



Tionól Reigiúnach Oirthir agus Lár-Tíre
Eastern and Midland Regional Assembly



CELTIC SEAS
PARTNERSHIP



Strategic Management Framework for Dublin Bay

(LIFE11 ENV/UK/392)
LIFE+ Programme (European Commission)

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Produced by: The Eastern and Midland Regional Assembly (EMRA)
as part of the Celtic Seas Partnership EU funded LIFE+ programme.

In memory of our colleague and friend Walter Foley.

The Eastern and Midland Regional Assembly is a link between local and national government and acts as a conduit between state and semi-state bodies. The Regional Assembly also works alongside a range of European institutions and networks and oversees and supports the Irish Regions Office in Brussels.



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List of Abbreviations

CaBa	Catchment-based approach
CSP	Celtic Seas Partnership
DHPCLG	Department of Housing, Planning, Community and Local Government
DLRCoCo	Dún Laoghaire-Rathdown County Council
ED	Electoral divisions
EMRA	Eastern and Midland Regional Assembly
EU	European Union
GES	Good Environmental Status
HOOW	Harnessing Our Ocean Wealth
ICZM	Integrated Coastal Zone Management
IMMERSE	Integrated Management and Monitoring of Estuarine and Coastal Ecosystems
ISMF	Irish Sea Maritime Forum
LAWCO	Local Authorities Water and Communities Office
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
NGO	Non-government organisation
NPWS	National Parks and Wildlife Service
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
RSES	Regional Spatial and Economic Strategy
SAAO	Special Amenity Area Order
SAC	Special Area of Conservation
SMF	Strategic Management Framework
SPA	Special Protection Area
SWAN	Sustainable Water Network
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States of America
WFD	Water Framework Directive

Executive Summary

Dublin Bay is located on the east coast of Ireland where a number of significant river basins come together. The mouth is approximately 10km wide, stretching from Howth Head in the north to Dalkey Point in the south, and is home to many coastal communities and villages. Dublin Bay features relatively productive and shallow waters with numerous sandbanks and rocky outcrops, creating a habitat for a wide range of marine flora and fauna. Dublin city was founded by the Vikings at a crossing point of the River Liffey. Dublin Bay is situated along a highly urbanised area. Dublin City is the capital city of Ireland with an urban population of over one million persons, and it surrounds the Bay to the north, west and south.

The Celtic Seas Partnership (CSP) project aims to bring stakeholders together from across the Celtic Seas in order to set up collaborative and innovative approaches to managing the marine environment. The Eastern and Midland Regional Assembly (EMRA) have targeted involvement in the Celtic Seas Partnership as it has the potential to improve the management of the region, involve stakeholders and contribute to the economic, social and environmental well-being of citizens. Some potential benefits of placing marine users at the heart of marine management include: increased transparency, increased flexibility and swifter reactivity to changes.

This Strategic Management Framework (SMF) explores local level implementation of the Marine Strategy Framework Directive (MSFD): a key piece of European legislation aimed at conserving and protecting Europe's seas while allowing for the sustainable use of our natural marine resources. Early and effective stakeholder participation is a key part of MSFD. The management of Dublin Bay is also influenced by Maritime Spatial Planning (MSP). This SMF aims to feed into the MSFD and MSP processes through the development of improved communications channels, and through facilitating communication between key stakeholders.



Figure 1: Martello Tower, Howth, Dublin (Photograph ©Fáilte Ireland)

A wide group of stakeholders participated to share data and information and develop consensus. This document describes a number of stakeholder engagement actions which were undertaken by EMRA such as workshops, Steering Group meetings, and the development of a data dashboard for information sharing, monitoring and evaluation. New opportunities and actions for enhancing Dublin Bay as a resource for the Dublin region, its citizens and visitors were identified. These actions will allow stakeholders to have influence over the management of Dublin Bay.

The stakeholder engagement methods described here have engaged stakeholders in the management of Dublin Bay, and have demonstrated their usefulness in real-life. A strength of this research is that the initiatives described here provide a foundation on which further actions can be built and maintained beyond the timeline of this project.

This document seeks to inform a future Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region of Ireland. The RSES is a strategic plan which puts into place policy and recommendations which will help to better manage regional planning and economic development. Issues such as climate change, flooding, water services, waste management and biodiversity are high on the policy agenda for EMRA.

The SMF will be used by Dublin Bay stakeholders to acquire a better understanding of Dublin Bay including: use of shared resources and services, adoption of an ecosystem-based approach, common goals and challenges, management and monitoring processes and techniques. It has relevance to various stakeholder groups who participated in its development, including local, regional and national authorities, as it addresses a wide variety of marine and coastal issues of current and upcoming importance, which can then be applied to other regions.

1 Management of Dublin Bay

Currently, management of Dublin Bay is fragmented across many different government departments and industry sectors (see Section 3 for a description of key legislation for the management of Dublin Bay). There is an ongoing need for a transparent and coherent framework for integrated management, aimed at bringing water issues, people and organisations together at the right scale to achieve effective solutions.



Figure 2: Dún Laoghaire harbour (Photograph © Fáilte Ireland)

As well as providing a range of societal and recreational services, the Bay is the epicentre for economic activity in Ireland, and a gateway into the country for millions of visitors each year. Dublin's port is located at the centre of the Bay on either side of the River Liffey at its mouth and is one of Europe's busiest ports. There are a number of sailing and yachting clubs throughout the Bay, as well as harbours in the north of the Bay at Howth, and the south at Dún Laoghaire (Figure 2).

A central aspect to the management of Dublin Bay is the Dublin Bay Biosphere. Dublin Bay was awarded a Biosphere designation due to its unique ecological and cultural status. The Bay is an area of environmental

importance; where warm coastal southern waters and northern coastal waters meet to create a rich and unusually diverse range of marine habitats (O'Mahony et al, 2014). There are several Natura 2000 designated sites, both Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) in Dublin Bay. In North Dublin Bay, there is a designated SAC (site code 000206) which overlaps with North Bull Island SPA (site code 004006). North Dublin Bay is also a Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) designated Marine Protected Area (MPA). In South Dublin Bay, there is an SAC (site code 000210) which is designated for the marine Annex I qualifying interest of mudflats and sandflats not covered by seawater at low tide. The South Dublin Bay

SAC overlaps with the South Dublin Bay and River Tolka Estuary SPA (Site Code 004024). To the south, the Dalkey islands are designated as an SPA (site code 004172) in order to maintain or restore the favourable conservation status of the bird species listed as special conservation interests. Howth Head is designated as an SAC (site code 000202) due to the Annex I qualifying vegetated sea cliffs of the Atlantic and Baltic coasts and European dry heaths. Howth Head is designated as a Special Amenity Area Order (see section 1.6), Howth Head SAC overlaps with Howth Head Coast SPA (site code 004113). For further information and conservation objectives for these areas, please see the National Parks and Wildlife Service website (www.npws.ie).

The MSP Directive (for further details see Sections 3.3 and 5.3) requires EU Member States to draw up maritime spatial plans which identify existing human activities and effective ways of managing them. It also requires cross boundary cooperation by EU Member States. As many different activities compete for space in Dublin Bay, it is envisaged that the MSP Directive will bring environmental benefits through improved management. However, this SMF for Dublin Bay pre-dates the implementation of the MSP Directive in Ireland, but it is hoped that this SMF may inform the MSP process.

1.1 Stakeholder participation

This SMF was written in collaboration and partnership with a wide range of stakeholders and policymakers in Dublin Bay through a series of workshops, conversations, meetings and with the input from the project Steering Group.

The project Steering Group guided the development of the SMF (see Table 1). The active participation of the Steering Group facilitated a free flow of ideas and information, progress reviews, identification of opportunities, and resolution of issues. Its membership maximised the policy relevance of the SMF. In addition, EMRA worked closely with academic partners in the National University of Ireland, Maynooth, and Dublin Biosphere and fisheries representatives. A meeting was held with Dublin Port on the 15th of May 2015, where the CEO and Communications Manager were informed of the Celtic Seas Partnership and its potential implications for Dublin Bay. Time and resource constraints limited these stakeholders in participating in the Steering Group. This, in itself, highlights the difficulties and resources required in bringing together such a wide group of stakeholders in order to achieve a meaningful discussion.

Table 1: Steering Group Members, organisations and positions

Organisation	Position
Department of Housing, Planning, Community and Local Government	Technical Policy Adviser
Heritage Council	Head of Research and Policy
Sustainable Water Network (SWAN)	SWAN Policy Officer
Fingal County Council	Heritage Officer
Local Authority Water and Communities Office	Regional co-ordinator
Dún Laoghaire Rathdown County Council	Senior Executive Planner
Eastern and Midland Regional Assembly	Senior Programme Executive
Eastern and Midland Regional Assembly	Assistant Director
Eastern and Midland Regional Assembly	Director

Representatives from across various sectors participated in the EMRA run workshops, with 63 participants attending the workshops (Table 2), (while many stakeholders attended multiple workshops but were only counted once). A number of networks were utilised to widen the net through which participants could be included.

The development of a vision for Dublin Bay requires the inclusion of high level decision makers from across all sectors.

This SMF went through a considerable stakeholder consultation process. A draft report was presented to EMRA Elected Members at the EMRA meeting on the 8th of July 2016, which was followed by a detailed discussion of the document. Following a consultation period, the

SMF was approved by the Elected Members at the EMRA meeting on the 9th of September 2016. Topics discussed at the meetings included: the role of the original Dublin Bay Taskforce, coastal erosion issues on adjoining coastlines, the potential impacts of the British exit of the European Union, governance structures and the Dublin Bay Biosphere, coastal erosion and sewerage issues in the north east of Dublin Bay, the Dublin Bay cycle path, and blue flag beaches. The Elected Members engaged positively in the development of this SMF.

The development of a vision for Dublin Bay requires the inclusion of high level decision makers from across all sectors listed in Table 2 in order to reach a collective consensus. Although it may be possible to proceed with a vision without all key stakeholders on board, such a vision would not be inclusive. The Project Steering Group agreed that in the absence of representation from all sectors, the SMF should deliver stakeholder engagement methods which can be used in the future to involve stakeholders in the creation of a future vision for the management of Dublin Bay.

Table 2: Workshop numbers of attendees and sectors represented

Sectors	Number of attendees
NGO's/Community Reps (Environmental)	12
Private Enterprise / Consultant	6
Local Authority staff	10
National Government	4
Political representatives	3
Port Company & Harbours	3
Energy	0
Shipping	0
Fisheries	4
Academia/Research	14
Statutory Body / Agency	7
Total (excluding project team)	63

1.2 Delineating a boundary for the Strategic Management Framework

Defining a boundary for Dublin Bay was necessary from the perspective of putting in place governance mechanisms for the strategic management framework. By defining a geographical extent for Dublin Bay, it became easier to account for the various services that are provided within this area, and it assisted with the analysis of geophysical and geopolitical interactions and dependencies in Dublin Bay and its terrestrial and marine hinterlands. Mapping the extent of Dublin Bay required consideration of boundaries using a combination of stakeholder opinion, geographical delineators and socio-economic evidence. Work carried out by the Dublin Bay Biosphere provided an excellent basis on which to begin to incorporate land use types. It similarly focused on concepts such as transitional and buffer areas.

In defining the boundary, the following key considerations were used: current political and institutional contexts, the socio-economic system that depends on the use of the coast and marine area; terrestrial land use cover, coastal and marine ecosystems and their respective characteristics; drivers of spatial impacts; and pressures on coastal systems. The methodological framework for delineating a boundary for the SMF was based around groupings of administrative areas called electoral divisions (EDs) as these provided a basis on which socio-economic data could be collated to measure and monitor the socio-economic well-being and performance of the terrestrial side of Dublin Bay. The boundary delineation was rooted in a desire to build social capital and to provide units through which data and information could be easily collated.

The determination of a core management zone (as shown in Figure 3) for Dublin Bay was central to stakeholder mapping exercises, future resourcing, collaboration and determination of roles and responsibilities. Communities directly adjacent to the coast were identified; these were classified as Zone 1 communities or coastal adjacent communities. Zone 2 was defined as communities adjacent to Zone 1 communities, or communities within

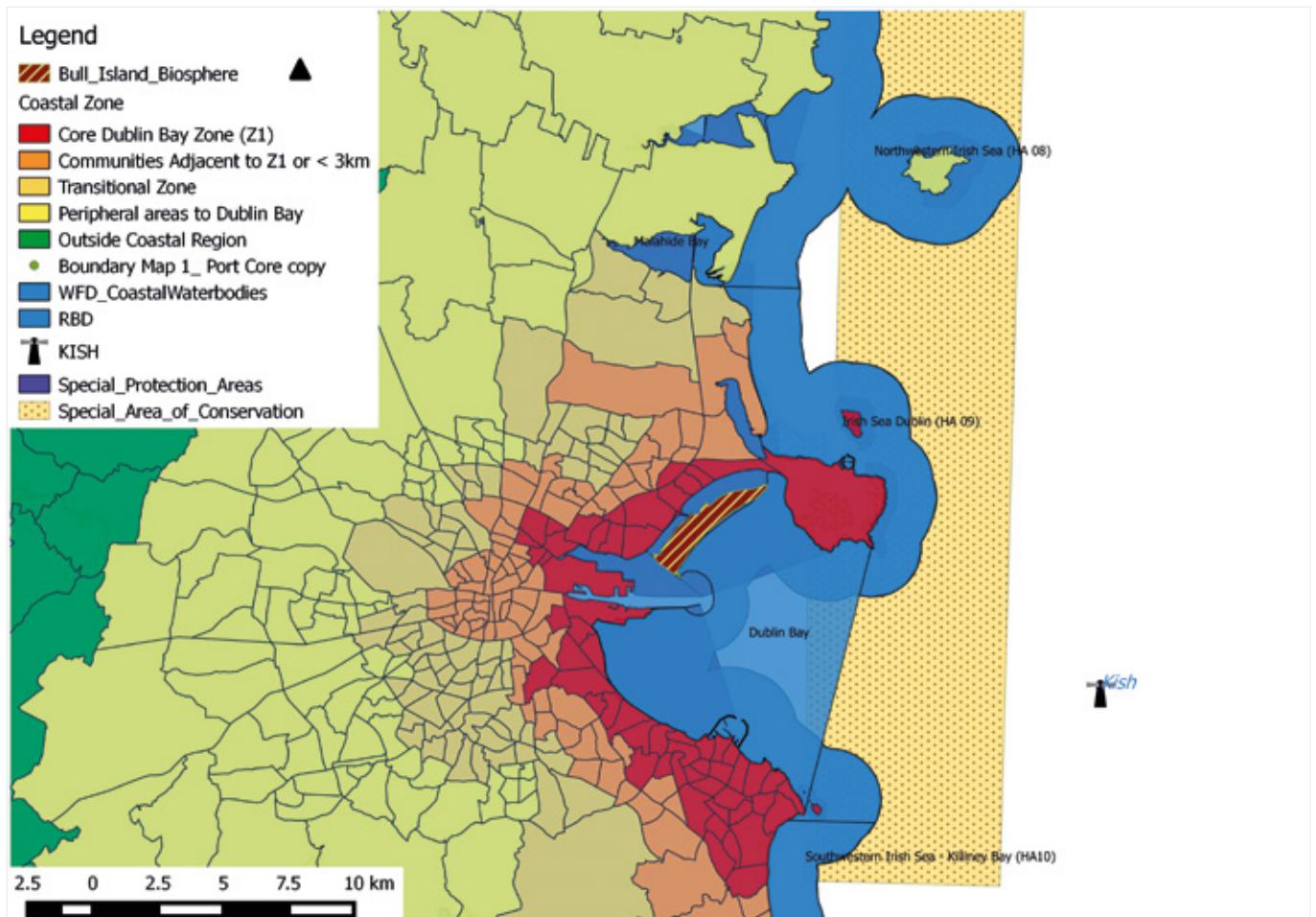


Figure 3: GIS map of boundaries for Dublin Bay Strategic Management Framework

a three kilometre buffer of the shoreline (if any part of the community was within 3km, the entire community was included). Zone 2 also included communities adjacent to the inner city Liffey estuarine waters. The Zone 3 Transitional zone was adjacent to Zone 2 and outside of the 3km buffer or represents a community situated closer in distance to the coast than an adjoining Zone 3 community. Zone 4 was peripheral, and for the purposes of this SMF, was deemed to be outside the coastal region. It was proposed that only Zones 1-3 were considered as coastal based on the criteria of distance and adjacency of communities.

