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Research Policy Analysis
Ymchwil Polisi Dadansoddi




The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004

Ireland Wales Cooperation Programme 2014-2020

Strategic Environmental Assessment
Environmental Report - Non Technical Summary

July 2014

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Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
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Ex-ante Evaluation and Strategic Environmental Assessment for Ireland Wales Cooperation Programme 2014-2020

STRATEGIC ENVIRONMENTAL ASSESSMENT

NON-TECHNICAL SUMMARY

JULY 2014

1 INTRODUCTION

1.1 Purpose

1.1.1 This Strategic Environmental Assessment (SEA) report of the Ireland Wales Operational Programme (IWOP) has been produced by Bangor University in association with Old Bell 3 Ltd. on behalf of the Welsh European Funding Office (WEFO). **This Non-Technical summary of the SEA provides a brief overview of the SEA Report findings and should be viewed alongside the full SEA and the proposed IWOP.**

1.1.2 The SEA has been carried out in accordance with the requirements of the European SEA Directive (2001/42/EC) and the implementing regulations for Wales and for Ireland.

1.1.3 The SEA has been carried out in conjunction with the development of the IWOP and its overall Ex-Ante Evaluation. It aims to ensure that the IWOP contributes positively to a high level of environmental protection, as well as supporting the goal of the Welsh and Irish Governments of working towards sustainable development. It does this:

- by setting out the environmental parameters within which the IWOP will operate;
- by identifying, describing and assessing likely significant effects on the environment arising from IWOP's implementation;
- by considering reasonable alternatives.

1.1.4 The SEA sets out to influence strategic changes that might result from the assessment. Changes should have already occurred by the time that the report is finalised, confirming that the right approach has been taken to the SEA process, namely that it has been used to improve the environmental performance of the programme, rather than merely presenting a snapshot of it.

1.2 SEA requirements

1.2.1 The Environmental Report complies with the requirements of the relevant regulations, namely the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Instrument 2004 No. 1656 (W.170)); S.I. No. 435/2004 - European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004; and S.I. No. 200 of 2011 - European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011.

Table 1 identifies those sections **within the main Environmental Report** that relate to the specific requirements of the regulations.

Table 1: References to the SEA Regulations

Environmental Report - Information to be included	Relevant Section
1. An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes.	**Section 9, page 65** **See also pp74-75**
2. The environmental characteristics of areas likely to be significantly affected.	**Sections 4-7 , pp13-60**
3. Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC.	**Section 8, page 61**
4. The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation.	**Annex I**
5. The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and	**Section 11, page 79** **Annex II**

archaeological heritage; landscape; the interrelationship between the above factors.	
6. The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan.	**Section 11.1.8, page 87**
7. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken.	**Section 12, page 88**
8. A description of measures envisaged concerning monitoring in accordance with Regulation 17.	**Section 13, page 95**
9.. A non-technical summary of the information provided under paragraphs 1 to 9.	**Accompanying document**

1.3 The SEA and other EU Directives and Standards

1.3.1 The IWOP is subject to the provisions of the SEA Directive, and also to a wide range of other EU legislation, which is described in Annex I of the main report. This includes the EIA Directive, Water Framework Directive, Habitats and Birds Directives, the Marine Strategy Framework Directive and the Waste Directive.

1.3.2 As well as requirements set out under these laws, the EU provides a range of strategies and programmes which have been analysed in the formulation of the report.

2 SEA PROCESS AND ASSESSMENT METHODOLOGY

2.1 Approach and overall SEA tasks

2.1.1 The approach that has been adopted is based on a number of advisory documents, chiefly the guidelines of the former Office for the Deputy Prime Minister (ODPM) 2005, and the EC's guidance documents on implementing the SEA Directive including guidance on integrating climate change and biodiversity.

2.1.2 Note was also taken of guidance provided by the Environment Agency, the Countryside Council for Wales, RSPB, and the Scottish Executive. Relevant citations can be found in the footnotes of the Environmental Report, as well as in the references.

2.2 Challenges in undertaking the SEA

2.2.1 The assessment was constrained by two key factors:

- The proposed IWOP is not spatial nor strictly thematic, but provides generic descriptions of the kind of activities likely to be supported. It can therefore be difficult at times to envisage potential significant environmental effects with certainty, and therefore a precautionary approach has been taken to the assessment.

- The plan is defined by the need to prioritise regional economic activity based on available funding and on the timescale over which it will operate. The identification and discussion of *reasonable* alternatives is limited to the availability of funding and the timescales and priorities described in the IWOP.

2.3 Development of SEA objectives

2.3.1 The assessment is based on 17 overarching objectives, underpinned by 53 sub-objectives, as shown in table 2 below.

2.3.2 The objectives were selected as a result of a wide-ranging literature review, largely based on state of environment reports, assessments of previous Operational Programmes, sustainable development policies and strategies, environmental action plans and agency or NGO advice. These include (not exhaustive):

- European Commission Core Indicators[1]

[1]European Commission. Programming period 2014-2020. Monitoring and evaluation of European cohesion policy - European Regional Development Fund and Cohesion Fund. Concepts and Recommendations. Guidance

- EU 6th and 7th Environmental Actions Plan & Sustainable Development Strategy[2]
- Wales Environment Strategy[3]
- Wales National Ecosystem Assessment[4]
- Sustainable Development Indicators for Wales[5]
- Ireland's Environmental Assessment[6]
- Irish Sea Pilot[7]
- PISCES LIFE+ project[8]
- Ireland-Wales Operational Programme 2007-2013[9]

2.3.3 As well as these, a range of sectoral and thematic documents were analysed. The following is an indicative list of the kinds of documents reviewed, and is not exhaustive: Ireland Offshore Renewable Energy Development Plan (OREDP) SEA[10]; the scope of SEA of Irish Sea Area 6 in regard to prehistoric remains[11]; Southern and Eastern Regional Assembly Operational Programme[12]; Energy in Ireland[13]; Ireland

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document. November 2011. (http://ec.europa.eu/regional_policy/information/evaluations/guidance_en.cfm#1)

[2]Decision No 1600/2002/EC of the European Parliament and the Council laying down the sixth community environmental action programme. July 2002.(http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:242:0001:0015:EN:PDF)Summary and explanation. (http://europa.eu/legislation _summaries/ agriculture/ environment/l28027_en.htm)

[3]WAG Cardiff. Environment Strategy Action Plan October 2008. (http://wales. gov.uk/ desh/publications/enviroprotect/environmentstrategy/environmentactionplan/esap0811e.pdf;jsessionid=7D4C112D25E2CF42B4AD153E9C57CDA0?lang=en)

[4]National Ecosystems Assessment (2011): Chapter 20: Status and Changes in the UK's Ecosystems and their Services to Society: Wales. World Conservation Monitoring Centre Cambridge.

[5] Welsh Government (2012): Sustainable Development Indicators. WG Cardiff

[6] Ireland's Environment – an Assessment 2012 (Environmental Protection Agency, Wexford, 2012

[7] Lumb et al (2004): Irish Sea Pilot - Developing Marine Nature Conservation Objectives for the Irish Sea. JNCC

[8] A guide to implementing the ecosystem approach through the Marine Strategy Framework Directive. WWF-UK in partnership with WWF-Spain, Environment Council, Ireland Coastal and Marine Research Centre, France SeaWeb (2012)

[9] CCI number: 2007CB163PO062

[10] AECOM Environment: Strategic Environmental Assessment (SEA) of the Offshore Renewable Energy Development Plan (OREDP) in the Republic of Ireland (October 2010)

[11] The scope of Strategic Environmental Assessment of Irish Sea Area SEA6 in regard to prehistoric archaeological remains. DTI 2005

[12] Southern and Eastern Regional Assembly. Regional Operational Programme 2007-2013

Bathing Water Quality Report[14]; Wales Tourism Strategy[15]; Wales Coastal Flood Erosion Strategy[16]; Wales Climate Change Strategy[17]; Woodland for Wales[18]; Farming Food and Countryside[19]; Western Wales River Basin District Management Plan SEA[20]; Ireland Seafood Operational Programme[21]; and The Irish Government's 'National Climate Change Adaptation Framework' (2012)[22].

