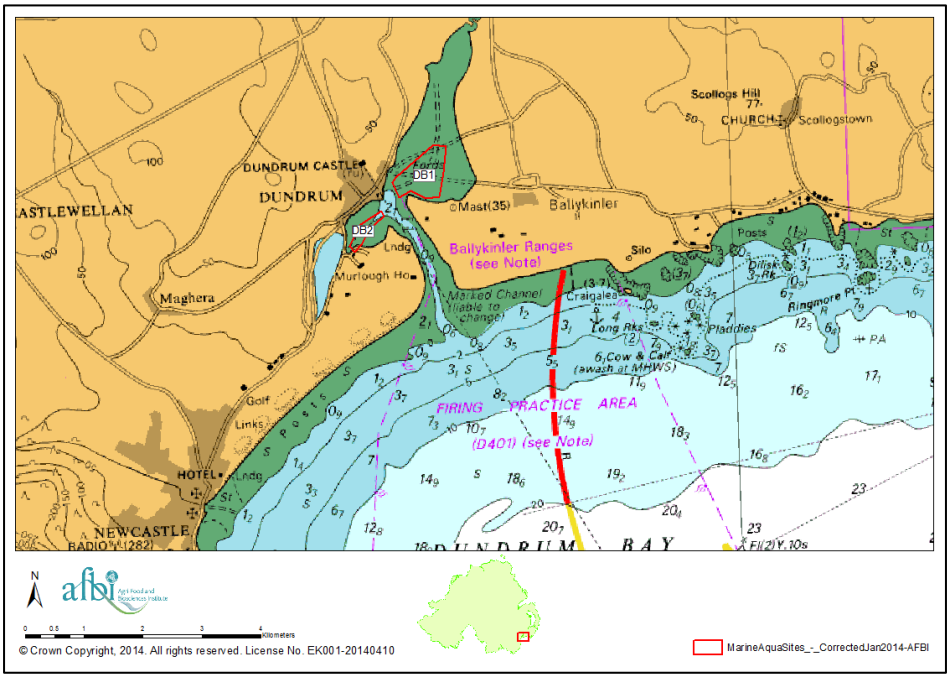

Figure 3: Licensed aquaculture sites within Dundrum Inner Bay.

In 2014 AFBI carried out a Habitats Regulation Assessment for shellfish aquaculture within Dundrum Bay (AFBI, 2014). This report assessed the potential impacts of aquaculture activities on the designated features of the Murlough SAC . Both licensed areas (DB1 and DB2) are within the boundary of the Murlough SAC. The total area of these sites is approximately 63.64 hectares. The total area of the Murlough SAC is 11,902.03 hectares. This equates to current aquaculture practise occuping only 0.53% of the total designated area. Under the conditions of the current FCL only 20% of the designated area may be utilised for trestle culture. Aquaculture operators undertaking shellfish farming in either new or existing developments must follow the conditions and mitigations set out as stated in the required licence. Aquaculture developments should operate within appropriate departmental guidance which states that no significant adverse effects, directly, indirectly or cumulatively on the seabed, designated features, species, wider biodiversity interests or environmental carrying capacity must occur.

Intertidal hand gathering of shellfish refers to the collection of wild shellfish from the shore without the aid of mechanised equipment. In NI this is predominantly for periwinkles but also includes cockles, native oysters and blue mussels (DAERA, 2022). The activity is common and is undertaken for both personal consumption and as a commercial activity. Intertidal hand gathering of shellfish is currently unregulated by DAERA and as a result, the Department holds limited information on the commercial scale of this fishery (DAERA, 2022).

Strategic Guidance 4: Recreation and Tourism.

Shoreline based recreation.

Within the Murlough MPAs management plan area there is a wide range of shoreline based recreational activities from angling, abseiling, kite buggies, dog-walking, bird watching, camping, and hiking within the areas close to the MPAs. The area is known for the National Trust Murlough National Nature Reserve (NNR) with a network of paths and boardwalks through the dunes, woodland and heath which provides access to Murlough Beach. During and post the Covid-19 Pandemic, there was a significant rise in recreation and tourism visitors to the Murlough NNR. The number of visitors grew from 396,000 in 2020 to 476,000 in September 2021. Many of these visitors are respective and follow environmentally friendly management guidance, but there are some that can partake in anti-social behaviour, vandalism, littering and disturbance to wildlife. These pressures require management guidance that raises awareness and education for recreational activity users on their potential impacts on resident species and habitats.

Additionally, the plan area is adjacent to the town of Newcastle which promotes itself as an activity resort and has benefited from multimillion pound streetscape and promenade upgrades. Another popular attraction includes the Royal County Down Golf Club, which hosted the Irish Open in 2015 and is considered one of the best links courses in the world. Dundrum at the head of the Inner Bay is small village known for its historic Norman Castle, recreational walking facilities at Keel Point and the historic Downshire Bridge.

Recreational shoreline users should be aware of their interactions with the designated features within the MPA. A clear focus within this plan is on the need to raise awareness of the importance of these designated features and how activities can sometimes cause negative impacts. MarPAMM policy officers created story maps to raise awareness of MPAs and provide education on their ecosystem benefits. These can be found in the MarPAMM Irish Regions section in the MPA plans tab on the MarPAMM website (MarPAMM Irish Regions Introduction (arcgis.com)).

Shoreline based recreational users should aim to minimise their level of detrimental impact within the Murlough MPAs plan area by following DAERA policy on interactions with wildlife within and adjacent to the SAC and follow recreational Codes of Conduct. As well shoreline based recreational activity users should adhere to the considerations set out in actions in 4.2.

Surface based recreation.

Within the Murlough area there are a wide range of surface based recreational activities which represent a significant amount of tourism assets. Surface based activities include coastal canoe trails (i.e., Mourne Coastal Route), paddle sports (kayaking, stand up paddle boarding and rowing), sailing, wind - and kite surfing, surfing, recreational fishing and jet-skiing, pleasure boating/cruising.

Although surface based recreational activities represent a significant asset for the local economy as well as providing wider social-economic benefits, there are negative associations with certain activities with respect to wildlife disturbance and degradation of designated features. In recent years, stakeholders have expressed concern with the increasing prevalence of jet-skis in marine areas. These can be launched from beach locations and are known for operating at speed and in an unpredictable manner within shallow areas, which has been linked to disturbance of marine mammals (e.g., Oakley *et al*., 2017). Following complaints of personal watercraft disturbing marine wildlife around NI, including Murlough SAC (Tyrella and Minerstown ASSI), specific management measures for the use of fast craft and Personal Watercraft (PWC) in Marine Protected Areas have been proposed by DAERA (DAERA, 2022b).

Wildlife disturbance can occur from direct or indirect interaction with people that changes the behaviour of an animal or effects changes in the environment which in turn affects the well-being or survival of an animal in the short, medium or long term. This might include direct injury (e.g., collisions, propeller damage), changes in distribution and disruption of natural behaviours (communication, migration, breathing, breeding, nursing, feeding, or resting). Disturbance can also cause excessive use of energy and eventual loss of condition caused by continual or repeated avoidance of an area under regular disturbance, increased vulnerability of an individual or population to predators, damage to habitat and chronic stress, which can impact on an animal’s health (e.g., immune, digestive, and reproductive functions).

There are existing byelaws restricting PWC access to Minerstown seashore. Newry, Mourne and Down District Council state in the byelaws for the regulation of the seashore at Minerstown, County Down 2014 that, “A person shall not bring any watercraft including a kite, surfing board, personal watercraft, inflatable boat or semi rigid craft within 200 m of the restricted zone between 1st May and 31st October (both dates inclusive)”. DAERA have been working with Newry, Mourne and Down District Council to raise awareness of marine wildlife disturbance with users of the Minerstown area and will continue to do so.

Surface based recreational activities within MPAs should be undertaken in a sustainable manner that causes no intentional damage to designated features or disturbances to wildlife. The depth of Dundurn Bay is shallow within the unbuoyed channel into anchorage, and it is recommended that approaches by visitors is undertaken by shallow draft boats in settled conditions. Dundrum harbour lies in a lagoon through a narrow channel with a sand bar at the seaward end. As the area is characterised with sandbars there are pressures associated with anchorage or mooring, which can result in degradation of designated benthic features. Anchoring in emergency situations will not be restricted.

Sub aqua recreation.

Sub-aqua is a broad term encompassing underwater activities such as recreational snorkelling, free- and SCUBA diving. DAERA are the responsible authority for the management and protection of wrecks within the inshore waters of NI, with The MCA being responsible for collection of reported information and salvaged materials from wreck dives. Recreational diving can help to aid recording marine biodiversity through citizen science groups like Seasearch (https://www.seasearch.org.uk/). Such information recorded by divers and other recreational users can provide a useful observational tool for the condition of MPAs and wider ecological trends. Sub-aqua fishing activities (i.e., spearfishing) are regulated using the same by-laws and management accords used in shoreline-based fishing activities. This is expanded in the guidance actions.

Sub-aqua activities within MPAs and areas adjacent should be undertaken in a sustainable manner that causes no intentional damage to designated features. Recreational divers intending to dive within the Murlough MPAs management plan area should follow the actions outlined in 4.2 before participating in sub-aqua activities.

Strategic Guidance 5: Military and Defence – Ballykinler.

The UK Ministry of Defence (MoD) have an established presence within the Ballykinler area both historically and through the retention of the Ballykinler Training Centre. The MoD is a competent authority and carefully follows requirements for Habitats Regulations Assessments within the SAC and assenting requirements for the ASSI. The MoD use their own environmental assessment of military activities because military activity is not widely covered by JNCC conservation advice.

The MoD have incorporated all designated MPAs into their Environmental Protection Guidelines (Maritime) and wider Marine Environmental and Sustainability Assessment Tool. These guidelines are used to manage MoD activity to minimise the associated risks to the environment within the Murlough MPA management plan area.

4.2. Specific goals and detailed actions to deliver Strategic Guidance.

Strategic Guidance 1: Climate Change, Coastal Processes and Shoreline Change.

Impacts of storm events, sea-level rise, and shoreline change.

Management measures which cover shoreline change within the Murlough management plan area, including that within the MPA, are outlined below and in guidance (numbers 1, 2, 3, 4, 5, 7).

