



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

West Wales and Valleys ERDF Programme 2014-2020

Strategic Environmental Assessment Environmental Report

April 2014

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**Ex Ante Evaluation and Strategic Environmental Assessment for
European Regional Development Fund Operational Programme
2014-2020
West Wales and Valleys**

STRATEGIC ENVIRONMENTAL ASSESSMENT

DRAFT ENVIRONMENTAL REPORT

APRIL 2014

Glossary of acronyms and their meanings

Glossary of terms

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GLOSSARY OF ACRONYMS AND THEIR MEANINGS

AA	Appropriate Assessment, a statutory assessment of the likely and significant effects of a proposal on any site and/or species that is of European conservation interest (see SAC, SPA and Ramsar Site), under the terms of the Habitats Directive (92/43/EC). (See HRA below).
AONB	Area of Outstanding Natural Beauty, a landscape designation under the National Parks and Access to the Countryside Act 1949.
BAP	Biodiversity Action Plan. Initially this was the UK government's response to the Convention on Biodiversity 1992 as its plan to halt biodiversity loss. Each of the UK nations now has its own BAP, as do all the local authorities (known as local biodiversity action plans or LBAPs). In Wales there are currently 24 of these. BAPs are non-statutory documents.
Cadw	The name given to the Welsh Government's statutory body for the protection of Wales' built heritage, ancient monuments and sites.
CCT	Cross-cutting themes, a term used in the context of the Structural Fund Programmes to denote compliance in terms of sustainable development, equal opportunities and poverty alleviation.
CCW	The Countryside Council for Wales, the Welsh Government's statutory body for the protection of biodiversity and landscape and the promotion of access to the countryside (superseded by Natural Resources Wales April 2013).
CO ₂	Carbon Dioxide, a greenhouse gas emitted when burning fossil fuels.
DEFRA	The Department for Environment, Food and Rural Affairs for the United Kingdom. Defra represents the UK's agriculture, fisheries, environment and rural community interests in Europe.
DG	Directorate-General, one of 32 departments of the European Commission.
EA	The Environment Agency, a non-departmental public body whose main duty is to safeguard the quality of air and the quality and availability of water.

EAU	The Welsh Office Environmental Unit, a department of the Welsh Department prior to the establishment of the Welsh Assembly Government.
EC	The European Community
EEC	The European Economic Community
EIA	Environmental Impact Assessment (in the context of this document), a statutory assessment of the significant environmental effects of a plan or project, and the measures to avoid, mitigate or compensate, or to enhance the environment as an outcome. Operates under the terms of the EIA Directive 337/85/EEC.
ERDF	European Regional Development Fund, one of the EU's structural funds. A financial tool designed to reduce disparities by creating sustainable jobs, economic development, research and development, environmental protection and risk management.
ESF	European Social Fund, also one of the EU's structural funds. A financial tool designed to reduce disparities by promoting adaptability, access to employment, and social inclusion for disadvantaged people.
EU	The European Union.
gha	Global hectares, the measure of a population's ecological footprint.
GHG	Greenhouse gas or gases. As well as carbon dioxide, greenhouse gases include water vapour, methane, nitrous oxide and ozone, all of which contribute to the 'greenhouse' effect by absorbing and emitting radiation within the thermal infrared range.
GVA	Gross Added Value, an economic measure of the total value of goods and services produced in an area, sector or industry.
HRA	Habitats Regulations Assessment. The process of assessing the risk of likely and significant impacts on habitats and species of European conservation interest. The assessment entails a screening process, and where necessary a detailed analysis of likelihood and significance of impacts on biodiversity arising from a plan or project, known as an Appropriate Assessment.

ICOMOS	The International Council of Monuments and Sites, professional association that offers advice on the protection and conservation of cultural heritage sites and structures around the world.
ICT	Information and Communications Technology.
IUCN	The International Union for the Conservation of Nature, a governmental and non-governmental forum that aims to find pragmatic solutions to environment and development challenges. It is the world's oldest and largest environmental network.
KWh/d/p	Kilowatt-hours per day per person, a measure of energy use.
LDP	Local Development Plan, the statutory local authority spatial plan policy document.
LULUCF	Land use and land use change and forestry, a sector defined by the United Nations as 'a greenhouse gas inventory sector that covers the emission and removal of greenhouse gases resulting from direct human-induced land use, land change and forestry activities'.
NEA	National Ecosystem Assessment, an initial assessment of the state of a nation's ecosystems, their services to human well-being, and a description of pressures and trends likely to influence their future condition.
NGO	Non-governmental organisation.
NNR	National Nature Reserve, a statutory designation that protects the natural interest of a site from potentially damaging operations, whether directly or indirectly.
ODPM	The Office of the Deputy Prime Minister.
R&D	Research and Development.
RDP	Rural Development Programme or Plan.
RSPB	The Royal Society for the Protection of Birds, a conservation NGO.
SAC	Special Area of Conservation, a designation for habitats and species requiring special protection as site of European conservation interest under the Habitats Directive (92/43/EC).
SEA	Strategic Environmental Assessment

SF	Structural Fund(s) are the financial tools set up to reduce regional disparities across the EU.
SME	Small and medium enterprises. Three categories are defined by the European Commission: 'micro', with a staff of fewer than 10 and/or a turnover/balance sheet total of less than €2m; 'small', with a staff of fewer than 50 and/or a turnover/balance sheet total of less than €10m, and 'medium', with a staff of fewer than 250 and/or a turnover/balance sheet total of less than €50m/€43m.
SoE	State of the Environment. An assessment of the environmental condition, pressures, responses and trends of a defined area, whether local or global.
SPA	Special Protection Area, a site or area designated for the protection of birds requiring special measures. As in the case of SACs (see above) these are sites of European conservation interest, established under the Birds Directive (79/409/EEC).
SSSI	Site of Special Scientific Interest, a statutory designation that protects the natural interest of a site from potentially damaging interventions, whether directly or indirectly.
SUDS	Sustainable Urban Drainage Systems.
TEN-T	The Trans-European Transport Network, a transport infrastructure and traffic management system that incorporates rail, road, inland waterways, sea and air transport. Its aim is to facilitate ease of transport and travel across Europe.
TO	Thematic Objective, one of eleven generic objectives established under the European Common Provisions Regulation.
UK	The United Kingdom of Great Britain (England, Scotland and Wales) and Northern Ireland.
US	The United States of America
WAG	The Welsh Assembly Government, the former name for the Welsh Government.
WEFO	The Welsh European Funding Office.
WFD	The Water Framework Directive.

WG

The Welsh Government, the executive of the National Assembly for Wales, established by the Government of Wales Act 2006.

GLOSSARY OF TERMS

Avoidance In the context of this report, avoidance is used to mean a decision not to proceed with a project in order to avoid an impact; to relocate a project in order to avoid an impact; or to manage a project in such a way that it avoids an impact that may be seasonal in nature.

Cumulative or synergistic In the context of this report, cumulative effects are effects which alone do not result in a significant impact, but collectively do so. For example the cumulative effect of a number of acceptable developments, or discharges that individually do not have a significant impact. Synergistic effects are those that are not simply cumulative, but result in a further effect that may be positive or negative. The effects of chemical cocktails in a river may be synergistic, as may be the economic and social effects of interventions.

Ecological footprint An indicator of the demands made on the environment by a population, measured in global hectares. The ecological footprint for Wales in 2006 was about 4.4 gha. In other words, the population is consuming the equivalent of 4.4 'planet earths'.

Environmental Assessment A method or procedure for predicting the effects on the environment of a proposal, either for an individual project or a higher-level strategy (a policy, plan or programme), with the aim of taking account of these effects in decision-making. The term “Environmental Impact Assessment” (EIA) is used, as in European Directive 337/85/EEC, for assessments of projects. In the SEA Directive, an environmental assessment means “the preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision”, in accordance with the Directive’s requirements.

Environmental Report A key output of the SEA process as required by the SEA Directive. Sets out to identify, describe and evaluate the likely significant effects on the environment of implementing a plan or programme.

Ex Ante Evaluation The process of evaluating the overall effects of a programme prior to its adoption. Carried out in parallel with the development of a programme, in order to inform it in terms of likely outcomes in order to optimise its implementation.

Indicator A measure of variables over time, used in this case to measure the extent to which objectives are being attained.

Mitigation Used in this case to refer to measures to reduce or offset significant adverse effects on the environment. It should not be confused with ‘compensation’, which assumes an environmental loss that is substituted.

Natura 2000 is the European-wide network of nature protection areas designated under the European Birds (Special Protection Areas or SPAs) and Habitats Directives (Special Areas of Conservation or SACs), as well as candidate and proposed sites. Sites that occur in marine or intertidal areas are known as European marine sites, or European offshore marine sites.

Objective A statement of what is intended, specifying the desired direction of change as a result of interventions.

Plan or Programme The term “plan or programme” covers any plans or programmes to which the SEA Directive applies.

Responsible Authority The organisation which prepares a plan or programme subject to the Directive and is responsible for the SEA. In this case WEFO is the responsible authority.

Scoping The process of determining the extent and level of detail of an SEA, including the environmental effects and alternatives which need to be considered, the assessment methods to be used, and the structure and contents of the Environmental Report.

Screening The process of deciding whether a plan or programme requires SEA.

Strategic Environmental Assessment (SEA) Generic term used to describe environmental assessment as applied to policies, plans and programmes. In this report, “SEA” is used to refer to the type of environmental assessment required under the SEA Directive.

SEA Directive European Directive 2001/42/EC “on the assessment of the effects of certain plans and programmes on the environment”.

SEA Regulations The regulations transposing the SEA Directive into law, namely The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

Significant environmental effects Effects on the environment which are significant in the context of a plan or programme. Criteria for assessing significance are set out in Annex II of the SEA Directive.

1 INTRODUCTION

1.1 Purpose

1.1.1 This Strategic Environmental Assessment (SEA) report of the West Wales and the Valleys European Regional Development Fund (ERDF) Programme ('the proposed Operational Programme') has been produced by Bangor University in association with Old Bell3 on behalf of the Welsh European Funding Office (WEFO). The assessment has been carried out in accordance with the requirements of the European SEA Directive (2001/42/EC) and the implementing regulations for Wales, the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Instrument 2004 No. 1656 (W.170)).

1.1.2 This SEA is carried out in conjunction with the development of the proposed Operational Programme and the Ex Ante Evaluation. It sets out to ensure that the proposed Operational Programme contributes positively to a high level of environmental protection, as well as supporting the goal of the Welsh Government (WG) of working towards sustainable development. It does this:

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

The purpose of this SEA is therefore to ensure that it informs the development of the proposed Operational Programme before its adoption and to provide an environmental context for its implementation.

1.2 SEA requirements

1.2.1 This Environmental Report complies with the requirements of the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Instrument 2004 No. 1656 (W.170)) (see paragraph 1.1.1 above).

Table 1 identifies those sections within the Environmental Report that relate to the specific requirements of Regulation 12 and Schedule 2 of the Regulations.

Table 1: References to the SEA Regulations

Environmental Report - Information to be included	
1. An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes.	Section 3; pages 32-36
2. The environmental characteristics of areas likely to be significantly affected.	Section 4; pages 37-72
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.	As above; see in particular section 4.17 pages 69-72
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.	Appendix 1
7. 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 archaeological heritage; landscape; the interrelationship between the above factors.	Section 5; pages 73-93
8. The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan.	Section 5.2 pages 86-92
9. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken.	Section 6 pages 94-97
10. A description of measures envisaged concerning monitoring in accordance with Regulation 17.	Section 8 pages 100-102
11. A non-technical summary of the information provided under paragraphs 1 to 9.	Accompanying document

1.3 SEA process prior to the Environmental Report

1.3.1 An **initial meeting** between the contractors and WEFO and Welsh Government officials was held on 10 December 2012 in Cardiff to determine the broad nature and scope of the Structural Fund (SF) Programme and to establish a timetable for consultation.

- 1.3.2 Subsequently, a **Screening Report** was produced on 4 January 2013 for consultation with the statutory bodies (the Environment Agency, the (then) Countryside Council for Wales and Cadw), in accordance with the requirements of the SEA Directive, in order to determine the need for a full SEA of the West Wales and the Valleys ERDF Programme. It was confirmed that, owing to the potentially significant effects that could arise from the proposed Operational Programme, a full SEA was required.
- 1.3.3 A meeting was held with the then Countryside Council for Wales to discuss our approach to the SEA in terms of biodiversity concerns.
- 1.3.4 A **Scoping Report** was produced on 14 January 2013. The first draft Environmental Report was based on responses to the Scoping Report and to subsequent consultations with statutory and non-statutory interests (see Appendix 6 for a list of consultation respondents).
- 1.3.5 WEFO organised a series of consultation events to engage stakeholders in the development of the 2014-2020 SF and RDP Programmes. As part of these events, stakeholders were given the opportunity to comment on the first draft Environmental Report. A second draft Environmental Report was produced in response to those consultations.
- 1.3.6 This third draft has been produced in order to reflect the most recent iteration of the proposed East Wales Operational Programme (7 October 2013), and reviews the analysis of the proposed Operational Programme's objectives.

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) 2005¹, and the EC's guidance documents on implementing the SEA Directive² and Ex Ante Evaluation (Annex 1) 2012³. Note was also taken of guidance provided by the Environment Agency⁴, the Countryside Council for Wales⁵, RSPB⁶, and the Scottish Executive⁷.

2.1.2 Table 2 describes the SEA stages and tasks.

Table 2 SEA stages and tasks

STAGE	TASK
Setting the context and objectives	<i>Establish the baseline and deciding on the scope.</i> <i>Identify/review relevant policies, plans and programmes and sustainable development objectives that will affect or influence the proposed Operational Programme.</i> <i>Collect relevant social, environmental and economic baseline information.</i> <i>Identify key sustainability issues for the SEA to address and define objectives.</i>

STAGE	TASK
Setting the context and objectives	<i>Develop SEA framework, objectives, indicators and targets.</i> <i>Test the proposed Operational Programme objectives</i>

¹"A Practical Guide to the Strategic Environmental Assessment Directive". ODPM 2005.

²"Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment". European Commission DG Environment. Undated.

³"Guidance document on Ex Ante Evaluation. The Programming Period 2014-2020. European Regional Development Fund. European Social Fund. Cohesion Fund". European Commission DG Regional Policy. DG Employment, Social Affairs and Inclusion, June 2012.

⁴"Strategic Environmental Assessment and Climate Change: guidance for practitioners". Environment Agency. August 2011.