Zones 1-3 are located within the four local authorities that constitute the geographic area of the county and city of Dublin, namely; Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council and Fingal County Council. These four local authorities continue to operate as a functional spatial and economic area, and cooperation is evident across a number of policy areas and issues. Moreover, data collated and analysed by the Central Statistics Office and other bodies are often aggregated to Dublin region scale.

1.3 The Celtic Seas Partnership



Figure 4: Celtic Seas Area (Celtic Seas Partnership Project)

The Celtic Seas Partnership aims to draw people together from across the Celtic Seas (Figure 4) to set up collaborative and innovative approaches to managing the marine environment. The aim of the Celtic Seas Partnership is to put the people that use the marine environment at the heart of its management, and offer them the opportunity to influence how their marine environment will be managed. Some potential benefits of placing marine users at the heart of marine management include: increased transparency, increased flexibility and swifter reactivity to changes. The focus of the Celtic Seas Partnership is on supporting the delivery of the Marine Strategy Framework Directive (MSFD).

The Eastern and Midland Regional Assembly (EMRA) have targeted involvement in the Celtic Seas Partnership as it has the potential to improve the management of the region, involve stakeholders and contribute to the economic, social and environmental well-being of citizens.

The Celtic Seas Partnership aims to fulfil the following objectives:

1. Increase stakeholder understanding of marine policy and approaches to marine management,
2. Build and develop relationships between sectors and countries in the Celtic Seas,
3. Influence management practices across the Celtic Seas,
4. Increase stakeholder involvement in marine policy and decision making,
5. Improve the availability of Celtic Seas scale information to aid MSFD implementation and improve management practices.

The following is a selection of Celtic Seas Partnership activities which have informed and been conducted in close collaboration with this SMF:

1.3.1 Irish Sea Maritime Forum

The Celtic Seas Partnership has piloted a transnational working group - the Irish Sea Maritime Forum (ISMF) in order to support MSFD implementation. The ISMF comprises users of the Irish Sea and representatives of key agencies. A series of workshops enabled stakeholders to share ideas and information and develop new partnerships and actions. The University of Liverpool and the North West Coastal Forum, provide the joint Secretariat to the Irish Sea Maritime Forum. The aims of the ISMF are as follows:

- To provide a broad forum for all Irish Sea users and provide an opportunity for voices to be heard,
- To facilitate knowledge exchange and capacity building across administrative areas and sectors in relation to marine planning,
- To facilitate sharing of data and information,
- To encourage and maintain political support,
- To facilitate a more coordinated and efficient planning process for transnational issues.

The Eastern and Midland Regional Assembly have worked closely with the ISMF in the development of their conferences and workshops. The 2015 Working Group workshop on the 16th of September 2015, at Queen's University Belfast, discussed ecosystem services related to the marine environment. The EMRA-run workshop, Nature and Livelihoods, which took place on the 27th of November, 2014 (see Section 2.1), fed into this ISMF workshop as it provided one of the pilot ecosystem services assessments. Links were developed between ecosystem services assessment and key EU Directives such as the Water Framework Directive and MSFD. The pilots developed user friendly resources that allowed a wide variety of stakeholders to discuss different scenarios in relation to Dublin Bay.

1.3.2 Country workshops

Two rounds of country workshops were organised by the Celtic Seas Partnership in order to ensure the involvement of a wide spectrum of marine stakeholders in shaping and delivering the outputs of the Celtic Seas Partnership. The aims of the country workshops were to:

- Increase understanding of the current issues and future trends in each country,
- Identify the challenge of meeting good environmental status in the Celtic Seas,
- Gather stakeholder views and further develop tools and mechanisms to address these issues and challenges,
- Update stakeholders on progress to date and upcoming work,
- Develop tools and mechanisms to support collective working to achieve good environmental status.

The first Republic of Ireland country workshop 'Meeting Our Marine Challenges Together' took place on the 3rd of September, 2014 in Dublin and was attended by thirty-six participants across ten sectors. Participants were given a brief introduction to the Celtic Seas Partnership project and the challenge of achieving good environmental status.

Group table discussions gave attendees the chance to discuss challenges and opportunities they face in relation to achieving good environmental status under MSFD. Dr Walter Foley, EMRA Dublin Bay Officer, presented on a management framework for Dublin Bay. Participants at each workshop also had the opportunity to learn about and contribute to the development of new measures being drafted by Government and non-government marine stakeholders to help address marine challenges and help deliver good environmental status.

The second workshop, 'Securing a Sustainable Future for the Celtic Seas' took place in the Hilton Dublin, Kilmainham, Dublin on the 7th of October, 2015. The workshop was attended by twenty-seven delegates. Sessions were held on MSFD, future trends, developing tools to meet current and future marine challenges and next steps. Dr Walter Foley, EMRA Dublin Bay Officer, presented on the Celtic Seas Partnership in Dublin Bay. Details of the upcoming public consultation on the Programmes of Measures for MSFD were announced.

The country workshops gave the identified stakeholders the opportunity to discuss important country specific issues and good practice examples which guided development of integrated coastal zone management (ICZM) guidelines to support MSFD. In addition, the EMRA sit on the Steering Group for the Integrated Management and Monitoring of Estuarine and Coastal Ecosystems (IMMERSE) project, funded by the Irish Environmental Protection Agency, which provides valuable insights into integrated environmental management and monitoring.

1.3.3 Integration with planning

Terrestrial and marine ecosystems are closely connected, and development on land can have significant impacts on the health of the marine environment. In order to highlight this issue, guidelines (available: www.celticseaspartnership.eu/) were produced by the University of Liverpool on marine proofing for good environmental status of the sea for terrestrial planning. The guidelines aim to promote integration of planning for the land and the sea by encouraging connections between marine

and terrestrial planning. The ways in which onshore development can impact on marine ecosystems, and the role terrestrial planning can play in delivering international obligations related to the protection and enhancement of the marine environment are explained. The guidelines can assist with the identification of pressures on the marine environment which might arise from landward development. Working closely with the University of Liverpool, the EMRA provided guidance in relation to an Irish country fact sheet for terrestrial planning (available: www.celticseaspartnership.eu/). The guidance showed how planning and development on the land can promote good environmental status of the sea. The document provides guidance on the likely implications of the MSFD and MSP Directives on terrestrial planning.

1.3.4 Conflict resolution

Conflict resolution guidelines (available: www.celticseaspartnership.eu/) have been produced as part of the Celtic Seas Partnership. These provide guidance on encouraging positive interaction and preventing conflicts between marine stakeholders (Figure 5).

The guidelines are designed to help marine users, regulators and stakeholders benefit from the knowledge and experience gained by the Celtic Seas Partnership in order to encourage positive working relationships and avoid conflict. As a result of the stakeholder discussions, a set of conflict resolution recommendations were produced which emphasised:

- The need for clear roles and terms of reference,
- Engagement should be open to all stakeholders,
- Early engagement actions are important,
- Bi-lateral meetings are useful,
- Independent arbitration and facilitation is beneficial,
- Building trust takes time, involves early engagement and incremental progress,
- Conflict resolution should be tailored to the situation; there is no one best method,

- Forums which bring stakeholders together may reduce or prevent conflict.

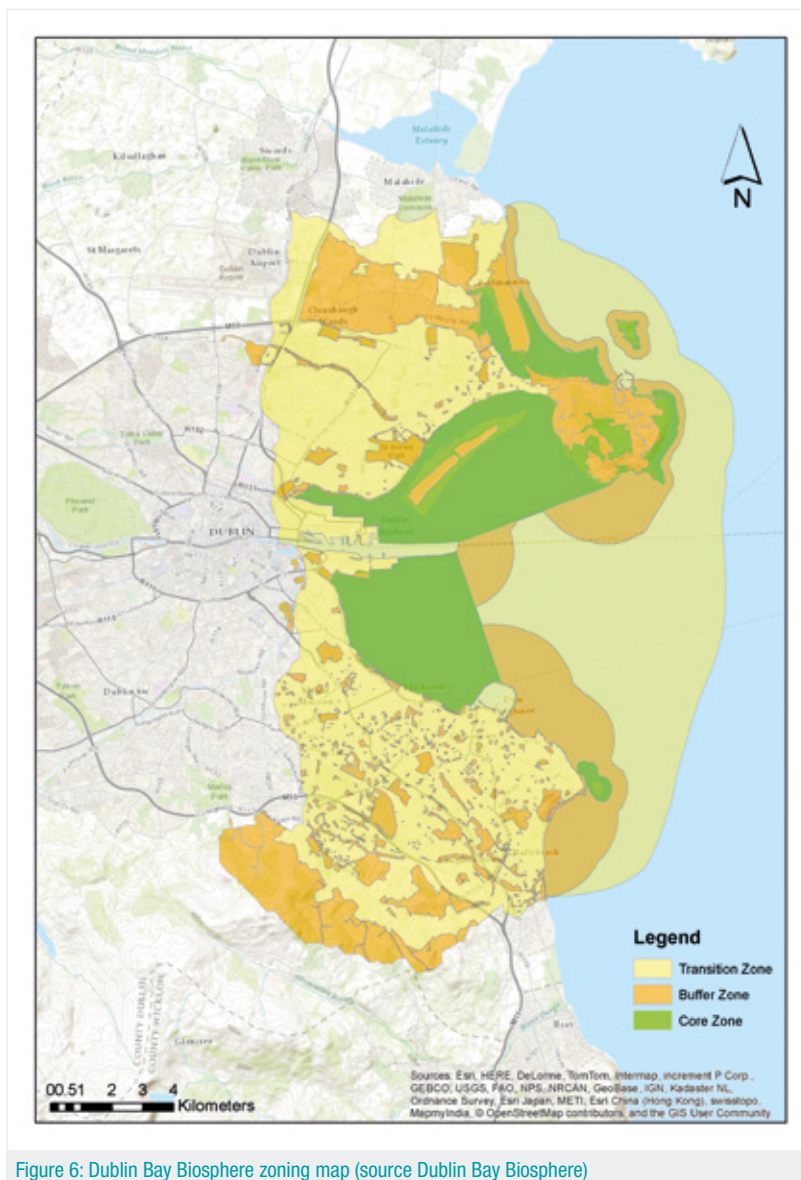
The guidelines stress the importance of data, information and communication, including:

- The use of evidence-based scientific information,
- The relationship between data quality and trust should be acknowledged,
- Communication with stakeholders as to how their views have been taken into account.

The project actions as part of this SMF (see Sections 2.2, 5.1, 5.2, and 5.3) have taken these guidelines into consideration.



Figure 5: Paddle boarding in Dublin Bay (Photograph Seán Ó Máille)



1.4 Dublin Bay Biosphere

A central aspect to the management of Dublin Bay is the Dublin Bay Biosphere. The United Nations Educational, Scientific and Cultural Organization (UNESCO) designated the North Bull Island as a biosphere reserve in 1981 in recognition of the area's unique habitat and biological diversity. The designation was further expanded in 2015 to include the wider Bay. The Dublin Bay Biosphere consists of over 300 km² of marine and terrestrial habitat, and can

draw upon an extensive global network of 669 Biospheres in 120 countries. The Biosphere brings together a number of important coastal habitats which support a wide and rich variety of wildlife. There are three management zones within the Dublin Bay Biosphere. The core zone consists of a protected ecosystem which is managed for conservation of landscape and biological diversity. Surrounding the core zone is the buffer zone in which activities such as research, monitoring, training and education are encouraged. The transition zone is the outer part of the biosphere in which sustainable development is promoted (Figure 6).

The Dublin Bay Biosphere is internationally recognised for its biological diversity and demonstrates successful collaboration in an effort to achieve a balance between people and nature. The Dublin Bay Biosphere Partnership includes Dublin City Council, Dublin Port Company, Dún Laoghaire-Rathdown County Council, Fingal County Council, Fáilte Ireland and the National Parks & Wildlife Service. Educational resources such as identification guides, identification leaflets and action plans are available on the Dublin Biosphere website (<http://www.dublinbaybiosphere.ie/educational-resources>).

For a detailed management plan reporting on the status of habitats and species of conservation in North Bull Island, see McCorry & Ryle (2009). For an action plan for UNESCO's Man and the Biosphere Programme and its World Network of Biosphere Reserves for the period 2016-2025, see UNESCO (2016).

The North Bull Island UNESCO periodic review (Dublin City Council, 2014), submitted by Ireland to UNESCO in September 2014, refers to the intention to develop a process for setting up a new governance structure to enhance community participation and bring in the competencies of other state bodies. This SMF for Dublin Bay provides guidance and recommendations for a proposed new structure (see Section 6.2).