1. To increase the resilience of coastal MPAs, the protection and restoration of wetlands, marshes, and dunes should be encouraged by local landowners, local authorities, and competent regional authorities to help reduce the impacts of increased storm, flooding, and erosion events.
    a. The above approach should focus on the use of green and/or blue infrastructure instead of grey infrastructure (hard engineering with rock or concrete) which can help to dissipate the direct energy and impacts associated with storms, flooding, and wave energy.
        i. Using green and blue infrastructure (i.e., salt marshes) to increase resilience to sea level rise will create living shorelines that can help to mitigate inundated shores and protect against higher water levels.
        ii. In extreme cases where the competent authority deems it appropriate, hard engineering response will be accepted as a last resort.

iii. Managed realignment should be encouraged and promoted by competent authorities.
iv. Case Study - Wallasea Island, Essex. One the largest managed realignment projects in the UK. The project examined breaching the sea wall to recreate intertidal habitats that were changed through drainage and engineering to arable land in the 1930s. The project required low level land to be raised through the reuse of clean spoil from the Crossrail development. The clean spoil helped transform nearly 170 hectares of arable land into a mix of lagoons, saltmarsh, and mudflats with 1,500 acres of tidal wildlife habitat (RSPB, 2021).

b. Coastal landowners and responsible authorities should apply Nature Based Solutions (NBS) to aid adaptation and mitigation.
    i. NBS provide beneficial infrastructure options as they often have a smaller carbon footprint than grey infrastructure and often sequester carbon.
    ii. NBS can be cost effective in comparison to grey infrastructure and can provide more societal and economic benefits.
    iii. Case Study - Medmerry, Sussex. The construction of NBS through wetland generation to provide four miles of sea defences. The project was delivered in partnership with Environment Agency, Natural England, RSPB, and local communities. The project resulted in the creation of 200 hectares of wetland habitats which protects 348 properties and 5000 residents from coastal flooding. The Environment Agency estimates its overall value at £90 million compared to a project cost of £28 million (Harding, 2021).
c. Existing storm defence infrastructure from a governmental, local authority or private perspective should consider implementing either soft engineering or NBS.
d. Coastal infrastructure operators and competent authorities should work towards the effective testing of a proactive aligned management approach.
e. Some of the proposed measures above may require consent/assent, a marine license and/or permission from the DAERA Marine and Fisheries Division.
    i. As part of the consent process an assessment may be required to determine potential impacts of the proposal on other designated features from coastal adaptation schemes.

2. All operators should be encouraged to progress away from hard engineering, but this will be allowed only in cases deemed acceptable by the competent authority.
    a. The Departments responsible (DFI, DAERA) should explore proactive examples of successful soft engineering or NBS as a means of reassuring stakeholders and operators of their benefits over hard engineering methods.

3. All shoreline users should keep to designated paths and avoid walking directly on sand dunes as this can result in the trampling of dune habitats and reduction of the stability of dune systems.
    a. All shoreline users, particularly those that regularly access the shoreline for recreation, should have regard for local exiting codes of conduct, signage, and digital interactions (i.e., signposted QR codes) to help raise awareness of the impacts through their interactions with sensitive features (e.g., sand dunes).

    b. Appraisals should be undertaken by landowners with DAERA Marine and Fisheries Division and the Northern Ireland Environment Agency (NIEA) to advise on the management of dunes at Murlough.

        i. There may be an opportunity for the rehabilitation of sand dunes to restore their natural processes through grass planting, fencing, and controlled grazing within the dune systems which can help create a buffer for erosion and flooding. There is also potential that this work may help sustain or establish new habitats. This should only be used if there is a need for natural flood defence.

4. Marine users should report sightings or occurrences of non-indigenous species to the competent authorities or landowners.
    a. Marine users can learn about non-indigenous species and the reporting procedures with the relevant departments using the MarPAMM Island of Island Interactive story map and CEDaR Online Recording (https://www2.habitas.org.uk/records/).

5. The competent authorities must identify low-lying coastal areas that are particularly vulnerable to coastal flooding from rising sea levels and adopt mitigation measures to reduce the risks of flooding.
    a. The competent authorities should promote the restoration and/or establishment of coastal saltmarshes in areas identified as being vulnerable to rising sea levels.
        i. Saltmarsh habitats have the effect of binding and raising sediment levels, reducing the risk of coastal flooding caused by sea level rise.
    b. Competent authorities should identify areas at risk for breeding or overwintering birds within and adjacent to MPAs and adopt mitigation measures to reduce declines. Examples of such measures include shoreline stabilisations or the installation of artificial floating islands.
    c. Case Study- The 488 hectares Steart Marshes project, River Parrett, Somerset. This project used managed realignment on the River Parrett to restore 305 hectares of intertidal habitat. This is an example of a working wetland which acts both as a carbon sequester and as a habitat for seabirds (WWT, 2022). In some cases, dredged material

may be used to support land raising or landscaping and help reduce potential impacts (WWT, 2022).

6. The proposed measures within this guidance in this section may require permission from Departments in NI and RoI for planning permission, licensing, consent, and assent. Some of these guidance measures may require additional assessment to determine potential impacts of a proposal on designated features within the MPAs.

7. Future proofing of all marine craft should look towards a reduction of diesel, petrol, and LPG operations and transition to low carbon emission technologies to achieve net zero carbon target for 2050.

Blue Carbon Habitats.

1. The competent authorities should conserve existing and establish new areas of Blue Carbon habitats if deemed appropriate within the Murlough SAC area of Dundrum Inner Bay as supported by The Green Growth Strategy for Northern Ireland 2022 and the Blue Carbon Action Plan.
    a. The potential for restoration and enhancement of salt marsh and eel grass beds within the Dundrum Inner Bay needs to be explored by DAERA and local marine managers.
    b. Competent authorities should ensure that there is no net loss of existing Blue Carbon habitats and examine the existing conditions of Blue Carbon Habitats within Dundrum Inner Bay.
    c. Enhancing Blue Carbon habitats can be promoted through partnership and effective co-ordination across governmental departments with inter-departmental arrangements set out to help develop and maintain Green Growth strategies as appropriate.
    d. The competent authorities should ensure that stakeholder engagement is sought out and maintained throughout the process of maintaining, restoring, and establishing Blue Carbon habitats.
    e. To support further development and implementation of adaption strategies and plans at all levels of governance, the competent authorities should promote local ownership and the use of NBS.

2. It is an offence to damage, remove or destroy areas of Atlantic saltmarsh meadows or *Zostera marina* eel grass beds intentionally or through negligence, under the Habitats Regulations.
    a. The use of off-road vehicles, agricultural equipment, quadbikes or other powered vehicles should be prohibited in areas in which Atlantic saltmarsh meadows and *Z. marina* eel grass beds are growing.
    b. Users participating in recreational activities such as dog walking, bird watching, trekking, or engagement in citizen science should avoid trampling areas of Atlantic saltmarsh meadows and *Z. marina* eel grass beds, keeping to existing footpaths where they are present.

3. The competent authorities should devise and deploy an effective means of removing invasive cord grass (*Spartina anglica)* from areas of Blue Carbon habitats, whilst conserving areas of native habitats.
    a. The use of herbicide spraying methods to remove the invasive cord grass (*S. anglica)* should be carefully considered due to the potential adverse impacts on indigenous plant species, as well as the possible impacts on water and sediment stability.

4. The current extent and ongoing spread of the reed *Phragmites Australis* should be monitored. In areas where this reed is negatively impacting the Atlantic saltmarsh meadows (altering the hydrological regime and invading lower marsh zones, displacing characteristic flora) management plans should be developed.

5. The competent authorities should examine and characterise current and future threats to Blue Carbon habitats (and potential future Blue Carbon habitats) due to Climate Change and human activities.

6. Further research and monitoring of coastal areas of the Murlough MPAs area should be carried out to identify un-designated potential Blue Carbon habitats (such as horse mussel beds or native oysters), with the aim of proposing new Blue Carbon habitats and ecosystems so that they may receive the appropriate level of protection.

7. The competent authorities should encourage the recommendations of the Blue Carbon Action Plan to advise on how Blue Carbon may be included in Northern Ireland's national response to Climate Change and the associated climate, nature, biodiversity, and spatial planning policy frameworks.
    a. Currently DAERA Marine and Fisheries Division are assessing the potential of Blue Carbon restoration as part of the review of the MPA Strategy in NI. This review follows a co-designed process using focus group workshops, with a formal consultation due in 2023.

Strategic Guidance 2: Commercial Fishing.

The DAERA (2020) consultation on the development of fisheries management measures for MPAs has identified that the level of static gear fishing activity taking place in Murlough SAC area should be considered as low. As the designated sandbank features are moderately sensitive to static gear fishing pressures, the risk of damage from current activity levels is moderate. To mitigate this risk the Department is recommending the introduction of a managed static gear fishery throughout the SAC. The Department expect no loss of fishing opportunity from the introduction of the additional management measures on the pot fishery. Management measures which cover the entire NI pot fishery, including that within the MPA, are outlined below and include both statutory measures (numbers 1 - 5) and guidance (6 - 12).

Statutory Measures.

1. Minimum Landing Sizes (MLS) for lobsters, brown crabs, velvet crabs and whelks are governed through Regulation (EU) 2019/1241 of the European Parliament and of the Council on the conservation of fishery resources and the protection of marine ecosystems through technical measures. Historically these were introduced at an EC level through Council Regulations (EC) 850/98. This been amended into UK Policy though the Fisheries Act (2020). Whilst the MLS for velvet crab, lobster and whelk follow those set out in the EU regulations, DAERA have increased the MLS for brown crab from the EU MLS of 130 mm to 150 mm (January 2022) following consultations with the fishing industry on ways of sustaining the stock. The current MLS in NI are 150 mm for brown crab, 87 mm for lobster, 65 mm for velvet crab and 45 mm for whelk.
    a. Unless a species is subject to the landing obligation (discard ban), all catches below the MLS must be returned to the sea immediately.
    b. The Edible Crabs (Conservation) (Amendment) Regulations (Northern Ireland) 2021 (S.R. 2021 No. 336) prohibit the retention on board, the bringing to land and the landing from a sea -fishing boat, the detached claws of an edible crab.

2. The Unlicensed Fishing for Crabs and Lobster Regulations (Northern Ireland) 2008 was introduced to improve the management and conservation of crab and lobster and to prevent the increase in fishing by hobby fishermen who do not hold a license.
    a. Under the regulations anyone without a license is prevented from:
        i. landing more than five crabs and one lobster per day,
        ii. using more than 5 pots, and
        iii. using a stock cage.
    b. Currently, there are no restrictions placed on pot fishing for whelks (other than the EU MLS), *Nephrops* and *Palaemon* spp in NI.

3. Static fisheries should take efforts to limit bycatch of non-target species.
    a. Vessel operators are required to report any incidents of accidental injury or mortality of marine mammals resulting from bycatch to the Marine Management Organisation within 48 hours from end of trip. In compliance with the Habitats Directive 92/43/EEC article 16, vessels must report any incidents of lost gear to the relevant authorities if the gear cannot be reclaimed by the vessel.
    b. Failing to report lost gear or not marking lost gear correctly is an offence and may result in the owner of the vessel being fined and prosecuted.
    c. Static fishing pots should use an escape panel for reduction in by-catch and the easy release of under-size stock. Escape panels have also showed that less bait is needed when they are used.

4. Using the MarPAMM story maps, Seafish Kingfisher MPA fisheries map (which includes management measures for specific MPAs) and marine map viewers (NI/RoI), awareness can be raised within the commercial fishing community on the connectivity between MPAs in relation to impacts.

5. Commercial fishing should follow best practice on biosecurity to prevent the spread of disease and non-indigenous species. An example is the awareness of American lobster in UK Waters and the use of identification guides for comparison to catch if unsure of species.

6. Entanglement incidents should be notified and officially reported in local reporting schemes from environmental bodies.