2.3.4 Each of the constituent authorities' various biodiversity action plans and SEAs linked to spatial plans were likewise reviewed in developing objectives (see references).

2.3.5 The literature review resulted in the development of 51objectives, which were then aggregated into the 17 objectives against which the programme was assessed (see table 4). Although some are somewhat generic in nature, they have been retained as sub-objectives in order to focus thinking and to express more clearly what the main objectives mean. Two further sub-objectives were recommended by Welsh statutory consultees and have been added, making 53 in total.

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[13] Sustainable Energy Authority of Ireland (SEAI) (2013): Energy in Ireland - Key Statistics

[14] Environmental Protection Agency (2013): The Quality of Bathing Water

[15] Welsh Government (2013): Partnership for Growth. The Welsh Government Strategy for Tourism 2013-2020. EG Cardiff

[16] Welsh Government (2011): National Strategy for Flood and Coastal Erosion Risk Management. WG Cardiff

[17] Welsh Assembly Government (2010): Climate Change Strategy for Wales. WAG Cardiff

[18] Welsh Assembly Government (2009): Woodlands for Wales. The Welsh Assembly Government's Strategy for Woodlands and Trees. WAG Cardiff

[19] Welsh Assembly Government (2009): Farming, Food and Countryside - Building a Secure Future. WAG Cardiff

[20] Natural Resources Wales (2013): Water for Life and Livelihoods. Western Wales River Basin Management Plan. Strategic Environmental Assessment.

[21] Ireland (Modified) Seafood Development Operational Programme 2007-2013 (April 2013)Ref. Ares(2013)1230089 - 21/05/2013

[22] DECLG (2012): Building Resilience to Climate Change. Dublin. (December 2012) http://www.environ.ie/en/Publications/Environment/ClimateChange/FileDownLoad,32076,en.pdf

Table 2: SEA Themes, Objectives and Sub-objectives

	Objective	Sub-objective
Protect and enhance natural and cultural heritage	**A** Protect places, landscapes and buildings of historic, cultural and archaeological value	Deliver conservation programmes for monuments in state care, alongside the designation of further heritage assets
	B Protect and enhance landscapes, seascapes, townscapes and the countryside	Improve the quality of the local built environment
		Develop an integrated approach to eco-system health
		Improve management of common land
		Protect and enhance access to the coastline and countryside
		Avoid significant alteration to urban landscape character
	C Protect and enhance biodiversity	Protect internationally, nationally and locally designated nature conservation sites
		Protect Biodiversity Action Plan (BAP) habitats and species, increase area of habitat

	Objective	Sub-objective
Protect and conserve natural resources	**D** Protect and improve the region's water quality	Monitor and regulate known and emerging environmental hazards
		Protect and enhance the quality of groundwater, rivers, lakes, and coastal waters
		Comply with 'good' status under the Water Framework Directive (WFD)
		Protect and enhance salmonid and other fisheries
		Avoid physical disturbance to the water and water edge environment
		Reduce diffuse pollution from agriculture, acid precipitation and other sources
	E Protect the water resource and ensure its sustainable use	Maintain levels of abstraction and recharge within the carrying capacity of the region
		Maintain and enhance ground and surface water physical, ecological and chemical quality
		Monitor use and discharge rates

	Objective	Sub-objective
Protect and conserve natural	**F** Guard against land contamination, encourage reuse of existing buildings and of previously developed land of low ecological quality	Use planning policy to identify suitable previously developed land
		Use planning policy to encourage the re-use of existing buildings
		Monitor and regulate known and emerging environmental hazards. Maintain and update contaminated land data and strategies

	G Minimise the requirement for energy generation, promote efficient energy use and increase the use of energy from renewable resources	Generate up to twice as much renewable electricity annually by 2025 as is generated today
		Introduce higher energy conservation standards in constructing new housing
	H Minimise waste, and increase re-use, recycling and recovery rates	Restrict biodegradable materials going to landfill
		Re-use materials from existing buildings
	I Minimise the need to travel; provide alternatives to car use	Optimise opportunities to work locally
		Promote sustainable transport
		Protect and enhance public transport systems
		Legislate to place a duty to provide cycle routes in key areas

Maintain and improve the human environment	**Objective**	**Sub-objective**
	J Limit and adapt to climate change	Reduce emissions of greenhouse gases
		Provide measures to enable adaptation to climate change
		Ensure infrastructure and material assets are resilient to potential increases in extreme weather events (such as storms, floods and heat waves, as well as extreme cold weather).
		Ensure that communities are resilient to changes in weather patterns by protecting resources and by promoting awareness of the need to adapt to extreme weather events
		Build in flexibility to enable the modification of assets in the future without incurring excessive cost.
		Work to ensure we have a sustainable food and fisheries industry
		Protect and manage soil
		Reduce the risk of flooding
		Complete flood and coastal risk plans

Maintain and improve the human environment	**Objective**	**Sub-objective**
	K Protect and improve air quality	Minimise the use of processes that produce toxic air pollutants, and incorporate extensive safety and capture processes for those that occur
	L Improve physical and mental health and reduce health inequalities	Minimise environmental nuisance such as fly-tipping, littering, dog fouling, graffiti, noise pollution, and light pollution
		Promote the provision of opportunities for disadvantaged communities.
		Monitor and regulate known and emerging environmental hazards
		Protect and enhance existing greenspace

	M Improve public access to land	Improve opportunities to access green space
		Ensure that disadvantaged communities have opportunities to access greenspace and open countryside and to benefit from such access

	Objective	**Sub-objective**
Protect the marine environment	**N** Protect seabed features so that they can support the processes, habitats and species characteristic of the marine landscapes.	Protect coastal processes from ecologically-significant change due to human activity, and reverse such change where practicable
		Protect seabed habitats from ecologically - significant change due to human activity, and reverse such change where practicable.
		Protect biogenic structures from ecologically-significant change due to human activity, and reverse such change where practicable.
	O Protect water column features so that they can support the characteristic processes, habitats and species	Protect the water column features from ecologically-significant change due to human activity, and reverse such change where practicable.
	P Protect the water quality of the component water column features so they can support the processes, habitats and species characteristic of the water column and associated seabed habitats.	Maintain or recover water quality to within defined standards which aim to prevent 'undesirable disturbance' caused by eutrophication.
		Ensure that environmental standards are not exceeded.
		Maintain noise and vibration levels below precautionary standards aimed at protecting vulnerable marine species from disturbance
		Reduce input of litter to the marine environment to below levels aimed at protecting vulnerable marine habitats and species
	Q Maintain biota quality	Ensure standards for contaminants in biota are not exceeded

2.3.6 It should be noted that the objectives are not scored or weighted, since they are interdependent and potentially mutually reinforcing. However, it is recognised that *within* some objectives there is a hierarchy of priority concerns. For example the objective to 'protect and enhance biodiversity' implies that in some circumstances, *avoidance* must be the only option (in the case of ancient woodlands, say, or of designated habitats and species), whereas in others, *mitigation* and/or *compensation* might be appropriate. In any case, all mitigation and compensation measures must ensure an *enhancement* of the status quo wherever possible, should relate to any development proposal in terms of scale, and should be local to that proposal.

2.4 Development of SEA indicators

2.4.1 A set of indicators was developed using similar sources of literature, including a number of constituent spatial plans and strategies and their SEAs (see references to the main report), and linked to the 53 sub-objectives referred to above. The indicators and the objectives to which they relate are shown in tables 8 and 9 of the main report and in Annex I.

2.5 Assessment methodology

2.5.1 The assessment consists of analysing each of the IWOP's key measures against the objectives of the SEA, based on a range of criteria derived from the Directive and supporting guidance. The results are aggregated and set out as a basic compatibility test and can be seen in section 11 of the main report. Annex II of the main report provides a fuller account of this assessment.

2.5.2 The criteria for the detailed analysis were developed on the basis of advice given in the ODPM guidance document, which refers to *'...scale and permanence and the nature and sensitivity of the receiving environment.'* (p.32) and the advice given by DG Environment[23]

2.5.3 The assessment is made on the basis of a number of assumptions regarding terminology. Some reference has been made to the ecosystem approach. This term is not used in the draft IWOP, although reference is made to ecosystem services in relation to ToA6 (page 60). The term 'climate change adaptation' is used widely. It is assumed that this refers to various activities including technological approaches as well as land management and spatial policies and planning. The IWOP aims to address climate change concerns in the context of a 'jobs and growth agenda'.