⁵"Strategic Environmental Assessment. Guidance for Practitioners". Countryside Council for Wales. SEA Guidance Note series. August 2007.

⁶"Strategic Environmental Assessment. Learning from Practice". RSPB. Undated.

⁷"Strategic Environmental Assessment Toolkit". Natural Scotland. Version 1 September 2006.

<i>(continued)</i>	<p><i>against the sustainability objectives and whether the programme objectives are consistent with one another.</i></p> <p><i>Produce scoping report and undertake consultation with the consultation bodies.</i></p>
Developing and refining the options	<p><i>Carry out appraisal of the proposed Operational Programme options and make recommendations for improvement.</i></p>
Appraising the effects of the proposed Operational Programme	<p><i>Predict effects and carry out assessment of the effects of the proposed Operational Programme</i></p> <p><i>Propose measures to maximise benefits and mitigate adverse effects.</i></p> <p><i>Develop proposals for monitoring.</i></p> <p><i>Prepare the Environmental Report of the proposed Operational Programme.</i></p>
Consulting on the Environmental Report and proposed Operational Programme	<p><i>Consult on the Environmental Report along with the proposed Operational Programme</i></p> <p><i>Carry out appraisal of significant changes made as a result of consultation.</i></p>
Implementation and monitoring	<p><i>Inform consultees that the proposed Operational Programme has been adopted.</i></p> <p><i>Issue statement summarising information on how the SEA results and consultees' opinions were taken into account, etc.</i></p> <p><i>Make Operational Programme and final Environmental Report available for public viewing.</i></p>

2.2 Challenges in undertaking the SEA

2.2.1 The assessment was constrained by two key factors:

- By its nature, the proposed Operational Programme is not spatial, but provides generic descriptions of the kind of activities likely to be supported under each priority and theme across the whole of the West Wales and the Valleys area. It was therefore difficult at times to envisage potential significant environmental effects with certainty, and therefore a precautionary approach has been taken to the assessment of effects.
- Conversely, the proposed Operational Programme is itself constrained by the need to prioritise regional economic activity, and the timescale over which it will operate. Therefore, the identification of *reasonable* alternatives is constrained in terms of alternative themes or combinations of themes, alternative timescales and alternative priorities.

2.3 Development of SEA objectives

2.3.1 Whilst there is no requirement under the SEA Directive to produce objectives or indicators as part of the SEA process, their use is promoted as an appropriate tool for identifying and assessing potential environmental effects, both positive and negative.

2.3.2 The objectives were developed from a review of literature that included:

- The draft 2014-2020 Operational Programme consultation documents (together with the post-consultation ERDF Operational Programmes)
- WEFO's Environmental Sustainability Cross Cutting Theme Matrix and Guidance⁸
- The Welsh Government: Programme for Government⁹
- Wales Environment Strategy¹⁰
- Wales National Ecosystem Assessment¹¹

⁸The consultation documents issued 14 January 2013. The Cross Cutting Guidance comprises 14 Guidance notes listed in the bibliography

⁹ Programme for Government. Welsh Government. 2011 (<http://wales.gov.uk/docs/strategies/110929fullen.pdf> & <http://wales.gov.uk/docs/strategies/120528fullen.pdf>)

¹⁰WAG Cardiff. Environment Strategy Action Plan October 2008. (<http://wales.gov.uk/desh/publications/enviroprotect/environmentstrategy/environmentactionplan/esap0811e.pdf;jsessionid=7D4C112D25E2CF42B4AD153E9C57CDA0?lang=en>)

- EU 6th Environmental Action Plan & Sustainable Development Strategy¹²
- 2007-13 ERDF West Wales and the Valleys Strategic Environmental Assessment¹³
- Wales Spatial Plan¹⁴
- European Commission Core Indicators¹⁵
- EU2020 targets¹⁶

2.3.3 As well as the review of the above literature, the following local level documents were analysed in order to develop a comprehensive list of both high level and locally focused objectives:

- Anglesey County Council: Sustainability Appraisal of the Anglesey LDP (withdrawn December 2010).
- Blaenau Gwent County Borough Council Local Development Plan. Deposit Plan Sustainability Appraisal. Main Report January 2012.
- Bridgend Borough Council. Sustainability Appraisal of the Bridgend Local Development Plan November 2008.
- Caerphilly Local Flood Risk Management Strategy. SEA and Sustainability Appraisal. Revised Scoping Report October 2012.
- Caerphilly Local Development Plan Strategic Environmental Assessment/Sustainability Appraisal. Draft Scoping Report. June 2006.
- Carmarthenshire County Local Development Plan. SA/SEA-LDP Objectives Compatibility Assessment. (undated).
- Ceredigion Local Development Plan 2007 – 2022. Addendum to the Ceredigion LDP: Deposit Sustainability Report Submission Version.

¹¹ *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.*

¹² *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)*

¹³ *DTZ/Royal Haskoning (2006): West Wales and the Valleys ERDF Convergence Programme 2007-13. Strategic Environmental Assessment Environment Report. Draft report. Royal Haskoning Exeter*

¹⁴ *Welsh Assembly Government (2008): People, Places, Futures. The Wales Spatial Plan. 2008 update. July 2008. WAG Cardiff.*

¹⁵ *European Commission. Programming period 2014-2020. Monitoring and evaluation of European cohesion policy - European Regional Development Fund and Cohesion Fund. Concepts and Recommendations. Guidance document. November 2011. (http://ec.europa.eu/regional_policy/information/evaluations/guidance_en.cfm#1)*

¹⁶ *Communication from the Commission. Europe 2020 - a strategy for smart, sustainable and inclusive growth. (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>) (see also http://ec.europa.eu/europe2020/pdf/targets_en.pdf for specific targets).*

- Conwy Council Borough Council Deposit Local Development Plan. Sustainability Appraisal/Strategic Environmental Assessment. August 2012.
- Denbighshire County Council Local Development Plan. Sustainability Appraisal. August 2007.
- Gwynedd County Unitary Development Plan Deposit Draft. Sustainability Appraisal/Strategic Environmental Assessment. July 2005.
- Merthyr Tydfil County Borough Council Local Development Plan. Sustainability Appraisal/Strategic Environmental Assessment. Final Report. May 2011.
- Neath Port Talbot County Borough Council Local Flood Risk Management Strategy. Strategic Environmental Assessment Draft Consultation Document. December 2012.
- Neath Port Talbot County Borough Council Local Development Plan. Pre-Deposit Plan Interim Report Sustainability Appraisal. September 2011.
- Pembrokeshire County Council Local Development Plan: Sustainability Appraisal Report, March 2012 (for the Pembrokeshire Local Development Plan adopted 28 February 2013).
- Pembrokeshire Coast National Park Local Development Plan (end date-2021) Adopted Plan: Finalised Sustainability Appraisal Report, September 2010.
- Powys County Council Unitary Development Plan¹⁷. Adopted Plan. Strategic Environmental Assessment. Final Report. March 2010.
- Rhondda Cynon Taf County Borough Council Local Flood Risk Management Strategy. Strategic Environmental Assessment Volume 1. Environmental Report. October 2012.
- Rhondda Cynon Taf County Borough Council Local Development Plan Preferred Strategy Sustainability Appraisal. January 2007.
- Swansea Local Development Plan. Sustainability Appraisal and Strategic Environmental Assessment. Scoping Report. February 2012.
- Torfaen County Borough Council Local Development Plan. Sustainability Appraisal and Strategic Environmental Assessment. Draft Scoping Report. July 2006.

2.3.4 This process led to the development of 48 generic questions, in which we asked *'in its delivery, will the proposed Operational Programme...'*

¹⁷ Although Powys is not within the West Wales and the Valleys Programme area the UDP is relevant because of the close interconnections between settlements and the environment in Powys and those in the area.

- *help to protect or enhance historic buildings, areas and areas of landscape/townscape character?*
- *improve access to buildings and landscapes/townscapes of historic/ cultural value?*
- *increase the total area of land designated for its landscape/townscape quality?*
- *use architectural design to enhance and promote the local distinctiveness and the “sense of place” of development?*
- *protect and enhance landscape and seascape character?*
- *increase levels of light pollution?*
- *increase levels of noise pollution?*
- *improve the quality and increase the quantity of publicly accessible open space?*
- *deliver more sustainable location patterns?*
- *improve the management of the impacts of access and recreation?*
- *protect and enhance rare or endangered species and habitats and provide opportunities for habitat creation/restoration?*
- *protect habitats and minimise the fragmentation of nature corridors and networks in accordance with Biodiversity Action Plans?*
- *provide opportunities for people to come into contact with and appreciate wildlife and the natural environment?*
- *avoid damage to sites of geological interest?*
- *maintain and enhance ground and surface water ecological and chemical quality?*
- *maintain levels of abstraction and recharge within the carrying capacity of the region?*
- *improve the quality of coastal waters?*
- *maintain and improve local air quality?*
- *reduce the amount of derelict, contaminated, degraded and vacant/ underused land?*
- *encourage the development of brownfield land in preference to greenfield where appropriate?*
- *avoid the loss of good quality soils to development?*
- *maintain and enhance soil quality?*
- *reduce greenhouse gas emissions?*
- *contribute to the ability to adapt to the impacts of climate change?*
- *reduce or manage flooding?*
- *ensure sustainable use of raw materials (e. g. timber, fresh water, minerals)?*
- *reduce imported materials such as minerals?*
- *promote the use of recycled and secondary materials?*
- *reduce the need for energy?*
- *increase the production and/or use of renewable energy?*
- *increase energy efficiency (e.g. energy efficiency in buildings, transport modes, etc)?*

- *reduce the use of fossil fuels?*
- *avoid dependency of new development on remotely derived energy resources?*
- *reduce car traffic?*
- *encourage walking, cycling and use of public transport?*
- *encourage development to coalesce into compact nodes?*
- *improve access to and encourage the use of ICT?*
- *reduce HGV traffic by switching to alternative transport modes?*
- *increase proportion of waste recycling and reuse?*
- *reduce the production of waste?*
- *reduce the proportion of residual waste to landfill?*
- *reduce hazardous waste?*
- *reduce waste in the construction industry?*
- *promote healthy lifestyles?*
- *reduce health inequalities among different groups in the community?*
- *provide development patterns that do not harm the linguistic character of Welsh speaking communities?*
- *encourage the mainstreaming of the Welsh language?*
- *ensure settlements can absorb growth without damage to character?*

2.3.5 These were distilled into 34 objectives. In order to reflect the high level nature of the proposed Operational Programme, and in keeping with the previous and other SEAs at this level, these provided the basis for the 13 objectives against which the proposed Operational Programme was assessed, being retained as sub-objectives. The 'environment' is often perceived and described in three broad ways, and the 13 objectives were grouped under three headings in order to reflect these broad perceptions¹⁸:

- The need to protect and enhance natural and cultural values for their own sake;
- The need to conserve the natural resources that humanity relies on;
- The need to protect and enhance the environment in which people live and work

2.3.6 In carrying out the assessment, then, reference is made to the 13 objectives and their sub-objectives. Table 3 contains a list of the SEA objectives and sub-objectives against which the effects of the proposed Operational Programme are assessed in section 5.

¹⁸ See for example Vining et al., *The Distinction between Humans and Nature: Human Perceptions of Connectedness to Nature and Elements of the Natural and Unnatural*. *Human Ecology Review*, Vol. 15, No. 1, 2008.

2.3.7 It should also 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 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 a development proposal in terms of scale, and should be local to that proposal.

Table 3 List of SEA objectives and sub-objectives

Protect and enhance natural and cultural heritage	Objective	Sub-objective
	1. Protect places, landscapes and buildings of historic, cultural and archaeological value	Deliver Cadw's conservation programme for monuments in state care, alongside the designation of further heritage assets
	2. 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
	3. 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
Protect and conserve natural resources	Objective	Sub-objective
	4. 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 the salmon and other fisheries
		Avoid physical disturbance to the water and water edge environment
		Reduce diffuse pollution from agriculture, acid precipitation and other sources
	5. 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

Protect and conserve natural resources	Objective	Sub-objective
	6. 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
	7. 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 ¹⁹
		Introduce higher energy conservation standards in constructing new housing
	8. Minimise waste, and increase re-use, recycling and recovery rates	Restrict biodegradable materials going to landfill
		Re-use materials from existing buildings
	9. 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

¹⁹ This objective was taken from the Programme for Government, so 'today' may be taken as referring to 2011.

Maintain and improve the human environment	Objective	Sub-objective
	10 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).
		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
	11. 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
	12. 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
		Monitor and regulate known and emerging environmental hazards
		Protect and enhance existing greenspace
	13. Improve public access to land	Improve opportunities to access green space

2.4 Development of SEA indicators

- 2.4.1 The indicators were adapted from the literature review, as shown in Appendix 2. There is no scoring or weighting in the case of indicators.
- 2.4.2 The indicators and the objectives they relate to are shown in Appendix 3.
- 2.4.3 It should be noted that the proposed Operational Programme for West Wales and the Valleys has its own indicators based on Commission core indicators set by the European Commission, and specific programme indicators. These are separate to the indicators referred to here, and include, for example, a number of economic indicators that are not relevant to this report. Appendix 4 lists the indicators for each of the four Priority Axes contained in the proposed Operational Programme.

2.5 Assessment methodology

- 2.5.1 The assessment consists firstly of an analysis of each of the potentially supported types of actions listed in the proposed Operational Programme against the objectives of the SEA, based on a range of criteria derived from the Directive and supporting guidance. The criteria are discussed in section 2.6.
- 2.5.2 The results of this analysis were aggregated and set out as a basic compatibility test, as illustrated in section 5.2.
- 2.5.3 Finally, levels of risk were assessed for proposed supported actions that appeared to produce a negative effect when matched against the SEA objectives. Negative effects were considered in terms of:
- The possibility of the effect exceeding a standard established by policy²⁰.
 - The possibility of the effect exceeding a threshold established by a regulation or an EC directive.
 - Acceptability of the effect by acknowledged interests most likely to be impacted on by it.

²⁰ For example, some operations such as the restoration of land by the use of soil materials and its subsequent aftercare are based in part on conditions related to planning policy (see TAN 6 Planning for Sustainable Rural Communities). Likewise the standards that apply to the development of renewables (in terms of location, visual effects, spatial layout etc.) are largely based on policy (see TAN 8 Planning for Renewable Energy). Wales policy statements are also relevant.

2.5.4 Risk was assessed for the *likelihood* of a negative effect occurring, and the *significance* of the effect should it occur as a result of the proposed intervention. This element therefore highlights the need for avoidance, mitigation or compensation, or a combination of them. This is shown in section 6.1.