7. Ban the landing of soft-shelled crab/lobster. Once moulted, brown crab and lobster have a soft shell which not only is representative of poor meat quality due to the high-water content, also greatly reduces survival rate if landed.

    a. The Edible Crabs (Conservation) (Amendment) Regulations (Northern Ireland) 2023 (S.R. 2023 No. 5) prohibit the retention of a soft-shelled crab on board a sea-fishing boat, the bringing to land, the landing, having in possession, selling, exposing for sale, buying for sale, or consigning to any person for the purpose of sale.
    b. Where a soft-shelled edible crab is brought on board a sea-fishing boat, it must be immediately returned to sea as near as possible to the place from which it was taken.

Guidance Measures.

8. Any female lobster which has been v-notched should not be landed. This reduces the harvest rate on reproductive females, and, as the v-notch can last several moults, it means the female is protected for several years. The aim of v-notching is to increase the total number of reproductive females in the population and hence increase the total egg production of the population.

9. All vessels operating within the pot fishery under 12 m should be encouraged to use Inshore Vessel Monitoring System (I-VMS). Data derived from I-VMS will provide a more complete picture of all fishing in the seas.

    a. I-VMS is similar to Vessel Monitoring System (VMS). It provides positional information such as latitude and longitude, course, speed and date and time of each positional report. However, rather than transmitting data via satellite which can be expensive, it reports its data via mobile phone signal (GPRS). This is a cheaper alternative, and the frequency of reports can be set at a higher level.

b. This issue has been explored by DAERA (2022), through a consultation on I-VMS for fishing vessels under 12 m as an enhanced data collection and monitoring tool mechanism.

10. Static fishers should be aware of all MPAs, the MPA network and the connectivity between MPAs when carrying out commercialised fishing practices. Where practicable fishers should limit the impact to designated features.

11. Introduction of a pot tagging scheme to enable quantification of effort, with different colours for commercial and recreational pots. The number of tags issued to each recreational fisherman would reflect the current 5 pot limit, as described in Regulation 4 of The Unlicensed Fishing for Crabs and Lobster Regulations (Northern Ireland) 2008.

12. Marking of Pots for static fishing- Currently there is no definitive way of marking pots to know to which fisherman a pot belongs to. By ensuring that all pots are labelled in a consistent manner it safeguards that they are easily identifiable. This can be used in terms of enforcement, gear conflict, or if fishermen's pots are moved by weather events.
    a. Marking of static pots can help to distinguish the difference between a commercial fisher or a hobby fisher. This could be further worked into a departmental scheme for tagging to examine tagging differences between commercial and hobby.

13. Old fishing gear should be discarded of appropriately to reduce the risk of entanglement.

Strategic Guidance 3: Aquaculture.

Management measures which cover aquaculture area within Dundrum Inner Bay, including that within the MPA, are outlined below and include both statutory measures (1 - 3) and guidance (4 - 8).

Statutory Measures.

1. Aquaculture operators within the Murlough SAC area are to carefully monitor the health of cultures to minimise the risk of transmissible diseases and parasites to naturally occurring species within the MPAs as well as reducing the risk of transmissible pathogens to humans.

2. Current aquaculture practises have no spatial overlap with sandbanks that are slightly covered by sea water all the time. Therefore aquaculture practises may have no impact on this protected feature within the SAC.

3. The Molluscan Shellfish (Control of Deposit) Order (Northern Ireland) 1972 prohibits the introduction into NI waters of molluscan shellfish taken from outside NI waters except under the authority of a permit granted by DAERA Marine and Fisheries.
    a. All spat and juveniles must be sourced from areas free from known invasive non native species.
    b. The movement of the non native Pacific oyster (*M. gigas*) is regulated under the Alien and Locally Absent Species in Aquaculture Regulations (Northern Ireland) 2012, which implements Council Regulation (EC) No 708/2007 on the use of alien and locally absent species in aquaculture.
    c. All aquaculture operators must comply with The Alien and Locally Absent Species in Aquaculture Regulations (Northern Ireland) 2012 with regards to alien and locally absent species in accordance with a competent authority.
    d. Aquaculture wihin Dundrum Inner Bay is continuously monitored by AFBI and current deployed mitigation measures are successful at sustaining the intergrity and conservation objectives of the SAC.

4. Intertidal Shellfish gathering undertaken as a commercial activity and sold into the food chain must comply with retained EU Regulation 853/2004. This regulation lays down specific hygiene rules for premises that handle or process fishery products.

5. The DAERA intertidal shellfish gathering consultation 2022 recommends:
    a. A closed season for whelk gathering from January to April. This annual 'off season' would be the most effective period for protecting future stock.
    b. MLS for whelks should be set at 16 mm to allow all specimens a minimum of one winter spawning.
    c. A bag limit of 4 kg/ 2 litres in one tide for personal consumption.
    d. Registration of commercial gatherers with the Department with activity logs which detail weight and location of harvesting. And
    e. A night-time curfew on gathering which will have benefits for shellfish stock as well as protection of sensitive habitats and species.

6. A voluntary code of practice to aid sustainability of intertidal shellfish should include:
    a. That harvesters need to be aware of MPA related regulations and environmental legislation for feature protection.
    b. Sorting and returning small shellfish to the shore.
    c. Replacing to their original location rocks or clumps of seaweed that have been moved while gathering.

Guidance Measures.

7. Measures relating to mudflats and sandflats not covered by sea water at low tide (designated feature). These areas also support eelgrass beds which are a key element of this feature.
    a. Aquaculture activities have the potential to damage this feature through trampling (caused by human and vehicular presence when accessing intertidal sites) and smothering (when aquaculture structures are placed over areas colonised by eelgrass species). Eelgrass extent within Dundrum Bay is mapped by DAERA. Eelgrass is not present within the boundary of the currently licensed aquaculture sites within Dundrum Inner Bay.
    b. The access route to the aquaculture sites within Dundrum Inner Bay do not overlap with any SAC features. Negative impacts to designated features as a direct result of accessing aquaculture sites are therefore exceptionally low.
    c. The bioaccumulation of faeces and pseudofaeces beneath intertidal oyster trestles has the potential to impact benthic community structures.
        i. These impacts are generally considered to both small scale and localised.
8. There are considered to be no negative impacts from intertidal aquaculture on the Marsh fritillary butterfly (*E. aurinia*).
9. Harbour Seal *(P. vitulina*) - The areas licensed for aquaculture at Dundrum Inner Bay are greater than 1.7 km from the closest seal haul-out within the Murlough SAC (AFBI 2014). It is therefore unlikely that aquaculture activities at the licensed sites within the Dundrum Inner Bay area will impact this SAC feature.
10. Aquaculture operators within the Murlough SAC area should carefully monitor the health of cultures to minimise the risk of transmissible diseases and parasites to naturally occurring species within the MPAs, as well as reducing the risk of transmissible pathogens to humans.
11. When considering and applying for new aquaculture sites or altering the operations of existing sites within the Dundrum Inner Bay, areas of eelgrass habitat should be avoided.

Strategic Guidance 4: Recreation and Tourism.

Shoreline based recreation.

Management measures which cover onshore recreation within the Murlough MPAs management plan area including within the MPAs are outlined below and include both statutory measures (numbers 1 - 3a) and guidance (2b - 9).

Statutory Measures.

1. Recreational users within the Murlough SAC area, including Murlough, Ballykinler and Newcastle beaches should undertake activities in a manner that has limited interactions or will cause minimal negative adverse effects directly, indirectly, or cumulatively on designated features in the area.
    a. Recreational/tourism activities within the Murlough SAC Area can include angling, sea bathing, bird watching, walking/hiking, geo-tourism, exercising, and beach going.
    b. Recreational users should comply with appropriate regulations around wildlife disturbance.
    c. The Wildlife (NI) Order 1985 as amended states that it is an offence to wilfully interfere with or destroy a breeding or resting place for wildlife.
    d. The Conservation (Habitats etc.) Regulations (Northern Ireland) 1995 (as amended) gives power to the competent authority to reduce the level of disturbance to habitats and wildlife with protected features.
2. Shoreline anglers are required to follow NI Departmental and Local Authority fishing byelaws regarding taking size and quantity limits as well as prohibited species (salmon, sea trout and sea bass during spawning).

3. All wild birds, cetaceans (whales, dolphins, and porpoises) and seal species are protected by under Section 4 (1) of the Wildlife (NI) Order 1985 as amended. Offences can include intentional or reckless disturbance, taking, harming, and killing and in some cases possession or sale of protected species.
    a. All users of Murlough SAC should keep their distance at least 100m from any seals present and refrain from touching or feeding them. Seals can move surprisingly fast even on land and may bite if they feel threatened. Seals may also carry infections or diseases which can be transferred to humans.
        i. Never separate pups from mothers. Leave lone pups alone – the mother may only be foraging for food.
        ii. If there are several people on foot, keep to one side of the animals and leave them an escape route to the sea. Remain as quiet as possible, especially if you are in a group, and avoid sudden movements.
        iii. Never camp near a haul-out site or at a breeding site.
        iv. Avoid taking dogs close to seal haul-outs as they are likely to disturb seals.
        v. If you come across an abandoned seal pup which is obviously injured, sick or distressed, contact Exploris on 07701 372 623. Do not pick the seal up or chase it back into the sea. Instead, observe from a safe distance until the rescue team arrives.

vi. If you come across a dead seal, contact the DAERA Marine and Fisheries Division Marine Conservation and Reporting Team (MCRT) on Marine.Wildlife@daera-ni.gov.uk or 028 905 69421. Exploris do not have any involvement with dead seals.
vii. If you find a whale, dolphin or porpoise stranded on the beach, contact the DAERA Marine and Fisheries Division Marine Conservation and Reporting Team (MCRT) on Marine.Wildlife@daera-ni.gov.uk or 028 905 69421.
viii. For information, please refer to DAERA Marine and Fisheries Division Protocol for Dealing with Stranded Marine Wildlife 2021.
ix. Drones should never be flown directly at/or over seal haul-out sites, nesting sites and foraging areas for sea birds. Care should be taken not to disturb marine mammals and birds by flying too close to them. For more information, see DAERA leaflet on drone usage (https://www.wildlifecrimeni.org/_files/ugd/259455_db4ed41291ce447bb7781013ab3d16aa.pdf).

<u>Guidance Measures.</u>

b. (Point 3 continued) For seabirds - Where possible use binoculars or telescope, understand the birds' situation and behaviour to recognise signs of stress.
    i. If conscious of disrupting bird behaviour in any way, back off carefully.
    ii. Use bird hides or observe from a vehicle/boat at a distance.
    iii. Approach birds slowly and quietly and if on foot adopt a prone position whilst observing.
    iv. Be careful that the size of bird watching group does not in itself disturb the birds, particularly if the birds are not used to people watching them.
    v. Always keep noise and sudden movements to a minimum.
    vi. Dogs often cause alarm to birds so if dogs are present when bird watching keep them on a lead and under close control.
    vii. Be very careful not to leave any litter, and don't leave food "for the birds". This is likely to attract predatory gulls and do more harm than good.
    viii. Avoid flash photography, especially at close range. Flash is rarely needed but is a default setting on many cameras. Check camera settings before any bird watching trip.
    ix. Drones should never be flown directly at or through nesting, foraging or rafting birds. Care should be taken not to disturb birds by flying too close to them.