Figure 7: Dublin Port, view from Liberty Hall, Dublin (Photograph ©Fáilte Ireland)

1.5 Dublin Port

Dublin Port (Figure 7), located in the centre of Dublin Bay is one of the main commercial users in the Bay. Dublin Port Company is a State owned company responsible for the management, control, operation and development of the Port. A masterplan has been produced for Dublin Port to cover the period 2012-2040, providing a view as to how the Port will be developed over the long-term (Dublin Port Company, 2012). The main site for Dublin Port is located on the north side of the estuary, covering an area of approximately 650 acres, and contains a gas power generating station and oil terminals. Dublin Port is the largest Port in the Republic of Ireland and handles almost half of the Republic of Ireland's trade. The Port currently caters for a wide variety of vessels including cruise liners, passenger and freight ferries, container vessels, bulk liquid vessels, bulk solid vessels, break up and general cargo vessels and vehicle imports. In addition, naval vessels,

sailing vessels, leisure craft and research vessels are accommodated in the Port. A total of 1,945,864 persons travelled through Dublin Port in 2015, either through the ferry companies operating at the Port or through cruise vessels calling to the Port (Dublin Port Company, 2016). Cargo volumes and passenger numbers have been increasing steadily in recent years.

Current activities being undertaken by Dublin Port in the Bay include maintenance dredging of the main Port channel to a depth of 7.8m, and disposal of material within the Rockabill to Dalkey Island candidate Special Area of Conservation (site code: 003000). The Alexandra Basin Redevelopment project (<http://dublinportabr.ie/>) is the most significant infrastructural development planned by Dublin Port Company in the past 100 years. Planned work involves the construction of new quays and jetties, remediation of contamination, infilling of basin berths, construction of a new river berth and increasing channel depth.

1.6 Howth Special Amenity Area Order

The Howth Peninsula (Figure 8) in North Dublin Bay contains particularly remarkable scenery; a Special Amenity Area Order (SAAO) was created in Howth in recognition of the outstanding beauty of the area. Other SAAOs in Dublin include the Liffey Valley SAAO and North Bull Island SAAO. The Howth SAAO is designed to protect outstanding landscapes, nature and amenities. It was assigned in 1999 for the coastal margins of Howth Head, and covers an area of 547 hectares (Fingal County Council, 1999). More stringent planning regulations were introduced in order to protect the visual and natural characteristics of the area. Design guidelines were produced by Fingal County Council to inform the public regarding methods to protect and enhance the environment when undertaking development in the area. The Howth SAAO is managed by a Management Committee consisting of community groups, landowners, local elected councillors and wildlife and heathland management experts. Works are conducted on the ground by community groups in conjunction with Fingal County Council. Such works include the maintenance and repair of paths and provision of signage, grassland and heathland management, removal of invasive species, protection of wildlife, input into the planning process, and protection of historic sites. However, the SAAO is to a degree a victim of its own success, with high visitor numbers leading to a requirement for increased investment in pathway maintenance and repair.



Figure 8: Sea cliff walk at Howth, Co Dublin (Photograph Brian Morrison ©Tourism Ireland)

2 Visions for Dublin Bay

In 2007, Dublin City Council produced 'An Integrated Economic Cultural and social Vision for the Sustainable Development' for Dublin Bay (Dublin City Council, 2007). It is a wide ranging study of Dublin Bay. The document identifies the challenge of marrying the role of the port with other developments, recreation, wildlife protection and enhancement. A number of potential options based on partial or complete relocation of the port were explored with stakeholders. The report highlighted the need for a radical and integrated approach for the management of Dublin Bay, suggesting that full relocation of the port and redevelopment of the port site could be the best option for the long term development of Dublin City. In addition, the relocation of the Port was deemed to offer the best relative quality of life position, promoting efficiency and short term opportunities. However, in the short term, this was the most expensive option. The vision states that the potential relocation of the port provides the opportunity to extend the 'necklace' of Dublin Bay villages surrounding Dublin Bay. Rising sea levels were highlighted as a significant factor in the development of the city's vision.

The following is a non-exhaustive selection of management objectives relating to Dublin Bay as described in the development plans of the four Dublin local authorities.

- The Dublin City Development Plan 2011-2017 (Dublin City Council, 2011) contains a number of objectives relating to the management of Dublin Bay as follows:
 - » It acknowledges Dublin Port as a major employer in the bay,
 - » An objective of the plan is to promote the development of the Sutton to Sandycove cycle track due to its potential recreational and tourism benefits for Dublin Bay,
 - » It seeks to improve water quality, bathing and recreational opportunities in coastal, estuarine and surface waters, and to protect the ecology and wildlife in Dublin Bay.
- The Dún Laoghaire Rathdown County Council Development Plan 2016-2022 (DLR CoCo, 2016):
 - » Any future development proposals shall ensure the protection of designated Special Areas of Conservation, Special Protection Areas and proposed Natural Heritage Areas in Dublin Bay,
 - » There is a policy objective for coastal zone management and Dublin Bay, which states that the council will co-operate in the preparation and implementation of a national coastal zone management strategy,
 - » There is an objective to participate in and support the work of the Dublin Bay Biosphere.
- The Fingal County Council Development Plan 2011-2017 (Fingal CoCo, 2011) recognises that the coast is a vital asset with limited capacity to absorb development, and acknowledges that there is no single body with responsibility for coastal management, and that overlapping responsibilities between agencies, public bodies and national government can cause difficulties in adopting an integrated approach. Specific objectives for the coast include:
 - » Protect the special character of the coast by preventing inappropriate development along the coast,
 - » Ensure that developments along the coast are sited and designed appropriately having regard to the visual impact,
 - » Designate a Coastal Zone, during the lifetime of the Plan, to provide for the proper planning and sustainable development of the coast,
 - » Undertake a Seascape Assessment to aid in the designation of a coastal zone,
 - » Promote, support and facilitate coastal zone management initiatives.

- The South Dublin County Council Development Plan 2016-2022 (South Dublin CoCo, 2016) refers to the requirement for each development plan to include objectives for the conservation and protection of Natura 2000 sites, and that development has the potential to impact on the integrity of sites such as those in Dublin Bay.
 - » The Development plan aims to create a well-defined and linked green structure in rural and urban areas where biodiversity, heritage, amenities and landscape are afforded protection, management and enhancement.

The report highlighted the need for a radical and integrated approach for the management of Dublin Bay.

As shown above, there are a wide variety of visions and development objectives for Dublin Bay. There is clearly a need to integrate these visions into one coherent vision for the management of Dublin Bay. A workshop was organised (see Section 2.1 below) in order to engage stakeholders in the formulation of a future vision for Dublin Bay based on ecosystem services appreciation and development impact.

2.1 Nature and Livelihoods

The first Dublin Bay workshop was organised by the Eastern and Midland Regional Assembly on the 27th of November, 2014. As part of this workshop, stakeholders were asked to think broadly about strategic management for Dublin Bay and the future pathway for its development and conservation. In addition, the workshop focussed on identifying an adaptive working geographical extent for the Bay and discussed themes. The concept of ecosystem services was used as a means of raising awareness of the benefits of achieving good environmental status for Dublin Bay.

A total of thirty stakeholders from across various sectors were in attendance at this workshop. Stakeholders were given the opportunity to consider the ecosystem services that Dublin Bay provides, and to indicate, if possible, where these services are spatially located. As the concept of ecosystem services can initially appear to be abstract or confusing, the workshop explained the value of ecosystem services to human well-being and development using visual aids. It represented a fresh approach in examining and valuing ecosystem services and gaining stakeholder feedback on the management of Dublin Bay. Stakeholders were asked to place notes on their maps at the locations where the ecosystem services they considered to be important were located. These soft interventions presented stakeholders with understandable visual aids through which the ecosystem services concept could be appreciated.

It represented a fresh approach in examining and valuing ecosystem services and gaining stakeholder feedback on the management of Dublin Bay.

In addition, stakeholders were invited to consider what might happen to these services in the future. The services were divided into three categories, which are not mutually exclusive: society, economy and environment. These

categories have been used extensively as components of the sustainable development paradigm and as part of contemporary planning processes. This exercise was designed to help Dublin Bay stakeholders to think about key themes for the SMF. By asking stakeholders to consider the services that the ecosystem of Dublin Bay affords, it is then possible to understand and integrate the value systems of persons representing diverse sectoral interests.

Stakeholders were encouraged to pose key questions in order to uncover actions to meet the objectives of a future SMF for Dublin Bay (Figure 9). A total of six broad themes were introduced and discussed as follows:

- A: Governance and Policy
- B: Stakeholder Engagement (related to governance)
- C: Geographical Extent of the Bay
- D: Data and Information Sharing
- E: Marine Pollution
- F: Climate Change and associated impacts

For further details on these themes, please see Appendix C.

Stakeholders emphasised that access to the Bay should be available without compromising biodiversity. The importance of recreation and amenity activities in the Bay was emphasised and the importance of these services to the provision of good life quality, incorporating physical and mental well-being. Educational events and services to help children to discover nature were highlighted as being important. The question of cruise tourism and the associated regeneration of Dublin Port were raised as important issues, renewable energy was identified as another important economic service. The feedback indicates that the majority of delegates found the event useful, and welcomed the opportunity to engage with others and share views and experiences.



Figure 9: Stakeholder engagement activities at workshop 1 (Photograph: Walter Foley)

2.2 The Marine Resource

Use of marine resources (Figure 10) is governed by a complex set of rights, economic and environmental requirements and legislation (Burns, 2012). Up till now, the marine environment in Ireland has generally been managed on a sector by sector approach. However, there is a clear need for an integrated approach which takes into account management of the entire marine ecosystem. MSFD recognises the increasing pressures on our marine ecosystems, and represents an excellent opportunity to enhance the sustainable use and protection of the marine environment.

There is a clear need for an integrated approach which takes into account management of the entire marine ecosystem.



Figure 10: Balscadden Bay, Howth, North Dublin Bay (Photograph Friends of Balscadden Bay)

An urgent challenge is the need to increase resilience in response to threats such as global climate change, flooding and coastal erosion (Harvey and Pilgrim 2011). The growing list of environmental problems such as climate change, dependence on fossil fuels, urban sprawl and habitat destruction indicate how our current patterns of resource use are unsustainable. To ensure well-being, it is necessary to maintain ecosystem services at an appropriate level, more resilient systems are able to absorb larger shocks without sacrificing provision of ecosystem services.

Climate change is already affecting the marine environment and will continue to trigger changes in biological, chemical and physical processes. Such changes can reduce the resilience of the ecosystem (its ability to persist despite disruption and change), leaving the ecosystem increasingly sensitive to disruption. The expected impacts of climate change include rising sea levels, increased sea temperatures, precipitation changes, and ocean acidification. Increased temperatures could alter the distribution of plankton (an important element of the marine food web) with knock-on effects for higher predators. Coastal flooding and erosion

are likely to increase with more frequent extreme weather events (Seas for Life, 2011). Although some of the likely impacts of climate change in marine and coastal regions can be anticipated, the extent and location of these impacts are difficult to predict with any degree of certainty. Management strategies need to be adaptive and flexible to deal with unpredictable impacts. There is a need to balance economic needs with careful marine resource management, intelligent design, and increased environmental protection to ensure that Dublin Bay's marine resources are managed sustainably.

It is incumbent on policy and decision makers to ensure that the sustainable use of marine resources does not impinge on the overall quality of the marine environment (Figure 11). In order to deliver the ambitions of the MSFD, effective approaches that link integrated coastal zone management (ICZM), MSP and MSFD objectives may be required. ICZM refers to the process of managing the coast in an integrated manner in order to increase sustainability and involves information collation, consensus building, planning, management, monitoring and implementation.

3 Overview and Status of Key Legislation of Relevance to the Management of Dublin Bay

Taking account of the various international, EU, national, regional and local policies that impact on Dublin Bay is an increasingly difficult challenge. A sectoral approach to management in Dublin Bay has resulted in an abundance of legislation and policy. These sectoral plans and community-based actions come from the following sources: port and harbour authorities, local authorities, government departments, state agencies, community interest groups, volunteer groups, NGO's, businesses, tourism interests and research institutes. Information, local knowledge and data are plentiful but dispersed across the various sectors. There was no singular platform or approach for information and knowledge sharing in Dublin Bay, hence the Dublin Bay Dashboard was developed in order to address this gap (described in Section 5.1).

Stakeholders are often left bemused regarding the amount and complexity of legislation. Here, a selection of key European Directives and other environmental policies and arrangements relevant to the management of Dublin Bay are explained. The two key pieces of legislation discussed here include the MSFD and MSP Directive. For a more comprehensive list of legislation relevant to the management of Dublin Bay, see Appendix A.

There was no singular platform or approach for information and knowledge sharing in Dublin Bay, hence the Dublin Bay Dashboard was developed in order to address this gap (described in Section 5.1).

3.1 Marine Strategy Framework Directive (MSFD)

The MSFD is a Directive of immediate interest to the Strategic Management Framework for Dublin Bay as it concerns the protection of marine waters through the application of the ecosystem-based approach for the management of human activities. Introduced in 2008, and now entering its second implementation cycle, the Directive is legally binding for all European Union Member States. The MSFD has the target of maintaining or achieving good environmental status in marine waters by 2020, based upon eleven descriptor areas as follows:

- Biological diversity
- Non-indigenous species
- Population of commercial fish / shellfish
- Elements of marine food webs
- Eutrophication
- Sea floor integrity
- Alteration of hydrographical conditions
- Contaminants
- Contaminants in fish and seafood for human consumption
- Marine litter
- Introduction of energy, including underwater noise.



Figure 11: Half Moon Swimming Club, Great South Wall, Dublin (Photograph Seán Ó Máille)



Figure 12: MSFD process diagram (Source: Celtic Seas Partnership)

The MSFD aims to ensure that Ireland's marine waters are managed sustainably for the future. It builds on existing EU legislation and covers specific elements of the marine environment not addressed in other policies. The MSFD takes into account elements regarding coastal, transitional and territorial waters. Significant inter-departmental co-operation has been undertaken in order to meet MSFD aims and objectives.

In order to implement the Directive, each Member State is required to:

- Provide a description of what they consider is a clean, healthy and productive marine environment: Define good environmental status (GES).
- Monitor and assess the quality of the marine environment against GES, and
- Ensure appropriate action is taken by 2020 to maintain or achieve GES.

The MSFD process is cyclical as shown in Figure 12; it follows a six-year timeline, and once complete, the process recommences.