2.6 Criteria for analysis

2.6.1 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 Environment²¹

2.6.2 Some indicative activities may be *irrelevant* to the SEA objective, and this is indicated where this is judged to be the case. In some cases this may be not be known, in which case it will be indicated as such. Where an indicative activity may be relevant, this is indicated as having a *direct* effect, an *indirect* effect, or an effect that may be *cumulative* or *synergistic*.

2.6.3 Such effects may be *negative* or *positive*, and these may differ in degree, so as to indicate very positive or very negative impacts.

2.6.4 Assessment also needs to be made with reference to *spatial extent*, that is whether the effect is likely to be local, regional, national or international; and to *duration*, that is whether the effect is likely to be short (1-2 years), medium (3-5 years), long (6+ years) term or permanent.

2.6.5 These criteria are described below (Table 4), and were used to carry out the detailed analysis of effects.

²¹ "Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment". DG Environment. Undated.

Table 4: Criteria used for analysis of effects

Reference	Symbol	Description
Irrelevant	O	An indicative activity is judged not to impact on the SEA objective.
Unclear	?	Difficult to envisage an impact, but limited confidence that there will be no impact.
Direct	Dir	There will be a discernible change to an aspect of the environment directly resulting from implementing an activity.
Indirect	Ind	There will be a discernible 'downstream' or 'parallel' change to another aspect of the environment, as a result of implementing an activity.
Cumulative/synergistic	CS	There will be a discernible change to an aspect of the environment arising from a number of anticipated activities.
Negative	x	There will be a loss or reduction in the integrity of an aspect of the environment.
Positive	✓	There will be an increase in the integrity of an aspect of the environment.
Local	L	Any discernible change to an aspect of the environment is likely to be at the farm/ neighbourhood/community/habitat scale.
Regional	R	Any discernible change to an aspect of the environment is likely to be at a county or sub-regional level.
National	N	Any discernible change to an aspect of the environment is likely to be beyond the scale of the Programme but not beyond Wales.
International	Int	Any discernible change to an aspect of the environment is likely to have implications outside of Wales as well as within it.
Short term	ST	Any discernible change to an aspect of the environment as a result of an activity is likely to last from 1-2 years
Medium term	MT	Any discernible change to an aspect of the environment as a result of an activity is likely to last for 3-5 years
Long term	LT	Any discernible change to an aspect of the environment as a result of an activity is likely to last beyond the life of the Programme (6+ years) but will not be permanent
Permanent	P	Any discernible change to an aspect of the environment as a result of an activity is likely to be permanent

2.6.6 The risk analysis of potentially negative effects was tabulated using the symbols and criteria shown here:

Definite	Def	The effects will be inevitable unless remediated in some way.
Probable	Prob	These effects are likely to occur as a result of the implementation of an indicative action.
Possible	Poss	These effects may occur as a result of the implementation of an indicative action.
Unlikely	Unl	Effects are unlikely to occur as a result of the implementation of an indicative action alone.

Low	Any effect arising from a proposed intervention is likely to be minimal. No adaptation of the Programme is anticipated.
Moderate	Any effect arising from a proposed intervention is likely to be significant. The Programme may require adaptation.
High	Any effect arising from a proposed intervention is likely to be substantial. The Programme will require adaptation.

2.7 Habitats Regulations Assessment

2.7.1 The Scoping Report identified a number of sites of European interest within the West Wales and the Valleys Programme area, including approximately 55 Special Areas of Conservation (SACs) wholly or partly within the West Wales and the Valleys Programme area; approximately 15 Special Protection Areas (SPAs) wholly or partly within this area; and 5 Ramsar sites²². They are discussed in more detail in section 4 of this report.

2.7.2 Despite its non-spatial nature, as a result of the consideration of the potential for effects of the proposed Operational Programme on SACs and SPAs and on European protected species in the first draft Environmental Report, and further to discussions held with the then CCW, it was agreed that a separate Habitats Regulation Assessment (HRA) should be undertaken by the same team. The Assessment is being presented in parallel with this Environmental Report.

2.7.3 Given the proposed Operational Programme's high-level nature, the effect of the Assessment has been to screen it out. Any subsequent lower-tier plan or project is likely to require its own Habitats Regulations assessment as a matter of law or policy.

²² Source - JNCC (<http://jncc.defra.gov.uk/page-4>) accessed 18/01/2013. It should be noted that in some cases, a site may be designated under two or all three categories.

2.8 Scoping

2.8.1 The Scoping Report is a key element of the environmental assessment of the proposed Operational Programme, and some aspects of that report are retained here in an amended form.

2.8.2 As well as those documents listed above (section 2.3.2) which informed the development of objectives and indicators, a number of other European, UK and Wales-level plans, programmes and policies were reviewed, in order to identify linkages between the proposed Operational Programme and this SEA, and to provide information on priorities and environmental issues. A summary of that review can be found in Appendix 1.

2.8.3 Whilst the complete list is too lengthy to provide in full, the following key Wales policy documents have informed this report:

- One Wales One Planet (2009)
- Wales Spatial Plan (2008 update)
- Environment Strategy (2010 update)
- Tourism strategy (2006/2010 update)
- Transport Strategy
- Waste Strategy
- Energy Policy Statement (2010)
- Climate Change Strategy (2010)
- Coastal Flood Erosion Strategy (2011)
- Historic Environment Strategy (2012)
- Infrastructure Investment Plan (2012)
- Sustaining a Living Wales (2012)
- Planning Policy Wales (2011)
- Welsh Government Strategic Policy Position Statement on Water (2011)

2.8.3 In addition, a number of SEAs undertaken for Plans, Policies and Programmes were examined:

- South East England Regional Assembly: ERDF Programme 2007-13 SEA
- WEFO: West Wales and the Valleys ERDF Operational Programme 2007-13 SEA
- Environment Agency: Western Wales River Basin District Management Plan SEA. December 2008

- Welsh Government. Flood and Coastal Erosion Risk Management: National Strategy. Habitat Regulations Assessment. June 2011
- North Wales Regional Waste Group. Strategic Waste Management Options SEA. October 2007
- Welsh Assembly Government. National Transport Plan SEA. March 2010
- Forestry Commission Wales. Woodlands for Wales Strategy. Voluntary SEA. March 2009
- Welsh Assembly Government. Wales Spatial Plan Update. SEA Statement. March 2009

3 THE PROPOSED ERDF OPERATIONAL PROGRAMME²³

3.1 Introduction

3.1.1 The proposed Operational Programme establishes a framework for ERDF investment in West Wales and the Valleys for the period 2014-2020 (figure 1). The current proposal provides information on its objectives in the context of European, United Kingdom (UK) and Wales policies. It also describes its selected priorities, and the types of actions that the WG expects to invest in over the next funding period.

3.1.2 The proposed Operational Programme is designed to deliver economic development in a sustainable manner, that is in a manner that does not diminish Wales' environmental and social values. Furthermore, it *'...should be implemented in a way which ensures opportunities are not lost to exploit and strengthen economic, social and environmental outcomes.'*²⁴

3.2 Vision and aims, priorities and proposed types of supported actions

3.2.1 Although the most recent draft Operational Programme proposal²⁵ does not set out a specific vision, previous documents have stated that:

*'Our vision is that by 2020, we will see a confident, ambitious and entrepreneurial Wales, prospering from sustainable economic growth...In line with the Welsh Government's clear commitment to sustainable development, including equality and inclusion, and tackling poverty the programme should be implemented in a way which ensures opportunities are not lost to exploit and strengthen economic, social and environmental outcomes.'*²⁶



Fig.1 West Wales and the Valleys Structural Funds area

²³ Correct on 1 November 2013. It should be noted that the ordering and precise make up of these Priority Axes may have changed during the period of this process, and may change further, but not in such a way that it will fundamentally affect this analysis.

²⁴ Consultation on European Structural Funds Programmes for West Wales and the Valleys 2014 - 2020

²⁵ 7 October 2013

²⁶ Consultation on European Structural Funds Programmes for West Wales and the Valleys 2014 - 2020

3.2.2 The proposed Operational Programme has been based on the selection of seven appropriate Thematic Objectives (TO's) from a suite of eleven such objectives defined by the European Commission in its Common Provisions Regulation²⁷. The selected TO's are:

- Strengthening research, technological development and innovation (TO1)
- Enhancing access to and use and quality of ICT (TO2)
- Enhancing the competitiveness of SMEs (TO3)
- Supporting the shift to a low-Carbon economy in all sectors (TO4)
- Promoting sustainable transport and removing bottlenecks in key network infrastructures (TO7)
- Promoting employment and supporting labour mobility (TO8)
- Promoting social inclusion and combating poverty (TO9)

3.2.3 The proposed Operational Programme is working to four Priority Axes that aim to address the above TO's:

- | | |
|---------------|---|
| Axis 1 | Research and Innovation (comprising elements related to TO1 and TO4) |
| Axis 2 | SME Competitiveness (comprising elements related to TO1, TO2, TO3 and TO9) |
| Axis 3 | Renewable Energy and Energy Efficiency (relating to TO4 only) |
| Axis 4 | Connectivity and Sustainable Urban Development (comprising elements related to TO2, TO7 and TO8) |

3.2.4 A number of Specific Objectives have been devised under each axis, namely:

Axis 1 Research and Innovation

1. To increase the success of Welsh research institutions in attracting competitive and private research funding.
2. To increase the level of innovation undertaken across all sectors of the Welsh economy, in particular within Welsh SMEs, leading to a growth in productivity.

²⁷ See Brussels, 14.3.2012; COM(2011) 615

final/http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2014/proposals/regulation/general/general_proposal_en.pdf

3. To increase the successful translation of research and innovation processes into new and improved commercial products, processes and services, in particular through improved technology transfer from HEIs.
4. To increase the success of Welsh research institutions in attracting competitive and private research funding (related to low carbon research and innovation).
5. To increase the successful translation of low Carbon research and innovation processes into new and improved commercial products, processes and services, in particular through improved technology transfer from HEIs.

Axis 2 SME Competitiveness

1. To increase the amount of finance available to SMEs for both business start-up and for business expansion.
2. To increase the number of SME start-ups through the provision of information, advice and guidance and support for entrepreneurship.
3. To increase SME productivity through the provision of advice and guidance, in particular through encouraging ICT exploitation.
4. To increase the growth of those SMEs with growth potential, in particular through accessing new markets (both domestic and international)
5. To address market failures in the availability of finance, in particular risk capital, for Welsh SMEs to undertake innovation and commercialise R&D.

Axis 3 Renewable Energy and Energy Efficiency

1. Increase the number of wave and tidal energy devices being tested in Welsh waters and off the Welsh coast, including multi-device array deployments, thereby establishing Wales as a centre for marine energy production.
2. To increase the number of small-scale renewable energy schemes established.
3. Increase the energy efficiency of the existing Welsh housing stock, particularly in areas of fuel poverty

Axis 4 Connectivity and Sustainable Urban Development

1. To address issues of peripherality and improve private investment in local areas through improvements to the functioning of the Trans-European Transport Network (TEN-T).
2. Increasing urban and labour mobility to and from key urban and employment centres.
3. To increase the access of Welsh businesses to high speed ICT networks in peripheral areas and strategic sites.
4. To increase employment through investments in prioritised local or regional infrastructure supporting a regional or urban economic strategy.

3.3 Conclusion

- 3.3.1 Flexibility will be required to allow for programming choices that reflect evolving needs and changing circumstances within the period of the proposed Operational Programme. It will be essential that the Operational Programme achieves a transformational effect on the Welsh economy and its people, and this will need to be demonstrated to the European Commission. This particular report is concerned with ensuring that at worst the Operational Programme is delivered without detriment to the environment; at best that it ensures enhanced environmental impacts, benefiting people and the economy. In all cases transparency should be sought in the decision-making process and consideration for the environment be seen as an opportunity rather than a threat.
- 3.3.2 It should be noted that there is commitment to integrate and align the Structural funds with the Rural Fisheries funds an important development in strategic thinking and planning compared to the approach under the current 2007-2013 programmes. Whilst appreciating that alleviation of poverty and regeneration of communities is an overarching 'must have' from the perspective of stakeholders, the importance of the environment in achieving these 'people' and 'prosperity' aspirations must be made clear at the outset.

4 ENVIRONMENTAL ISSUES AND BASELINE DATA

4.1 Introduction

4.1.1 The scoping process aimed to identify the key environmental issues that would influence Operational Programme development, and to scope in or out those issues that are relevant to the achievement of its objectives. This section describes the current state of the environment for the sub-region, in order to provide a context for understanding the potential for adverse (and positive) effects that may arise from the Operational Programme's implementation.

4.1.2 Because the proposed Operational Programme does not identify particular land allocations, the baseline is broad in scope. It would be premature to assume that it will not influence certain environmental aspects, however slightly.

4.2 Sourcing baseline data

4.2.1 The State of the Environment Statistical Bulletin (2012) provides an annual summary on a range of indicators reviewing the state of the environment and allocates them a status based on their long term trends²⁸.

4.2.2 The indicators, on which the above summary is based, cover a variety of topics including climate change, waste, flooding, water quality and biodiversity. 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 website²⁹.

4.2.3 Some of the statistics in the State of the Environment report correspond to or are similar to some of the Welsh Government's Sustainable Development Indicators³⁰. The status of some indicators may differ between the two publications (for example, ecological footprint). This is because the Sustainable Development Indicators look at more recent trends and present progress against an agreed set of indicators from a baseline year of 2003 (or the nearest year for which data are available), whereas the State of the Environment report

²⁸ <http://wales.gov.uk/topics/statistics/theme/environment/?lang=en#>

²⁹ <https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside>

³⁰ <http://wales.gov.uk/topics/statistics/headlines/sustaindev/120829/?lang=en>

considers progress over a longer term (in some cases, where data permits, from the 1990s).

- 4.2.4 As well as these key sources, the literature review included a number of other documents and websites such as the UK National Ecosystem Assessments, Health Statistics, ERDF 2007-13 West Wales and the Valleys Environment Strategy and Action Plan, and the Wales Sustainable Development Scheme.
- 4.2.5 Whilst there are no significant contradictions between statistics, some anomalies were identified as a result of different baseline scopes, baseline dates, criteria and indicators and perhaps different approaches to aggregating data. Where relevant, these have been indicated.
- 4.2.6 Much of the immediately available data is based either at local (i.e. development plan and below) levels or at Wales or UK levels. As well as the information obtained from the above sources, 24 local development plan SEAs were trawled for environmental information that reflected the distinctive nature of parts of West Wales and the Valleys. Therefore, whilst much of the data is presented here largely at Wales level, where possible, reference is made to West Wales and the Valleys, and also to the local level where it is thought to be relevant to the level of this SEA.