[23] "Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment". DG Environment. Undated.

3 ENVIRONMENTAL ISSUES

3.1 Introduction

3.1.1 The area comprises three distinct 'environmental systems' - North and West Wales; south east/mid-east Ireland; the Irish Sea. Whilst each has its own environmental characteristics, there is a clear environmental relationship between them, especially in terms of climate and marine currents. Although the prevailing winds are west to north west, there may be some effects in terms of air currents, although given the largely rural nature of both regions (apart from the obvious exception of Dublin), air pollution from industry and transport is unlikely to be a significant transboundary factor.

3.1.2 The scoping process sought to identify the key environmental issues that will influence the development of the IWOP, and to highlight those issues that are relevant to the achievement of its objectives. Sections 4 to 7 of the main report describe the current state of the terrestrial and marine environments in Ireland and Wales, in order to provide a context for understanding the potential for both positive and negative effects that may arise from implementing the IWOP.

3.2 Sourcing baseline data

3.2.1 'Ireland's Environment - An Assessment' was published by the Environmental Protection Agency in 2012[24]. In Wales, the State of the Environment Statistical Bulletin (2012) provides an annual summary on a range of indicators reviewing the state of the environment in Wales, and allocates them a status based on their long term trends[25]. The results for individual indicators can be found in the 'State of Environment Report' that is published alongside the bulletin. In addition to the report, data are available via the StatsWales website[26]. These documents provide important information at a national level, as well as useful statistics and assessments of pressures and trends. They also informed the formulation of the SEA objectives in this report.

3.3 Summary of issues

3.3.1 The European Commission is set to publish a Seventh Environmental Action Programme, which will address a number of issues, including:

[24] http://www.epa.ie/pubs/reports/indicators/00061_EPA_SoE_2012.pdf

[25] http://wales.gov.uk/topics/statistics/ theme/environment/?lang=en#

[26] https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside

- the rapidly changing external conditions and the **increasingly interlinked nature of environmental, economic and social challenges**
- **increased growth in the demand for natural resources and the impacts this has on the environment**
- the enlargement of the EU and the increased diversity of national characteristics and circumstances
- **pressure on ecosystems, biodiversity loss, waste generation and air quality in urban areas**
- the uneven implementation of environmental law across Europe.

The issues highlighted have a clear resonance with this report, and reflect some of the concerns expressed below.

3.3.2 Each of the 'environments' described in sections 6 to 8 has its own environmental priorities and challenges. In Wales, **development, agricultural intensification, erosion, pollution** and **loss of carbon** are all potential challenges, with potential impacts on human health, food productivity, biodiversity, ecosystem functions and the economy. **Halting biodiversity loss** is a major concern.

3.3.3 In Ireland, two primary areas where unsatisfactory conditions are prominent and extensive are **eutrophication** and other **water pollution** and the **unsatisfactory conservation status of natural habitats** and species. **Remediation of contaminated land** is also an important issue[27]. A number of dwellings in rural areas on both sides of the Irish Sea rely on septic tanks, some of which are in poor condition and pose a threat to soils and groundwater. This is highlighted in a number of Irish local plans.

3.3.4 **Fragmentation** through development, and the **conversion of land** from one use to another, as well as **intensification**, are seen as some of the underlying causes. **Erosion and silting**, as well as **nutrient loading**, have a particular negative effect on the quality of rivers and their chemistry and biodiversity. Furthermore, major land-use changes can significantly impact the **quality of the marine** (**particularly coastal**) **environment** (e.g. sedimentation, hydrographic change, impacts on benthic eco-system, etc).

3.3.5 In both regions, protected European areas and species are under pressure from the activities of other sectors**. Invasive species** are on the

[27] South-East Regional Authority Regional Planning Guidelines 2010-2022. Environmental Report and Habitats Directive Assessment page 28

increase, a situation likely to be exacerbated by climate change. In some areas, invasive species are seen as a particular threat[28].

3.3.6 For Ireland and for Wales, the issue of **population growth** with its attendant **demands on natural resources**, is a common theme. An **increase in traffic** will increase the likelihood of **local and regional air pollution**, as well as contributing greenhouse gases. For both regions, **climate change** will increase the likelihood of devastating storm conditions, and **sea level rise**poses a threat to the coastal communities on both sides of the Irish Sea. **Increasing tourism development** along the coasts is likely to add to pressures unless managed.

3.3.7 The threats from human activities to marine geological and geomorphological features derive from significant **dredging** and **dumping** activities and from **engineering works**. For most of these, effective present day controls exist but are not applied directly for Earth heritage conservation purposes because important sites have not been identified. In Wales, Cadw is aware of the significance of drowned landscapes and is particularly concerned about the possible impact of **offshore development**. Cable-laying for connection from offshore wind turbines to the inshore infrastructure are likely to cross sensitive areas where buried Mesolithic littoral settlements might be expected.

3.3.8 Threats to marine biodiversity are also of concern. These include **by-catch**, the incidental entanglement in nets of marine mammals such as small cetaceans and seals. The EU's By-catch Regulation 812/2004 requires monitoring of cetacean by-catch in pelagic trawl fisheries. **Overfishing** will potentially impact negatively on marine mammals directly through reducing the biomass of fish available, and indirectly by causing changes in the marine ecosystem. **Climate change** will result in changes to structures and distribution of marine species, and the increased possibility of disease. Warm water species may increase, as cold water species move northwards. Rising sea levels may alter the locations of haul out sites for seals, or reduce their availability. **Pollution** poses a threat to marine ecosystems. PCBs and toxic algal blooms are known to be associated with disease and neurological dysfunction in marine mammals[29]. The integrity of designated shellfish waters is critical to maintaining sustainable livelihoods, in enabling local consumption and in

[28] Wexford County Development Plan 2013-2019. Volume 8: Strategic Environmental Assessment June 2012

[29]Jepson, P.D., Bennett, P.M., Deaville, R., Allchin, C.R., Baker, J.L., Law, R.J. 2005. Relationships between polychlorinated biphenyls and heath status in harbour porpoises (*Phocoena phocoena*) stranded in the United Kingdom. Environmental Toxicology and Chemistry 24:238-248

minimising processing costs. Shellfish also act as a nutrient sink thus contributing to water quality improvement.

3.3.9 **Plastics** are an increasing threat to marine mammals, which ingest particles, become entangled in plastic objects or choke on them. **Noise** is of increasing concern in the marine environment, especially with the development of offshore energy rigs and wind farms, as well as an increase in marine transport and leisure craft. Studies have shown a sensitivity of marine mammals to construction and operational noise[30]. Finally, the threat of **invasive species** from seaborne traffic should not be overlooked, especially in the context of cross-border marine tourism.

3.3.10 Resultant effects are broadly of five types. They may be **spatial,** for example air or sea borne pollutants and invasive species may be carried across great distances, so that the effects are felt internationally. In the case of the IWOP, the prevailing winds are south-west to north-east, as are the sea currents, so that polluting effects of this sort are likely to be felt in the Isle of Man and north into Scotland. Agricultural pollutants will have a diversity of negative effects downstream, affecting the environments of coastal communities. The case of small protected areas is of particular concern, since efforts to conserve and enhance their conservation status are likely to be challenged by activities taking place surrounding or well upstream from the site.

3.3.11 Interactions may also have a **temporal** dimension, in that effects may not be felt for a considerable time. Climate change is an example, whereby the effects of Victorian industrialisation have only become apparent in recent decades. On a smaller scale, the ingestion of pollutants by communities of plants or animals may take time to have an effect, but may result in a catastrophic breakdown as thresholds are exceeded. This is of particular concern, since problems may not be apparent until a critical, and probably unknown, threshold is surpassed. The build-up of toxins in underground watercourses are another area of concern.