The Irish Government implemented the various steps of the directive and the associated reports are as follows:

- **Initial Assessment**
(available at: <http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Environment/Water/FileDownload,34365,en.pdf>)
- **Monitoring Program**
(available at: <http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Environment/Water/FileDownload,38589,en.PDF>)
- **Program of Measures**
(available at: http://www.housing.gov.ie/sites/default/files/public-consultation/files/outcome/msfd_poms_summary_report.pdf)

3.2 Harnessing Our Ocean Wealth (HOOW)

Harnessing Our Ocean Wealth – An Integrated Marine Plan for Ireland (HOOW) is a high level policy document published in 2012. It sets out the Irish Government's vision, high-level goals and integrated actions across policy, governance and business to enable the potential of the marine environment to be realised. It is intended to bring about an integrated policy system and programme planning for marine affairs, including MSFD and MSP, therefore HOOW is highly relevant to the management of Dublin Bay.

HOOW sought to build consensus among stakeholders from the outset, and in early 2012, launched the consultation document entitled Our Ocean Wealth: Seeking Your Views: New Ways; New Approaches; New Thinking. Nearly 200 submissions were received from a wide range of stakeholders, with additional input from the Joint Oireachtas Committee on Communications, Natural Resources and Agriculture. The resulting document outlined three high level goals:

- Goal 1: thriving maritime economy; Ireland harnesses market opportunities to achieve economic recovery and socially inclusive, sustainable growth.
- Goal 2: achieve healthy ecosystems; these ecosystems provide monetary and non-monetary goods and services (e.g. food, climate, health and well-being).
- Goal 3: increase engagement with the sea; building on the rich maritime heritage present in Ireland, the goal is to strengthen the Irish maritime identity and increase awareness of the value (market and nonmarket), opportunities and social benefits of engaging with the sea.

HOOW directly affects Ireland's MSFD strategy, and thus is of relevance to the Celtic Seas' SMF. As an output of this project the Dublin Bay Dashboard (available at: <http://www.dublindashboard.ie/pages/DublinBay>) could provide a tool for assisting with these goals, particularly Goal 3; in terms of engaging with the sea and increasing awareness, opportunities of, and benefits of the coastal resource.

The vision and goals of HOOW have been framed within the context of what is happening at the broader global and EU levels, particularly the Integrated Maritime Policy (IMP) for the European Union. It recognises the contribution the 'blue economy' can make to global economic growth and the need for appropriate policies, strategies and funding mechanisms to enable this.

HOOW identified thirty-nine actions to realise the high level goals, with the targets of doubling the value of Ireland's ocean wealth to 2.4% of GDP by 2030, and increasing the turnover from the ocean economy to exceed €6.4bn by 2020. HOOW publishes yearly updates outlining the progress that has been achieved, with the most recent being published in July 2016.

In terms of MSFD, HOOW states that the implementation of MSFD will support its 3 Goals. HOOW further identifies 3 actions to be taken to implement MSFD, which are:

1. Perform an initial assessment required under the MSFD to characterise the environmental status of marine waters;
2. Establish appropriate targets to define good environmental status; and
3. Develop an Atlas of the Irish Marine Environment, a collation of all relevant data into a central GIS. This will be a key tool to inform policies and actions for the protection of biodiversity and act as a precursor to future, long-term measures (e.g. in the development of a National Marine Habitat Map and a Maritime Spatial Plan).

In addition, HOOW includes 130 sites designated as Special Areas of Conservation (three of which are within Dublin Bay) under the EU Habitats Directive for marine or coastal habitats and species. The National Parks and Wildlife Service (NPWS) has responsibility for the designation of conservation sites in Ireland.



Figure 13: Stand up paddle boarding in Dublin Bay (Photograph Rob Durston © Fáilte Ireland)

3.3 Maritime Spatial Planning (MSP) Directive

The MSP Directive has been transposed into Irish Law (S.I. No. 352 of 2016 European Union (Framework for Maritime Spatial Planning) Regulations 2016), this SMF for Dublin Bay pre-dates the introduction of a legal framework for Maritime Spatial Planning (MSP) in Ireland. There are positive and negative aspects to this. It may be possible for the SMF to inform policy, however, there may be duplication as the exact details of the forthcoming legal framework are not yet known.

UNESCO defines Marine Spatial Planning as follows:

‘Marine spatial planning is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process. Characteristics of marine spatial planning include ecosystem-based, area-based, integrated, adaptive, strategic and participatory.’

With the qualification that MSP is not an end in itself, but a practical way to create and establish a more rational use of marine space and the interactions among its uses (Figure 13), to balance demands for development with the need to protect the environment, and to deliver social and economic outcomes in an open and planned way.

The European Commission outlined Maritime Spatial Planning as follows:

‘It’s about planning when and where human activities take place at sea – to ensure these are as efficient and sustainable as possible. Maritime spatial planning involves stakeholders in a transparent way in the planning of maritime activities.’

MSP can offer guidance in terms of managing and integrating different uses in high demand areas such as Dublin Bay. MSP has been promoted as a tool for the sustainable management of the marine environment and as a means of building consensus with regard to the use of marine resources. In January 2016, the Department of the Environment, Community and Local Government (now Department of Housing, Planning, Community and Local Government DHPCLG) was designated as the competent authority (Irish Government Department) with responsibility for implementation of MSP, including development of the necessary legal and policy framework. EU Member States are required to establish maritime spatial plans by 2021. The need for on-going participation and involvement from all sectors is emphasised. The Eastern and Midland Regional Assembly have consulted closely with the DHPCLG in relation to MSP. The DHPCLG sat on the project Steering Group and a workshop on MSP was organised in which the transposition of the MSP Directive into Irish Law was discussed, and stakeholders provided their feedback in helping to improve the channels of communication in relation to MSP.

Planning by its nature is an overarching process which aims to integrate differing programmes and objectives into coherent policy. The intention of MSP is to coordinate the different users of marine space in a coherent way to

achieve the priorities of an integrated maritime policy (Harnessing Our Ocean Wealth, 2012). At an EU level, the European Commission is directing Member States to adopt MSP as a means of ensuring that development is supported by a strong evidence base and is carried out in a structured and sustainable manner. MSP is both a means of implementing the sustainable use and eco-system focussed MSFD, and of balancing this implementation alongside national and local socio-economic priorities.

MSP policy in Europe has increasingly stressed the importance of climate change adaptation and mitigation measures (Burns, 2012). There is a need to balance competing, coexisting activities and uses, understanding how pressures individually and cumulatively impact on the marine environment. Coastal activities and MSP are closely related as it is difficult to separate activities on the water from impacts and relationships on the coast (Burns, 2012).

MSP based on area and type of activity requires management based on size, density and characteristics of planned or existing activities. MSP must furthermore take account of;

1. Impacts,
2. Environmental vulnerability,
3. And existing governance structures.

It is important to take into account commonly-agreed approaches to cross-border issues in order for MSP to be effective (Burns, 2012). The systematic and spatial nature of processes is emphasised in MSP, an equal part of the process is the contribution of stakeholders to decision making (Burns, 2012). There is a need to consider how MSP will interact with strategic and operational plans for different sectors operating in the maritime area, such as the fisheries, transportation and energy sectors. MSP is a mechanism that will support and facilitate decision making and the exchange of information at local, national and trans-boundary scales and is essential to the future management of Dublin Bay.

3.4 Water Framework Directive (WFD)

The topic of land-sea interface is important, in particular how terrestrial planning and maritime planning interact, and then overlap between the Water Framework Directive (WFD) and MSP. There is much overlap between the terrestrial and marine spheres and much can be learned from terrestrial planning. WFD is an important piece of EU legislation aimed at achieving good ecological status in rivers, lakes, groundwater, estuaries and coastal waters. The WFD seeks to integrate the management of a wide range of activities which have a potential to impact on the terrestrial water environment. The WFD is an innovative piece of legislation which required governments to adopt a holistic approach to the management of water bodies.

The WFD and MSFD overlap in coastal waters and transitional waters. One of the principal differences between the two Directives is that the definition of achieving GES as part of the MSFD is broader than the definition of achieving good ecological status through WFD. It can be argued that MSFD takes a more integrated approach as it covers a wide range of biodiversity, whereas the WFD assesses the quality of individual components of the ecosystem. Both Directives have comparable objectives, with MSFD focussed on the achievement of GES in marine waters, and WFD aiming to achieve good ecological and good chemical status. Whilst GES is not exactly equivalent to good ecological/chemical status, there are some significant areas of overlap, particularly in relation to chemical quality, the effects of nutrient enrichment (eutrophication) and some aspects of ecological quality and hydromorphological quality (DEFRA Marine strategy part 3, 2015). Due to this overlap, linking expertise and knowledge from WFD and MSFD is an important strategic policy in Dublin Bay.

WFD came into legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), and currently, WFD is on its second cycle of implementation. WFD aims to achieve good ecological status and applies to rivers, lakes, groundwater, and transitional coastal waters. The Directive requires that management plans be prepared on a river basin basis. There are three cycles of River Basin Management Plans; 2010-2015, 2016-2021, and 2022-2027. Currently, the second cycle of management plans are delayed in Ireland and will not be published by the Local Authorities Waters and Communities Office (LAWCO) until the end of 2017.

Following a review of the first round of river basin plans, a new structure based on three tiers has been put in place; the new structure was given legal effect by the European Union (Water Policy) Regulations 2014 S.I. 350 of 2014. The first tier consists of national management and oversight and is led by the Irish Government. The second tier concerns national technical implementation and reporting and is led by the Environmental Protection Agency. This includes preparing a template for the second cycle of river basin management plans, characterisation and assessment of our waters, oversight of monitoring and measures implementation and evaluation of outcomes. Finally, the third tier consists of regional implementation via water networks which includes all stakeholders. Under this third tier, Local Authorities now have an increased role and responsibility in terms of coordinating catchment management and public participation elements. In response, Local Authorities have setup a national shared service, a Local Authorities Water and Communities Office (LAWCO) to place more emphasis on community engagement and thus ensure effective public participation, a requirement under article 14 of the WFD.

This type of model, which has regional community water officers encouraging and coordinating community (and other stakeholder) actions on the ground, may be transferrable to the marine environment.

4 The Ecosystem-Based Approach

The ecosystem-based approach is a core component of both MSP and the MSFD, which seeks to combine conservation of the environment with sustainable resource use in an equitable way (Shepherd, 2008). For a list of guiding principles for the implementation of an ecosystem-based approach as set out by the Convention on Biological Diversity, please refer to Appendix B.



Figure 14: Dalkey Island Dublin Bay (Photograph © Fáilte Ireland)

EU member States are encouraged to develop their own national integrated maritime policies asserting that one size does not fit all cases; the same is true at a regional level, thus adaptive management strategies to achieve GES should be specific to the needs and features of Dublin Bay (Figure 14). The MSFD stresses the importance of stakeholder involvement and of creating cross-platform communication strategies to ensure clear implementation of the MSFD across government policy sectors: it is also necessary to place stakeholders at the heart of the process (Kraana et al, 2014). This is a key component of the Celtic Seas Partnership, which is bringing stakeholders from across country boundaries

and sectors to set up collaborative and innovative approaches to managing their marine environment. While stakeholder engagement processes are present in Ireland in the form of statutory consultations, they often feature low levels of public participation.

There is considerable scope to build stakeholder partnerships in terms of data sharing and co-creation, and mobilise public participation through, for example, citizen science initiatives.

The ecosystem approach is designed to ensure that the collective pressure of human activities is kept within levels compatible with the maintenance of GES, and that the capacity of marine ecosystems to respond to human-induced changes (e.g. climate change) is not compromised. Applying the ecosystem approach should assist with the sustainable use of marine goods and services by present and future generations.

The objectives of different groups can be brought together to meet collective needs in a more efficient way.

A key theme of the ecosystem-based approach to management is the promotion of partnerships so that the objectives of different groups can be brought together to meet collective needs in a more efficient way.

It also uses tools like MSP to ensure an integrated approach to marine management with preservation of whole ecosystems for future sustainability as its guiding principle.

The change of direction of which ecosystem assessment approaches are driven by is summarised by Santoro et al, 2014 as moving:

- From looking at individual species to looking at the entire ecosystem,
- From examining only small spatial scales to examining multiple scales,
- From the short-term perspective to a long-term perspective,
- From considering humans as being independent from marine ecosystems to recognizing humans as being an integral part of them,
- From having management divorced from research to using an adaptive case by case approach, informed by robust science,
- And from managing commodities to focusing on sustaining production potential for both goods and services (Santoro et al, 2014).



Figure 15: Swimmers in Dublin Bay (Photograph Seán Ó Máille)

Ecosystem approaches consider areas as a connected whole system (Figure 15) rather than concentrating on factors in isolation. There is a growing awareness of the important services which natural ecosystems provide, and the necessity of recognising the value of such services. For example, marine ecosystems provide food sources, employment, raw materials, carbon sequestration, flood protection, medicines, a sink for the disposal of treated and untreated wastewater, and create a space for leisure activities. There is also the integral value of marine ecosystems in and of themselves.

5 Project Actions in Dublin Bay

Stakeholder engagement is a broad, inclusive and continuous process between an activity or project and those potentially affected by it. This stakeholder engagement leads to improved relationships between sectors and management of shared resources. One of the challenges lies in establishing appropriate channels of communication and information, and translating feedback into common ground and objectives.

The following actions are designed to assist with the implementation of the objectives of the MSFD at a local level to be both more sustainable and more resilient. This SMF promotes partnerships so that the objectives of different groups can be brought together to meet collective needs in a more efficient manner. Actions such as utilising stakeholders, mapping, data and information sharing, and an evidence based approach to decision making are described here. A key deliverable of this SMF is the development of a data dashboard for Dublin Bay.