4. Landowners which allow members of public to use beach access or coastal paths could create educational signs surrounding haul-out sites to help educate the public on wildlife disturbance and enforce awareness that it is an animal welfare offence to disturb a seal.

5. Recreational dog walking - To avoid disturbance, walk dogs towards the back of the shore and try to avoid any feeding birds along the tide line, or at times around high tide.
    a. Dogs can often cause alarm to seabirds, waterbirds, and seals. Always keep them on a lead and under close control.

    b. To avoid disturbance of seabirds and marine mammals such as seals, walk dogs towards the back of the shore and try to avoid seal haul-outs and/or feeding birds along the tide line, or at times of low and high tide.
    c. Keep away from known bird roosts and take note of any signs requesting public co-operation in these areas.
    d. Do not allow dogs to chase birds on the beach. This prevents birds from feeding and roosting.
    e. Keep dogs on a lead when near feeding or roosting birds and in areas used by other recreational activities. Boisterous dogs can scare both birds and people.
    f. Please clean up after the dogs to keep the beach safe and clean for other users.

6. Support communication and planning for the management of licensed recreational service operators through the development of information and training needs to enhance visitor experiences.

7. Support and promote the implementation of volunteer codes of conduct for activities within MPA sites:
    a. Leave No Trace Campaign for the Island of Ireland.
        i. Seven Campaign principles:
            1. Plan Ahead and Prepare.
            2. Be Considerate of Others.
            3. Respect Farm Animals and Wildlife.
            4. Travel and Camp on Durable Ground.
            5. Leave What You Find.
            6. Dispose of Waste Properly. And
            7. Minimise the Effects of Fire.
    b. The WiSe Scheme - Minimising Disturbance for Marine Wildlife:
        i. Contains guidance for managing encounters with cetaceans, seals, basking sharks, and seabirds within their Boat course and new Adventure courses.
    c. Newry Mourne and Down District Council's Guidance on Share the Shore shoreline information panels. And
    d. NatureScot's A Guide to Best Practice for Watching Marine Wildlife.

8. The increase in marine litter and its impact on marine species is of growing concern. It is estimated that 70% of all marine litter has reached the seabed, 15% floating on the ocean's surface and a further 15% reaching inland shores (OSPAR, 2022). Documented cases of seals ingesting plastics (Desclos-Dukes *et al*., 2022) and becoming entangled has increased (Luck *et al*., 2022). High levels of marine litter are often linked with peak tourism seasons.
    a. Education of the significant impacts of marine litter on local marine species is crucial to the successful conservation of marine species located in the management plan area.
    b. Recreational users should use coastlines in a respectful manner and follow the guidance set out by Clean Coasts 'Enjoy and Protect Document' code of conduct.

9. Recreational activity users and operators should have good practice methods in creating an environment that does not cause any negative impact on the marine environment within the MPA network.

Surface based recreation.

Surface based recreational users within MPAs where activities including boating, jet-skiing, wildlife watching, pleasure cruisers and recreational offshore fishing should demonstrate that there will be no significant adverse effects, directly, indirectly, or cumulatively on designated feature areas.

Management measures which cover surface based recreation within the Murlough MPAs management plan area including that within the MPA, are outlined below and include both statutory measures (numbers 1, 3, 5, 6, 7,8, 9, 10, 11 and 12) and guidance (numbers 2,3,4, 7a and 13).

<u>Statutory measures.</u>

1. All operators of leisure boats and cruisers are advised to ensure effective measures are taken to prevent the spread of non-indigenous species within the MPA network.

2. Surface based recreational participants should ensure that they follow best practice guidelines in regard to the approach outlined in the JNCC code of conduct.
    a. All recreational boat users should adhere to the correct guidelines around basking sharks through the Sharks Trust, Basking sharks code of conduct which applies to both UK and EU waters.

3. Surface based recreational users should comply with appropriate regulations around wildlife disturbance.

   a. Section 23 (7)(c) of the Wildlife Act 1976 states that it is an offence to wilfully interfere with or destroy a breeding or resting place for wildlife.
   b. The Conservation (Habitats etc.) Regulations (Northern Ireland) 1995 (as amended) gives power to the competent authority to reduce the level of disturbance to habitats and wildlife with protected features.

4. Certain species are protected by international, European, and national legislation throughout the UK and Ireland. Offences can include intentional or reckless disturbance, taking, harming, and killing and in some cases possession or sale of the species.

5. Boat angling is required to follow UK and EU fishing byelaws, regarding taking size and quantity limits, and prohibited species (salmon, sea trout and sea bass during spawning).

6. There are existing byelaws restricting access to Minerstown seashore to PWC. Newry Mourne and Down District Council byelaws for the regulation of the seashore at Minerstown, County Down (2014) state that, “A person shall not bring any watercraft including a kite, surfing board, personal watercraft, inflatable boat or semi rigid craft within 200 m of the restricted zone between 1 May and 31 October (both dates inclusive)”.

7. The DAERA consultation 2022 on the use of fast and PWC in MPAs has recommended measures for the management of fast watercraft:

   a. For commercial tour operators’, access will be permitted to MPAs on the condition the vessel’s skipper has gained certification in the WiSe Scheme,
   b. For recreational users’, issue Advisory Notices detailing best practice on the use of PWCs in MPAs where vulnerable marine species are a designated feature.
   c. Permit access to MPAs for PWC use, conditional on the user’s agreement to abide by a code of practice for the operation of PWC in specific MPAs.
   d. Create speed restricted zones within specific areas of MPAs.
   e. Create prohibition zones within an SPA where there is the risk of disturbance to loafing/nesting birds.
   f. Create prohibition zones within an MPA where the use of PWCs will be excluded from the vicinity of marine species sensitive to disturbance.
      i. The boundaries of any prohibition zone will be set after consideration of the guidance set out in the WiSe Scheme (DAERA, 2022b).

8. The Department will Issue Advisory Notices detailing best practice on the use of FWCs and PWCs within the Murlough SAC where vulnerable marine species are a designated feature.

a. Permitted access to MPAs for PWC use will be conditional on the user's agreement to abide by a code of practice for the operation within the Murlough SAC area.

Guidance Measures.

9. Canoes and kayaks should avoid oyster trestles or navigate aquaculture areas at high tide.

10. Operators of PWCs should take care to anchor or moor in recommended or designated areas, including the anchorage to the South-west of the Craigalea drying rocks during low tide. If the red flags are hoisted in Ballykinler, take care not to drop anchor too far to the west. Safer areas in the bay are between Newcastle and Dundrum or in the bay North-north-west of St. John's Point.
    a. Pleasure boating and cruising operators should aim to achieve best practice as outlined within Moorage and Anchorages strategic guidance to reduce the risk of degradation to designated benthic features within or adjacent to MPAs and protected wrecks.

11. Surface based recreational users from PWCs should take caution when anchoring and mooring within MPAs and adjacent areas to mitigate damage to the seabed and the designated features within the area (i.e., seagrass). Operators should follow the appropriate code of conduct as set out in the 'Green Guide to Anchoring and Moorings' developed by the Green Blue Organisation and RYA.

12. In the case of interactions with marine mammals, surface based recreational users should first slow down and take time to assess what the animal(s) are doing and, if possible, what the group composition is. If they are feeding or resting the impacts of being approached could be more serious as it would disrupt important behaviour. If the animals are with young, this may affect their willingness to engage. Knowing what their original behaviour is can help users determine whether they will cause a disturbance, i.e., if the behaviour significantly changes.
    a. Do not approach animals closer than 100 m. Remain at least 200 m away if another boat is present and 300 m away if a mother and calf are present.
    b. Spend no longer than 15 minutes near the animals.
    c. Do not drive head on, in-between, or attempt to encircle the animals.
    d. Maintain a slow 'no wake' speed and steady course.
    e. If animals approach your craft, turn the engine to neutral.
    f. Never swim with animals in the water.
    g. Additional guidance can be found within the specific recommendations set out for sub-aquatic adventure sports within the WiSe scheme.

13. Seabird interactions from surface based recreational users can be witnessed in large groups, or rafts, on the sea both in summer and in winter. If a raft of birds is spotted ahead, reduce speed to less than 6 knots as the boat approaches. It is recommended to keep a minimum approach distance of around 50 m, although this may be varied according to species and circumstance. Avoid driving boats through rafts of birds and navigate around them where practicable and safe to do so. Breaking up rafts can make them more vulnerable to predators and uses up precious energy.

14. To minimise the level of disturbance on seal haul-out zones, the Department should issue appropriate guidance on the use of speed in close proximity to marine wildlife.

Sub-Aqua recreation.

Management measures which cover sub-aqua recreation within the Murlough MPAs management plan area including that within the MPA, are outlined below and include both statutory measures (1 -3) and guidance (numbers 1, 2, 3, 4, 5, 7 and 9).

<u>Statutory and Guidance measures.</u>

1. Divers and snorkellers must follow The Access to the Countryside (Northern Ireland) Order 1983 and seek permission from the landowners prior to entering private land.

2. Recreational divers intending to dive protected shipwreck sites are required to obtain the relevant licences from the competent authority.
    a. Recreational divers are required to report any salvage from or around wreck sites to the Receiver of Wreck.
3. The Receiver of Wreck for Northern Ireland is the MCA.
    b. Diving vessel operators should aim to achieve best practice as outlined within Moorage and Anchorages strategic guidance to reduce the risk of degradation to designated benthic features within or adjacent to MPAs and protected wrecks.

<u>Guidance Measures.</u>

4. Recreational divers engaging in sub-aqua fishing activities are required to follow UK and EU fishing byelaws regarding take size, catch quantity and prohibited species (salmon, sea trout and sea bass during spawning seasons).
    a. There are no licencing requirements for sub-aqua fishing activities or for the position of a rubber band spear gun.
    b. Divers may spear fish with and without (Apnea) devices.
    c. Hunting is allowed day and night.
    d. Spear shot fish may not be sold.

e. Prohibited species: Allis shad (*Alosa alosa*), Salmon (*Salmo salar*), Sea trout (*Salmo trutta trutta*), Sea bass (*Dicentrarchus labrax).*
f. Divers engaging in spear fishing activities should follow the guidelines laid out by Spearfishing Ireland.

5. Divers and snorkellers are encouraged to follow UNESCO's Code of Ethics for Diving on Underwater Cultural Heritage Sites and the BSAC, PADI and SSA's Respect Our Wrecks Code of Practice.
    a. Respect Our Wrecks policy -
        i. Respect war graves. Many wrecks are also war graves. Treat them with the respect that would be given to a churchyard.
        ii. Respect the wreck environment. Many wrecks make great habitats for marine life. Treat them with the care that would be given to coral reefs.
        iii. Respect the future. Explore wrecks, where allowed, but don't damage or disturb them. Take photos rather than souvenirs, so that the wrecks remain for future divers to see.
        iv. Respect the history. Many wrecks have an important history and hold clues to maritime past. If anything is found, report it to the Receiver of Wreck, who will pass on such information to archaeological experts.
        v. Respect yourself. Make sure that divers are appropriately trained for safe wreck diving.
        vi. Respect divers' family and friends. Some wrecks contain dangerous cargoes or live munitions. Don't disturb them or bring them ashore.
        vii. Respect the law. Know and respect maritime laws - and avoid a criminal record.