3.3.12 Interactions are also **sectoral**. The activities of, say, the agriculture sector will have a profound impact on the capacity of the water sector to deliver clean water to communities. For its part, the water sector will impact on

[30]Madsen, P.T., Wahlberg, M., Tougaard, J., Lucke, K. and Tyack, P. 2006. Wind turbine underwater noise and marine mammals: implications of current knowledge and data needs. Marine Ecology Progress Series 309:279-295; Carstensen, J., Henriksen, O.D. and Teilmann, J. 2006. Impacts of harbour porpoises from offshore wind farms construction: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs). Marine Ecology Progress Series 321:295-308; Koschinski, S., Culik, B.M., Henriksen, O.D., Tregenza, N., Ellis, G., Jansen, C. and Kathe, G. 2003. Behavioural reactions of free-ranging porpoises and seals to the noise of a simulated 2 MW windpower generator. MarineEcology Progress Series 265:263-273

other interests by its abstraction policies, and by its take of land for reservoirs. Both activities will diminish biodiversity, and will also impact on the availability of land for agriculture or for development. Tourism is an important economic driver in Wales and in Ireland, but it makes significant demands on natural resources, that may become unsustainable. There may also be impacts on social and cultural interests, as places and cultures become commodified, and as the availability of housing stock diminishes for local people. A major element factor in tourism in both areas is seafood. This sector relies on high water quality in order to meet appropriate standards.

3.3.13 Such interactions are **thematic** - air quality is a public health issue, but it is also a factor in climate change. These are environmental issues, but they are also social and economic. Flood and coastal protection schemes have in some cases impacted on biodiversity[31]. A significant number of houses in some areas are connected to septic tanks[32]. Septic tank failures could result in groundwater pollution, which is a public health hazard and may impact on biodiversity. Landscape is linked both to historic and cultural assets and to biodiversity.

3.3.14 **Synergistic** effects relate to the interactions of any of the above effects, in that any one activity may, by itself, not have a significant effect, but that taken together the effect may be profound, both positive and negative. This may derive within a single sector, such as energy or housing whereby a discrete, relatively few number of rigs, masts or dwellings may not have a significant visual or landscape impact, but with increases in infrastructure the landscape and biodiversity will be impacted on. Synergistic effects may also occur as a result of the combination of interventions across sectors and interests. Thus the loss of farmland birds may be attributed to a number of factors, of which agricultural practices may not be the only one. Cumulatively, such synergistic effects may result in the exceedance of thresholds and may have significant results. Conversely a range of mutually supporting activities may have significant positive effects.

3.3.15 The clear conclusion is that projects assessed through the IWOP will need to be considered not only for their immediate environmental and other effects, but on a broader consideration of spatial and temporal basis, and for their effects across other sectors and themes. The ecosystem

[31] See for instance Kilkenny City and Environs Development Plan SEA 2008 page 5

[32] For example, in North Tipperary in 2006 more houses were connected to septic tanks (10,990) than to public sewers (10, 877). See North Tipperary County Development Plan 2010-2016 Strategic Environmental Assessment NTS page 13

approach should be adopted to any project or proposal that emerges (see Annex IV to the main report for a discussion on the ecosystem approach).

4 THE IRELAND-WALES CO-OPERATION PROGRAMME

4.1 Introduction and context

4.1.1 The Ireland-Wales (IW) Co-operation Programme covers an area of about 40,000km^2, with a population of approximately 4 million people. The area comprises Dublin, Mid-East & South-East, and South-West regions in Ireland and the Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Ceredigion, Pembrokeshire, Carmarthenshire, Swansea, Flintshire and Wrexham in Wales. Due to changes in local government structures in Ireland, North Tipperary County Council and South Tipperary County Council will merge which may result in the whole county being included within South East Ireland region and therefore becoming part of the Programme area. The South West region in Ireland, and Swansea, Flintshire and Wrexham in Wales are included as adjacent areas, which means that they are eligible for a maximum of ten per cent of the allocated ERDF funding. Seventy per cent of the population of the programme area is based in Ireland, and thirty per cent in Wales; the population difference is largely due to the inclusion of the Dublin region where over half of the Irish population of the programme area lives.

4.1.2 The overall strategy of the EU, the Europe 2020 strategy, is about delivering smart, sustainable and inclusive growth. The Europe 2020 strategy aims for social and economic cohesion through effective investments in eleven thematic objectives (TOs), of which three (TO1, TO5 and TO6) have been selected for the programme.

4.1.3 A critical element is Horizon 2020, the EU's Framework Programme for research and innovation. This consists of three pillars, namely ‘excellent science’, ‘industrial leadership’ and ‘societal challenges’. The specific societal challenges most relevant for the IW programme are:

- food security
- sustainable agriculture and forestry
- marine and maritime and inland water research
- the Bio economy
- Climate action, environment, resource efficiency and raw materials;
- Europe in a changing world - inclusive, innovative and reflective societies.

4.1.4 The ‘Maritime strategy for the Atlantic Area’ (adopted in 2011) and the subsequent ‘Action Plan for a Maritime Strategy for the Atlantic Area’ (published in May 2013) are both significant for the IW cooperation programme given the prominence of the Irish Sea within the programme

area. The Action Plan considers responses to the challenges of delivering growth, reducing the carbon footprint, sustainable use of the sea's natural resources, responding effectively to threats and emergencies and implementing an "ecosystem" management approach in Atlantic waters. It contains four overarching priorities:

- Promote entrepreneurship and innovation;
- Protect, secure and enhance the marine and coastal environment;
- Improve accessibility and connectivity;
- Create a socially inclusive and sustainable model of regional development.

4.1.5 Table 3 summarises the types of action that will be supported by the programme.

Table 3: Priority Axes and Types of Action

PRIORITY AXIS	TYPES OF ACTION
Axis 1 Innovation	**ToA1: Building capacity** 1. Bringing together organisations who do not usually work together to stimulate cross-border collaboration and the development of fresh ideas and concepts; 2. Improving the transfer of knowledge between HEIs, research institutes and SMEs; 3. Activities which facilitate the transfer of skills, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities to ensure that scientific and technological developments are accessible to a wider range of users and in particular to SMEs; 4. Joint cross-border design of innovative solutions which could include piloting, testing or finding ways to overcome barriers to innovation, particularly those faced by SMEs; 5. Developing both physical and digital cross-border low-cost hubs or networks for innovative businesses and sectors – including networks aimed at core skills and identifying business opportunities; and innovative business networks based on the geographical characteristics of the region, i.e., small towns and rural environments.

	6. Pilot actions on developing knowledge exchange and collaboration tools. **ToA2: Translation of research and innovation processes into new and improved commercial products, processes and services** 1. Piloting initiatives on a cross-border basis to develop and test and transfer innovative products, prototypes, processes or services with commercial potential; 2. Developing and launching innovative new uses and adaptations for existing technology, processes or services into new markets using cross-border networks; 3. Marketing of innovation products, processes and services and expansion of available markets assisted by the sharing and development of best practice, expertise and experience on a cross-border basis; 4. Commercialisation, protection and exploitation of research (including applied research to improve market readiness); 5. Support for the development of cross-border smart specialisation clusters with a focus on commercial application of research and innovation; 6. Transferable models to assist internationalisation of SMEs and trade developed using cross-border partnerships. **ToA3: Delivering societal benefits through innovation** 1. Designing and demonstrating products, services and processes which address issues faced by populations which are isolated, excluded or at risk of exclusion including corporate social responsibility initiatives; 2. Developing and delivering cross-border services or financial tools that address the demographic or social challenges highlighted in the Programme area, in particular unemployment, deprivation, health inequalities, rural peripherality /isolation and social integration; 3. Developing cross-border clusters or networks focussing on social and economic development of communities – particularly coastal and rural communities; 4. Cross-border support and cooperation for social enterprises to engage in innovation – including developing low cost cross-border hubs and clusters; actions to improve communications and connections between social enterprises and organisations active in innovation; and cross-border partnerships between HEIs and research institutes, businesses and the community and sharing