5.1 The Dublin Bay data dashboard

The importance of data and information sharing was identified in the first Dublin Bay workshop (27th of November, 2014) as being a key component of effective management of Dublin Bay, and a key facilitator of knowledge based decision making. A potential issue for Dublin Bay was getting stakeholders in the area to commit to sharing data of relevance and/or to cooperating to fund a monitoring and evaluation process. Additionally, the sharing of commercially or otherwise sensitive data and information has been an issue in the past. Accessing and

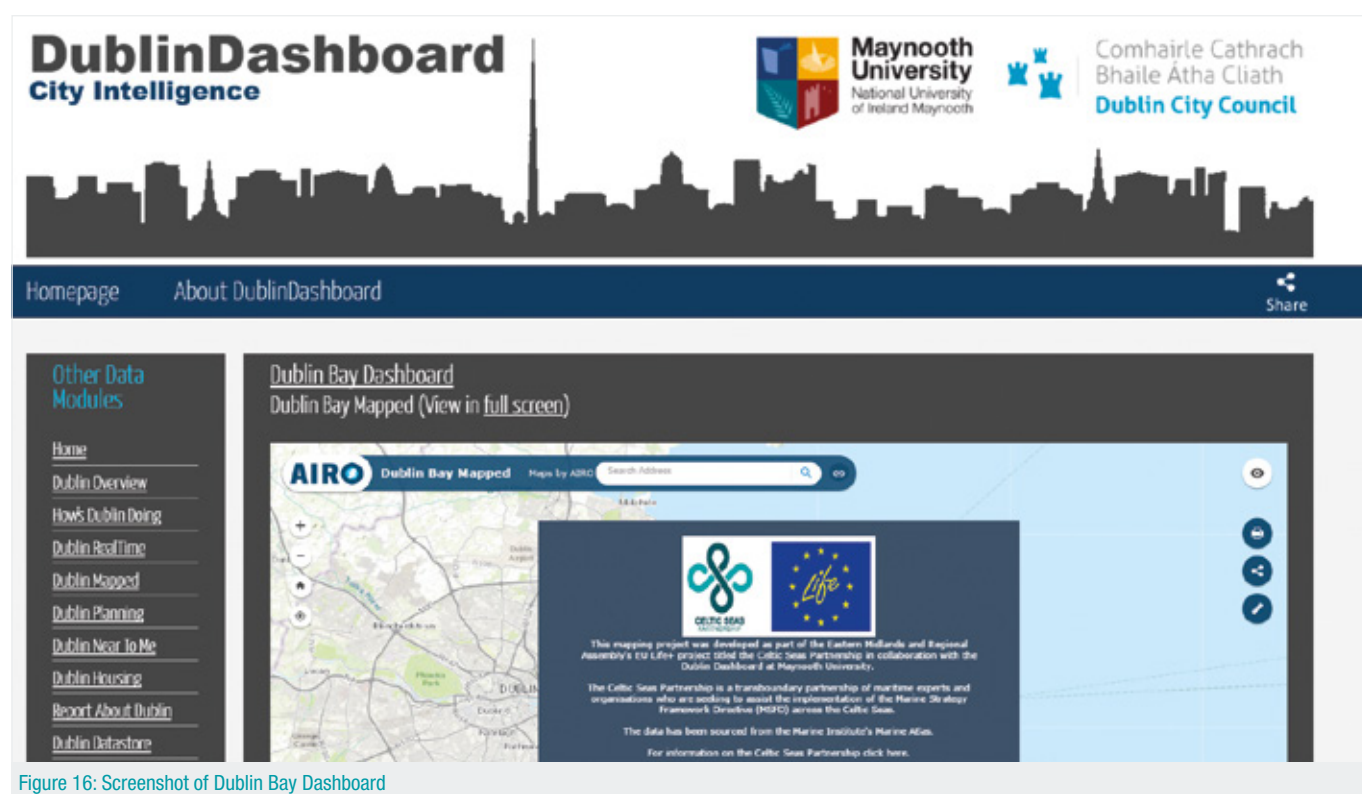


Figure 16: Screenshot of Dublin Bay Dashboard

sharing of data will underpin many future activities and can ultimately improve decision-making. The availability of robust, replicable and reliable data is crucial to the future management of Dublin Bay.

With this in mind, the Eastern and Midland Regional Assembly developed a data module for Dublin Bay (Figure 16) as a means of engaging stakeholders in data capture and sharing, working in collaboration with the Programmable City project and the All Island Research Observatory (AIRO) at Maynooth University, and Dublin City Council. The Dublin Dashboard was the output of this collaboration. For further details, see: <http://www.dublindashboard.ie/pages/DublinBay>.

The Dublin Dashboard¹ is optimised to work with most modern web browsers. The Dashboard is an open platform where users can use data to build their own apps, or connect their own apps back to the site to add new functionality. This two-way data flow promotes public participation and citizen science initiatives. The Dublin Bay Dashboard data module allows users to view real time data, interact with maps on the Dublin Bay region, compare Dublin Bay to other areas, find services and download data. It is a free resource and the user interface is designed to be intuitive and easy to use. It can benefit the general public and private sector, academia and public servants wishing to use the data. The Dashboard data is drawn from a wide variety of data providers, including but not limited to:

- Irish Government
- Local authorities
- Environmental Protection Agency
- Marine Institute
- Sustainable Energy Authority of Ireland
- Ordnance Survey Ireland
- National Parks and Wildlife Service

- Petroleum Affairs Division
- Central Statistics Office
- Fáilte Ireland
- Dublin Port
- Commissioners for Irish Lights
- Birdwatch Ireland
- International Maritime Organization
- Irish Naval Service
- Heritage Council
- Joint Nature Conservation Committee
- International Council for the Exploration of the Seas

Data sets were selected through consultation with data experts at the National University of Ireland, Maynooth and the Irish Marine Institute. This open, reliable and standardised data repository for marine and coastal related projects has the potential to reap benefits at a grassroots community level as well as research and commercial benefits. The types of data and information available help determine the decision-making tools, and planning models that can be put in place for coastal communities and activities. In addition, it may assist in setting up of a monitoring system for Dublin Bay which will be greatly assisted by the further expansion, promotion, and incorporation of Dublin Bay related data onto centralised and open platforms such as the Irish Spatial Data Exchange <http://www.isde.ie/#/>, Ireland's open data platform <https://data.gov.ie/data>, Heritage Maps <http://www.heritagemaps.ie/> and the Dublinked <http://dublinked.ie/> open data platform.

The incorporation of Dublin Bay related data onto a centralised and open platform assists in achieving a good practice international monitoring system. An open, reliable and standardised data repository for marine and coastal related projects has the potential to reap

¹ Development of the Dublin Bay data dashboard involved close collaboration between the EMRA and Professor Rob Kitchin, (Principal Investigator on the Dublin Dashboard), Dr Gavin McArdle (lead developer) and Katie Goodwin (researcher).

benefits at a grassroots community level, particularly if it can capture large numbers of online visitors, as well as research and commercial benefits. Allowing the project to benefit from crowd sourced or citizen science data; i.e. the general public could be recruited to monitor and report on aspects of the Bay, such as wildlife sightings, illegal dumping, broken facilities and water quality issues.

The development of data dashboard underpins critical future decisions in Dublin Bay and wider afield across issues such as: establishing baseline conditions and good environmental status; synchronisation between policy efforts - bridging deficits between policy frameworks such as Common Fisheries Policy and MSFD; putting appropriate conservation measures in place; ensuring that development policy ensures economic balance and sustainable use of marine resources. The Dublin Bay dashboard can act as a key component in the future management of Dublin Bay. The Dublin Bay dashboard can assist with the local level implementation of MSFD through monitoring of progress in relation to the eleven MSFD descriptor areas.

5.2 Data and Information – the Key to Success

The second workshop ‘Data and Information – the Key to Success’ was organised as a vehicle to launch the Dublin Bay Dashboard. The workshop took place on the 15th of February, 2016. It focused on data acquisition and sharing, and built on the success of data collation as an engagement mechanism and a common platform on which stakeholders can reside together for the purpose of information sharing, management of the Bay and evidence based planning and decision making.

Over thirty attendees from a variety of sectors were present at the workshop which provided a forum to exchange experiences and to discuss the value of different approaches to data management in Dublin Bay. The session was opened by the Eastern and Midland Regional Assembly Director (Figure 17), who provided a

background to the Celtic Seas Partnership and a fitting tribute to the late Dr Walter Foley. Malachy Bradley chaired the sessions and Travis O’Doherty provided an introduction to the Celtic Seas Partnership. This was followed by a presentation from Christina Kelly from the Integrated Environmental Management and Monitoring System (IMMERSE) project describing the benefits of developing an integrated approach to environmental management and monitoring. Katie Goodwin and Gavin McArdle provided a demonstration and background to the Dublin Dashboard Dublin Bay data module. Beatrice Kelly, the head of Policy and Research at the Heritage Council, described the Heritage viewer for the Dublin Bay area (<http://www.heritagemaps.ie/>). This viewer focuses on the built, cultural and natural heritage around Ireland and covers off shore areas. Heritage Maps acts as a one stop shop discovery tool providing access to heritage data along with contextual data from a very wide range of sources. Pauline Riordan described the Dublinked open data platform (<http://dublinked.ie/>), which consists of a partnership of the four Dublin Local Authorities and Maynooth University, which aims to drive innovation and collaboration in the development of new urban solutions, using open data. Finally, Trevor Alcorn from the Irish Marine Institute described the Irish Spatial data exchange and the www.data.gov.ie open data portal.



Figure 17: Jim Conway EMRA Director (Photograph: Susan Mahon)

The presentations were followed by a discussion on strengths, weaknesses, threats and opportunities in relation to data in Dublin Bay and a discussion of a draft Strategic Management Framework for Dublin Bay. The workshop provided an opportunity to exchange experiences and discuss different approaches to data management in Dublin Bay. Dublin Bay Stakeholders from a cross section of backgrounds and sectors were brought together to address data gaps and determine tangible actions that could be incorporated within a SMF. This represented an excellent opportunity for Dublin Bay stakeholders to discuss and put ideas forward regarding how their marine environment could be managed in the years to come. In addition, at the workshop, a questionnaire was distributed aimed at highlighting issues for the management of Dublin Bay (for a copy of the questionnaire, please see Appendix D). Some of the issues highlighted in the questionnaire include: cultural and organisational barriers, silo thinking, multiple agencies and legislative structures, a lack of understanding regarding the marine environment were highlighted as barriers to the implementation of a SMF in Dublin Bay.

5.3 Maritime Spatial Planning

The Eastern and Midland Regional Assembly organised a workshop on the 8th of June, 2016 to examine the issue of MSP, the relationship between MSP and MSFD, and implications for the SMF for Dublin Bay. The workshop was attended by over twenty stakeholders from a variety of sectors (Figures 18 and 19).

EMRA invited Roger Harrington, Principal Officer of Marine Planning and Foreshore in the Department of Housing, Planning, Community and Local Government (DHPCLG) who gave an overview and update on MSP implementation in Ireland. The DHPCLG is responsible for a range of marine issues including regulation for the use of the foreshore as part of the public estate and leading the development of a MSP framework for Ireland.



Figure 18: MSP Workshop 8th June, 2016 (Photograph: Susan Mahon)

A detailed and historic overview of Dublin Bay was given including the history of Bull Island and the cultural and historical development of Dublin Port. Past experiences in terms of MSP implementation were presented. It was noted that there are relatively few critical evaluations of MSP.

The drawbacks of an uncoordinated and fragmented approach to marine governance and the need for an integrated management authority were highlighted.

In addition, the need to invite alternatives which actively intervene to secure more democratic decision-making, and promote a fairer distribution of the benefits derived from our marine resources were stressed.

Examples of marine planning at the sub-national scale from the UK and the Isle of Man were presented and discussed. Issues such as different timescales for plan making and a lack of coordination were highlighted. In addition, transnational co-operation structures were described and a number of examples presented of cross-border initiatives from OSPAR, the Loughs Agency, the British-Irish Council and the Irish Sea Maritime Forum. Future opportunities for collaboration were highlighted such as a service for Member States to share relevant knowledge and information on MSP.



Figure 19: Presenters at the workshop on Maritime Spatial Planning. From left to right: Wesley Flannery, Jerry Barnes, Roger Harrington, Tim O'Higgins, Lynne McGowan and Travis O'Doherty (Photograph: Susan Mahon)

A new report funded by the Environmental Protection Agency was presented on recommendations for preparing maritime spatial plans in Ireland. MSP can learn much from terrestrial planning in terms of processes, procedures and methods and techniques, and that much work will need to be done in advance of the 2021 deadline for full implementation of marine plans in Ireland.

The ecosystem-based approach to management was outlined, and how human and natural forces have worked together in Dublin Bay to provide a highly valued ecosystem, and that balancing the use and conservation of the Bay has a strong legal basis under Europe's Integrated Maritime Policy. The following points were highlighted during the session:

- There needs to be recognition that every human being is a stakeholder,
- Political leadership is important, however, short political cycles impede long term planning,
- There is an important difference between consultation and participation; frequently consultation processes do not engage the community,
- There is a need for a formal communications strategy in order to reach out to a wider group of stakeholders.

6 Dublin Bay Key Opportunities

6.1 Citizen Science in Dublin Bay

Citizen science (also called crowd science, crowd-sourced science, or volunteer science) is research conducted, in whole or in part, by amateur or non-professional scientists (Bonney et al., 2009). Citizen science is not new, as many organisations have enlisted the public's help in gathering data, particularly to locate, identify and monitor wildlife. Examples of this type of citizen science carried out in Ireland include the Garden Bird Survey (Crowe, 2005); Greenwave, which recruits school children to track phenology (Walsh, 2015), the Irish Wildlife Trust's National Reptile Survey (IWT, 2005), various whale surveys (Beck et al., 2014) among others. Additionally, the mobilisation of citizens to gather non-biological data is also commonplace, with examples including police efforts², reporting of illegal dumping³, litter & graffiti⁴, fish kills & water pollution⁵. The FixMyStreet⁶ initiative allows members of the public to report on non-emergency issues relating to graffiti, road or path defects, street Lighting, leaks and drainage, litter and illegal dumping, and tree and grass maintenance. Dublin City Council operate an alerts website⁷ which informs the public of infrastructure disruptions.

In the past, organisations wishing to employ citizen science as a data collection method usually relied on motivated volunteers who would submit their observations via mail or telephone. This method can be very effective; for example the 2013 Christmas Bird Count, one the longest running citizen science programmes, had 71,531 participants in 2,369 locations (National Audubon Society, 2013).

Today, the proliferation of mobile devices with in-built cameras, GPS and internet connections has resulted in a much larger pool of potential citizen scientists, and an increase in the quality and quantity of data that is captured (Silvertown, 2009). For example, the National Biodiversity Centre of Ireland operates a data capture application – Biodiversity Data Capture⁸ which permits recording of biodiversity in the field, with records sent directly to the

National Biodiversity Data Centre's national database. However, it should be noted that there may be data quality issues in relation to data collected due to the wide variety of skills and expertise of data contributors. A large number of websites, mobile applications and online projects exist to identify, monitor and manage ecological, environmental and natural resources (Conrad & Hilchey, 2011). Citizen science has been shown to be a cost-effective method to collect essential monitoring information and can also produce the high levels of citizen engagement that are vital to effective management processes (Aceves-Bueno et al., 2015).

Incorporation of citizen science in the Dublin Dashboard can assist in gathering data within the Bay area. These data would supplement, but not replace, the data generated by the management partners.