4.3 West Wales and the Valleys - Overview

- 4.3.1 The area defined as West Wales and the Valleys extends to 1.24 million hectares (12,400 km²) with about 1,150 km of coastline³¹. Approximately 80% of the total area of West Wales and the Valleys is designated as Less Favourable Area, which reflects the extensive nature of mountainous and upland land. West Wales and the Valleys is highly diverse topographically, ecologically, geologically and culturally, with a population of some 1.86 million, 64% of the total population of Wales, living in a highly diverse mix of urban and rural settlements.

³¹ *The length of the coast varies according to different measurement criteria. The source used here is CCW, 2006, 'Advice to the Welsh Assembly Government - Extending Access to the Coast' which gives the length as 1296km. EUCC: <http://www.coastalguide.org/wales/> gives the total length as 1562km. The British Cartographic Society gives the length as 2740km: <http://www.cartography.org.uk/default.asp?contentID=749>.*

- 4.3.2 Although much of the region's population lives in the industrial valleys, spatially West Wales and the Valleys is predominantly rural³² with agriculture being the dominant land use³³.
- 4.3.3 Administratively, the region contains the Isle of Anglesey, Gwynedd, Conwy, and Denbighshire in the north and north west; Ceredigion, Pembrokeshire, and Carmarthenshire in the west and south west; the south valley/coastal regions of Swansea, Neath Port Talbot, and Bridgend; and the Valley regions of Rhondda, Cynon Taf, Merthyr Tydfil, Caerphilly, Blaenau Gwent and Torfaen (see figure 1³⁴).
- 4.3.4 The west, north and south west of the region is largely delineated by coastline, which varies from steep sea cliffs in parts of the Anglesey, Gwynedd, Ceredigion, Pembrokeshire and Swansea coasts, to extensive beaches and dune systems in the same areas and in Carmarthenshire. The Wales Coast Path runs mainly within this sub-region.
- 4.3.5 The westward facing areas have many short fast flowing river systems determined by the proximity of extensive catchment areas and their geology. The rivers that flow north and south-west/south tend to be longer and their lower valleys and estuaries, flowing through softer geology, are broader and relate to arable land and more extensive settlement. The complex river system of the largely landlocked Valleys area has dictated settlement, transport networks, employment and even local climate.
- 4.3.6 The central mountain core of Wales, running north to south, influences most of West Wales and the Valleys, with the exceptions of Anglesey, parts of Ceredigion, Pembrokeshire, Swansea and Bridgend. This part of Wales contains a significant amount of the 14% of Wales' land that are forest areas.
- 4.3.7 The region contains two of Wales' National Parks and a part of the third; one Geopark and part of a second; four out of five Welsh Areas of Outstanding Natural Beauty (AONBs), and a high proportion of Wales' European and national biodiversity-based protected areas.

³² For a discussion on definitions of 'rural' see Pateman, T. (2011). *Rural and Urban areas: comparing lives using rural/urban classifications*. Office for National Statistics.

³³ UK 2005. *The Official Yearbook of the United Kingdom of Great Britain and Northern Ireland*. London: The Stationery Office. 2004. pp. 279. ISBN 0-11-621738-3.

³⁴ On page 29 above

4.3.8 Important features for biodiversity in West Wales include the Atlantic oak woodlands; a significant coastal belt that is noted for several species of seabird, and a marine SAC. The uplands and valley systems with steep, rocky sides, waterfalls, pools and temperate wet environment, are important habitats for a wide variety of lower and higher plants, invertebrates, birds, reptiles and mammals. In the south of the sub-region, there is significant speleological interest. Caerphilly, for example, contains four Sites of Special Scientific Interest (SSSIs) of speleological importance.

4.3.9 Most of West Wales and the Valleys is dominated by westerly weather systems, tending to have a higher than average rainfall and a fairly mild climate. There is a possibility that climate change will exaggerate this pattern and will exacerbate problems of coastal flooding. The warming of the Arctic may also cause an increase in weather systems arriving from a northerly direction as the jet stream shifts further south. This may result in areas previously in the 'rain shadow' of south-westerly winds no longer benefitting from such protection with associated flood risks – particularly in North Wales³⁵. The proximity of rivers to constricted settlement and density of infrastructure in the Valleys also presents flood issues.

4.3.10 The Countryside Council for Wales (now Natural Resources Wales) produced the Wales Tranquil Areas Map in 1997 to provide a national assessment showing the areas of land affected by noise and visual intrusions (including light pollution) in the landscape. The Map was updated in 2009 to enable the change in extent of tranquil areas over the last twelve years to be assessed³⁶. Light pollution in West Wales is relatively low because of the lack of large settlements. The Valleys area has a concentration of settlement that causes higher levels of light pollution³⁷.

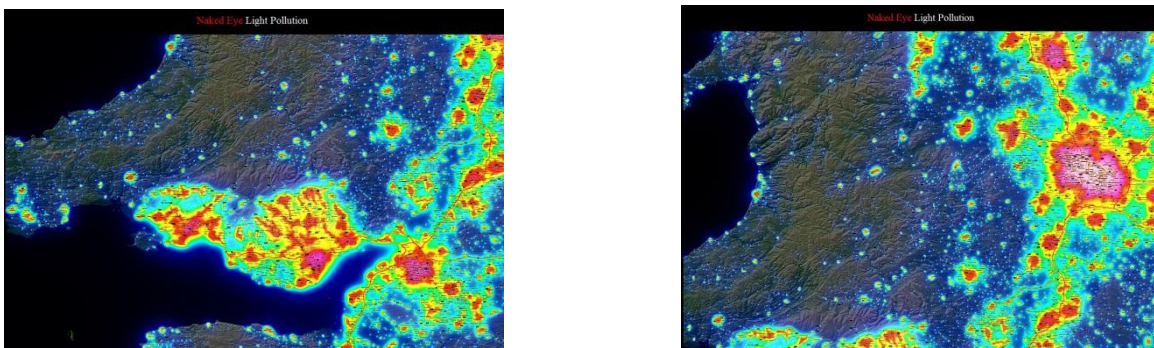


Fig 2: Light pollution in Wales. Source Stargazers Forum

³⁵ <http://www.climatecentral.org/news/arctic-warming-is-altering-weather-patterns-study-shows>

³⁶ Wales Tranquil Areas Map (2009), Report by Land Use Consultants for CCW

³⁷ <http://stargazerslounge.com/topic/42671-uk-light-pollution-map/>

- 4.3.11 Polluting industry is largely located in the Valleys area, including that from open cast mining. There are some major sources of air pollution arising from heavy industries located in Neath Port Talbot³⁸. Other industrial, agricultural, and forestry practices are associated with polluting watercourses, sensitive habitats and coastal/ marine environments³⁹. Redundant and abandoned coal, copper, lead and iron ore mines are a source of groundwater pollution, and with increasing flood conditions, this is a problem that may be exacerbated⁴⁰.
- 4.3.12 Transport systems in Wales have historically focused on west-east routes, which managed the outflow of people and goods. North-south links in the West Wales area depend on the A487 trunk road, which is being upgraded, as well as the A470. A network of trunk roads fans out eastwards from population centres, including the strategic A55, M4 and A465.
- 4.3.13 Recent flood events have resulted in severe disruption of road traffic and caused the whole of North West Wales to be cut off by both road and rail. The incidence of severe weather is projected to increase over the next 30 years⁴¹. This has clear implications for the functioning of the regions concerned, their future resilience and attractiveness to inward investors and to businesses already located within the region.
- 4.3.14 The rail system in West Wales links Aberystwyth and the north west coast (via Machynlleth) to Shrewsbury, whilst the Heart of Wales line links Llanelli to Craven Arms. The West Wales line from Fishguard, Milford Haven and Pembroke Dock through Carmarthen runs to Swansea and thence to Cardiff and England. The Valleys have a developed commuter rail network linked to Cardiff and Newport. In North Wales, the main rail line from Holyhead links the region to Deeside, Chester and destinations in the North West, Midlands and South East of England.

³⁸<https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside/State-of-the-Environment/EnvironmentalHazards/SensitiveHabitatsExceedingCriticalLoadsForAcidificationAndEutrophication-by-Year>

³⁹See StatsWales for example: <https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside/State-of-the-Environment/Environmental-Hazards/NumberOfDaysWithModerateOrHigherPollutionLevels-by-Area-Year>

⁴⁰See for example 'Industrial and Urban Groundwater Pollution'. UK Groundwater Forum. BGS NERC

'The State of Groundwater in England and Wales. Environment Agency. (undated). cdn.environment-agency.gov.uk/geho0906bldb-e-e.pdf

⁴¹See the UK Climate Projections for Wales: <http://ukclimateprojections.defra.gov.uk/21772>

4.3.15 West Wales and the Valleys has a significant diversity of cultural character and heritage. Gwynedd, the Isle of Anglesey, Ceredigion and Carmarthenshire are traditionally Welsh speaking areas and the language is an important aspect of everyday life. This is less so in the other parts of West Wales and the Valleys. In the north and on the west coast there is a significant reliance on tourism and this is linked to the value set on its landscape and cultural heritage.

4.3.16 The distinctive character of local architecture is mainly found in traditional farm buildings and structures associated with them, and tend to reflect the historic availability of local materials. Parts of the coastline have important historic castles including two of Wales' three Cultural World Heritage Sites and religious buildings and sites. Anglesey, Gwynedd and Pembrokeshire are distinguished by their prehistoric landscapes.

4.4 Biodiversity⁴²

4.4.1 Of the 21,000 km² land and freshwater surface area of Wales, about 30% is protected in special sites for wildlife, scenic beauty or geological value.

4.4.2 The three National Parks and five Areas of Outstanding Natural Beauty are categorised as 'Category V Protected Landscapes' by the International Union for the Conservation of Nature (IUCN), and occupy 24 per cent of Wales' terrestrial space (5,078 km²). In these areas there is an enhanced consideration of environmental matters in the management of development.

4.4.3 123,058 Ha are designated under the European Birds Directive as Special Protection Area (SPA), and 628,726 are currently designated under the Habitats Directive as Special Area of Conservation (figure 3). There are currently 92 SACs, 20 SPAs and 10 Ramsar sites in Wales, of which 86 are either within the West Wales and the Valleys region, overlapping with East Wales, or within 20 kilometres of

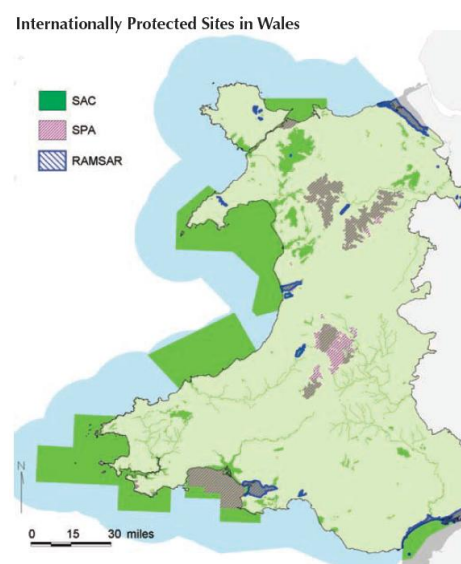


Fig 3: European and Ramsar Sites Source: Special Sites

⁴²Data derived from JNCC <http://jncc.defra.gov.uk/page-1399>; and from CCW <http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape.aspx>; unless stated.

West Wales and the Valleys. Much of this is nationally designated as National Nature Reserve (NNR).

- 4.4.4 The distribution of these protected sites is variable. For example, Gwynedd and Anglesey account for 25 NNRs, covering 4891 hectares, over one-third of NNRs by number and just under one-fifth in area. Gwynedd and Anglesey also account for one third of Wales' SPAs⁴³.
- 4.4.5 Conversely, the biodiversity of Neath Port Talbot is somewhat compromised by the extent of coniferous plantation which, at 35% of the area, is the highest cover of Forestry Commission plantation in England and Wales. Thus, despite the difference in size between the two councils, there are 20 SSSIs in contrast to Gwynedd's 140.⁴⁴

Protected Areas in Wales

3 National Parks and 5 AONBs
14 Heritage Coasts
1 Biosphere Reserve
2 Geoparks
92 SACs and 20 SPAs
Over 1,000 SSSIs (about 12% of the country's' surface)
72 National Nature Reserves (NNRs) (over 25,000 ha of land)
1 Marine Nature Reserve (over 1,000 ha of sea)*
92% of NNRs by area are also sites of international importance for wildlife
11 RSPB reserves
236 Wildlife Trust reserves

**Currently under review*

- 4.4.6 In common with other countries in Europe, Wales missed its international biodiversity targets in 2010. In 2005, 59% of Biodiversity Action Plan habitats in Wales were in declining condition. Priority habitats classed as stable or improving increased from 30% in 2002 to 36% in 2008. Fifty-four per cent of Biodiversity Action Plan species were assessed as being in 'unfavourable condition' in 2008, but with considerable variation between species groups. For example, 80% of marine mammals and birds were in favourable or recovering condition, while 80% of amphibians, butterflies and fish were recorded as being in unfavourable condition.

⁴³ Gwynedd UDP Deposit Plan SEA 2005

⁴⁴ Neath Port Talbot Flood Risk Management Plan SEA 2012

Biodiversity Action Reporting System (BARS 2011) Condition of habitats

Decline across 60% of marine habitats
 Decline across 8% of terrestrial habitats*
 Decline across 33% of freshwater habitats
 Improvement or stability in 80% of terrestrial habitats*
 Improvements or stability in 66% of freshwater habitats
 Improvement in 83% of Woodland, upland & Enclosed Farmland habitats
 Same or accelerated decline in 25% of wetlands and coastal habitats
 Apparent slowing decline in lowland grassland and heathland

UK NEA 2011

'Status & Changes in the UK's Ecosystems and
 their Services to Society':
 Chapter 20 Wales
 Key Findings

* About 12% are fluctuating/reveal no clear trend

4.4.7 In the case of SAC's, 61 per cent of habitat features and 67 per cent of species features for which they were designated are in unfavourable condition⁴⁵.

4.4.8 Coastal and marine habitats are under particular pressure, with the majority in stable or declining condition. Specifically, saltmarsh and coastal lagoons are equivocal or stable, whilst cliffs, dunes and shingle show a weak decline in condition⁴⁶. However, marine habitats themselves are mostly stable⁴⁷, and there has been a downward trend in some polluting substances in the marine environment⁴⁸

4.4.9 Other indicators present a mixed picture, particularly in the case of birds, with some farmland and woodland birds showing marked declines (some species showing a 42.7% decrease in range) and others (16.9%) an increase in populations⁴⁹.