	and development of best practice and models on a cross-border basis **ToA4: Eco-innovation** 1. Piloting initiatives to develop and test innovative products, prototypes, processes or services in adaptation and the renewable energy sector – especially marine energy production – including cross-border research into adaptation solutions, renewable energy sources and pilot projects to demonstrate practical application and transferability to business and wider communities; 2. Applied collaborative research and innovation on climate change adaptation, including new concepts, approaches, products, processes, services and technologies with cross-border participation by HEIs, research institutes, business, the public sector and third sector – particularly focussed on the maritime environment; 3. Cross-border demonstration and testing of new products, services, processes and systems relating to climate change adaptation in businesses, communities and the natural environment; 4. Creation of cross-border eco-innovation clusters or networks around the Irish Sea – creating a platform for HEI , third sector, businesses and public sector agencies to collaborate and co-ordinate their activities on a cross-border basis to meet the needs of the Programme area – for example a portal based on the Irish Sea; 5. Operations which develop the concept of the citizen scientist (i.e. community involvement) working innovatively with HEIs and other research organisations.
Axis 2 Climate Change Adaptation	**ToA5: Developing and Implementing Adaptation Solutions** **1.** Joint actions to understand the threats and opportunities from climate change on the environment, infrastructure, health, business, tourism and communities of the Programme area and spatial differences in these impacts; 2. Developing capabilities across the Programme area to identify, quantify and assess existing vulnerabilities and future risks from climate change e.g. impacts/ scenarios (positive/negative) on economic development (and particularly on businesses), social inclusion and natural resources – exchanging best practice and producing cross-border models; 3. Activities which increase an understanding of the evidence base on the impacts of climate change on the Irish Sea and supporting

	activities including the sharing of best practice models; 4. Develop adaptation actions to minimise the threats or maximise the opportunities to sectors, organisations, and communities in the area; 5. Developing evidence based cross-border adaptation strategies, management plans and pilot projects to turn what otherwise might be negatives into opportunities (such as warmer summers) – particularly related to the marine and coastal environment; 6. Delivery of relevant cross-border adaptation measures, particularly for coastal communities and marine environment; 7. Cross-border measures to encourage the use of climate change adaptation strategies and adaptation measures – including action plans to promote uptake and sharing of expertise and best practice models; 8. Transferring knowledge, expertise and best practice on adaptation measures between the two regions of the Programme area; 9. Piloting climate change adaptation measures; 10. Sustainable management of the marine environment, ecosystems and biodiversity which are threatened by climate change; 11. Stimulating awareness amongst the communities of the Programme area to influence behavioural change, knowledge awareness and best practice with regard to climate change adaptation; 12. Developing the knowledge base on adaptation to climate change, monitoring, surveying or mapping to reduce uncertainty to eco-systems, biodiversity and aquaculture particularly focused on the Irish Sea.

3 Cultural and natural resources and heritage	**ToA6: Enhancing sustainable economic growth** 1. Cross-border promotion of business opportunities which take full advantage of the sustainable management of natural resources, such as niche tourist attractions, including coastal and cultural attractions and maritime heritage sites – including cross-border marketing approaches; and the implementation of cross-border events and communication measures to increase interest; 2. Cross-border maritime tourism development – such as support for tourism at sea including developing and testing best practice

	models; 3. Development of entrepreneurial activity, SMEs and micro-enterprises active in the natural heritage and sustainable resource management, tourist, creative and cultural heritage sectors (particularly utilising existing strengths in this sector) – including testing and demonstrating different approaches to revive or enhance these industries; and sharing best practice, expertise and experiences on a cross-border basis; and supporting the expansion or commencement of businesses in these areas; 4. Cross-border promotion of the socio-economic value of traditional maritime and in-land industries and fisheries – including testing, demonstrating, and sharing different approaches to revive or enhance these industries; 5. Supporting the development, production and commercialisation of products, processes and services based on unique cultural and local characteristics; 6. Enhancing the environment – particularly the coastal and marine environment – in order to support green and blue growth; 7. Piloting actions and initiatives which maintain, preserve and promote the natural and cultural heritage in the Programme area. **ToA7: Developing and Promoting Socially Inclusive Sustainable Development** 1. Community regeneration through sustainable development and job creation based on cultural and natural heritage – particularly focused on coastal and rural communities and where common problems are faced or opportunities are available on both sides of the Irish Sea – including promotion and development of cultural heritage initiatives with emphasis on supporting economic development; 2. Using traditional, cultural and creative strengths to improve an area and make it a more attractive place to live, relocate, work and visit – including the sharing of expertise and developing projects based on joint strengths; 3. Engaging communities in the conservation of their natural and cultural heritage – including creating capacity within communities to engage and share best practice and ideas in innovative community, environmental and economic development; support for the development and promotion of joint environmental enhancement activities; and cross-border partnerships between research stakeholders and the community;

	4. Developing expertise and best practice identifying cross-border models for healthy living through outdoor activities and sport and piloting these models; 5. Sharing expertise on a cross-border basis to make the area a more attractive place to live, relocate, work and visit – including the development of knowledge transfer clusters.

5 ASSESSMENT OF THE IRELAND-WALES OPERATIONAL PROGRAMME

5.1 Testing the compatibility of the SEA objectives and the RDP measures

5.1.1 The purpose of this section is to analyse each measure and to consider the likelihood of environmental effects, and the significance of those effects as far as possible. Table 4 provides an overall assessment of the measures. A more detailed analysis can be found in the main report and in Annex II to the report

Table 4: Overall assessment

Type of Action (ToA) 1	Likely ✓/×	Comments
1	**0/✓**	Minimal positive effect likely. Opportunities for climate change adaptation through sharing fresh ideas and collaboration. Unlikely to reduce travel, and projects may stimulate more cross border travel.
2	**0/✓**	As above - transferring knowledge between research and SME's should have small positives for climate change adaptation.
3	**0/✓**	As above. Not likely to have a significant effect, but positive where it does occur.
4	**?/✓**	Some minor concerns about local effects on local amenity - depends on interpretation of 'overcoming barriers to innovation'. Otherwise potential small positives.
5	**?/✓**	As above - minor concerns about amenity effects of development in smaller settlements. Otherwise significant potential for environmental benefits including efficiencies in energy/water use and waste management.
6	**0/✓**	As in actions 1-3. Opportunities exist for minor positive gains.

Type of Action (ToA) 2	Likely ✓/×	Comments
1	**?/✓**	Depends on definition of ' products, prototypes, processes or services'. Some concerns about impacts on terrestrial and marine biodiversity, and amenity. Otherwise opportunities to innovate in the sphere of climate change adaptation and ecosystem management. Commercial success may bring about pressures to expand processes in sensitive areas?
2	**?/✓**	New uses and adaptations of innovative technology likely

		to have some positive outcomes, but with reservations as above.
3	**0**	Marketing of itself not likely to have significant effects within the programme's life.
4	**0**	As above. Unlikely to have a measurable/attributable effect. The terms 'commercialisation and exploitation' need to be weighed against the potential local effects.
5	**?/✓**	Development of 'clusters' (physical?) may have benefits in terms of sustainable energy/natural resource use. Application of innovative technology likely to have some positive outcomes.
6	**?/✓**	Generally positive where the focus is on climate change and environment. 'Internationalisation' may result in increases in travel.

Type of Action (ToA) 3	**Likely ✓/×**	**Comments**
1	✓	Significant potential for environmental benefits in terms of sustainable resource use, energy savings, efficiencies and waste recycling. Potential to improve physical and mental health.
2	✓	As above - potential to reduce the need to travel, reinforce social cohesion, improve communications, etc. (human health and wellbeing, travel).
3	✓	As above. Actions that focus on climate and ecosystem services will provide significant benefit at local levels, as well as supporting peripheral communities. Minor concerns about local impact of development should be addressed via the planning system.
4	✓	As above.
Type of Action (ToA) 4	**Likely ✓/×**	**Comments**
1	**?/✓**	Potential to develop and promote adaptation measures will deliver positive outcomes for sustainable energy. Concerns around impacts of development, especially in relation to the marine environment. EIA may be required for certain projects. Significant opportunity to develop renewables.

2	**?/✓**	Depends on interpreting ' innovation on climate change adaptation' and ' new concepts and approaches.' The Ecosystem approach to the marine environment will offer significant benefits. If projects are purely technological/ mechanical, there may be concerns regarding the marine environment.
3	✓	Significant potential to deliver environmental benefit, especially where communities are engaged in the development of climate change adaptation measures that are not purely technical.