Appropriate data to collect in this manner would include:

- The location of species and/or habitats present in the Bay and how this changes over time,
- Undesirable activity (e.g. dumping, crime, pollution),
- Visitor preferences (e.g. favoured locations, preferred trails, scenic spots),
- Infrastructure constraints and maintenance requirements (e.g. road potholes, degraded trails, cracked structures).

In addition, such a website or application could be used as a means of community outreach and communication. Data submitted by citizens could be mapped, allowing users to share their experiences and preferences with each other. Similarly, management partners could use this mechanism to advise the public of areas to be avoided (e.g. areas affected by dumping or pollution).

² <http://garda.ie/Controller.aspx?Page=3430>

³ <http://www.epa.ie/enforcement/report/nationalenvironmentalcomplaintsline/>

⁴ <http://www.dublincity.ie/main-menu-services-water-waste-and-environment-waste-and-recycling/litter-graffiti-and-pollution>

⁵ <http://www.fisheriesireland.ie/General/how-do-i-report-illegal-fishing-or-pollution.html>

⁶ <http://fixmystreet.ie/>

⁷ <https://dublincity.wordpress.com/>

⁸ <http://www.biodiversityireland.ie/downloads/apps/>

Finally, these two aspects, the collection of citizen science data and the communication with citizens, could be used by the management partners to mobilise citizen effort to accomplish specific tasks. Examples of similar efforts include beach clean-ups (e.g. the Clean Coast Programme, www.cleancoasts.org), the tidy towns programme (<http://www.tidytowns.ie/>), and environmental surveys (e.g. Coast Watch, <http://www.coastwatch.org/europe/survey>).

6.2 Proposed Forum for stakeholder engagement in Dublin Bay

The creation of the Dublin Bay dashboard has set up a template for information sharing and monitoring, and the EMRA run workshops provide a template for successful stakeholder engagement.

A stakeholder forum is proposed here in order to continue the work of this SMF beyond the timeline of this project.

The Project Steering Group first highlighted the need to develop a forum for all Dublin Bay related stakeholders, to deliver on management actions for Dublin Bay beyond the timeline of this project, and conduct further stakeholder engagement activities in Dublin Bay. Dublin Bay Biosphere and Dublin Port are key stakeholders in the proposed forum.

The proposed activities of the forum could include but not be limited to:

- Further analysis and monitoring of the Bay, including terrestrial impacts on the marine environment,
- Involve a wide range of bodies in the formation of a long term vision for Dublin Bay,
- Provide a platform for discussion of legislation and policy of importance to the management of the Bay,
- Develop and agree on a single vision, targets and a programme of measures for Dublin Bay (linking to MSFD and MSP implementation),



Figure 20: Young couples walking on Kiliney Hill (Photograph © Fáilte Ireland)

- Provision of guidance in relation to the roles and responsibilities of organisations involved in the management of the Bay,
- Coordinate local and community actions and monitor and report on progress.

A forum along the lines of the catchment management forums which are common place in terrestrial spheres could be applied to the maritime environment. The forum needs to be open and to listen to all views, to protect the integrity of the forum and build confidence. The forum would need to have cross sectoral representation in order to achieve consensus on the development of a vision for the future management of Dublin Bay. A memorandum of understanding based on a shared vision for Dublin Bay is required. Input from Dublin Port is essential as it has significant legal functions and legal rights in Dublin Bay. It would require leadership from existing networks such as the Dublin Bay Biosphere to provide a unifying structure. Duties of the forum include coordinating local management groups. The Howth SAAO (see Section 1.6) could provide an example of a successfully implemented local management committee.

Future expansion of the Dublin Bay dashboard to include a wider scope of data and data contributors would be of benefit to the forum.

There is an opportunity for the forum to research where marine reserves are located, their size and the benefits that can be accrued to local communities. There could be a role for local communities in terms of having input to the designation of this which may increase buy-in and may be more likely to work than top-down designation (Irish Wildlife Trust Report, 2012). The availability of spatially relevant information at the scale of Dublin Bay in a coordinated manner is of benefit to the management of Dublin Bay and implementation of MSFD. A major issue is the availability of funding, as resources are required to initiate the process and sustain the process in the long term, and to implement actions.

6.2.1 Existing examples of management forums and stakeholder engagement groups

The following is a selection of existing management forums and stakeholder engagement groups from which the proposed Dublin Bay forum can learn:

The Chesapeake Bay Programme: A Watershed Partnership (<http://www.chesapeakebay.net/>). Chesapeake Bay is an estuary on the West coast of the U.S, lying between the States of Maryland and Virginia. The Bay is approximately 320km long and 4.5km wide at its narrowest point and more than 150 streams flow into the Bay. The Chesapeake Bay Programme is an example of a successful forum that has led and directed restoration and protection activities since 1983. The fact that this forum has been active for over thirty years demonstrates its long term ability to survive. The forum consists of a regional partnership made up of federal and state agencies, local government, NGOs and academic institutions. The programme developed a series of written agreements and long-term goals to guide their work. Limits have been placed on the amount of nutrients and sediment which can enter the Bay, and Watershed Implementation Plans detail how and when each part of the Bay will meet their goals. The Chesapeake Bay Programme Office is staffed by employees from federal and state agencies, non-profit organizations and academic institutions. In addition, Chesapeake Stat (<http://chesapeakestat.com/>) has been developed to improve information-sharing and decision-making at the Chesapeake Bay Programme. Lessons for the implementation of a Dublin Bay forum may be learned from the experiences in Chesapeake Bay.

Closer to home, the Bere Island Conservation Plan is an Irish example of an integrated management plan (Heritage Council, 2003). Bere Island is located in the south west of Ireland in County Cork. The population of the island had been in decline, and a plan was required if the island was to remain viable in the future. A Heritage Plan was produced which provides a framework through which subsequent development plans should operate and actions can be guided. The plan addressed both the issues of conservation of heritage and the need for sustainable development. It

was developed from the bottom up by the community, with the assistance of specialists and was co-funded by the Cork County Council and the Heritage Council. The plan involved a detailed audit of the island's heritage and cultural history, followed by a period of consultation through questionnaires and public meetings. The Bere Island Conservation Group works on implementing the policies of the plan. A development worker was employed on the ground in order to work with the local project group in the implementation of the plan. Funding was secured to create a heritage centre on the island in 2009. The Bere Island Conservation Plan is highly regarded as a successful example of a conservation plan in operation.

Large public participation events can be organised in order to raise awareness of the work of voluntary groups. For example, the Island Bioblitz is a biodiversity recording event run on off-shore islands.

Groups compete on each island to record the most species over a 24-hour period. The action can be followed in real time on the Bioblitz website (www.bioblitz.ie). The group which record the most species becomes the national Bioblitz champion. In addition, a programme of events is organised to raise awareness of wildlife and to publicise the qualities of the islands.

There are several examples of open data source websites being used to build community participation in conservation to great effect. For example, in the UK, catchment-based approach (CaBa) has used a similar approach to create community-led restoration and management of over 100 river habitats: <http://www.catchmentbasedapproach.org/>. Tools include a habitats reliance tool, ecosystem-based modelling, pollution monitoring, and habitat surveys amongst many others. Data can be uploaded by local stakeholders and scientific information is shared across the community. Such an approach can facilitate ways to empower local communities to care effectively for their environments.

Networks of NGOs can act as a mechanism to achieve greater levels of participation, and mapping of stakeholders may be a beneficial exercise. Examples of which include the North Bull Island Dublin Bay Wildlife website (<http://www.northbullisland.com/>) and the Birds of North Bull Island Dublin Bay (<http://www.bullislandbirds.com/>) which offer platforms for citizens to report wildlife sightings in Dublin Bay, and any disturbances to wildlife, the forum may act to consolidate these types of initiatives and engage citizens in the management of the Bay.

Residents associations frequently have to actively search media for public notices, and this is a time consuming process. A formal stakeholder list whereby organisations can sign up to be notified of public consultation events could be effective. Clear terms of reference are needed for the identification of bodies, what their role is and how they are useful to the forum. There is a need to find a balance between bottom-up and top-down implementation to reinforce ownership and create shared learning, break barriers and make communication easier. Members of the forum can learn from each other, issues can be highlighted. Good practice examples can be used to inform members of what actions are needed on the ground, and what the implications are for local communities.

A formal stakeholder list whereby organisations can sign up to be notified of public consultation events could be effective.

7 Conclusions

This report has highlighted the fact that many stakeholder groups in Dublin Bay are operating on an ad hoc basis, which is unsuitable for tackling complex problems and encourages silo thinking. The North Bull Island UNESCO periodic review (Dublin City Council, 2014) refers to the intention to develop a process for the setting up of a new governance structure, to enhance community participation and bring in the competencies of other state bodies. The recommendations of this SMF provide guidance in relation to a proposed new structure for enhanced community participation.



Figure 21: Dublin Bay and the DART (Photograph © Dublin Regional Tourism Authority)

Stakeholder consultation in Ireland has been largely reactive to date. It may be difficult to engage individuals unless there is some pressing local issue of interest to them. Stakeholders need to feel that they are being listened to, and that they can influence policy. The Dublin Bay Dashboard encourages engagement with the local community surrounding the management of Dublin Bay, and aids in our understanding and protection of the local marine environment. It supports communication between scientific bodies and the public, making scientific data on marine life more digestible and accessible.

There is a need to sell Dublin Bay to tourism and business interests. The environment should be seen as an asset and not a problem. Appealing to people's emotional connection with the Bay can be effective; the media has a role in publicising the Bay. Investment is required in people and training, with emphasis on bringing people together, and actions on the ground. As Ireland's capital city, there is potential for Dublin to set an example in the implementation of MSFD and MSP; this is an opportune time to further engage stakeholders in the management of Dublin Bay. The implementation of the MSFD presents a particular challenge for the Dublin Bay area given the complex mix of uses in the relatively confined area of the Bay.

7.1 Strengths and Limitations

This research presents a pragmatic approach to enhancing stakeholder engagement in management of the marine resource; and it has relevance to Ireland in terms of meeting obligations under Marine Strategy Framework Directive and Maritime Spatial Planning Directive. Although it was not possible here to develop a vision for the future development of Dublin Bay due to limitations highlighted in Section 1.1.1, this document provides the building blocks towards the development of a future shared vision for Dublin Bay. It is proposed here that the forum for Dublin Bay would decide upon a future vision.

A strength of this research is that actions reported here have promoted public participation in maritime decision making. This project has provided a platform for bringing

local, regional and national stakeholders together and actively participating in MSFD, which has relevance to national and international stakeholder engagement concerns. It is clear from this research that interdisciplinary analysis is required for the management of Dublin Bay.

This project has recognised the necessity and desire of stakeholders and politically elected representatives to become involved in MSFD. The public response has been positive and actions have been well received. EMRA Elected Members were engaged in the development of this SMF. A draft report was presented to EMRA Elected Members at the EMRA meeting on the 8th of July, 2016. This was followed by a detailed discussion of the document. Following a consultation period, this SMF was approved by the Elected Members at the EMRA meeting on the 9th of September, 2016.

The active participation of the Steering Group facilitated a free flow of ideas and information and was beneficial to the project. However, the Steering Group would have benefitted from the inclusion of additional key stakeholders such as representatives from the ports and shipping sectors. Future work needs to expand the scope of the steering group. The support of a high profile champion, for example an Elected Mayor, may be effective at bringing more individuals and organisations on board and motivating them to participate as it's a difficult thing to happen organically.

An important aspect of MSFD is making data available to all, and ensuring that stakeholders are able to access data at the appropriate level for their purposes. The data dashboard for Dublin Bay has provided data to support management of the Bay at the appropriate scale and make data more accessible to marine stakeholders. The development of the Dublin Bay dashboard assists with local level MSFD implementation, and can support MSP implementation along the lines of the BaltSeaPlan web-advanced tool (Available at: <http://baltseaplan-web.eu/>). Initiatives such as the Chesapeake Bay Watershed Programme (see Section 6.2) and the Baltsea Action Plan have demonstrated what is possible, and Dublin Bay is well placed to follow these examples.



Figure 22: Panoramic view of Dublin Bay from Shielmartin Hill (Photograph Cllr. David Healy)

7.2 Next Steps

It is proposed here that the forum for Dublin Bay be set up to continue to engage stakeholders in MSFD implementation in Dublin Bay and decide upon a vision for the future management of Dublin Bay through collective collaboration. Six themes have been identified (see Appendix C) for the development of Dublin Bay which can form the basis of future discussions regarding the development of a long term vision for Dublin Bay.

Linking stakeholders with regional and national plans and policies is a critical part of the effective management of Dublin Bay. It is essential to have representatives from all relevant bodies collaborate to ensure that proposed actions of the management plan are implemented. This is a two-way issue: those relevant bodies need to communicate effectively with local communities about management issues to ensure that stakeholders really are engaged, and those local communities need to have their aspirations recognised and incorporated into policy for them to have influence in decisions which affect the Bay. The 'Future trends' report (available at: <http://www.celticseaspartnership.eu/>) produced as part of the

Celtic Seas Partnership explores future growth scenarios and impacts on environmental, social and economic conditions in the Celtic Seas. The report highlights the need for integrated marine management and is of value to the proposed forum for Dublin Bay as it can inform future growth scenarios.

Success of the forum is dependent on stakeholders contributing their ideas, knowledge and opinions in a constructive environment. Conflicting views may exist between stakeholders in Dublin Bay with regard to its future management, and it's important to listen to these views. A balance needs to be found between conservation and sustainable development in order to resolve conflict among stakeholders. The 'Best practice guidelines for conflict resolution - sectoral interaction between marine stakeholders', (available at: <http://www.celticseaspartnership.eu/>) produced as part of the Celtic Seas Partnership, provides useful guidance on how to encourage positive interaction and prevent conflicts between marine stakeholders. In addition, the 'Best practice guidelines for trans-boundary governance' (available at: <http://www.celticseaspartnership.eu/>) provide excellent guidance



on encouraging effective marine management and decision-making across borders; these sets of guidelines can inform the work of the forum for Dublin Bay.

Planning policy and planning management have a significant role in achieving MSP and MSFD objectives, however, this role has not yet been fully utilised or understood. Lessons can be learned from the first cycle of WFD implementation in Ireland. There may be scope to transfer aspects of the second cycle of WFD implementation, such as the use of regional community water officers coordinating actions on the ground to the marine environment. The ‘Good practice guidelines for terrestrial planning’ (Available at: www.celticseaspartnership.eu), produced as part of the Celtic Seas Partnership, provide guidance in terms of how those involved in planning and development on the land can ‘Marine Proof’ their activities to promote good environmental status of the sea. In addition, the Celtic Seas Partnership have produced ‘Best practice guidelines for the co-location of marine renewables with other marine interests’ which provide guidance on locating marine renewable energy projects in increasingly crowded waters and are valuable to the management of Dublin Bay.