6. Recreational divers can aid marine biodiversity conservation efforts. Information recorded by divers and other recreational users can provide assessment data on the condition of marine ecosystems, helping experts to identify trends and changes in the MPA network.
    a. Divers can actively help to protect the marine environment by reporting marine wildlife sightings to CEDar online recording facility or by using iRecord smartphone app and watching out for marine wildlife disturbance**.**

7. Divers should be encouraged to have adequate diving qualifications issued by an accredited diving organisation in order to dive.

    a. Divers should have experience/training in cold or temperate waters prior to exploring any of the Northern Ireland sites.
    b. To minimise the risk of harm to divers practice the principles of safe and responsible diving which apply before, during, and after every dive or snorkel activity.

8. Recreational divers participating within sub aqua activities should aim to achieve best practice when diving in areas containing marine mammals, sea birds, and basking sharks.
    a. Recreational divers are encouraged to follow the guidance laid out within the British Sub-Aqua Club's Divers Code of Conduct (Annex VIII) when participating in Sub aqua activities.
    b. Divers and snorkellers should follow the principles of 'Leave No Trace' while on land before or after their dive/snorkel.

9. Divers and Snorkels operating within the Murlough SAC area should follow the Codes of Conduct set out within the Causeway, Coast and Glens Heritage Trust and Ulster Wildlife's Rock pool, Snorkel and Shore Diving Guide For sub-sea and shoreline. This approach is applicable for coastal areas outside of the Causeway Coast.

Strategic Guidance 5 Military and Defence.

Management measures which cover sub-aqua recreation within the Murlough MPAs management plan area including that within the MPA are outlined below.

1. The Ballykinler Ranges in County Down, NI 1940 (to be reviewed) sets out a military exclusion zone within the marine areas of Dundrum Bay during live firing activities. The exclusion zone is active when displays of signals (red flags and/or lights) are hoisted on the perimeter of the ranges. All intrusion on the land, foreshore or sea during this period is prohibited.

2. The presence of **Red flags and/or Red Lights** within the boundary of the Ballykinler Training Centre prohibits access to the danger area. The authorities expect that you will not linger in the area and operate on the 'Clear Range' principle.
    a. When the red lights are on and red flags are raised, there is live firing across the area. At those times there is a risk of serious injury or death.
    b. Water users must not access these areas when ranges are live under any circumstances to ensure public safety.

3. The presence of raised red flags only does not prohibit passage through the danger area. The authorities can expect that you will not linger in the area and operate on the "Clear Range" principle.

    a. Range control is not contactable either by phone or VHF. If there is a need to cross the range while the red flags are being flown, Belfast Coastguard can be contacted on #16 so that they can contact the Reconnaissance Systems Officer (RSO).

4. The UK MoD Sustainable Development and Environmental Manual (JSP 418) set out their commitments to avoiding environmental damage.

5. The MOD will operate in MPAs following the requirements of the Environmental Protection Guidelines (Maritime) Version 2.1 which outline the details of activities which are prohibited in MPAs, and details based on designated features (i.e., sandbanks under 20ms). In addition, it outlines accepted activities and control measures to mitigate degradation on designated features from activities.

5. Monitoring of plan effectiveness

Monitoring, evaluation, and research are fundamental to the success of MPA Management plans. The management plan needs to demonstrate to regulatory authorities, marine activity users and local communities that the policies are making a difference to the integrity of the conservation objectives and achieving the aim of the plan. This process needs to be iterative with continual learning from management experience to help keep improving the overall integrity of the plan area through adaptive management.

The management plan policies use monitoring to help evaluate the effectiveness of management approaches. Initially the monitoring should focus on outputs that can be measured, such as using the modelling and data outputs from the MarPAMM project, as well as monitoring surveys on key species and habitats within MPAs. This approach to monitoring is essential to distinguish the success in delivering the aims, objectives, and outcomes of the management plan. To balance the need for plan evaluation and management stability, the regulatory authority will look annually at key performance of the plan and undertake a detailed plan review every 6 years to provide a detailed update and review of the strategic guidance.

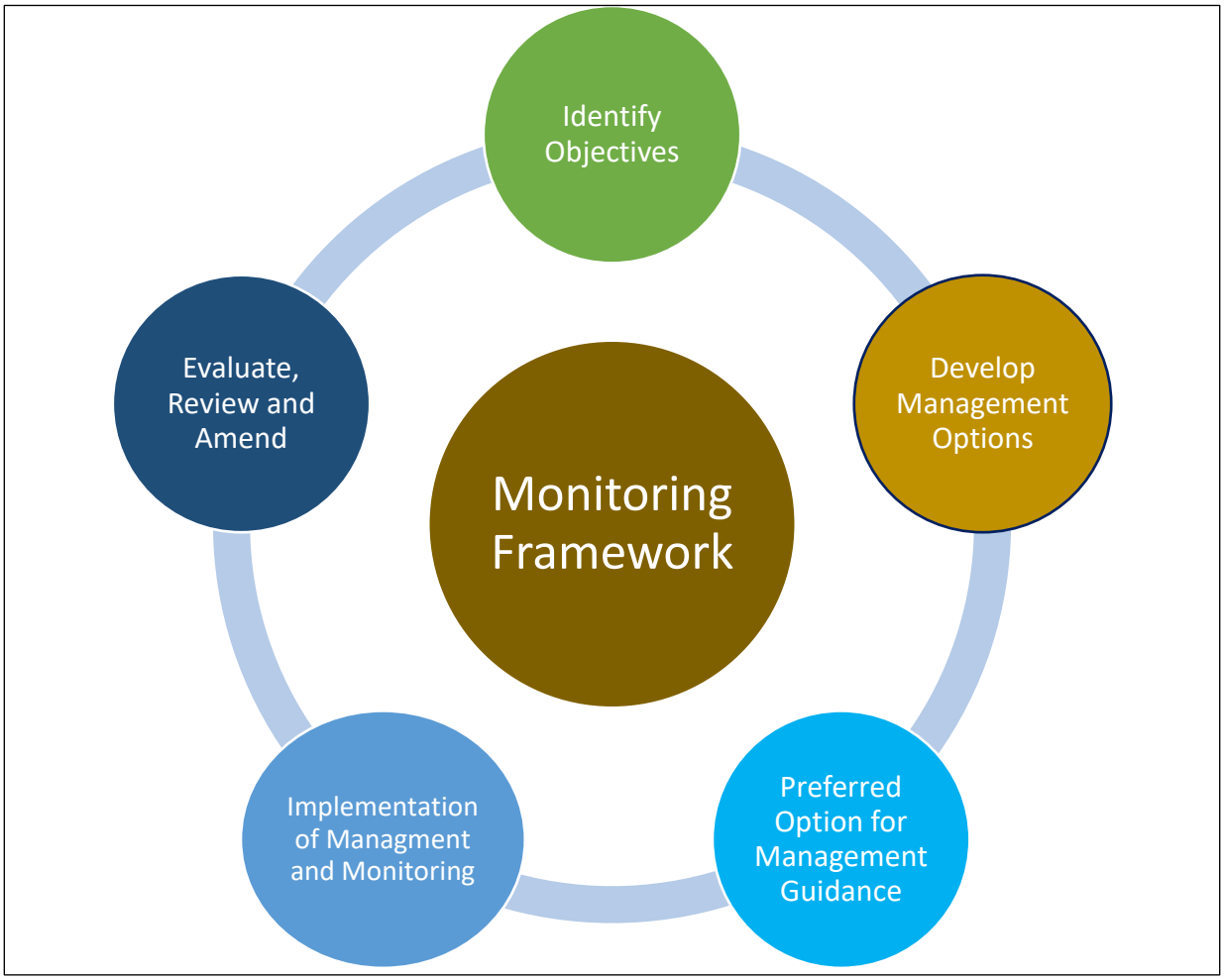

Figure 4: Management Monitoring Framework (AFBI, 2022).

The six-year plan review aligns with the reporting obligations attached within the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 in NI. The monitoring approach and the six-year plan review will also align with the Common Standards Monitoring approach of feature condition assessment within protected areas. This will help with biodiversity indicators, international obligations and assessing progress on feature sustainability from local to international scales.

Strategic Guidance 1: Climate Change, Coastal Processes and Shoreline Monitoring.

1. DAERA Marine and Fisheries Division will monitor the condition of designated features to assess the impact of Climate Change on habitat and species sustainability.
2. The competent authorities (DAERA, DFI and LAs) should monitor the condition of future shorelines within the dynamics of change and the impacts of vulnerability.
3. DAERA Marine and Fisheries Division will monitor the scale of biosecurity measures and the extent of disease, non-native spread, and native species absence within MPAs.
4. The competent authorities (DAERA, DFI and LAs) will monitor the impact of shoreline and beach profile changes as well as erosion rates.
5. The competent authorities (DAERA, DFI, NI Water and LAs) will monitor the impact of flood prevention measures from this plan from the perspective of pluvial, fluvial and coastal flooding.
6. DAERA Marine and Fisheries Division will undertake species and ecosystem function assessments for managed realignment and habitat restoration schemes to help climatic adaptation.
7. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
8. All aspects of this guidance will be re-examined as part of a six-year plan review.

Blue Carbon Habitats Monitoring.

1. DAERA Marine and Fisheries Division will compile a report examining the opportunities for Blue Carbon restoration and enhancement within Dundrum Bay.
2. DAERA Marine and Fisheries Division will monitor the scale of biosecurity measures and the extent of disease, non-native spread, and native species absence within designated Blue Carbon Habitats.

3. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
4. All aspects of this guidance will be re-examined as part of a six-year plan review.

Strategic Guidance 2: Commercial Fishing and Dundrum Pot Fishery Monitoring.

1. DAERA Marine and Fisheries Division will analysis the impact and application for mitigation of bycatch, such as modifying fishing gear so that fewer non-target species are caught or can escape.
2. The process of genetic v-notch monitoring should be undertaken every 2 years to check the healthy status of stocks.
    a. This should include a process to authorise or reject samples of crabs or lobsters which can be forwarded to Queens University for study. This will help to establish how larvae retention is working within Dundrum Bay areas.
3. AFBI will undertake observer trips throughout the year on commercial fishery vessels which work in MPAs to examine target species and by-catch relevance. This will be NI wide and not just within the management guidance plan area.
4. DAERA Marine and Fisheries Division will monitor the scale of biosecurity measures within MPAs.
    a. The AFBI observer programme can alert DAERA if non-native species appear in catches.
5. DAERA Marine and Fisheries Division will examine the impact and recordings of bycatch on stocks, seabirds, and marine mammals.
6. DAERA Marine and Fisheries Division will examine the impacts of activities on benthic environments and develop records of present condition and subsequent variation of condition in the feature(s) of interest.
7. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
8. All aspects of this guidance will be re-examined as part of a six-year plan review.