4.4.10 Drivers of change in Welsh Coastal Margin Habitats include:

- Changing tourism patterns and interests
- Land use demands
- Climate change

⁴⁵ *Special Areas of Conservation in Wales. Current State of Knowledge report. September 2010*

⁴⁶ *UK NEA 2010 Chapter 20*

⁴⁷ *UK MAAS 2010*

⁴⁸ *State of the Environment Report 2012*

⁴⁹ *Ibid.*

- Nitrogen deposition
- Sea-level rise

4.4.11 Invasive species, such as the signal crayfish (*Pacifastacus leniusculus*), the 'killer shrimp' (*Dikerogammarus villosus*)⁵⁰, Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Polygonum cuspidatum*), parrot's feather (*Myriophyllum aquaticum*), floating pennywort (*Hydrocotyle ranunculoides*), and Water fern (*Azolla filiculoides*) are giving rise to concern since they threaten a number of native species, choke waterways and banks, and in some cases damage infrastructure. In coastal waters, Japanese wireweed (*Sargassum muticum*), New Zealand barnacle (*Elminius/Austrominius modestus*) and algae such as *Heterosiphonia japonica* are also becoming problematic.

4.4.12 A further cause of concern is the incidence of runoff and nutrient enrichment, which may have impacts on important species⁵¹.

4.4.13 The National Assembly Sustainability Committee's 2010 report into biodiversity loss⁵² lists 19 recommendations for addressing the challenge, including:

- Driving the ecosystem approach into policy and across all government departments in Wales
- Focusing more on biodiversity in the wider landscape rather than dependence on protected sites alone
- Involving the private sector in biodiversity management through the use of incentives and payments for ecosystem services

4.4.14 Further information on West Wales and the Valleys European protected habitats and species is provided in the Habitats Regulations Assessment carried out in parallel with this report.

4.5 Population and human health

4.5.1 The population of West Wales and the Valleys varies considerably across its constituent administrations. The population of Carmarthenshire (184,000, is more than the combined size of its adjoining county of Ceredigion (75,300) and Denbighshire in the north

⁵⁰ <http://www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx>

⁵¹ For example arctic charr (*salvelinus alpinus*) in Llyn Padarn and gwyniad (*Coregonus lavaretus*) in Llyn Tegid, both in Gwynedd

⁵² Sustainability Committee National Assembly for Wales 'Inquiry into Biodiversity in Wales' 2011

(93,900), as a result of the concentration of its urban and post-industrial areas. The populations of Gwynedd (121,500) and Pembrokeshire (122,600) are similar, with that of Conwy not significantly less at 115,300. Merthyr Tydfil contains the smallest population at 58,800. The population of Swansea unitary area is 239,000.

4.5.2 In terms of space, Gwynedd occupies 2,548 sq.km, giving it a population density of 47 people per sq.km, in contrast to that of Swansea, whose population density is 601 people per sq.km. within Swansea's 378 sq.km. authority area.

4.5.3 The Welsh Government's Sustainable Development Scheme 'One Wales: One Planet (May 2009) defines wellbeing (p19) as:

'...a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment and a healthy and attractive environment.'

4.5.4 The State of the Environment Report (July 2012) sets outcomes for health and well-being and provides detailed information on progress, based on sets of indicators. Its main findings on the condition of health and well-being in Wales are summarised here:

- In 2009/10, 50.3% of respondents found it very easy to access parks or open space and a further 35.6% found access fairly easy, a decrease from 89.9% in 2005 to 85.9% in 2009/10.
- 20% of adults reported currently being treated for high blood pressure, 14% for a respiratory illness, 12% for arthritis, 11% for a mental illness, 9% for a heart condition, and 7% for diabetes.
- 29% of adults reported being physically active on five or more days in the past week.
- 57% of adults were classified as overweight or obese, including 22% obese. 35% of children were classified as overweight or obese, including 19% obese.

- In 1997, 78.2% of people travelled to work by car. In 2011, this had risen to 80.7% (an increase of 2.5 percentage points). In 1997, 11.2% of people walked to work. In 2011 this had fallen to 10.3%, a fall of 0.9 of a percentage point.
- Over the same period the proportion of people using public transport had fallen from 8.8% to 7.5% (a fall of 1.3 percentage points), and those travelling by bicycle had fallen from 1.9% to 1.4% (a fall of 0.5 of a percentage point).
- Having peaked at just over 5,200 per 100,000 self-reported illnesses made worse by work in 2005/6, the figure currently stands at just under 4,000 per 100,000. There were 5,863 reported injuries to employees in 2011, a 4.4% decrease from the previous year.

4.5.5 In terms of housing stock, although the number of homes has steadily increased since 1986, the rate of unfitness has continued to fall (Welsh House Condition Surveys and Living in Wales Survey 2004).

4.5.6 By 2008 the number had reduced from 19.5% of the 1986 total (199,000 dwellings) to 4.1% (52,100).

4.5.7 A variety of health data sources⁵³ report issues around lifestyle habits including smoking, alcohol use and obesity. Whilst these are not of direct relevance to the proposed Operational Programme, travel to work, the working environment, access to space and recreation, reductions in stress levels, living conditions and so on are undoubtedly factors that relate to the types of supported actions that it envisages.

4.5.8 Of more direct relevance is the Index of Multiple Deprivation⁵⁴ data for access to the 'physical environment' (figure 4), which is defined in terms of air quality and risk of flooding. Much of West Wales is considered to be relatively free from flood risk and from exposure to low air quality, although this varies locally.

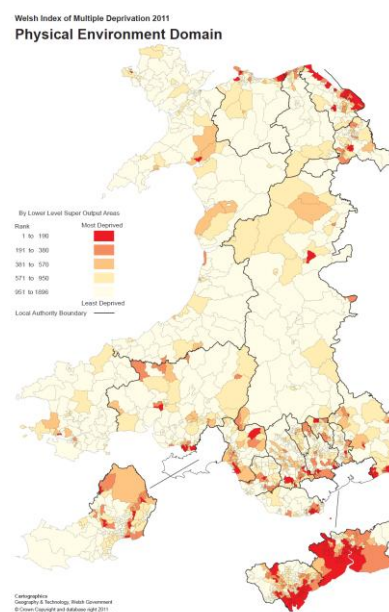


Fig 4. Index of Multiple Deprivation - physical environment

⁵³ See *Welsh Government 'Key Health Statistics for Wales' 2012; Wales Health Survey 2011*

⁵⁴ See wales.gov.uk/topics/statistics/publications/wimd11summary/

4.5.9 Access to essential services such as education and health are of concern to some remote communities. The trend towards the centralisation of public services in order to deliver financial efficiency will need to consider where new developments can best be located. Services must be accessible to as many people as possible, and if a low carbon future is to be envisaged, would need to be accessible by public transport. Changes in climate leading to more adverse weather conditions may make it impossible to access centralised education/health services for those living anywhere other than in their immediate vicinity, and may also make it difficult for employees to travel to work where there are long journeys involved.

4.5.10 A number of reports⁵⁵ allude to an increasing disconnect between young people and the natural environment, linked to a fear of strangers and of other hidden dangers. Whilst this is not an appropriate forum for detailed discussion of this issue, there are indications that demonstrate that contact with the outdoors and with nature brings with it a number of mental and physical health benefits, and conversely such a disconnect should raise concerns about the future health of young people.

4.6 Soils and material assets

4.6.1 Globally, soil is under stress from a number of factors, including erosion, loss of organic matter, salination, compaction, contamination, loss of biodiversity, eutrophication and acidification.

4.6.2 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.

4.6.3 Whilst other measures have been used to promote soil protection, there was no distinctive measure within Europe that aimed specifically to protect the quality and productivity of the soil. The European Commission published a proposal for a framework directive on the protection of the soil in 2006⁵⁶, and more recently has published a report on the implementation of the Soil Thematic Strategy⁵⁷, which

⁵⁵ For example *England Marketing (2009) Childhood and Nature; Report to Natural England; Children and Nature Network (2010) Children's Contact with the Outdoors and Nature; Greater London Authority (2011) Sowing the Seeds – reconnecting London's children with nature*

⁵⁶ COM (2006) 232 final. *Proposal for a directive establishing a framework for the protection of soil and amending Directive 2004/35/EC*

⁵⁷ COM (2012) 46 final. *Report on implementation of the Soil Thematic Strategy and ongoing activities. 2012*

was an output of the Sixth European Environmental Action Programme⁵⁸.

4.6.4 Soil is a critical area of policy concern, and a number of questions are subject to research in order to be able to address challenges such as sustaining the soil's capacity to sequester carbon, to maintain its micro-organic biodiversity and to sustain its productivity.

4.6.5 Whilst soil types are well understood and have been categorised⁵⁹, there are still gaps in understanding its structure and function. Whilst some of these issues relate more to the Wales Rural Development Plan, aspects of this proposed Operational Programme have a bearing. Air pollution, waste, infrastructure, flood risk management and energy demand all have a direct or indirect relationship to the physical, chemical or biological quality of the soil.

4.6.6 The rate at which the soil carbon store is changing in Wales is the subject of some debate, with apparently contradictory results from two major UK surveys; the National Soil Inventory⁶⁰ and the Countryside Survey 2007⁶¹. Issues such as carbon storage, soil compaction⁶² and erosion⁶³ are and have been subject to research.

4.6.7 Concern also revolves around the potential impact of climate change. As the Welsh Government has put it,

*'Climate change is also expected to lead to changes in soil composition. A reduction in the carbon content of soil will lead to a reduction in the capacity of the soil to absorb rainfall.'*⁶⁴

4.6.8 Soil and land contamination is a concern, especially in post-industrial environments where the cost of remediating polluted land is high. The total amount of contaminated land in Wales is unknown, although a baseline desk study assessment of contaminated and derelict land in

⁵⁸ EU 6th Environmental Action Programme.

<http://ec.europa.eu/environment/newprg/index.htm>

⁵⁹ Avery, B.W. (1980). Soil classification for England and Wales [Higher Categories]. Survey Technical Monograph No. 14, pp67. Harpenden, UK.

⁶⁰ Bellamy et al 2005

⁶¹ Emmett et al. 2010

⁶² Research Study BD5001: Characterisation of Soil Structural Degradation Under Grassland and Development of Measures to Ameliorate its Impact on Biodiversity and Other Soil Functions. Newell Price and Chambers 2012. Literature Review. Critchley and Kirkham 2011.

⁶³ See Bellamy and Rickson (2011) Monitoring Soil Erosion in England and Wales. Cranfield University.

⁶⁴ Welsh Government National Strategy for Flood and Coastal Erosion Risk Management in Wales. Nov 2011:14

Wales (EAU 1988) indicated 752 potentially contaminated sites covering 3,721 ha and 10,900 ha of derelict land.

4.6.9 As well as soils, the use of Wales' other material resources such as timber and rock are an area which should be considered.

According to the British Geological Survey/Office for National Statistics, the amount of aggregate taken in Wales was (2005):

- Land-based sand and gravel – 65 m. tonnes
- Marine dredged landings – 13m. tonnes
- Crushed rock – 102m. tonnes

4.6.10 Wales lacks a plentiful supply of terrestrial sand and gravel, and therefore relies on marine dredged sources to supply a Wales-wide demand. The implication is that Wales needs either to import supplies or to intensify its dredging activity in order to meet a significant increase in infrastructural development or that the level of infrastructure proposed is unsustainable.

4.6.11 Wales' State of the Environment Report (2012) indicates that:

- 45% of construction and demolition waste was reused and recycled in Wales in 2003 and 2005, compared with 52% in England in 2005.
- The percentage of construction and demolition waste used for landfill engineering and restoration in Wales increased from 11% in 2003 to 32% in 2005.
- The percentage of construction and demolition waste spread on exempt facilities in Wales decreased from 35% in 2003 to 17% in 2005.
- Currently no data are available regarding the total amount of aggregates used in Wales. It is estimated that 12.2 million tonnes of construction and demolition waste was produced in Wales in 2005-06. Just under half of this was aggregate waste, i.e. secondary aggregates.
- The percentage of aggregates (excluding construction and demolition waste) used from secondary and recycled sources in Wales has generally increased since 2004 though in 2010 it decreased slightly compared with the previous year.

- 4.6.12 Timber is a critical natural resource for Wales. The preliminary National Forest Inventory map, based on analysis of 2006 aerial photographs, identifies 304,000 hectares of woodlands in Wales. The Inventory indicates that conifer woodland covers 129,600 hectares of all woodland (43%), and broadleaved 116,000 hectares (38%). Mixed conifer and broadleaved woodland accounts for 12,000 hectares, 4% of woodland area. Other areas (15%) include felled areas, young trees, and shrub.
- 4.6.13 About 65% of the coniferous woodland is owned by the Welsh Government, whilst a high proportion of broadleaved woodland is privately owned. The timber resource is under-exploited owing to competitively priced imported timber (Jones 2011).
- 4.6.14 The issue of biomass is important in this context. Europe faces a biomass shortage with demand expected to increase by 50% over the next 10 years⁶⁵. Within the UK alone, the total amount of biomass burnt each year will increase 10 fold from 5 million tonnes to 50 million tonnes once all of the existing and currently proposed biomass power stations come into operation. This sudden and increased demand is causing a surge in imported biomass fuels from 13% to 68% with imports being three times greater than the UK's current wood production alone⁶⁶.
- 4.6.15 There is an opportunity to promote the use of timber as a sustainable construction material and, in the context of biomass, as part of reducing the carbon footprint of the construction sector. However, timber processing is a low margin, heavily regulated sector that operates in an international market. Welsh haulage costs compare poorly with those of international producers and are very sensitive to increases in the price of fuel. Locally, the environmental impacts of timber haulage can be considerable.
- 4.6.16 Land is clearly a matter of interest, particularly the amount of previously developed land available. The general planning policy is to redevelop such 'brownfield' land where feasible rather than establishing new development on 'greenfield' sites, especially where such sites are agriculturally of higher grade.

⁶⁵ <http://www.hortweek.com/news/1060886/Woodfuel-Taskforce-warns-future-report/>

⁶⁶ [http://www.forestry.gov.uk/pdf/WoodfuelTaskForceUpdateReport_2011.pdf/\\$FILE/WoodfuelTaskForceUpdateReport_2011.pdf](http://www.forestry.gov.uk/pdf/WoodfuelTaskForceUpdateReport_2011.pdf/$FILE/WoodfuelTaskForceUpdateReport_2011.pdf)

4.6.17 Although there appear to be no statistics, there is likely to be considerably more brownfield land available in larger settlements in the Valleys than in the smaller communities in the West. The latest figures⁶⁷ are somewhat dated, but indicate (perhaps unsurprisingly) that the greatest period of land reclamation occurred throughout the 1990's and has since tailed off.