To maximise the legacy of the Dublin Bay Dashboard, it is important to consider geospatial data which is of most use to stakeholders, and it may be of benefit to consider facilitating the uploading of data by stakeholders. It is recommended here that future iterations of the Dublin Dashboard incorporate initiatives such as citizen science into evidence and policy formation. For example, through the development of apps showing status of sea pollution levels, levels of key species stocks, status of threatened species, levels of marine litter, etc. By asking members of the community to adopt the proposed actions, local people can be kept at the heart of delivery and project development.

A new approach to the management of Dublin Bay is needed taking into account complex problems such as climate change.



Figure 23: The Baily Lighthouse Panoramic view of Dublin Bay from Shielmartin Hill (Photograph Cllr. David Healy)

It has been argued here that a new approach to the management of Dublin Bay is needed taking into account complex problems such as climate change. The stakeholder engagement methods developed here provide a basis for policy dialogue and to help prioritise actions in Dublin Bay. The activities described here assist in enabling stakeholders to steer the region towards creating a healthy marine ecosystem, with productive businesses operating in a sustainable way.

This work was promoted and disseminated at conferences and events nationally, and a positive response was received. In order to further engage stakeholders, particularly in the fishing and energy sectors, further targeted promotion and disseminated activities are planned. Securing the support of a high champion may be helpful in encouraging additional stakeholders to engage.

The outputs from this SMF are designed to support the local level implementation of stakeholder engagement aspects of MSFD, setting out how stakeholders can participate in the process. Outputs can be used by national government to support the delivery of MSFD and

MSP outcomes. The EMRA have worked closely with the Irish Government Department of Housing, Planning, Community and Local Government. With the recent transposition of the Maritime Spatial Planning Directive into Irish law, and the forthcoming preparation of marine plans, there is an excellent opportunity for the stakeholder actions undertaken here to inform policy. In addition, the work of the Irish Sea Maritime Forum can assist with the implementation of MSFD in the local context of Dublin Bay. There is further scope for collaboration with the ISMF around coastal planning themes.

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8 A Selection of Further Resources

Alexandra Basin Redevelopment in Dublin Port <http://dublinportabr.ie>

Baltsea - MSP project in the Baltic Sea <http://www.baltseaplan.eu/>

Birdwatch Ireland - large independent conservation organisation in Ireland <http://www.birdwatchireland.ie/>

Birds of North Bull Island - Dublin Bay Wildlife Report sightings on North Bull Island <http://www.bullislandbirds.com/>

Department of Housing, Planning, Community and Local Government - Competent authority for MSP and MSFD implementation <http://www.housing.gov.ie/housing/housing>

Dublin Bay Biosphere - UNESCO biosphere reserve in Dublin Bay <http://www.dublinbaybiosphere.ie/>

Dublin Bay Birds - Keep track of water birds in Dublin Bay through marking and monitoring <http://dublinbaybirds.blogspot.ie/>

Dublin Bay Dashboard <http://www.dublindashboard.ie/pages/index>

Dublin City Maps <http://www.dublincitymaps.ie/>

Dublinked open data platform <http://dublinked.ie/>

Dublin Port Company - Manage Dublin Port, Ireland's largest port <http://www.dublinport.ie/>

Future Earth Coasts (Formerly LOICZ) - A project to support sustainability and adaptation to global change in the coastal zone <http://www.futureearthcoasts.org/>

GBIF - Global Biodiversity Information Facility <http://www.gbif.org/>

GreenWave Sustainable ocean farming <http://greenwave.org/about-us/#flowchart>

Heritage Maps - Heritage related data viewer <http://www.heritagemaps.ie/>

HERMIONE - Hotspot Ecosystem Research and Man's Impact On European Seas <http://www.eu-hermione.net/>

Howth Special Amenity Area Order <http://www.fingal.ie/planning-and-buildings/development-plans-and-consultations/studies-and-reports/howth-special-amenity-area-order/>

IMMERSE - Project Integrated Management and Monitoring of Estuarine and Coastal Ecosystems project <https://www.qub.ac.uk/research-centres/TheInstituteofSpatialandEnvironmentalPlanning/Impact/CurrentResearchProjects/IntegratedEnvironmentalManagementandMonitoringSystem/OutputsandDissemination/>

INBDC - Irish National Biodiversity Data Centre <http://www.biodiversityireland.ie/>

Ireland's open data platform <https://data.gov.ie/data>

Irish Spatial Data Exchange <http://www.isde.ie/#/>

Marine Atlas Ireland - Marine Institute Atlas <http://atlas.marine.ie/>

Marine Institute of Ireland <http://www.marine.ie/Home/>

MSFD - EC website on MSFD http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm Irish Government webpage on MSFD - <http://www.housing.gov.ie/water/water-quality/marine-strategy/marine>

MSP - EC website on MSP http://ec.europa.eu/maritimeaffairs/policy/maritime_spatial_planning/index_en.htm Irish Government webpage on MSP - <http://www.housing.gov.ie/planning/maritime-spatial-planning/maritime-spatial-planning-directive/maritime-spatial-planning>

North Bull Island Dublin Bay Wildlife - Encourage data recording and promote interest in Biodiversity on the North Bull Island <http://www.northbullisland.com/>

ODEMM - Options for Delivering Ecosystem-Based Marine Management <http://odemmm.com/>

Our Ocean Wealth - Integrated marine plan for Ireland <http://www.ouroceanwealth.ie/>

OSPAR - Mechanism by which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic <http://www.ospar.org/>

PISCES (Partnerships Involving Stakeholders in the Celtic Sea Ecosystem) - EC funded Celtic Seas Stakeholder project <http://www.projectpisc.es.eu/>

LWEC - Living with Environmental Change: NERC - the UK Natural Environment Research Council <http://www.nerc.ac.uk/research/partnerships/lwec/>

MARCOM - The European Marine and Maritime Science and Technology Forum <http://marcom.eucc-d.de/topics.html>

PEGASO Project - Integrated Coastal Zone Management in the Mediterranean and the Black Sea <http://www.pegasoproject.eu/project-overview>

WISE - Water Information System for Europe, data is available to NGOs and the general public. <http://water.europa.eu/>

9 Appendices

9.1 Appendix A: Legal and policy documents

The following is a sample of legal and policy documents related to offshore and coastal activities in Dublin Bay:

A selection of Irish Maritime Policy documents and legislation:

- Harnessing Our Oceans' Wealth
- Regional Planning Guidelines
- City and County Development Plans
- Bathing Water Directive 2006/7/EC
- Urban Wastewater Treatment Regulations 2001-2010
- Waste Management Act 1996
- Strategic Environmental Assessment Regulations 2004
- Wildlife (Amendment) Act 2000
- National Transport Authority 2030 Vision (Green Infrastructure Actions)
- Port and Harbour masterplans and strategies
- Heritage (Amendment) Act 2001
- National Monuments (Amendment) Act 2013
- National Landscape Strategy
- River Basin Management Plans

A selection of EU and International maritime legislation and policy

- Birds Directive 2009/147/EC
- Habitats Directive 92/43/EEC
- Water Framework Directive 2000/60/EC
- The EU Marine and Maritime Agenda for Growth and Jobs, EU Integrated Maritime Policy
- EU Registration of Persons Sailing on board Passenger Ships (Amendment) Regulations 2015
- International Labour Organisation Maritime Labour Convention 2006
- Oil Pollution of the Sea (Civil Liability and Compensation) Acts 1988 to 2003

- The Sea Pollution Act 1991
- International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78
- The International Convention for the Prevention of Marine Pollution from Ships

Irish Primary Maritime legislation

- Harbours Bill 2015
- Merchant Shipping (Registration of Ships) Act 2014
- Merchant Shipping Act 2010
- Harbours (Amendment) Act 2009
- Sea Pollution (Miscellaneous Provisions) Act 2006
- Sea Pollution (Hazardous Substances) (Compensation) Act 2005
- Maritime Safety Act 2005
- Dumping At Sea Act 1996
- Dumping at Sea (Amendment) Act 2004
- Harbours (Amendment) Act 2000
- Merchant Shipping (Investigation of Marine Casualties) Act 2000
- Sea Pollution (Amendment) Act 1999
- Merchant Shipping (Miscellaneous Provisions) Act 1998
- Oil Pollution of the Sea (Civil Liability and Compensation) (Amendment) Act 1998
- Merchant Shipping (Commissioners of Irish Lights) Act 1997
- Merchant Shipping (Liability of Shipowners and Others) Act 1996
- Harbours Act 1996
- Dumping At Sea Act 1996
- Irish Shipping Limited (Payments To Former Employees) Act, 1994

- Merchant Shipping (Salvage and Wreck) Act 1993
- Merchant Shipping Act 1992
- Sea Pollution Act 1991
- B & I Line Act 1991
- Oil Pollution of the Sea (Civil Liability and Compensation) Act 1988
- Shipping Investment Grants Act 1987
- Irish Shipping Limited (Amendment) Act 1984
- Merchant Shipping (Light Dues) Act 1983
- Irish Shipping Limited Act 1982
- Merchant Shipping Act 1981
- Irish Shipping Limited (Amendment) Act 1980
- Merchant Shipping (Certification of Seamen) Act 1979
- Harbours Act 1976
- British & Irish Steam Packet Company Limited (Acquisition) (Amendment) Act 1971
- Merchant Shipping (Load Lines) Act 1968
- Merchant Shipping Act 1966
- British & Irish Steam Packet Company Limited (Acquisition) Act 1965
- Irish Shipping Limited (Amendment) Act 1959
- Mercantile Marine Act 1955
- Merchant Shipping (Safety Convention) Act 1952
- Harbours Act 1947
- Irish Shipping Limited Act 1947
- Merchant Shipping Act 1947
- Harbours Act 1946
- Merchant Shipping (Amendment) Act 1939
- Harbours, Docks and Piers (Charges) Act 1936
- Harbours (Regulation of Rates) Act 1934
- Merchant Shipping (Safety and Load Line Conventions) Act 1933
- Merchant Shipping (International Labour Conventions) Act 1933
- Dublin Port and Docks Act 1925
- State Harbours Act 1924
- Merchant Shipping Act 1921
- Merchant Shipping (Amendment) Act 1920
- Pilotage Act 1913
- Merchant Shipping (Seamen's Allotment) Act 1911
- Merchant Shipping (Stevedores and Trimmers) Act 1911
- Merchant Shipping Act 1906
- Merchant Shipping (Mercantile Marine Fund) Act 1898
- Merchant Shipping Act 1897
- Merchant Shipping Act 1894

9.2 Appendix B: Ecosystem-based approach guiding principles

The guiding principles for the implementation of an ecosystem-based approach as set out by the Convention on Biological Diversity states that;

- No ecosystem is isolated. Rather, ecosystems overlap and interact with each another. An ecosystem-based approach recognizes that a specific ecosystem is heavily affected by its surrounding systems, i.e. “ecosystems are not islands of excellence in an otherwise second-rate landscape” (Shepherd, 2008).
- It is not sufficient to only consider protected areas (e.g. Natura 2000 sites) when planning conservation efforts. Adjacent areas need to be considered, and not just within a buffer zone. The interaction between people and biodiversity can only be sustainably developed within larger ecosystem areas, and ecosystem-based approaches encourage both a consideration of the wider landscape and an identification of interconnectivity (ICES, 2005).
- Human beings are part of the ecosystem. Humans and their activities are valued in an ecosystem-based approach, and are crucial to achieving sustainable ecosystem management. In many cases, local, on the ground, stakeholders must be given responsibility for many of the day-to-day decisions that collectively determine the sustainability of vast areas. Local people, their customs and their livelihoods should be given equal consideration as conservation measures (Smith & Maltby, 2003).

- Ecosystem-based approaches are not static; they must adapt to changing conditions and new information. In many cases, problems and challenges will only become apparent when conservation programmes get up and running; management programmes must be flexible in dealing with obstacles while retaining a clear idea of the long-term goals.
- Following on from the above, management partners must be open to developing new partnerships and practices as conditions demand. Ecosystems are dynamic, and an ecosystem-based approach “implies flexibility and requires learning-by doing” (Shepherd, 2008).

Ecosystem-based approaches have been successfully applied across the globe (Shepherd, 2008), in many different contexts including grazing management in Nigeria (Reynolds et al., 2007), logging and forestry management in the Democratic Republic of Congo (Sayer & Maginnis, 2007) and a variety of fisheries (De Young, Charles, & Hjort, 2008; Garcia & Cochrane, 2005). A commonality of these successful programmes using the ecosystem-based approach is meaningful stakeholder engagement.



Figure 24: Balcaddan Bay, Howth, North Dublin Bay (Photograph Friends of Balcaddan Bay)

9.3 Appendix C: Themes for Dublin Bay

Issue A: Governance across Dublin Bay

Brief Outline: The governance of Dublin Bay is currently managed by multiple interest groups.

Ecosystem Services: It is arguable that all ecosystem services provided by Dublin Bay are influenced directly by the governance mechanisms which are in place.

Sources of information/frameworks/plans etc: Marine Strategy Framework Directive, Maritime Spatial Planning Directive; Water Framework Directive; Common Fisheries Policies; EU Floods Directive; Integrated Marine Plan for Ireland; County and Local Development Plans; Sectoral Plans and Strategies; Biodiversity and Heritage Plans; National Climate Change Strategy; etc.

Description of Issue

The need to take into account the various international, EU, national and local policies that impact on issues relating to Dublin Bay is a pre-requisite. Directives of immediate interest are:

Marine Strategy Framework Directive – a framework for community action in the field of marine environmental policy. The MSFD takes into account elements regarding coastal, transitional and territorial waters covered by relevant provisions of existing Community legislation.

Water Framework Directive – a sister Directive of the MSFD which adds policy drive to efforts to better manage our coastal and transitional waters. Linking expertise and knowledge from WFD and MSFD is an important strategic policy.

Maritime Spatial Planning Directive which will provide a cornerstone for the EU's Blue Growth Strategy, offer certainty regarding maritime investment and recognise the importance of the ecosystem-based approach to planning.

Sectoral plans and community based actions are split between the Port and harbours, three local authorities; government departments and agencies; volunteer groups and NGOs; business and tourism; community interest groups; research institutes and so on.

Information, local knowledge and data are plentiful but difficult to find. There is no singular platform for information and knowledge sharing and no singular vision for Dublin Bay.