Strategic Guidance 3: Aquaculture Monitoring.

1. AFBI will continue with existing monitoring and evaluation procedures looking at potential impacts from aquaculture within Dundrum Inner Bay.

2. DAERA Marine and Fisheires Division will monitor the condition of benthic features and seabed to assess the impact of aquaculture processes.
3. DAERA Marine and Fisheries Division will monitor the scale of biosecurity measures and the extent of disease, non-native spread, and native species absence within MPAs that contain aquaculture licences.
4. DAERA Marine and Fisheries Division will construct an assessment document to reviemw and examine the impact of actionables associated with this guidance.
5. All aspects of this guidance will be re-examined as part of a six-year plan review.

Strategic Guidance 4: Recreation and Tourism Monitoring.

Shoreline based recreation monitoring.

1. Regulatory Authorities will analyse the level of recreational activity within the Murlough MPAs management plan area to establish how recreational interactions are affecting natural marine processes.
2. Local Authorities and/or NGOs with remits for shoreline/beach/pathways should monitor the impacts from visitors in terms of disturbance, litter, camping and anti-social behaviour.
   a. MPA Managers should establish litter monitoring schemes with visitors, reporting litter amounts to an online database or ranger in publicly accessible areas of the Murlough NNR.
   b. Competent authorities and relevant NGOs should undertake beach watch surveys to monitor recreational interactions within Murlough, Ballykinler and Newcastle beaches.
3. The component authorities (DAERA, LCs and landowners with public access) will monitor the impact of recreational interactions with the conservation objectives of protected features.
4. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
5. All aspects of this guidance will be re-examined as part of a six-year plan review.

Surface based recreation monitoring.

6. DAERA Marine and Fisheries Division, along with AFBI, will monitor the condition of features and seabed to assess the impact of surface based activities and their impact on natural marine processes.

7. DAERA Marine and Fisheries Division, along with AFBI, will monitor the scale of biosecurity measures and the extent of disease, non-native spread, and native species absence within MPAs.
8. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
9. All aspects of this guidance will be re-examined as part of a six-year plan review.

Sub-Aqua recreation monitoring.

10. DAERA Marine and Fisheries Division, along with AFBI, will monitor the condition of features and seabed to assess the impact of sub-aqua activities and their impact on natural marine processes.
11. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of actions associated with this guidance.
12. All aspects of this guidance will be re-examined as part of a six-year plan review.

Strategic Guidance 5: Military and Defence Monitoring.

1. The MoD will assess the impacts of activities within their range sites and how it interacts with the features of the Murlough MPAs management area.
2. DAERA Marine and Fisheries Division will construct an assessment document to review and examine the impact of MoD activities and outcomes within the MPAs of the Murlough MPAs management area.
3. All aspects of this guidance will be re-examined as part of a six-year plan review.

Overall, local MPA managers could use citizen science to help with further data collection for baselining and monitoring within this management plan area. The surveys could be Beach watches, Coast watch Surveys, Dynamic Dunes, and/or other citizen science projects which could capture coastal and marine data.

The non-statutory policies within this Management Plan will need to be assessed in the future for management effectiveness through a formal engagement process. This process will examine policy outcomes and help stakeholders understand the rationale of the management approaches applied. The monitoring policies created for each of

the five Strategic Guidance areas need to feed into wider regional monitoring for the marine environment in NI and RoI. This will provide a way to show accountability for this Management Plan. The monitoring reviews could aid the completion of OSPAR Score Cards as a straight-forward self-assessment tool used by MPA managers to monitor management effectiveness (OSPAR, 2007).

The policies outlined in this management plan have monitoring measures associated with them to determine the level of achievement made against the named objectives in the guidance plan. To balance the need for evaluation and efficacy of the management plan, the regulatory authority will look annually at key performance and undertake a detailed plan review every 6 years to provide a detailed update and assessment of the strategic guidance.

6. Future work and management considerations.

The Murlough MPAs management plan is an assurance to provide enhancement and further protection for marine and coastal biodiversity for MPAs within the Murlough SAC area. This section looks at future considerations that may arise or are important for consideration as part of the management of MPAs. Some of these issues may present opportunities or challenges which could create novel prospects for innovation and partnership within MPAs, not only within the Murlough SAC but across NI. By creating management guidance for the Murlough SAC, future uncertainties and changes can be mitigated or adapted to through applying the plan generated principles.

The outputs of the MarPAMM project relating to seabirds, benthic habitat and seabed mapping, marine mammals and coastal processes provide new data and evidence that can be used outside of this plan to improve and enhance integrated and holistic marine management within MPAs across NI. In addition, MarPAMM work can identify potential knowledge gaps that could lead to new research areas or considerations that may become important in the future.

In 2021, a tagging and tracking survey was carried out on Black Guillemots (*Cepphus grylle*) under the MarPAMM project, looking at the colony nesting within existing sea defences along the Newcastle shoreline (Johnston *et al.* 2022). There are currently no detailed protection measures for *C. grylle* within the Murlough area, with any protection afforded to the species linked to that afforded through the ASSI designation covering wintering wildfowl and waders. If DAERA were to create a distinctive MPA for Black Guillemots, the MarPAMM data would help to support this decision. The preferred location of any areas designated for *C. grylle* that would afford the greatest protection or the future of the species would ideally be sited within 5 km of current colony distribution and where the bathymetry profile was shallower than 30m (ibid, pg 38). This important survey work will need to be repeated in the future to update species numbers and details. Overall further tracking of *C. grylle* is recommended in the future within the coastal areas of NI, which would increase knowledge on the foraging range sizes and location of colonies of the species, and where possible concentrate long-term surveys on key sites where the species has a strong stable presence (ibid, pg 38).

The lesser sand eel (*Ammodytes marinus)* is a key benthic feature in marine ecosystems within the North-East Atlantic ecosystem, but little is known about its distribution outside of fished areas (Langton *et al.,* 2021). Sand eels can often be found in vast shoals in areas close to sandy seabed. More research within the Murlough SAC is needed to examine their distribution and sustainability in the area.

The application of a hurdle model to examine the impact of activities or proposed future activities on sand eels within the Murlough SAC area could be a future research area which would be beneficial for management of the MPA in relation to this important resource. The hurdle model is a special tool, providing the highest predictive performance evaluation using independent data across a study region (Langton *et al.,* 2021). This could help marine managers examine the availability of sand eels as a food source to predators and identify areas where impacts could be having a negative impact.

The Murlough MPAs management plan area provided a detailed case study for the coastal processes work carried out in MarPAMM and utilised novel datasets to update and enhance guidance for management of the area. Analysis of these new innovative datasets showed nearshores dynamics and sediment transport patterns at Dundrum Outer Bay are a complex combination of variables relating to hydrodynamic forces, local geology, current MPA management of the area, and nearshore bathymetry. Marine management will always have an impact on the discourse of the natural processes for Dundrum Bay and these need to be considered for all future development and related activities in the area, especially regarding coastal defence. In particular, the role of the ebb tidal delta and how it affects wave energy dissipation and direction needs to be better understood. From the prospect of anthropogenic induced change (such as sea-level-rise), a full analysis of the Dundrum Bay area would require more research into the erosive/depositional processes and future hydrodynamics in the dune system and other vulnerable features designated within the area.

Considerations outside of work packages.

The continued development of accurate baseline data for coastal change in NI through the 3D LiDAR work from DAERA Marine and Fisheries Division is important for monitoring change. Additionally, this baseline could help form a coastal repository which is managed by Ulster University (discussed through National Trust “Shifting Shores” and DAERA - DFI Coastal Erosion Working Group). This repository would help future survey work to improve the quality of monitoring other coastal drivers at local and regional scales, including waves and tidal dynamics, providing a more accurate picture for vulnerability assessments of the shoreline of the Murlough/Dundrum Bay area.

A future concern for aquaculture could be the impact of Anti-Microbial Resistance on cultured shellfish (AMR). As antibiotics are commonly used in foodstuff to control bacterial infections, their efficacy could decline due to the impacts of warming sea-temperatures. Meta-analysis across several countries has shown an association between aquaculture related AMR and climate warming (Pepi and Focardi, 2021).

AFBI and DAERA should collect long-term data to better understand how marine pests, pathogens and INNS are affected by extreme events, climate variability and Climate Change. This should include:

- Improvement of horizon scanning and modelling capability for INNS and pathogens, including collaborating with international organisations.
- Improving public awareness and citizen science projects.
- Improving understanding of factors that contribute to disease-resistant organisms. And
- Improving understanding of and developing contingency planning for emergent risks, especially for novel pathogens.

Steering Group Future.

The creation of the Murlough MPAs Steering Group created an engagement platform for stakeholders to advise and assist on the development of management policy as well as detailed revisions of the policy iterations. The process enabled stakeholders to access scientific outputs from the MarPAMM project to help develop recommendations on management strategies and guidance. The Steering Group has been functioning from February 2021 and has been integral to this management planning process.

As the project draws to a close in 2023, there needs to be consideration on continuing the Steering Group over the legacy and long-term period post MarPAMM. The department (DAERA) should look at mechanisms similar to the Rathlin Island Management Group to sustain the Steering Group and overtime refresh it with renewed members and sectors into a Marine Advisory Group (MAG). The future of this group should be evolved for the purpose of evaluation and review of the effectiveness of the management plan guidance from industry and activity users. There could be new funding avenues to help support the development of a MAG through the next round of European funding (post Brexit) through the Peace Plus programme. This would help to evolve and grow the skills of Steering Group members for the benefit of future decision making within the Murlough MPAs management plan area.

7. Reference List

AFBI (2014) Pot Fishing in Northern Ireland. Report to the Department of Agriculture and Rural Development.

Bennett, N.J., Calò, A., Di Franco, A., Niccolini, F., Marzo, D., Domina, I., Dimitriadis, C., Sobrado, F., Santoni, M.C., Charbonnel, E. and Trujillo, M. (2020) Social equity and marine protected areas: Perceptions of small-scale fishermen in the Mediterranean Sea. *Biological Conservation*, *244*, p.108531.

Berkes, F. (2009) Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of environmental management*, *90*(5), pp.1692-1702.

Berkes, F., (2010) Shifting perspectives on resource management: resilience and the reconceptualization of 'natural resources' and 'management'. *Mast*, *9*(1), pp.13-40.

Biausque, M., Guisado-Pintado, E., Grottoli, E., Jackson, D.W. and Cooper, J.A.G., (2022) Seasonal morphodynamics of multiple intertidal bars (MITBs) on a meso-to macrotidal beach. *Earth Surface Processes and Landforms*, *47*(3), pp.839-853.

Brumbaugh, D.R. (2017) Stakeholder Involvement in Co-Management of Marine Protected Areas. *A Stakeholder Analysis for The Bahamas. Report to The Nature Conservancy, Northern Caribbean Program, Nassau, Bahamas*, *26*, p.142.