4.6.18 There is only one Green Belt in Wales (not within West Wales and the Valleys), and the need to contain urban sprawl or locate new industries on urban fringes needs to be balanced against intensifying the already relatively dense urban environment, and to provide higher quality green infrastructure in Wales' larger settlements. There is a wide-range of serious environmental, social and economic challenges to consider such as developing housing to meet demographic changes; ensuring that the environment is resilient to a changing climate; maintaining adequate supplies of water; managing flood risk; securing food and energy supplies; and safeguarding against biodiversity loss. Green infrastructure has a critical role in meeting many of these challenges.

4.7 Air quality

4.7.1 Given the diversity of landscape and land cover, the geology, density of settlements, quality of housing, employment patterns, traffic flow and densities of traffic, the quality of the air is likely to vary across West Wales and the Valleys.

4.7.2 Air quality relates to a number of variables, including carbon monoxide and dioxide, nitrous oxide, particulates, methane, ozone and radon.

4.7.3 In the previous century much of the air pollution problem was associated with the burning of fossil fuels such as coal for heating and industrial purposes, leading to smoke emissions containing high levels of sulphur dioxide. The major threat to clean air is now posed by traffic emissions. Petrol and diesel engines emit a wide variety of pollutants, principally carbon monoxide, oxides of nitrogen, volatile organic compounds and particulates, which are having an increasing impact on air quality, particularly in urban areas⁶⁸ (see figure 5).

4.7.4 Air quality in parts of the Valleys area is relatively poor in EU terms⁶⁹. In the past, Wales' weather systems have helped to ameliorate the

⁶⁷ <https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside/Land>

⁶⁸ *Caerphilly local development plan SEA*

⁶⁹ <http://www.businessgreen.com/bg/news/2187762/exclusive-eu-prepares-legal-action-uks-pollution>

effects of air pollution, but with increasingly unpredictable patterns of weather there is a possibility of deteriorating quality. A few councils have declared Air Quality Management Areas (AQMA) where air quality consistently exceeded thresholds⁷⁰, but West Wales in general has no AQMAs⁷¹.

- 4.7.5 In contrast to the urban environment, ozone, which is a greenhouse gas, can be a health hazard at ground level, and is more likely to occur in rural environments (figure 5)⁷².

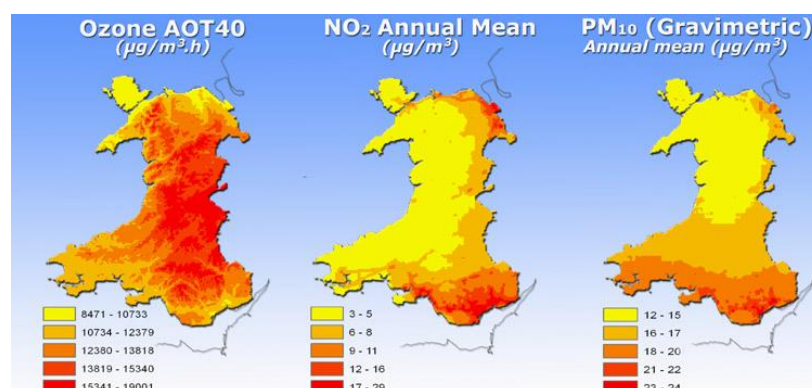


Fig 5: Air Quality in Wales

- 4.7.6 Some parts of West Wales and the Valleys are designated as radon affected, areas, since there are locations such as parts of Conwy⁷³ where it is estimated that more than 1% of homes exceed the Government Action Level for radon. In parts of north Pembrokeshire, Anglesey and Gwynedd, the number of homes exceeding the action level may be as high as 30%⁷⁴. This will need to be considered in the design of new buildings, and particularly homes.

4.8 Water - resource and quality

- 4.8.1 The Welsh Government 'State of the Environment Report' (2012) sets outcomes for water resources and provides detailed information on progress that is based on sets of indicators.

⁷⁰ For example Caerphilly town centre, whose council anticipates an increase in AQMAs with the rise in traffic; Neath Port Talbot; Swansea.

⁷¹ See Defra AQMA maps for Wales. http://aqma.defra.gov.uk/maps-wales.php?&la_id=409

⁷² Air Quality Forum: <http://www.welshairquality.co.uk/trend.php?t=4>

⁷³ Conwy LDP SEA 2011

⁷⁴ Indicative Atlas of Radon in England and Wales. Miles JCH et al Health Protection Agency Didcot and British Geological Survey Nottingham. 2007

- 4.8.2 Generally, there has been a downward trend in water leakage, from 249 megalitres per day in 200-02, to 202 megalitres per day in 2010-11. However, this represents 23.5% of total water supplied (WG SoE Report 2012; UK NEA 2011).
- 4.8.3 Overall, average per capita consumption in Wales has remained fairly stable: having risen from 148 litres/day in 2001 to 152 litres/day in 2008-09, in 2010-11 it was 149 litres/day. Where households were metered, consumption was significantly less.
- 4.8.4 Not all of the water abstracted in Wales is for home consumption, as there are considerable transfers to English regions. According to the Environment Agency (2010), abstractions in Wales were 40% greater in 2007 than in 1995. The major reasons for abstraction related to electricity supply and represented 75% of total Welsh abstractions – although it needs to be recognised that most of the water abstracted for this purpose is returned to the environment.
- 4.8.5 In terms of quality, the picture appears mixed. Bathing waters have achieved a high level of compliance with EC standards since 2002. For five of the last ten years, compliance has been 100%. It is not clear to what extent this success has been weather related – because when there is heavy rainfall in summer, sewage discharges to sea mean that the EC standards are not met. This raises the question as to what will be the impact of increased climate change-induced extreme weather events might be.
- 4.8.6 For chemical quality, the percentage of river length of good quality has been consistently high at about 95%. However, ecological and biological water quality indicates some areas of concern.
- 4.8.7 Whilst 67% of coastal waters have been assessed as being of 'good' or 'high' ecological quality, this implies that 33% (i.e. one third of the coastal zone) is *not* of good ecological quality. The picture for overall river length of good biological quality is positive at approximately 87%. However, the ecological status for specific water body types is mixed: 36% of transitional water bodies, 34% of rivers, 56% of canals and 21% of lakes assessed were given 'good' or 'high' ecological status in 2011.
- 4.8.8 In 2002, Environment Agency Wales identified 1,300 mine sites where discharges to water are known to occur (EAW 2002). This continues to be a significant source of pollution, accounting in 2012 for 130 or

10% of water bodies failing to meet WFD standards⁷⁵. Other major sources of WFD failures in water bodies are:

- agricultural pollution (155 failing water bodies)
- artificial barriers to fish migration (150 failing water bodies)
- impoundments (reservoirs) and regulated flows (101 failing water bodies)
- sewage discharges (82 failing water bodies).

4.8.9 The Welsh Government's Green Paper 'Sustaining a Living Wales' (2012) highlights some of the challenges to water resources (p8):

'Even though Wales receives more annual rainfall than many other parts of the UK this does not mean that we can take a continuous and endless supply of water for granted. In Wales rainfall travels quickly to our rivers and during dry periods our river levels can also drop quickly in response. In addition to causing stresses to the water environment and aquatic habitats and species in these rivers, this also creates challenges to ensuring security of public water supply and supporting other water abstractions. Currently the Environment Agency estimate that, in approximately 38% of river water bodies in Wales, water is no longer reliably available for new water abstractions.'

4.8.10 Freshwater ecosystems in Wales are subject to a variety of human pressures including pollution, sedimentation, extractive fisheries, invasive/non-native species, and over abstraction. Trends such as population growth, combined with climate-related trends, may significantly impact on the availability of good quality water.

4.8.11 The overall statistics conceal pockets where there may be significant problems due to over-abstraction, high levels of diffuse pollution, leakages, domestic over-consumption and low ecological/biological quality. Some areas within the region may require high demands where settlements or industry are concentrated, and pressures may increase as a result of the proposed Operational Programme.

4.9 Flood Risk

4.9.1 According to the Wales NEA (2011), it is estimated that one in six properties in Wales (600,000 people in 357,000 properties, of which 150,000 are residential) is at risk of flooding. The 2004 Foresight

⁷⁵ *Living Waters for Wales, Fifth Water Framework Directive Newsletter, Spring 2012, Environment Agency Wales.*

Future Flooding Report⁷⁶ estimated that economic risk from flood damage to properties and contents would rise from £70 million in 2004 to £1,235 million in the 2080's in the most likely scenario.

Flooding issues

- 28% of the Welsh coastline has some form of artificial sea defence works
- Wales has approximately 2,740 km of coastline. Flood risk is highest along the low-lying zones of the North Wales coast, and at Llanelli, Port Talbot
- Erosion of natural flood defences, such as dunes and wetlands, makes Welsh coasts more susceptible to risk
- In downstream and at-risk areas uptake of the Sustainable Drainage Systems (SuDS) schemes is at a relatively early stage and has so far been patchy across local authority areas in Wales

(UK NEA 2011)

- Over 150,000 residential properties, many commercial and industrial developments, other key infrastructure like power supplies, transport links and schools and colleges, as well as important environmental and historic sites are on land at risk of flooding
- The asset value protected by Wales' 415km of man-made flood and erosion defences is estimated at over £8 billion of assets⁷⁷
- Increased frequency of flooding will have an impact on livestock and could damage crops

Welsh Government:
Climate Change Adaptation Strategy -
consultation document Feb 2007

4.9.2 Since 2005-6, 5,700 properties have benefitted from Environment Agency flood alleviation schemes⁷⁸. The role of the planning system in considering the likely impact of climate change on development locations is obvious, and projects or developments brought forward in response to the proposed Operational Programme need to be assessed in this light.

⁷⁶ Foresight Programme (UK Government), (2004). *Foresight Future Flooding*.
www.foresight.gov.uk/OurWork/CompletedProjects/Flood/index.asp

⁷⁷ See also Wales Audit Office 'Coastal Erosion and Tidal Flooding Risks in Wales' 2009.

http://www.wao.gov.uk/assets/englishdocuments/Coastal_flooding_eng.pdf

⁷⁸ Environment Agency response to the Scoping Report

4.10 Climate issues

4.10.1 Climate change relates to several of the baseline discussed here, including flood risk, water resources, air quality and biodiversity. It is a critical Welsh Government policy issue:

*'Tackling climate change is a fundamental part of delivering sustainable development. Climate change is one of the most important challenges facing the world and the Assembly Government has made a commitment to tackling climate change, resolving that the Government and people of Wales will play the fullest possible part in reducing its carbon footprint. Our commitment to action on climate change is based on a scientific imperative to act and to act urgently to reduce greenhouse gas emissions and deal with the consequences of climate change.'*⁷⁹

4.10.2 The same document states that:

'The Assembly Government has set out to achieve annual carbon reduction-equivalent emissions reductions of 3 per cent per year by 2011 in areas of devolved competence, which include land use planning. We are also committed to achieving at least a 40% reduction in all greenhouse gas emissions in Wales by 2020 against a 1990 baseline. This will assist in making a significant contribution to the UK Carbon Budgets'

Climate Change

Carbon dioxide (CO₂) is the main contributor to greenhouse gas emissions in Wales. In 2010 it was estimated that

- Energy industries accounted for 41% of total CO₂ emissions
- Manufacturing and construction industries accounted for 24%
- Transport accounted for 15%
- The remainder came from domestic, agricultural and waste emissions

Welsh Government 'State of the Environment Report'
July 2012

4.10.3 The SoE Report sets outcomes for minimising the effects of climate change and provides information on progress. The main findings on the progress of climate change mitigation measures in Wales are summarised below:

⁷⁹Planning Policy Wales Feb 2011 p44

- The estimated emissions in million tonnes of CO₂ equivalent from transport in Wales in 2010 was 6.1. Wales transport emissions accounted for 5% of the UK total in 2010
- The land use and land use change and forestry (LULUCF) sector can have both negative and positive impacts on greenhouse gas emissions. In Wales the sector is generally a small net sink of carbon dioxide, and this sink has slightly increased between 1990 and 2009.
- The indication is that there has been a clear improvement in Wales' resilience to the impacts of climate change.

4.10.4 Based on the Welsh Government's Climate Change Adaptation Strategy and consultation (2007, Chapter 4), it is likely that the continuing trends in climate change are likely to lead to more extreme weather events with an increase in temperatures, resulting in hotter, drier spring and summer conditions, which may impact particularly in the East of Wales and across the border in England placing significant pressure on already stressed water resources. Later research by Jennifer Francis of Rutgers University and Stephen Vavrus of the University of Wisconsin-Madison⁸⁰, suggests that rapid Arctic climate change is directly linked to amplification of the jet stream movements resulting in the high-impact, extreme weather events already experienced in the U.S. and Europe. This may result in warmer winter conditions, increases in flooding, landslip and soil erosion all having implications on areas of development.

4.10.5 Extreme cold weather may also result from the warming Arctic Ocean and all of these extremes of weather may result in disruptions to productivity, travel to work and access to public services such as schools and hospitals as well as disruptions to the transport infrastructure adversely impacting industry, which will have implications for investment and for economic sustainability.

4.10.6 UK climate impact projections quoted in the NEA suggest that average annual natural river flows could reduce by 10–15% in Wales by 2050, and natural summer river flows could reduce by 50% or more, with implications for flood hazard regulation and water supply.

⁸⁰<http://www.climatecentral.org/news/arctic-warming-is-altering-weather-patterns-study-shows/>

4.11 Energy consumption

4.11.1 Climate change adaptation is closely linked to the use of energy - its generation, delivery and consumption patterns, and critically its conservation. The Welsh Government's 'Renewable Energy Route Map' (2008) provides indicative data on energy demand, supply and emissions.

4.11.2 The SoE Report considers energy use and environmental standards in new buildings in Wales. In the case of energy savings from public sector buildings, it says that there has been little overall change in energy consumption since 2005. In 2008, gas accounted for 60% of public sector energy use, electricity accounted for 36%, whilst oil and coal combined accounted for 4% of public sector energy use.

4.11.3 The report points out that estimates of public sector energy use in Wales have been back-calculated from greenhouse gas emissions (GHG) inventory analysis and UK energy statistics. It indicates that these data are experimental estimates and very uncertain, especially as they do not take into account fluctuating conditions.