4	**0**	Unlikely to be a significant impact by itself, especially in the short term.
5	**0**	As above.

Type of Action (ToA) 5	Likely ✓/×	Comments
1	**?✓**	Whilst unlikely to deliver benefit in the short term, an understanding of such interactions including ecosystem function has the potential to deliver significant positive outcomes, especially to biodiversity and the quality and productivity of water and of the coastal/marine environment.
2	**?✓**	As above.
3	**?✓**	As above.
4	**?✓**	Depends on the adaptation actions envisaged. The ecosystem approach must be considered in order to optimise benefit whilst addressing potential threats from climate change.
5	**?**	There are potential benefits in terms of technological development for renewables of some types. Changes in land use may pose a threat to biodiversity, and increased tourism development may have implications for coastal and marine environments.
6	**?✓**	Adaptation measures will need to be based on the ecosystem approach in order to adapt for the longer term whilst delivering environmental benefits to biodiversity and developed opportunities to convert to aquaculture.
7	**?✓**	As above. Considerable potential for environmental benefit is based on interpreting 'adaptation'.
8	**0**	Not likely to generate significant positive outcomes by itself. Neutral.
9	**?✓**	As in 6 and 7. Piloting measures will be a valuable way of deriving evidence for larger scale measures.
10	**✓✓**	Significant environmental benefits likely to accrue. Critical to adopt the ecosystem approach to resources that recognises the value of ecosystem services, the functions of ecosystems and the interactions between them. A lack of this approach may fail to optimise potential.
11	**0✓**	Some minor positives, longer term, needs to form part of a wider initiative.
12	**✓**	Though unlikely to deliver positive outcomes in the short term, is central to climate change adaptation measures, especially in the marine context.

Type of Action (ToA) 6	Likely ✓/×	Comments
1	**?/×**	This action raises concerns, depending on the term 'take full advantage of sustainable management'. Requires appropriate management - potential to impact negatively on sensitive sites, especially in marine areas and on coastlines. Potential increase in travel, noise, light, waste, pollution and infrastructure development, as well as potential for non-native invasive species in relation to promoting cross border maritime tourism. Will need careful consideration and possible EIA.
2	**?/×**	There is a potential for negative pollution from vessel discharges. There may be a need for port infrastructure upgrade, as well as impacts from increased numbers of cruise tourists in sensitive areas. Potential disturbance to cetaceans may be an issue, as is the potential for non-native invasives carried by cruise vessels. Critical need for EMS/awareness on the part of operators, and EIA.
3	**0✓**	Potential for small scale benefits in terms of health and well-being in peripheral communities; improved natural resource management; re-use of redundant buildings. Local development may impact but unlikely to be significant.
4	**0✓**	Mainly neutral, though traditional industries depend on high quality environments including marine and river systems, with traditionally managed woodland.
5	**?✓**	Linked to branding, potential benefits from maintaining high quality environments. Commercialisation may result in development impacts.
6	**?✓**	Potential benefit but 'enhancing the environment... in order to support green and blue growth' depends on a careful analysis based on the ecosystem approach.
7	✓✓	Likely to result in significant environmental effects.

Type of Action (ToA) 7	Likely ✓/×	Comments
1	✓	Potential to promote links between development of social/community enterprises and high quality environments - opportunities to improve local environments.
2	✓	Measures to improve natural and built environment. Reinforcement of traditional skills will promote ecosystem function.
3	✓	As 1
4	**?✓**	Some positive effects from the management of high quality environments that promote access and well-being. However, there may be issues with regard to sensitive environments, including marine environments. Impacts on terrestrial and marine biodiversity possible.

5	**?**	There is a need to define 'attractive'. In some cases this may be taken to imply development and infrastructure, as well as high impact activity. Need for careful consideration.

5.1.2 **Conclusion**

The programme overall provides opportunities to significantly impact positively on the environment. However, it is not possible to be categoric. Of the **forty-five actions** described, **eleven** can be said with confidence to **offer significant positive effects**. In **eighteen** cases, **positive effects depend on the type, scale and location of the actions**. In these cases the effects may be **both positive and negative** depending on which environmental aspects are considered. In **twelve** cases the effects are likely to be **neutral or minimally positive** as far as can be seen.

5.1.3 In **four** cases there is some concern:

- **ToA5, action 5** refers to turning '...what otherwise might be negatives into opportunities (such as warmer summers...'

There are a numbers of implications, including more pressures on coastal tourism and on terrestrial/coastal environments in response to land use changes.

- **ToA6, action 1** refers to '...business opportunities to take full advantage of the sustainable management of natural resources...', in the context of '...niche tourist attractions...'
- **ToA6, action 2** refers to '...marine tourism development...'

There is a distinct possibility of negative environmental effects unless these are carefully assessed in the context of specific proposals, individually and cumulatively. Issues include seaborne invasives, disturbance to marine wildlife, marine infrastructure and coastal development.

- **ToA7, action 5** refers to making the area '...a more attractive place to live, relocate, work and visit...'

Depending on how the term 'attractive' is interpreted, there may be pressures arising from domestic and infrastructure development as a result of attracting more settlement, tourism and businesses, with their attendant demands.

5.1.4 Finally, whilst renewables technologies contribute significantly to reductions in carbon-based energy and to emissions, there were some concerns over their effects on the amenity and the biodiversity of the coastal and marine environment.

5.1.5 As a matter of principle, the key to minimising negative environmental impact should be **avoidance**, and therefore projects likely to impact negatively on environmental interests should not be supported via this programme. Where there might be a conflict between one environmental interest and another, rigorous analysis of a project's implications should determine whether and how to proceed. Any project that might trigger an EIA should be subject to particular scrutiny.

6 ALTERNATIVES

6.1 Selection of alternatives to the proposed Operational Programme

6.1.1 The SEA Directive requires a discussion of reasonable alternatives to the proposed IWOP. The Directive does not specify what is 'reasonable' but does state (in paragraph 5.12) that a discussion of alternatives should include *'...the likely evolution of the current state of the environment without the implementation of the alternative'.* The Directive does not specify whether 'alternatives' means alternative programmes, or different alternatives *within* the proposed programme.

6.1.2 The purpose of analysing alternatives is to determine whether the proposal offers the optimal option in terms of sustainable development. The priorities and themes are not prioritised in any way, since the underlying rationale is that they are mutually reinforcing and therefore equally important for achieving the overall programme objectives.

6.1.3 Whilst it might be possible to envisage a range of scenarios, such as an 'economic growth first' scenario as opposed to, say an 'environment first' or a 'food security first' scenario, as is common in many policy forecasting studies, it would be inappropriate in this case, since the EU, Irish and Welsh Governments have indicated that the scenario they seek is a 'sustainable development' scenario which seeks to integrate social, environmental and economic priorities. There is thus no definitive 'first', since it is not the intention to seek 'trade-offs'.

6.1.4 Assuming this, there are a number of constraints in terms of alternatives including:

- Time - the IWOP is subject to a seven-year timescale. Whilst it may be possible to manage the pace of proposals within this time period, it is likely that most will not be realised within, say the first two years. It is not reasonable to discuss operational timescales beyond the remaining five-year window.

- Funding - this appears to have increased from €70.3m under the 2007-2013 programme to €79.2 for the 2014-2020 period[33]. It would not be reasonable to discuss alternative global figures, since the figure is settled.

[33] Commission implementing decision of 16 June 2014. Annex I page 22.

- Deployment of funds - Article 9 of the Common Provisions Regulation (1303/2013) identified eleven thematic objectives (TOs). Article 6 of the Specific Provisions for ERDF support for territorial co-operation requires that at least eighty per cent of the fund shall be concentrated on a maximum of four of the eleven TOs. The Ireland-Wales partnership might have considered alternative TOs to the three selected, or may have opted to select a fourth TO. It would perhaps not be reasonable to explore every possible combination, but it is noted that one TO places an emphasis on transport infrastructure, others on poverty and employment issues, another on education and another on public administration.

- Policy - it would not be reasonable to consider alternatives that are not consistent with EU, UK and Wales policies.