Chaigneau, T. and Brown, K. (2016) Challenging the win-win discourse on conservation and development: analyzing support for marine protected areas. *Ecology and Society*, *21*(1).

Department of Agriculture, Environment and Rural Affairs (DAERA) (2015) Murlough ASSI. Available from: www.daera-ni.gov.uk/protected-areas/murlough-assi.

Department of Agriculture, Environment and Rural Affairs (DAERA) (2017) Murlough SAC. Available from: www.daera-ni.gov.uk/protected-areas/murlough-sac.

Department of Agriculture, Environment and Rural Affairs (DAERA) (2021) Marine Protected Areas. Available from: www.daera-ni.gov.uk/articles/marine-protected-areas.

Department of Agriculture, Environment and Rural Affairs (DAERA) (2022) Intertidal hand-gathering of shellfish in Northern Ireland – A call for evidence. Available from: Final version- Call for evidence on potential management options for intertidal hand gathering of shellfish of shellfish in Northern Ireland.PDF (daera-ni.gov.uk).

Desclos-Dukes, L., Butterworth, A. and Cogan, T. (2022) Using a non-invasive technique to identify suspected microplastics in grey seals (*Halichoerus grypus*) living in the western North Sea. Veterinary Record, p.e1484.

Freeman, B.G., Lee-Yaw, J.A., Sunday, J.M. and Hargreaves, A.L. (2018) "Expanding, shifting and shrinking: The impact of global warming on species' elevational distributions." *Global Ecology and Biogeography* 27, no. 11: 1268-1276.

Grottoli, E., Biausque, M., Jackson, D. W. T., Cooper, J. A. G. (2022a) Coastal geomorphology and sediment dynamics. MarPAMM final report.

Grottoli, E., Biausque, M., Jackson, D. W. T., Cooper, J. A. G. (2022b) Report on Coastal Flooding Potential. MarPAMM final report.

Grottoli, E., Biausque, M., Jackson, D. W. T., Cooper, J. A. G. (2022c) Nearshore dynamics. MarPAMM final report.

Harding, C., (2021) Medmerry: Habitat creation and flood scheme leads the way for nature-based solution. Sussex World. Available from: https://www.sussexexpress.co.uk/news/environment/medmerry-leads-the-way-for-nature-based-solutions-3452064.

IPCC, (2021) Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3−32, doi:10.1017/9781009157896.001.

Johnston, D.T., Masden, E.A., Booth-Jones, K.A., Humphreys, E.M. (2022) Black Guillemot foraging ecology in relation to Marine Protected Area management plans for Northern Ireland. *Final report to MarPAMM project*. Available from: MarPAMM-Lot-4-Black-Guillemot-Tracking-Final-Report.pdf (mpa-management.eu).

Kooiman, J., Jentoft, S., Bavinck, M. and Pullin, R. (2005) *Fish for life: interactive governance for fisheries* (p. 432). Amsterdam university press.

Langton, R., Boulcott, P. and Wright, P.J. (2021) A verified distribution model for the lesser sandeel *Ammodytes marinus*. *Marine Ecology Progress Series*, *667*, pp.145-159.

Luck, C., Jessopp, M., Cronin, M. and Rogan, E. (2022) Using Population Viability Analysis to examine the potential long-term impact of fisheries bycatch on protected species. Journal for Nature Conservation, p.126-157.

Morris, C.D. and Duck, C.D. (2018) Aerial thermal-imaging surveys of harbour and grey seals in Northern Ireland, August 2018.

Nagendra, H. and Ostrom, E. (2014) Applying the social-ecological system framework to the diagnosis of urban lake commons in Bangalore, India. *Ecology and Society*, *19*(2).

OSPAR (1992) The Convention for the Protection of the Marine Environment of the North-East Atlantic, entered into force 1998. I-42279; UNTS2354.

OSPAR (2006) Memorandum of Understanding between the North-East Atlantic Fisheries Commission and the International Council for the Exploration of the Sea, Agreement 2006–8.

OSPAR (2007) Guidance to assess the effectiveness of management of OSPAR MPAs: a self-assessment scorecard. Available from: https://www.ospar.org/documents?d=32781.

OSPAR (2022) Beach Litter. Available from: https://www.ospar.org/work-areas/eiha/marine-litter/assessment-of-marine-litter/beach-litter.

Ostrom, E. (2009) A general framework for analyzing sustainability of social-ecological systems. *Science*, *325*(5939), pp.419-422.

Pepi, M. and Focardi, S. (2021) Antibiotic-resistant bacteria in aquaculture and Climate Change: A challenge for health in the Mediterranean Area. *International journal of environmental research and public health*, *18*(11), p.5723.

Royal Society for protection of Birds (RSPB) (2021) Wallasea Island Wild Coast Project. Available from: https://www.rspb.org.uk/our-work/casework/cases/wallasea-island/.

Sardá, R., Requena, S., Dominguez-Carrió, C. and Gili, J.M. (2017) Ecosystem-Based Management for Marine Protected Areas: A Systematic Approach. *Management of Marine Protected Areas: A Network Perspective; Goriup, PD, Ed*, pp.145-162.

Wilson, D. C., J. R. Nielsen, and P. Degnbol *editors* (2003) The fisheries co-management experience: accomplishments, challenges and prospects. Kluwer Academic Publishers, Dordrecht.

Wildfowl and Wetlands Trust (2022) Steart Marshes. Available from: https://www.wwt.org.uk/wetland-centres/steart-marshes/about/.

Appendix 1: Stakeholder Engagement Report.

TCI Engagement - Final Report to AFBI, re MarPAMM project January 2022

1. Background.

TCI Engagement (TCIe) was commissioned by AFBI in autumn 2019, after competitive tender, to assist with Stakeholder Management activities during the MarPAMM project, then scheduled until autumn 2021 (subsequently extended by mutual agreement, by reason of the Covid pandemic, until January 2022).

TCIe specialises in stakeholder management and managing public consultation, through advice and guidance, training and other relevant support. An agreed work plan, updated and refined during the course of the project, guided TCIe and MarPAMM officers, ensuring efficient project management.

Significant components of the work plan covered:

- Stakeholder identification, profiling and mapping
- Risk Assessment and mitigation
- Stakeholder communication and engagement
- Database management and monitoring
- Responses to stakeholder enquiries
- Production of online content (social media, web etc)
- Servicing meetings through alerts, agendas, minutes etc

The engagement plan has been delivered to deadline, and to budget.

2. How were stakeholders recruited into the MarPAMM project?

After wide promotion, a well-attended in-person seminar in December 2019 engaged participants in a detailed discussion on Stakeholder Mapping and Consultation / Engagement Risk Management.

Stakeholders were identified as those who will be affected and impacted by the decisions recommended through this policy drafting process. This includes stakeholders who live, work, use or have an interest in the areas and the topics. Activists, officials, farmers, fishers, campaigners, lobbyists, academics, trade associations, other public bodies, environmental and conservation groups all fall under the umbrella term of stakeholders.

Once stakeholders were identified and profiled (who are they, whom do they represent?), the process of stakeholder mapping was undertaken: this is an iterative, matrix-based process, drawing on and contributing to corporate memory; it allows for amendments to stakeholder involvement to be made as the project evolves; it also aids resource allocation, targeting and eliminates wasteful activities.

The process of stakeholder management also involves the categorisation of key stakeholders into key areas, policy objectives and geographical locations (e.g., Murlough SAC group, Carlingford SAC group and Regional group; these three geographies were selected to maximise efficiencies and reflect each locality's needs).

3. How did this convert into Steering Groups and what did the Steering Groups achieve?

Stakeholder mapping led to the formation of three Steering Groups made up of representative stakeholders (Murlough, Carlingford, Regional), as described above. These Steering Groups were designed to facilitate engagement with stakeholders to benefit from site-specific knowledge and expertise on the coastal areas included in the MarPAMM project.

Steering Groups provided a platform for stakeholders to raise concerns about the pressures and unanticipated issues they felt were facing coastal areas, whether that be in their line of work, their property, communities, or as recreational visitors.

They also facilitated information-sharing, issue debates and sharing of ideas, updating on the project and its direction, as well as engaging special interest / single issue groups.

Overall, Steering Groups provided the opportunity for stakeholders to be directly involved in the drafting process which will inform policy implementation in their areas.

TCIe facilitated online protocols and a Code of Conduct that guided participants in best practice, ensuring strong impacts.

At all times GDPR and data security protocols were noted and fully observed.

Covid19: Rethinking stakeholder engagement and initial approaches made to transfer MarPAMM engagement online.

In light of Covid19 from March 2020, compliance required that adjustments be made to the management of stakeholder engagement, to facilitate online communication in place of in-person face-to-face activity, to ensure the safety of all participants. Reduced activity during lockdowns also meant that some activities were suspended, or rescheduled (including by agreement, the TCIe contract, which was extended to January 2022.

The video conferencing and meeting platform Zoom, curated, and provided by TCIe, allowed for stakeholder meetings to be conducted online, in accordance with public health advice. Features such as breakout rooms, online polling (via Sli.do) and screen-sharing allowing for personable experiences for stakeholders. Chairs reported improved delegate contributions, more manageable discourse and less time-wasting; sessions began and ended on time; the Chairs were respected and advice from support staff followed.

The platform established by TCIe with a dedicated MarPAMM email address and central hub, for information and data sharing, worked well, with all correspondence tracked and archived when appropriate; meeting alerts, calendar invites, agendas, Friday / Tuesday reminders and follow-ups were all undertaken efficiently.

In addition, to ensure inclusivity for all stakeholders', detailed minutes were circulated after each meeting, with supporting papers, to keep those unable to attend up to date on project direction and stakeholder interaction with project officers.

Online written materials such as website updates and newsletters were circulated, with the purpose of keeping stakeholders informed about project activities across the three Irish region Steering Groups and MarPAMM partners from across the project.

While issues surrounding internet connectivity (broadband width) and ICT resource and hardware constraints occasionally arose for some stakeholders through this process, the email system requires less technical resource, and Zoom allowed for stakeholders to participate in meetings in a time-efficient and convenient manner from a PC, tablet, or mobile device.

Social media platforms (Twitter and Facebook) provide convenient tools for stakeholder engagement. Small bite-sized pieces of information, with relevant graphics, photographs and video content was available to a wide audience, increasing the reach of, interest in, and impact of the project.

Please see selected graphs below showing engagement with MarPAMM social media outlets.

4. Benefits of the MarPAMM project - policy guidance and drafting.

The core objectives of the MarPAMM project were to deliver four novel models designed to support the conservation of habitats and species that underpin Marine Protected Area (MPA) designations within the eligible region.

MarPAMM is an environment project to develop tools for monitoring and managing a number of protected coastal marine environments in Ireland, Northern Ireland and Western Scotland. It will be completed by 31 March 2022.
It is a cross-border project because many marine species and habitats do not abide by administrative borders. To manage mobile species and border areas requires cooperation.
MarPAMM partners will collect data on the abundance, distribution and movement of marine protected species and habitats. These data will help us produce new habitat maps and develop models for a range of species, including connectivity assessment for species with mobile life stages.
We will produce a regional sea bird model, a regional model of protected seabed-dwelling species and habitats, a seal foraging and underwater noise model and a coastal processes model.