4.11.4 'A Low Carbon Revolution' - the Welsh Government's Energy Policy Statement (2010) provides some general information about energy consumption in Wales (p9):

'Currently, in the UK the average person's daily energy consumption (excluding energy related to food and imported goods) is around 125 kilowatt hours per day per person (kWh/d/p).

Of this 125 kWh/d/p, after taking into account conversion losses, we use a third for heating, a third for transport and a third for electrical power. The average electrical power consumption per person per day in Wales is approximately 22 kWh/d/p, (slightly higher than the UK average of 18 kWh/d/p. To put this into context this is equivalent to every person in Wales leaving twenty-two 40-watt light bulbs on for 24 hours every day.'

4.12 Waste management

4.12.1 The SoE Report's latest findings on waste management (July 2012) are summarised below:

- The total amount of household waste produced per person in Wales has fallen to 467kg in 2010/11
- In 2005-06, the estimated amount of construction and demolition waste produced in Wales was 12.2 million tonnes

- 191,000 tonnes of waste was produced by the public sector in Wales in 2007, of which 46% was recycled off-site or re-used off site; 41% of public sector waste was landfilled in 2007
- The percentage of local authority municipal waste (excluding abandoned vehicles) reused, recycled or composted in Wales increased to 45%
- The percentage of industrial and commercial waste recycled, composted or re-used in Wales decreased from 64% in 2002/03 to 49% in 2007
- 39% of industrial and commercial waste was sent to landfill in 2007 (3.6 million tonnes), increasing from 28% in 2002/03.
- 51% of municipal waste (excluding abandoned vehicles) was sent to landfill in 2010/11 - a decrease from 93% in 2000/01
- 338 companies are Green Dragon certified in 2012; 21 companies achieved the highest rating (Level 5), an increase from 17 in 2011

4.12.2 The trend in the amount of municipal waste reused, recycled or composted is upward. The picture is less clear in regard to industrial and commercial waste, since 2009 has been taken as the baseline and more recent figures are unavailable.

Waste

- 48% of local authority municipal waste was recycled March 2011-12
- The residual household waste produced per person in Wales fell to 56 kilograms per person in January to March 2012, from 65 kilograms per person in January to March 2011.

Statistics Wales:
Local Authority Municipal Waste Management, 2012 p2

- Commercial and industrial waste accounts for around 50% of the total waste ecological footprint), with municipal waste accounting for about 35% and construction and demolition waste accounting for 15%.
- In 2007-08, 10,554 tonnes were reused via Third Sector organisations in Wales – this included 9,602 tonnes of furniture.

Source: Cylch Let's Prove It Report 2008

- Cardboard boxes and containers are the largest component of business waste, making up 15%, or 100,000 tonnes of the total. Kitchen waste made up 13%, or 90,000 tonnes.

WAG - Towards Zero Waste - Consultation on a
New Waste Strategy for Wales. April 2009

4.13 Transport

4.13.1 *'Rising concentrations of greenhouse gases are recognised to be causing global climate change. Transport, through the use of fossil fuels, is one of several key activities that produce greenhouse gases, and accounts for around 16% of CO₂ emissions (around 14% of greenhouse gas emissions) in Wales.'*

'One Wales - Connecting the Nation' -
The Wales Transport Strategy April 2008 (p5)

4.13.2 There has been little change in the main modes of travel to work since 1997 in both Wales and the UK. In 2011 the situation was as follows:

- 81% of the population travelled to work by car, van, minibus or works van
- 12% by walking or cycling and
- 8% used other modes of transport in Wales.
- Almost as many children travel to school by car (33.6%) as by walking (36.4%)
- the numbers travelling to school by bus or coach have reduced since 2002/3, with 23.9% travelling in this way⁸¹
- bus passenger numbers have fallen from about 118 million in 2009/10 to 113 million in 2010/11
- rail passenger numbers (for journeys either beginning or ending in Wales) have increased from some 25 million 2008/09 to 27 million in 2010/11
- Sixty-nine per cent of these journeys were entirely within Wales
- For 39% of these, Cardiff was the destination of rail passenger journeys⁸²

4.13.3 Overall, greenhouse gas emissions relating to transport fell by over 5% between 2008 and 2010⁸³.

⁸¹ SoE Report 2012

⁸² Statistical Bulletin. Rail transport October 30 2012

⁸³ National Atmospheric Emissions Inventory: <http://naei.defra.gov.uk/>

Transport issues

- On the east-west corridor buses account for 85% of public transport
- Out-commuting accounts for many journeys on the east-west network in West Wales & the Valleys
- Approx. 70% of all personal journeys in Wales are made by car
- Average of 47 journeys per person per year are made by bus or coach

West Wales and the Valleys Consultation Document Jan 2013
Annex A

- CO₂ emissions from road transport have steadily increased since 1990, and depending on the forecasting method used, look set to continue to grow. Emissions of other pollutants such as Nitrogen Oxides (NO_x) and particulates (PM₁₀) are 58% and 44% lower

'One Wales - Connecting the Nation -
The Wales Transport Strategy April 2008

4.14 Culture, architecture and archaeology

4.14.1 The Welsh language is a member of the Brythonic branch of Celtic languages, and is the oldest spoken language in Europe. In 2001, the number of Welsh speakers was over 582,000 (21 per cent of the total population)⁸⁴. The 2011 Census results on the Welsh language in Wales were published by the Office for National Statistics on 11 December 2012. These initial results include data at a Wales and local authority level. The number of people who speak Welsh has fallen in the past 10 years, according to the 2011 census. Despite an increase in population the number of Welsh speakers has fallen overall from 582,000 in 2001 to 562,000 in 2011 a two-percentage point drop in the proportion of Welsh speakers in the population as a whole - from 21% to 19%. Gwynedd and Anglesey are the only areas where over half the population now speak Welsh.

4.14.2 The local authorities with the highest percentage of Welsh speakers have not changed but Gwynedd now has 65% (down from 69%), Isle of Anglesey 57% (down from 60%). Welsh is now a minority language in two of its traditional strongholds: Ceredigion at 43% (down from 52%) and in Carmarthenshire at 44% (down from 50%). The local authorities with the lowest percentage of Welsh speakers were in South East Wales. More detailed analysis shows:

⁸⁴ WAG 2010: *Wale's Population – a Demographic Overview Cardiff 2010*

- 19% of the Welsh population aged over three said they were able to speak the language - able to speak Welsh: 562,016; not able to speak Welsh: 2,393,825
- Gwynedd has the highest percentage of residents aged three or over who said they could speak, read and write in Welsh (65,900 people, 56%)
- In Carmarthenshire, 43.9% of the population aged over three said they could speak Welsh in 2011, down from 50.3% in 2001 and 54.9% in 1991
- In Ceredigion it was 47.3% in 2011, down from 52% in 2001
- 11.1% of the population of Cardiff said they could speak Welsh in 2011, a 0.1% increase, while there was also an increase in Monmouthshire from 9.3% to 9.9%;
- Blaenau Gwent reported the lowest percentage of people who could speak Welsh at 7.8%⁸⁵.

4.14.3 It was thought that migration trends and education might lead to an increase in speakers in less traditional Welsh-speaking areas. But the census suggests otherwise, with just two areas, Monmouthshire and Cardiff, seeing a percentage increase.

4.14.4 The results of the 2011 census data on the Welsh language were released during the writing of this report. There has been a significant decline in the number of Welsh speakers in the rural areas. Natural Resources Wales, the single body which will replace the Environment Agency, Countryside Council for Wales and the Forestry Commission on 1st April is consulting on its Draft Welsh language scheme⁸⁶. Part of this new body's vision is to

"Promote an understanding that the Welsh language, as a part of Welsh culture, is integral to the ecosystem approach to managing the environment in Wales"

The potential impact on the Welsh language is therefore a significant consideration within the overall assessment of effects.

⁸⁵ Census 2011/ONS

⁸⁶ <http://www.ccw.gov.uk/about-ccw/consultations/draft-welsh-language-scheme.aspx>

Cultural, Architectural & Archaeological Heritage

- In both 1996 and 2003, nearly 80% of scheduled ancient monuments were reported to be stable, and about 10% are improved or greatly improved
- There was an increase in superficial disturbance, generally from invasive vegetation and scrub encroachment, probably due to the less intensive agri-environmental schemes. This was offset by the reduction in the disturbance sometimes caused by intensive agriculture.

Cadw: Position Statement 2007

Listed buildings at risk, 2007 and 2008

- The percentage of the sample of listed buildings in Wales that were classed as 'at risk' has fallen slightly from 10.2% in 2007 to 9.6% in 2008.
- The percentage of the sample of listed buildings that were classed as 'vulnerable' has fallen slightly from 17.5% in 2007 to 17.3% in 2008.
- The percentage of the sample of listed buildings that were classed as 'not at risk' has increased slightly, from 72.4% in 2007 to 73.2% in 2008.

Handley Partnership/Cadw

4.14.5 West Wales and the Valleys contains a rich heritage of historic buildings, including vernacular and agricultural buildings, as well as industrial, ecclesiastical and historic military structures and sites.

4.14.6 It is important that this historic building stock and its character is maintained to a high standard, and this includes wherever possible its setting. However, retrofitting historic buildings to an adequate standard is likely to prove highly costly, not least the need to ensure that hardware and insulation does not conflict with the integrity of such buildings.

4.14.7 In 2007, Cadw commissioned a baseline report on listed Buildings at Risk in Wales. This brought together data from most of the local authority registers. The 2009 summary report⁸⁷ estimated that of the 29,896 listed buildings in Wales, 2,882 are 'at risk', and 5,145 are 'vulnerable', owing to the rate of decline of their fabric and character. The report indicates that North West and Central Wales have a particularly high number of 'at risk' buildings. In some areas the threat of flooding is a concern. For example, of 365 listed buildings within

⁸⁷ *Buildings at Risk in Wales". Handley Page partnership for Cadw. (2009)*

Caerphilly council, about 260 are located within areas identified as being in locations identified as being above the Flood Risk Threshold⁸⁸.

4.14.8 Fifty-eight areas of Wales have been identified for placing on the historic landscapes register for Wales maintained by Cadw, NRW, and the International Council of Monuments and Sites (ICOMOS). There are also over 100,000 archaeological sites listed by the four Welsh Archaeological Trusts, some of which are impressively set.^{89,90}



Fig 6: Historic landscapes.
Source: CCW

4.14.9 Four Landscape Partnership schemes operate in Wales, in order to support the conservation and enhancement of these special landscapes: Llŷn, Tywi Valley, the Clwydian Hills and Blaenavon.

4.15 Landscape

4.15.1 The landscapes of Wales are remarkably varied for such a small nation. The underlying geology, and the variety of land use and land cover result in a number of distinctive landscapes that can be identified at both an extensive and at a local level.

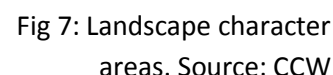
4.15.2 Some areas, such as Snowdonia/Eryri, the Gower Peninsula and Pembrokeshire, are well-known for certain characteristics, and have been named, written about, appreciated and visited for centuries, and it is perhaps no surprise that each of these areas is a protected landscape. Others, such as the Dovey Valley or the Elenydd are less widely known but are nonetheless well-known and appreciated locally. Within these larger areas, distinctive landscapes can be identified and described. The wooded valley systems of south Snowdonia contrast strongly with those of the north, on account of their glacial history, their topography, the underlying geology and hydrology and their historic land uses.

⁸⁸ Caerphilly Flood Risk Management Strategy. SEA Scoping Report (2012)

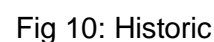
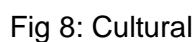
⁸⁹ See www.archwilio.org.uk

⁹⁰ <http://www.ccg.gov.uk/landscape/wildlife/protecting-our-landscape/historic-landscapes/wales-historic-landscapes.aspx>

4.15.4 NRW's LANDMAP programme⁹¹ has developed a system for assessing the condition and quality of Wales' landscape from five dimensions, known as 'aspect areas'. These are cultural, geological, historic, landscape habitat and visual and sensory.



4.15.6 The red areas indicate outstanding landscape attributes, and the amber areas are of high quality.



64

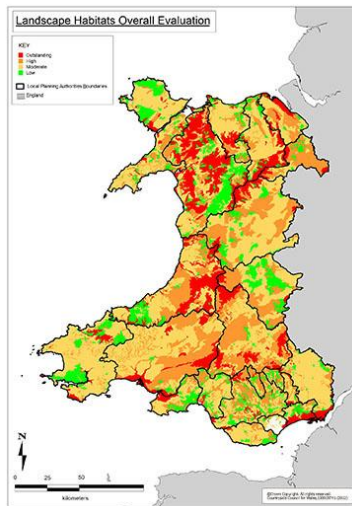


Fig 11: Landscape habitat

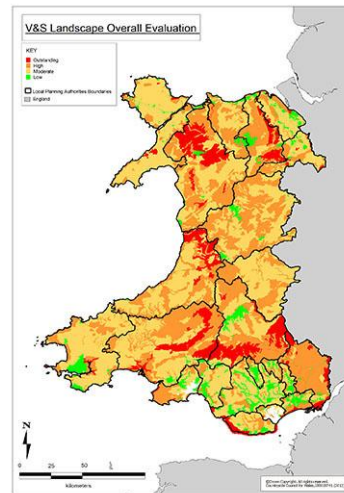


Fig 12: Visual and sensory

4.16 Interactions

4.16.1 These issues should not be considered in isolation from each other, or from wider social and economic contexts. Impacts on any of these themes will have adverse or positive effects on others to a greater or lesser extent, and such impacts are almost entirely anthropogenic. Decisions that affect the landscape, biodiversity or historic and cultural heritage of Wales will impact on its economy through losses in tourism income or a reluctance to relocate to or invest in degraded, unattractive regions. Conversely, a failure to invest in sympathetic development will result in losses in income or the inability to increase income, and a lack of funds for conservation, whilst at the same time threatening the capacity of transport, drainage or sewage systems to deal with the effects of seasonal tourist fluctuations or increasing populations, thus impacting on biodiversity.

4.16.2 There will be changes to biodiversity, with (some would argue) gains and some losses, but this is unpredictable as is the overall net impact. Habitat and species gains and losses relate to wider ecosystems that may become stressed as a result. A change in composition of plant or tree species to ones which are more resilient to change may lead to a change in invertebrate numbers and types; new predatory or invasive bird and mammal species from the Continent or Mediterranean may impact on other more vulnerable species.