6.1.5 It is a requirement to consider what might be the state of the environment without programme implementation, and this 'do nothing' option is therefore one of the alternatives selected. By 'do nothing' is meant literally withdrawing support for interregional cooperation.

6.1.6 Another alternative might be to continue with the 2007-2013 programme.

6.1.7 It should be noted that of the eleven options identified in the regulation, the three TOs in the programme include the two most overtly environmental TOs available, namely:

- Promoting climate change adaptation, risk prevention and management
- Protecting the environment and promoting resource efficiency

6.1.8 Table 5 considers the likely effect on the SEA objectives of each of the following options:

1 Do nothing
2 Continue the existing Programme
3 TO group A - transport infrastructure
4 TO group B - education for employment
5 TO group C - institutional capacity
6 TO group D - private sector/SME investment
7 Implement the proposed Programme.

Whilst it is somewhat speculative, it reflects a detailed analysis of a wide range of programmes and strategies based around these themes, as well as an aggregated assessment of the objectives of the 2007-2013 and the

proposed 2014-2020 programme. The number of question marks reflects the levels of confidence and challenges in being categoric.

Table 5: Assessment of alternatives

		Alternatives						
		Do nothing	Continue as before	Transport infrastructure	Education for employment	Institutional capacity	SME/business	Proposed programme
SEA Objectives								
A	Protect places, landscapes & buildings of archaeological, historic & cultural value	?	✓?	×?	✓?	✓	×?	✓?
B	Protect/enhance landscapes, seascapes, townscapes & the countryside	?	✓?	×?	✓?	✓	×?	✓?
C	Protect/enhance biodiversity	?	✓	×?	✓?	✓	?	✓
D	Protect/ improve the region's water quality	×?	✓	×?	✓?	✓	O	✓
E	Protect the water resource; ensure its sustainable use	×?	✓	O	✓?	✓	?	✓
F	Guard against land contamination, reuse existing buildings & previously developed land of low ecological quality	×?	✓?	?	✓×	✓?	✓×	✓?
G	Minimise the requirement for energy generation use, promote efficient energy use & increase the use of energy from renewables	?	✓	×?	✓×	✓×	✓×	✓✓
H	Minimise waste; increase re-use, recycling & recovery rates	?	?	O?	✓?	✓?	✓×	✓?
I	Minimise the need to travel; provide alternatives to car use	?	O?	×	×	✓?	×	O?

J	Limit/adapt to climate change	**×?**	**✓**	**×**	**✓?**	**✓?**	**?**	**✓✓**
K	Protect/ improve air quality	**×?**	**✓?**	**×**	**×?**	**✓?**	**×**	**✓?**
L	Improve physical & mental health; reduce health inequalities	**?**	**✓?**	**✓×**	**✓?**	**✓?**	**✓?**	**✓?**
M	Improve public access to land	**?**	**?**	**×?**	**✓?**	**✓?**	**O**	**✓?**
N	Protect seabed features - support processes, habitats & species characteristic of the marine landscapes.	**×?**	**✓?**	**O**	**O**	**✓?**	**?**	**?**
O	Protect water column features - support the characteristic processes, habitats & species	**×?**	**✓?**	**O**	**O**	**✓?**	**?**	**?**
P	Protect water quality of component water column features - support processes, habitats & species characteristic of the water column & associated seabed habitats	**×?**	**✓?**	**O**	**O**	**✓?**	**?**	**?**
Q	Maintain biota quality	**×?**	**✓**	**?**	**✓?**	**✓?**	**?**	**✓**

6.1.9 **Conclusion**

The 2014-2020 IWOP contains elements of three of the alternatives, in that it aims to promote education and knowledge exchange, economic opportunities for both communities and for SMEs, and institutional capacity building. It builds on the 2007-2013 programme, partly as a result of research carried out in that programme on climate change and on the coastal and maritime environment[34].

6.1.10 Given that more funding is available for delivering the programme objectives there appear to be significant opportunities for positive

[34] Whilst not explicitly linked to the 2007-2013 programme, documents such as the Irish Government's 'Harnessing our Ocean Wealth: An Integrated Marine Plan for Ireland' (2012); 'Delivering Green Potential' (2012); and the National Climate Change Adaptation Framework (2012) have helped to drive the 2014-2020 proposals

environmental outcomes. On that basis, and depending on interpretation of some terminology, the proposed programme appears to be optimal.

8 MONITORING

8.1.1 The SEA of the European-level INTERREG Programme[35] states that:

'The highly indirectness (sic) *of potential environmental effects of the INTERREG EUROPE Programme due to its nature does not allow the identification of measures to monitor possible impacts on the environment by projects funded by this Programme. Thus, the monitoring must aim to ensure that no adverse effects to the EU environmental objectives and the EU environmental policy are supported by INTERREG EUROPE, even if the direct impacts will occur in the long run only.'*

8.1.2 However, the INTERREG regulation[36] itself identifies a set of environmental indicators, for monitoring and reporting purposes.

Table 6: Environmental indicators identified in the regulation

ENVIRONMENT		
Solid Waste	tonnes	Additional waste recycling capacity
Water supply	persons	Additional population served by improved water supply
	m^3	Estimated reduction of leakage in water distribution network
Wastewater treatment		Additional population served by improved wastewater treatment
Risk prevention and management	population equivalent	Population benefitting from flood protection measures
	persons	Population benefitting from forest fire protection and other protection measures
Land rehabilitation	hectares	Total surface area of rehabilitated land
Soil sealing	hectares	Change in land sealed due to development
Nature and biodiversity	hectares	Surface area of habitats in better conservation status
ENERGY AND CLIMATE CHANGE		
Renewables	MW	Additional capacity of renewable energy production

[35] see Dr. Dräger & Thielman (2014): http://www.interreg4c.eu/fileadmin/User_Upload/PDFs/INTERREG_EUROPE_Environmental_Report.pdf

[36] Annex to Regulation 1299/2013 on Specific Provisions for the support from the European Regional Development Fund to the European territorial cooperation goal.

Energy efficiency	households	Number of households with improved energy consumption classification
	kWh/year	Decrease of annual primary energy consumption of public buildings
	users	Number of additional energy users connected to smart grids
GHG reduction	Tonnes of $C0_2eq$	Estimated annual decrease of GHG

8.1.3 The potential for internal tensions between these indicators is apparent. Furthermore they are headline quantitative indicators, and therefore do not in themselves provide sufficient information on environmental outcomes. Whilst WEFO and its Irish counterpart will monitor a number of outputs and outcomes related to the above indicators, it is important that the monitoring of effects is more widely scoped.

8.1.4 Table 7 summarises some of the key monitoring bodies for the SEA objectives identified in table 2. University departments are commissioned to carryout monitoring on behalf of the statutory bodies and the government departments. Organisations such as the Health and Safety Executive/Health and Safety Authority are responsible for monitoring workplace safety issues. Natural Resources Wales (NRW) monitors the state of Wales' woodlands and the condition of tree species, including threats from diseases, whilst in Ireland this function is likely to be shared between the National Parks and Wildlife Service (NPWS), the Environmental Protection Agency (EPA) and the Forest Service. Local councils on both sides of the Irish Sea undertake monitoring of the effects of their spatial planning policies as required by national laws, as well as a number of environmental and health topics including air quality and waste (in association with the statutory agencies). A number of non-governmental and public bodies play a significant role in managing and monitoring biodiversity. In Ireland these include the Heritage Council and An Taisce. In Wales the RSPB and Wildlife Trusts are important partners, working with statutory bodies through Wales Environment Link.