Stakeholder engagement is important as it helps to address gaps within current marine conservation policy by identifying the up-to-date issues and pressures that face these areas, from experts active in the areas.

As marine species and habitats do not abide by administrative borders the cross-border element of the MarPAMM project was vital, building, and cementing relationships and networks of future value. MarPAMM believes that MPAs work better when they arise from a point of connectivity between the geographies and the

personnel servicing those areas. Therefore, objectives included deployment of a collaborative cross-border approach involving rich and extensive, meaningful stakeholder engagement; this worked productively.

Another benefit of the MarPAMM project was the importance placed upon connectivity between species and habitats. MarPAMM has potentially created sustainable networks which provide an interdisciplinary approach (quantitative science packages and qualitative stakeholder engagement) to MPA research, leading to more concerted, coherent, and impactful actions.

5. Result: Finished policy guidance draft brought back to stakeholders.

The final product of the MarPAMM project is the production of 6 policy guidance documents which will provide coastal users / environmental organisations / stakeholders / local government / other non-departmental public bodies (NDPBs) / other departments and DAERA itself with information about MPA areas and best practice that meets conservation objectives.

This policy guidance document along with the accompanying social media / online engagement will improve the reach and visibility of marine work of this sort being conducted by MarPAMM; the model can also ensure embedding of the proceeds of the connectivity described above between geographies, disciplines, and marine mammal – and many other – species.

Effective stakeholder engagement in turn strengthens relationships, causing deeper involvement, interactions, and possible co-management of future programmes.

Appendix 2: DAERA Identified threats, pressures, and activities with impacts on the site.

Military Use - has the potential to cause substantial impacts on the dune system. The current management committee and agreed management plan provide a framework for resolving issues.

ACTION: Continue to liaise with MoD. and other stakeholders.

Disruption to natural sediment regime - Like most dune systems, Murlough is a highly dynamic system that needs sensitive management. Construction on the shore – including rock armouring and other coastal defence works – are likely to have "knock-on" impacts throughout the system, potentially leading to coastal erosion and loss of intertidal and adjacent coastal habitats. Natural sand loss from the western end of the beach fronting Newcastle is probably an ongoing system response to hard engineering activities foreshortening the beach profile. Ongoing retreat of the dune front is most noticeable east of the Slieve Donard Hotel. This has resulted in the golf club getting approval for installation of hard engineering coastal protection structures, which generally have the effect of reducing or stopping the interchange of sediment between the beach and dune components of the system, and to exacerbate erosion further down 'drift'. Substantial erosion of the dune front is ongoing over the length of the National Trust ownership – no management response is anticipated. Historically emplaced railway sleepers near the dune foot fronting the golf course have been recently renewed. In general, the Newcastle - Murlough beach/dune system is undergoing erosion while the Ballykinler side is stable or actively accreting.

ACTION: Liaise with Council, MoD, NT, Golf Course and others as appropriate.

Recreational Impact - Trampling through dunes can have a destabilising effect, with particular impacts on foredunes and shifting white dunes. Severe cases can result in blow-outs. Less intensive trampling can affect plant communities through the loss of species sensitive to trampling. In the Murlough system, recreational impacts are clearly more pronounced on the NT land, where public access is permitted. However, NT has a proactive management strategy for dealing with visitors, which includes fencing the most sensitive areas, and the use of boardwalks where access to the beach is concentrated. As a result, recreational pressure does not currently appear to be a major issue on this part of the system. At Ballykinler, the dunes represent an important amenity area for military personnel, and recreation tends to be concentrated in the more accessible parts (e.g., to the east). At Royal County Down golf course management is important for the condition of the grey dunes and

especially dune heaths. Gorse removal offers the opportunity to extend the area of more desirable communities.

ACTION: Liaise with NT, MoD and Golf Course as appropriate.

Changes to surrounding land use - Any changes in local land-use e.g., agricultural intensification, drainage works, and coastal development) may be detrimental to the SAC.

Action: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change - Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events. The Northern Ireland Climate Change Adaptation Programme was published in January 2014. This contains the Northern Ireland Executive's response to the risks and opportunities identified in the Climate Change Risk Assessment for Northern Ireland (published January 2012) as part of the overall UK Climate Change Risk Assessment. The Adaptation Programme provides the strategic objectives in relation to adaptation to Climate Change, the proposals and policies by which each department will meet these objectives and the timescales associated with the proposals and policies identified in the period up to 2019.

ACTION: When developing SAC management plans, the likely future impacts of Climate Change should be considered, and appropriate changes made.

Appendix 3: Detailed Policy Overview.

1. **International Legislation.**

International legislation that are applicable to the management plan include:

- OSPAR Convention 1992,
- Marine Strategy Regulations 2010,
- Marine and Coastal Access Act 2009, and
- Marine Policy Statement 2011.

Under the OSPAR Convention to Protect the Marine Environment of the Northeast Atlantic, Ireland and the UK are committed to establishing marine protected areas to protect biodiversity (i.e., OSPAR MPAs). The OSPAR Convention aims develop an ecologically coherent network of well-managed MPAs. OSPAR provides a mechanism through collaborative governance with EU and non-EU members to protect the marine environment of the North-East Atlantic. OSPAR includes a wide array of marine issues from work on pollution and dumping at sea to the conservation of marine biodiversity (OSPAR, 2016).

The Marine Strategy Regulations 2010 replaces MSFD post-Brexit and provides the framework for delivering marine policy at the UK level. The UK Marine Strategy Regulations 2010 require the UK to take the necessary measures to achieve or maintain Good Environmental Status through the development of a UK Marine Strategy. The UK Marine Strategy sets out a comprehensive framework for assessing, monitoring, and taking action across the UK's seas to achieve the shared vision for 'clean, healthy, safe, productive, and biologically diverse ocean and seas. There are strong links between the UK Marine Strategy and River Basin Management Plans (RBMPs). The RBMPs address the improvement and protection of the chemical and ecological status of surface waters over the whole river basin ranging from rivers, lakes, and ground waters through to estuaries and coastal waters out to one nautical mile at sea and overlap with the UK Marine Strategy in coastal waters. The Department for Environment, Food and Rural Affairs (DEFRA) are responsible implementation of the Regulations within the UK, with devolved responsibility for NI delegated to DAERA.

Across the UK, each devolved administration has the power to create Marine Protected Areas to conserve nationally important wildlife and habitats. These national sites have different names in the devolved nations of the UK. The Marine

and Coastal Accesses Act 2009, in Northern Ireland gives DAERA's Marine and Fisheries Division the responsibility for licensing of activities related to construction, deposition or removal of any substance or object as the marine planning process. The Marine Policy Statement 2011 provided the platform for the development for a Northern Ireland Marine Plan ensure the sustainable use of marine resources and 52 strategic management of marine activities from renewable energy to nature conservation, fishing, recreation, and tourism.

2. **National Legislation.**

National designations that are applicable to the management plan include:

- The Marine Act (Northern Ireland) 2013,
- Water Environment (Floods Directive) Regulations (Northern Ireland) 2009,
- Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017,
- Water (Northern Ireland) Order) 1999,
- The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019,
- The Environment (Northern Ireland) Order 2002,
- Nature Conservation and Amenity Lands Order (Northern Ireland) 1985,
- The Wildlife (Northern Ireland) Order 1985 (as amended)

The Marine Act (Northern Ireland) 2013, establishes a strategic system of marine planning within the inshore region (out to 12 nautical miles) and helps to streamline the process of marine licensing. As part of this act is the creation of draft of our The Marine Plan for Northern Ireland 2013, which informs and guides the regulation, management, use and protection of our marine area, one for the inshore region and one for the offshore region (as a material consideration due to draft). This plan covers the inshore region from the Mean High Water Spring Tide mark out to, at most, 12 nautical miles and the small offshore region. The Marine Plan will be used for making decisions on activities in the marine environment. The Act enables the delivery of an ecologically coherent network of Marine Protected Areas, through giving DAERA the power, with the agreement of the Secretary of State, to designate MPAs, called Marine Conservation Zones (MCZ).

Marine Conservation Zones (MCZs) are designated protect a range of nationally important habitats and species such as cold-water coral reefs which thrive in the UK's deeper waters, sedimentary seabed habitats vital for a range of marine

processes. MCZs fulfil the obligations of The Marine Act (Northern Ireland) 2013 to contribute to an ecologically coherent UK network of MPAs as well as wider biodiversity commitments at North-East Atlantic and global level while fully considering any economic, cultural, or social consequences of doing so.

The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009, is the transposed, post Brexit legislation for managing flood risk from floods of all flood types (fluvial, pluvial, sea water, groundwater, artificial water bearing infrastructure. It has a particular focus on riverine and coastal floods. Coastal waters are assigned to these river basin districts as well as are groundwater bodies.

Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017, is the transposed, post Brexit framework for the Community action in the field of water policy. The sets out the management of the 'water environment' including rivers, lakes, transitional waters, groundwater and coastal waters out to 1 nautical mile (12 nautical miles for chemical status, i.e., for territorial waters). Member States must aim to achieve good chemical and ecological status in identified water bodies by 2015. This includes transitional (estuarine) and coastal waters out to one nautical mile.

Under the Water (Northern Ireland) Order 1999, the discharge of trade or sewage waste to any waterway, or any water contained underground requires the consent of the Department of Agriculture, Environment and Rural Affairs. This includes waste from any commercial, industrial, or domestic premises not connected to the public sewer.

Special Areas of Conservation (SAC) are sites designated under the Habitats Directive for habitats of European Importance. SACs are designated for habitats and species listed under Annex I and II of the EC Habitats Directive, such as reefs and sandbanks. The Habitats Directive requires Member States to take measures that contribute to the conservation of biodiversity by maintaining or restoring certain habitats and species at a favourable conservation status. The Habitats Directive was transposed by The Conservation (Natural Habitats, etc) Regulations (Northern Ireland) 1995 and is required to identify and protect a series of Special Areas of Conservation (SACs). This has been transposed into NI legislation post Brexit through The Conservation (Natural Habitats, etc.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019.

Areas of Special Scientific Interest (ASSIs) are designated under The Environment (Northern Ireland) Order 2002 and contains powers for the protection of nationally

important flora and fauna within Northern Ireland. Schedules of listed nationally important habitats and species include reference to coastal and marine features, including mudflats and common seals.

An Area of Outstanding Natural Beauty is designated under the Nature Conservation and Amenity Lands Order (Northern Ireland) 1985.

The Wildlife (Northern Ireland) Order 1985 (as amended), prohibits the intentionally killing, taking, or injuring of certain species of wild birds and animals or the intentional destruction, uproot or picking of certain wild plants. Under the Wildlife (Northern Ireland) Order it is an offence to release into the wild non-native invasive species as listed in Schedule 9 Part II of the Order.

Appendix 4: Murlough MPAs Steering Group Infographic.