In addition to cross sectoral silo's, there is arguably a vertical disconnect along all governance stages from citizen to local representation to regional bodies and central government.

Key Questions

How can we collectively deliver consistency in public policy and work towards a sustainable future for the Bay taking into account local, regional and national policy and the checks and guidance of EU Directives?

What are the socio-economic benefits in developing a singular vision and platform for cooperation for Dublin Bay?

What examples of national and international best practice in this area can be adapted to a Dublin Bay context?

Issue B: Stakeholder Engagement (part of Governance)

Brief Outline: Stakeholder engagement is a key issue in Dublin Bay. The challenges lie in establishing appropriate channels of communication and information and translating feedback into common ground and objectives. An integrated participatory framework for decision-making and the valuation of services is required.

Ecosystem Services: All ecosystem services are potentially relevant. Stakeholder engagement processes are in place in terms of statutory consultations through MSFD, WFD, and city/county development plans, associated SEAs, etc. There is opportunity to raise issues with how these plans or processes affect the services derived from Dublin Bay.

Sources of information/frameworks/plans etc: A number of public consultation and citizen engagement tools are in use utilizing traditional and contemporary (social media) mediums.

Description of Issue

Engendering a sense and application of stakeholder engagement is central to processes like Integrated Coastal Zone Management and the Marine Strategy Framework Directive. Conflicting views may exist between stakeholders in Dublin Bay with regard to its future management. A balance will need to be found between conservation and development. The process of stakeholder engagement should lead to a coalition of shared resources and tangible activities.

In addition, a participatory approach is wholly necessary in terms of measuring the overall importance of complex goods and services and developing policies and/or actions which protect and/or enhance these goods and services. Even with the best will in the world and adequate resourcing, the process of valuing and integrating stakeholder opinion and contributions, is a wasted exercise in the absence of a coherent vision for Dublin Bay.

Developing procedures to ensure that stakeholder engagement is comprehensive and inclusive, and balances social judgement, scientific input and development drivers is key to developing a management framework for Dublin Bay. A simple process is outlined in the following Table:

Engagement Action	Main Outcome(s)
Informing	Balanced and objective information to promote better understanding of alternatives, opportunities and solutions. An opportunity to set the scene and identify all stakeholders. Setting out the scope of influence.
Consulting	Obtaining feedback and deepening collective knowledge. Obtaining views about the need for management. Providing different means of involvement.
Involving	Working directly with the various stakeholders throughout the process to ensure that opinion and concerns are understood. Articulating values. Involving silent majorities.
Collaborating	Creating various partnerships across the quadruple helix of industry, government, research and citizen. Analysing values.
Empowering	Ensuring that the public voice is heard and incorporated into final decisions.

Key Questions

How do we identify, integrate, regulate and manage stakeholders?

What mechanisms for consultation can be used to allow stakeholders to recognise, value and enhance the environmental, cultural, economic, social and amenity value of Dublin Bay, its waters and surrounding lands? Who or whom is the neutral/independent voice and facilitator?

Issue C Geographical Extent of Dublin Bay

Brief Outline: There is a need at some level to identify an adaptive working geographical extent for Dublin Bay and to use this geographical extent to apply various management principles and future actions.

Ecosystem services: By defining a geographical extent for Dublin Bay, it will become easier to account for the various services that are provided within this area. Mapping affinity for Dublin Bay at the level of Dublin post code and mapping the elicitation of values that stakeholders assign to goods and services can greatly assist the process of defining a Bay area.

Sources/frameworks/plans: Spatial maps and associated data and information.

Description of Issue

Mapping the extent of Dublin Bay requires consideration of both physical and emotional boundaries. Using a combination of stakeholder opinion, geographical delineators and socio-economic evidence, it is possible to create a boundary within which a strategic management framework can be applied. The determination of a core management zone for the Dublin Bay is central to stakeholder mapping exercises, future resourcing and collaboration and determination of roles and responsibilities. A number of natural catchment areas, designations and administrative boundaries are available to assist this process. Boundary justification will need to be based on a number of these criteria:

- Political boundaries (Electoral divisions (EDs) or groups of EDs)
- Areas of environmental/ecological/cultural sensitivity (SACs/SPAs/potential NHAs)
- Community associations and socio-economic boundaries (such as deprivation data).
- Other demarcations such as infrastructural/physical aspects (i.e. roads, rail, houses etc).

Key Questions

How important is it to delineate a boundary for Dublin Bay in terms of developing a vision, assessing the ecosystem services that Dublin Bay provides and considering Dublin Bay as part of a wider ecological network?

Is it feasible or practical to combine natural catchments and administrative areas for Dublin Bay?

Could the Strategic Framework for Dublin Bay consider core and buffer areas? (Following something similar to UNESCO Biosphere designations).

Issue D Data and Information Sharing

Brief Outline: A key component of effective management of Dublin Bay is the sharing of: best practices, details of research activities, future development plans and policy. Accessing and sharing of data will underpin many future activities and ultimately improve decision-making.

Ecosystem services: The availability of robust, replicable and reliable data will underpin future studies on ecosystem services in Dublin Bay. The articulation of values to ecosystem services will be enhanced by these data.

Sources/frameworks/plans: Local authorities; CSO; SFPA; ERBD; Dublinked and other open data; Marine Institute (Marine Atlas), MIDA, etc; Local knowledge; EPA; NGOs (in-house data) etc.

Description of issue

The types of data and information available help determine the types of decision-making tools and planning models that can be put in place for coastal communities and activities. In addition, achieving a best practicing international monitoring system for Dublin will be greatly assisted by the further expansion and promotion of the Marine Atlas, and of incorporation of Dublin Bay related data onto centralised and open platforms such as the Dublinked open data platform and/or the Dublin Dashboard.

An issue for the Dublin Bay project may be getting stakeholders in the area to commit to sharing data of relevance or to cooperating to fund a monitoring and evaluation process. Another issue may be sharing of commercially or otherwise sensitive data and information.

The development of an open and reliable data repository for marine and coastal related projects has the potential to reap benefits at grassroots community level as well as research and commercial benefits. Data will underpin critical future decisions in Dublin Bay and wider afield across issues such as: establishing baseline conditions and good environmental status; synchronisation between policy efforts - bridging policy deficits between policy frameworks such as CFP and MSFD; putting appropriate conservation measures in place; ensuring that development policy ensures economic balance and sustainable use of marine resources.

Key Questions:

What, if any, are the main data gaps that you or your organisation can identify in relation to the management of Dublin Bay? Please list.

How best can marine, socio-economic and spatial data and information, etc be shared effectively across stakeholders in relation to Dublin Bay?

Issue E: Offshore Activities

Brief Outline: Offshore activities have potential impacts. Energy sector developments may be contentious in the future. For example, The Offshore Renewable Energy Development Plan OREDP aims to set out scenarios for the development of offshore renewable energy in Irish waters up to 2030 and a longer-term vision for the growth of the offshore renewable energy sector in Ireland. Development pressure and renewable energy may conflict with aesthetic evaluation and seascape.

Plan/Programme Name: OREDP 2010 – 2030. Prepared by Sustainable Energy Authority of Ireland. Foreshore (Amendment) Act 2013.

Ecosystem Services: Renewable Energy, Seascapes, (indirectly Climate Control) <http://www.dcenr.gov.ie/NR/rdonlyres/2990B205-534E-486E-8586->

Description of Issue

Weather patterns associated with longer term climate change are resulting in more severe storms, flooding, and coastal erosion and are impacting habitats and communities in Dublin Bay. Measures to mitigate the impact of climate change have created various challenges including balancing visual and amenity impact against the need to protect coastal property and communities. A key challenge is the efficient use of resources and of best practice flood controls.

The National Climate Change Adaptation Framework (NCCAF, 2012) takes its lead from EU policy such as the 2009 White Paper on Adapting to Climate Change and seeks broadly to create more resilient regions, exchange good practice in the area of climate change adaptation, and mainstream those practices into policies, strategies and programmes. Climate change adaptation in terms of a resilient and sustainable future

Dublin Bay will need to take account of not only impacts on coastal communities and humans and habitats and species, but also the critical infrastructure which is located in the Bay. An integrated approach, involving all stakeholders on all institutional/governance levels, is therefore essential.

This said, some sectors have begun examination of the impact of climate change on their operations and exploration of options to reduce their vulnerabilities. The Irish Academy of Engineering published Ireland at Risk – Critical Infrastructure – Adaptation for Climate Change in 2009 calling for coastal protection plans to mitigate rising sea levels, more extreme storm surges and flooding in coastal locations. Similarly, the Heritage Council and Fáilte Ireland published a self-explanatory titled report Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways. Research is furthermore contributing to the knowledge base and should be integrated into future plan and decision-making.

Coordination, Communication and Adaptation for Climate Change in Ireland: an integrated approach (COCOAPAPT) is one such example. This report contributes to the NCCAF (2012) examining impacts (positive and negative) on water resources; biodiversity; society; economy and sub-sectors such as tourism and construction; and governance. Data on exposed percentages of land given various sea level rises points up the vulnerability of Dublin Bay (EPA, 2013). Dublin, Cork and Galway are most at risk nationally in terms of the numbers of addresses that would be impacted upon. Dublin's exposed percentage of land is notably higher than other coastal counties at a 0.5 metre sea level rise at 1.6%. This compares to Cork, Galway and Limerick at 0.4% each.

Emergency planning is also in place through the Office of Emergency Planning and annual major emergency plans at local authority level. These plans, whilst pre-empting potential future hazards through evidence base assessment are by nature more reactive rather than strategically proactive.

Key Questions

What measures can be put in place to reduce the amount of water entering the Dublin Bay system during extreme weather events?

How do we better engage with the public having regard to impact of flood defences on their amenity?

9.4 Appendix D Questionnaire

1. Please state your sector:

- ☐ Policy sector (excluding local government)
- ☐ Local Government
- ☐ Commercial Fisheries
- ☐ Renewable Energy
- ☐ Shipping & navigation
- ☐ Seafood industry - aquaculture
- ☐ Leisure tourism & coastal recreation (including recreational sea angling)
- ☐ Maritime economy – Ports and harbours
- ☐ Conservation groups
- ☐ A member of the public
- ☐ Water / wastewater
- ☐ Other: _____

2. Please state your organisation name (if applicable).

3. Please state your areas of interest or influence.

- ☐ Maritime Economy
- ☐ Maritime governance
- ☐ Maritime planning (spaces and places)
- ☐ Community and citizenship (Coastal communities)
- ☐ Maritime Recreation/Heritage
- ☐ Other: _____

4. How relevant do you consider your sector to the sustainable management of Dublin Bay?

- ☐ Very relevant
- ☐ Relevant
- ☐ Not at all relevant

5. How important do you consider your organisation to the sustainable management of Dublin Bay? Please tick only 1 box as appropriate.

- ☐ Important
- ☐ Neither important nor unimportant
- ☐ Not important
- ☐ Other please specify _____

6. What in your opinion are the barriers to developing a joined up approach to the management of Dublin Bay?

7. Across the following sectors, please indicate whether you think the impact of the sector is either positive, neutral or negative on the environmental status of the Dublin Bay coastal area.

SECTOR	POSITIVE	NEUTRAL	NEGATIVE
Policy sector (excluding local government) – institutions with an influence on maritime policy			
Local Government			
Commercial Fisheries			
Renewable Energy			
Extractive industries including aggregates, dredging,			
Shipping and navigation			
Leisure tourism and coastal recreation (including recreational sea angling)			
Seafood industry -aquaculture			
Maritime economy –Ports and harbours			
Water/wastewater			
Conservation groups			

8. Across the following sectors, please indicate whether you think the impact of the sector is either positive, neutral or negative on the socio-economic welfare of the Dublin Bay coastal area.

SECTOR	POSITIVE	NEUTRAL	NEGATIVE
Policy sector (excluding local government) – institutions with an influence on maritime policy			
Local government			
Commercial Fisheries			
Renewable Energy			
Extractive industries including aggregates, dredging,			
Shipping and navigation			
Leisure tourism and coastal recreation (including recreational sea angling)			
Seafood industry -aquaculture			
Maritime economy –Ports and harbours			
Conservation groups			

Spatial and Temporal Considerations

9. In order of importance (1 -8 with 1 being the most important), rate the factors you think should be considered to define Dublin Bay.

- ☐ Administrative Boundaries/Political Boundaries
- ☐ Groupings of Coastal Communities
- ☐ Geographic features and or physical aspects such as rail and road
- ☐ Utilitarian – based on the practicalities of management
- ☐ Perception based – based on citizens' opinions about where the Bay begins and ends
- ☐ Priority based – defining the coastal zone onshore according to priority issues such as flooding
- ☐ Ecosystem reach – examining how far goods and services provided by Dublin Bay impact?
- ☐ Environmental/ecological areas/protected areas/hydrological impacts
- ☐ Other: _____

10. Should the SMF be a statutory document?

- ☐ Yes
- ☐ No

Feel free to explain your opinion or move to the next question

11. What time period (plan period) should the SMF for Dublin Bay cover?

- ☐ 6 year time period in line with Regional Spatial and Economic Strategies
- ☐ 20 year period
- ☐ It should evolve continually and be reviewed on an annual or biannual basis
- ☐ Other please specify _____

12. Who should manage, prepare and coordinate the SMF?

- ☐ A new coordinating body
- ☐ An existing public body: Please state _____
- ☐ It should be a distributive function with shared responsibility and utilising expertise from multiple sectors
- ☐ Other please specify _____

13. Would you be in favour of using Local Economic Community Plans, Local Community Development Communities and/or Public Participation Networks to form coastal partnerships and/or integrate coastal projects into local community planning?

- ☐ Yes
☐ No
☐ Don't know

Data and Events

In February 2016, we will hold a workshop on data sharing in Dublin Bay. This will build on work carried out in developing the Dublin Bay module on Dublin Dashboard.

14. Do you hold data of any relevance or importance to inform the better management of Dublin Bay?

- ☐ Yes
☐ No

If yes; please state, the type, frequency and scale of data:

E.g. Type/format (*.xls, spatial, images)

Frequency (real time or time series -monthly, yearly or once off (survey) etc)

Scale (Dublin region, Dublin Bay, parts of Dublin Bay, point source)

15. Are you involved in data gathering/citizen science events?

- ☐ Yes
☐ No

If yes, would you be willing to discuss your project and/or data with the CSP in Dublin Bay?

- ☐ Yes
☐ No

If yes, please find contact details at the end of the questionnaire.

If yes, please list:

Frequency (e.g. yearly) _____

Time of Year (June 2016) _____

☐ Don't know

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