Table 7: Monitoring against SEA objectives

	Objective	Monitoring bodies	Indicators (examples)
Protect and enhance natural and cultural heritage	Protect places, landscapes & buildings of historic, cultural & archaeological value	**Cadw/ Royal Commission on Historic and Ancient Monuments/Heritage Council/An Taisce/National Monuments Service/Office of Public Works** monitor condition of historic buildings; condition of sites; maintain databases **Local planning authorities** - monitor building standards; conservation areas; development management; protected buildings; maintain EIA databases **NPWS** - manages and monitors protected landscapes **Archaeological Trusts** maintain relevant data and carry out research	Condition of sites on agricultural land Number and condition of listed buildings LANDMAP culture aspects - condition Number of community-owned or managed biodiversity/amenity assets Register of SAMs - condition status National Inventory of Architectural Heritage Condition of National Heritage Areas - targets in management plans
	Protect/ enhance landscapes, seascapes, townscapes and the countryside	**Local planning authorities** - monitor building standards; conservation areas; development management; listed buildings; maintain EIA databases	LANDMAP visual and sensory aspects - condition Register of conservation areas Use of conditions with planning permissions Targets in local/county development plans

	Protect/enhance biodiversity	**NRW/NPWS/Heritage Council** monitor condition of sensitive sites/species; Appropriate Assessment case studies/invasive species/data on landscape character **Wildlife NGOs (e.g. Birdwatch Ireland/RSPB/Irish Rare Birds Committee)** monitor condition of species and habitats; maintain databases **Local authorities** hold ecological data linked to LBAPs and county sites	Conservation status of SAC/SPA features dependent on/impacted on by agriculture Conservation status of target species/habitats dependent on/impacted on by agriculture Conservation status of NNR/SSSI features dependent on/impacted on by agriculture Presence & condition of unfarmed features - hedges, scrub, fallow areas, buffers, trees, ditches & ponds Percentage area of independently certified woodland (such as FSC) Lowland/upland farm birds - target species, presence, numbers - overwintering, breeding, spring feeding Woodland birds - target species, presence, numbers - overwintering, breeding, spring feeding Presence/location of invasive species

	Protect/enhance biodiversity (continued)		Condition of Geological Conservation Review (GCR) sites that are SSSI's Common land in management agreements

Protect and conserve natural resources	**Objective**	**Monitoring bodies**	**Indicators (examples)**
	Protect/ improve the region's water quality	**NRW/EPA** monitor ecological and chemical condition of river systems; bathing water quality; maintains databases. **Water companies** monitor chemical quality **Local authorities** also carry out monitoring of water quality **NPWS** carry out/monitor works linked to water ecosystems	Bank erosion remediated (length) Chemical/ecological quality of rivers Number of agriculture-related pollution incidents Eutrophication statistics Estuary water condition Bathing water quality Area designated as Nitrate Vulnerable Zone Number of water pollution incidents, category 1 & 2 Water quality measures in local/county plans Use of conditions/regulations with planning permissions

	Protect the water resource & ensure its sustainable use	**Water companies/NRW/EPA** monitor abstraction and discharges of water; losses. Flood risk databases.	Water abstracted (licensed) Water abstracted (unlicensed) Agricultural discharge to water courses Number and cost of flooding incidents
	Guard against land contamination, encourage reuse of existing buildings & of previously developed land of low ecological quality	**Local planning authorities** monitor land availability including 'brownfield land' and maintain databases	Amount of brownfield land remediated/ developed Buildings recycled Policies/targets in local/county development plans

	Minimise the requirement for energy generation, promote efficient energy use & increase the use of energy from renewable resources	**Department of Communications, Energy and Natural Resources** is responsible for implementing measures to increase penetration of renewable energy technologies and holds data **Local planning authorities** permit renewables schemes and hold data on permissions, conditions, etc **UK Department of Energy and Climate Change** provides statistics	Additional capacity of renewable energy production Number of energy users connected to smart grids Number of households with improved energy consumption classification Decrease of primary energy consumption of public buildings Energy saved Number of micro-generation schemes established
	Minimise waste/ increase re-use, recycling & recovery rates	**Local authorities** monitor municipal waste including recycled waste	Waste arisings by sector Waste arisings by disposal Domestic waste arisings Waste recycled or composted

	Minimise the need to travel; provide alternatives to car use	**Local authorities** develop policies and monitor use of public transport. Organisations such as the **Urban Institute Ireland** and academic partners such as **NUI Maynooth** carry out studies and monitoring In the UK, the **National Travel Survey** and the **Department for Transport** provide data **Welsh Government Economy and Business** promotes broadband access and holds statistics	Availability of public transport (bus and rail) - national, regional, local National Park/county, local buses; taxis; community schemes Promotion of public transport associated with tourism Additional households/businesses with broadband access at least 30 Mbps

	Objective	Monitoring bodies	Indicators (examples)
Maintain and improve the human environment	Limit/adapt to climate change	A wide range of institutions carry data, including **Centre for Ecology and Hydrology; National Soil Resources Institute; Countryside Survey.** **Teagasc** researches the Irish agricultural sector and holds data on soils and emissions **Forestry Commission/Service** maintain soil databases for planting. **EPA** monitors greenhouse gas emissions **Local planning authorities** promote climate change adaptation in planning	Change in soil organic carbon, acidity, nitrogen, biology Water capture Changes in area of grassland and woodland CH_4 emissions Number of micro-generation schemes established Change in ecological footprint Estimated decrease in GHG
	Protect/improve air quality	**NRW/EPA** and **local authorities** issue permits and monitor air quality; maintain databases	Change in ammonia,CH_4, N_2O, ozone Air quality incidents Radon remediation programmes Percentage of sensitive habitat area exceeding critical loads for acidification and eutrophication

	Improve physical & mental health; reduce health inequalities	The **Public Health Observatory** monitors health and wellbeing issues and maintains databases **Welsh Health Survey** provides data **Health Information and Quality Authority** monitors health information **Dark Sky Discovery**, **NRW and NPWS** promote tranquil areas and dark skies	Change in number and extent of tranquil areas Percentage of dark sky at night by area Access to services e.g. GP, hospital, broadband Increase in employment Decrease in poverty
	Improve public access to land	**National parks, AONBs** and **local authorities** monitor visitor statistics; **Visit Wales** and **Regional Tourism forums** maintain records **Fáilte Ireland** promotes tourism including access **NRW/NPWS** hold databases on open access	Hectares of Open Country and Common Land Length and condition of PROWs and cycleways Amount and condition of accessible land in agri-environment schemes

	Objective	Monitoring bodies	Indicators (examples)
Protect the marine environment	Protect seabed features so that they can support the processes, habitats & species characteristic of the marine landscapes	In Ireland, **Marine Institute** is the national agency responsible for marine research, technology, development and Innovation in the Republic of Ireland **Coastal and Marine Resources Centre (CMRC), University College Cork**, seeks to make a significant contribution to the scientific understanding of coastal and marine environments and their management In Wales, **NRW** monitors the marine environment in Welsh waters **CEH Bangor** carries out research and holds data, as does the **Centre for Catchment and Coastal Research** The respective government departments (**Department of Agriculture, Food and the Marine** and **Department for Environment, Food and Rural Affairs**) are responsible for the state of the marine environment	Concentrations of hazardous substances compared to Environmental Quality Standards (EQSs) Hazardous substances in marine organisms Plastic particles in stomachs of seabirds Organochlorine/mercury concentrations in seabird eggs/feathers Hazardous substances in coastal waters Chlorophyll-a in transitional, coastal & marine waters Bathing Water quality

	Protect water column features so that they can support the characteristic processes, habitats & species	As above	As above
	Protect the water quality of the component water column features so they can support the processes, habitats & species characteristic of the water column & associated seabed habitats	As above	

	Maintain biota quality	As above	Number, abundance, diversity and evenness of taxa distribution Percentage of overfished stocks of commercial importance Fish catches by major species and area Accidental by-catch: birds, mammals and turtles Changes in proportion of large fish and hence the average weight and average maximum length of the fish community Aquaculture impact on genetic structure of wild fish populations Seabird population trends

8.1.5 It is not possible to monitor everything. Environmental indicators are a 'proxy' of the state of the environment, and where carefully selected will provide a picture of its condition. It is critical that indicators are sufficient in number to be comprehensive, but do not duplicate unnecessarily. It is important when aggregating data to higher levels, to ensure that critical factors are not lost, such as cumulative effects over periods of time that in themselves are not significant. It is also critical to capture *quality* as much as quantity. Simply quantifying the number of schemes entered into, or the amount of fencing or planting, does not in itself confirm that there has been an increase in quality environments.

The indicators above are not exhaustive, but have been selected to reflect the objectives, and aim to be sufficient enough to be reasonably attributable to the proposed programme.