4.16.3 If current climate trends continue, there will be habitat change, with wetter habitats in some areas and perhaps drier conditions elsewhere. It is possible that changes will occur in the uplands, with some

abandonment or reductions in agricultural productivity⁹². There may be changes in woodland, hedgerow and river bankside management systems to mitigate the effects of runoff.

4.16.4 Climate change may also have significant effects on settlement patterns, agricultural productivity and other activities in the longer term and the planning system will increasingly need to take this into account.

4.17 Summary of issues

4.17.1 This section summarises the key issues that relate to West Wales and the Valleys. In most cases, these issues have implications for the proposed Operational Programme, which are discussed in sections 5.2 and 5.3 and in Appendix 5.

Biodiversity	About 60% of SACs , and a number of Biodiversity Action Plan species and habitats are in unfavourable condition , especially on the coast. Pressures can come from visitor numbers on some sites, changes in weather patterns, development, over- or undergrazing, pollution, nutrient enrichment and eutrophication, sediment deposits, invasive species, inappropriate planting, over abstraction and overfishing.
Population and human health	Some areas lack easily accessible open space . Stress related illnesses from poor living and working conditions , as well as unemployment ; heat and fuel poverty ; poor diets leading to obesity ; illnesses and injuries at work; and poor social/private rented housing standards are contributory factors in health problems in Wales. In some areas, poor air quality may be a contributory factor.
Soil quality and structure	Development, changes in agriculture (especially intensification) and climate change contribute to a loss in soil carbon and structure . There have been changes in hydrology and erosion due to changes in rainfall patterns and agriculture. The need to maintain best quality agricultural land in the face of development pressure may result in losses of less productive land which may be

⁹² *This in turn may result in a higher demand for imported food. In this document however we do not offer a detailed analysis of how much food produced in Wales is consumed in Wales – in future we may consume more indigenously grown food and export less. Lamb, for example is currently imported and exported in large quantities.*

	valuable for carbon sequestration.
Minerals and aggregates	Wales has a relatively limited range of terrestrial minerals and aggregates, sand and gravel is extracted from marine areas. About 50% of waste aggregate is currently recycled.
Timber	About 43% of all woodland is coniferous plantation , mainly owned by Welsh Government. There will be a significant demand for imported biomass fuel and also for good quality building timber.
Water quality	Pollution from flooded mines continues to present a challenge. Diffuse pollution from other sources including agriculture is exacerbated by changing weather patterns with sudden flooding. There is a potential threat to coastal water quality as a result of increases in storm events. Currently, about 33% of coastal waters are not of 'good' ecological quality , and the pattern for terrestrial water bodies is mixed.
Water availability	About 23.5% of water supply is lost to leakages ; there has been a significant increase in abstracted water , mainly for electricity supply. About 38% of river waters are not reliable for new abstractions - there may be an increased demand due to population growth.
Flood risk	28% of the Welsh coastline has sea defence infrastructure ; about 1 in 6 properties is at risk from flooding - this will be significantly higher locally - the economic cost of flooding is estimated at more than £200 million per annum . River flows are predicted to reduce overall, but with sudden rapid flows related to turbulent weather. In some areas, natural flood systems have been developed or artificially drained for agriculture.
Climate	A number of changes in weather patterns are predicted, including summer water shortages ; increases in amounts and intensity of winter rainfall , with milder winters ; hotter, drier summers ; increases in sudden storms . These will result in rapid build-up of river and drainage systems ; increases in storm induced coastal erosion and subsidence ; ecosystem changes with some species and habitat losses and gains

Energy consumption	Gas accounts for 60% of public sector energy use. About 33% of domestic energy use is for heating and about 33% for lighting/installations . A target has been set by Welsh Government to reduce average per person carbon emissions by 33% by 2020.
Waste	The amount of municipal waste recycled, reused or composted has increased from 18% in 2003/4 to 48% in 2011/12 . Having peaked in 2005/6, the total amount of waste generated has decreased since 2000 by about 95,000 tonnes per annum . The amount of industrial waste that went to landfill increased between 2003 and 2007.
Transport	81% of the population travels to work by motor vehicle , and 12% by walking or cycling. There has been a fall of about 5 million bus passengers (2010/11) since 2009/10, and an increase of about 2 million rail passengers in the same period. There are conflicting statistics on transport related emissions.
Culture, architecture and archaeology	Over 25% of Wales' listed buildings are either 'at risk' or 'vulnerable' . Whilst nearly all of Wales' ancient monuments are stable or improving, climate change and changes in agricultural use may create new challenges. Historic buildings and their settings, and the wider landscape, are under pressure from development . The number of people who can speak Welsh has decreased slightly since 2001, although the number who can understand but not speak Welsh has increased slightly.

4.18 Ecological footprint

4.18.1 Ecological footprint is an indicator of the total environmental demand that is made on the planet. It is presented in terms of global hectares (gHa), which represents the amount of land required both to deliver the demands of a population in terms of food, water, fibre and fuel, natural resources and spiritual and recreational opportunities, and to absorb the impacts of that population in terms of pollution and waste. It is associated with the concept of 'ecosystem services'. Housing, travel and food are the main criteria used in the calculation, and both direct and indirect consumer impacts are assessed.

4.18.2 Wales' ecological footprint had risen at a rate of about 1.3% between 1990 and 2003, in line with a growth in Gross Added Value (GVA)⁹³. Had this trend continued, it would have been likely that by 2020 Wales's ecological footprint would have been 20% higher than it was in 1990. The current footprint is under review⁹⁴, but in the light of the economic downturn, this may have been reversed since 2008.

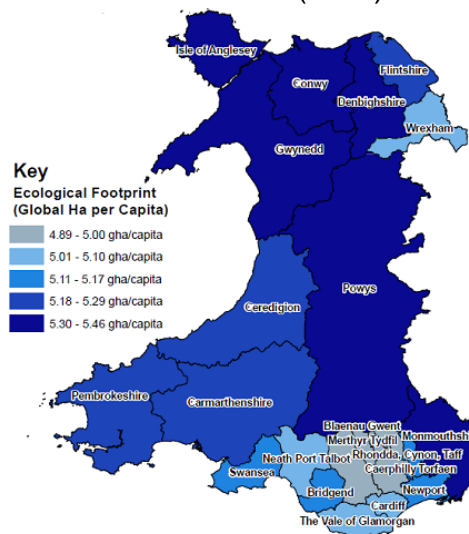


Fig 13: Wales' ecological footprint.
Source Dawkins et al

4.18.3 The most recent calculation (2006)⁹⁵ is that Wales' ecological footprint is about 4.4 gha, which is a significant reduction from the 2003 average figure of 5.16 gha.

4.18.4 West and north-west Wales would appear to have higher than average footprints, whilst the Valleys appear to have a footprint below the Welsh average. This is likely to be a reflection of energy demands, travel needs and the dispersed delivery of services⁹⁶.

4.18.5 The intention of the Welsh Government is to reduce the national ecological footprint to 1.88 gha per person within the lifetime of a generation⁹⁷.

⁹³ E. Dawkins, A. Paul, J. Barrett, J. Minx and K. Scott (2008). *Wales' Ecological Footprint: Scenarios to 2020*. Stockholm Environment Institute

⁹⁴ <http://www.government-online.net/calculating-wales-ecological-footprint/>

⁹⁵ *One Wales One Planet. Annual Sustainable Development Report 2009-10*

⁹⁶ See <http://www.resource-accounting.org.uk/downloads/wales/wales>

⁹⁷ *ibid.*

5 COMPATIBILITY - SEA AND PROPOSED OPERATIONAL PROGRAMME OBJECTIVES

5.1 Comparing objectives - a basic matrix assessment

5.1.1 It perhaps goes without saying that at this level an assessment of this nature is largely an informed forecast based on the professional judgement of the assessor. It is impossible to state with certainty what the specific effects of any policy or strategy will be. The best that can be achieved is a considered opinion based on detailed analysis, discussion with professional peers, and consensus.

5.1.2 The assessment set out below is based on a more detailed analysis of each Specific Objective set against the SEA objectives (shown in table 3) and indicators. This analysis can be seen in full in Appendix 5.

5.1.3 The SEA objectives are set out in section 2.3.7. For ease of reference, the 13 'headline' objectives are:

1. Protect places, landscapes and buildings of historic, cultural and archaeological value
2. Protect and enhance landscapes, seascapes, townscape and the countryside
3. Protect and enhance biodiversity
4. Protect and improve the region's water quality
5. Protect the water resource and ensure its sustainable use
6. Guard against land contamination, encourage reuse of existing buildings and of previously developed land of low ecological quality
7. Minimise the requirement for energy generation use, promote efficient energy use and increase the use of energy from renewable resources
8. Minimise waste increase re-use, recycling and recovery rates
9. Minimise the need to travel; provide alternatives to car use
10. Limit and adapt to climate change
11. Protect and improve air quality

12. Improve physical and mental health and reduce health inequalities
13. Improve public access to land

5.1.4 In table 5, we set each Specific Objective against each of the 13 SEA objectives, with relevant comments on the score we have applied.

Table 5: Presentation of compatibility matrices⁹⁸

PRIORITY AXIS 1 - RESEARCH AND INNOVATION		
1 To increase the success of Welsh research institutions in attracting competitive and private research funding.		
1	O	No obvious link.
2	O?	Very weak link, e.g. development – subject to planning considerations.
3	O	No obvious link.
4	O	No obvious link' unless specific to water quality.
5	O	No obvious link.
6	O?	Very weak link. Re-use of previously used land/buildings?
7	O	No obvious link.
8	O	No obvious link.
9	✓?	Weak positive link – support for research into alternative travel modes?
10	✓?	Focus on research into climate change adaptation?
11	✓?	Focus on research into air quality improvement?
12	✓?	Potential positive, assuming a link to the Life Sciences and Health sector Grand Challenge Area.
13	O	No obvious link.
PRIORITY AXIS 1 - RESEARCH AND INNOVATION		
2 To increase the level of innovation undertaken across all sectors of the Welsh economy, in particular within Welsh SMEs, leading to a growth in productivity.		
1	✓x	Potential enhancements linked to tourism sector. Possible impacts of inappropriate development on sensitive sites.
2	✓x	As above.
3	✓x	As above.
4	O	No obvious link.
5	O	No obvious link.
6	✓?	Weak link. Re-use of previously used land/buildings?
7	✓	Assuming a focus on climate change, positive linked to Axis 3.
8	✓?	Potential for research + SME growth into recycling/re-use of waste
9	x?	Growth in productivity may lead to increase in travel.
10	✓	Assuming a focus on climate change, positive linked to Axis 3.
11	✓	As above.
12	O	No obvious link.
13	O	No obvious link.

⁹⁸ An explanation of the symbols is in Table 4 at para. 2.6.5

PRIORITY AXIS 1 - RESEARCH AND INNOVATION		
3 To increase the successful translation of research and innovation processes into new and improved commercial products, processes and services, in particular through improved technology transfer from HEIs.		
1	?	Depends on the scale, type and location of commercial products, processes and services.
2	x?	Depends on the scale, type and location of commercial products, processes and services. Potential impacts from development arising from expansion of successful enterprises.
3	x?	As above.
4	O	No obvious link. Depends on the product/process.
5	O	No obvious link. Depends on the product/process.
6	✓?	Weak link. Re-use of previously used land/buildings?
7	✓x	Potential for increased application of energy conservation/renewables. But also potential for increased energy demand.
8	?	Depends on application of high standards of waste management. Potential growth area?
9	x?	Growth in productivity may lead to increase in travel.
10	✓?	Depends on the scale, type and location of commercial products, processes and services. Focus on renewables/energy sectors may be positive.
11	✓?	As above.
12	O	No obvious link. Depends on the product/process – potential for employment opportunities?
13	O	No obvious link.
PRIORITY AXIS 1 - RESEARCH AND INNOVATION		
4 To increase the success of Welsh research institutions in attracting competitive and private research funding (related to low carbon research and innovation).		
1	?	Depends on the scale, type and location of commercial products, processes and services. Visual impact may be an issue.
2	?	As above.
3	✓?	Potential for reduced impact of atmospheric pollution on sensitive sites/species.
4	✓?	Low carbon economy will benefit water quality, linked to development of processes/services.
5	O	No obvious link specific to low carbon research.
6	O	As above.
7	✓	Positive link to reduction/efficiency in energy use/development of renewables.
8	✓?	Research into energy generation from waste?
9	✓?	Research into efficient travel modes?
10	✓	Link to climate change adaptation.
11	✓	As above.
12	✓?	Link between research into improved air quality and human health.
13	O	No obvious link.

PRIORITY AXIS 1 - RESEARCH AND INNOVATION		
5 To increase the successful translation of low Carbon research and innovation processes into new and improved commercial products, processes and services, in particular through improved technology transfer from HEIs.		
1	?	Depends on the scale, type and location of commercial products, processes and services. Visual impact may be an issue.
2	?	As above.
3	✓?	Potential for reduced impact of atmospheric pollution on sensitive sites/species.
4	✓?	Low carbon economy will benefit water quality, linked to development of processes/services.
5	○	No obvious link, but increased availability of better quality water may be a slight positive?
6	○	As above. Availability of previously used land for commercial development?
7	✓	Positive link to reduction/efficiency in energy use/development of renewables.
8	✓?	Commercialisation of energy generation from waste?
9	✓?	Potential for commercial development of low carbon travel modes?
10	✓✓	Strong link to climate change adaptation.
11	✓✓	As above.
12	✓	Improvements in air quality > increased human health.
13	○	No obvious link.

PRIORITY AXIS 2 - SME COMPETITIVENESS		
1 To increase the amount of finance available to SMEs for both business start-up and for business expansion.		
1	<input type="radio"/>	No obvious link.
2	<input type="radio"/>	No obvious link. Potential impacts from expansion? Subject to planning processes/project EIA.
3	<input type="radio"/>	No obvious link.
4	<input type="radio"/>	No obvious link.
5	<input type="radio"/>	No obvious link.
6	<input type="radio"/>	No obvious link. Possible re-use of redundant land/buildings.
7	<input checked="" type="radio"/>	Potential to ensure that start-up/expansion is linked to energy efficiency
8	<input checked="" type="radio"/>	Potential to ensure that start-up/expansion is linked to efficient management of waste & use of recycling
9	<input checked="" type="radio"/>	Expansion may lead to increase in travel. To be considered via planning policies.
10	<input checked="" type="radio"/>	Potential to ensure that start-up/expansion is linked to appropriate measures to mitigate climate effects. Depends on type of activity.
11	<input checked="" type="radio"/>	Potential to ensure that start-up/expansion is linked to appropriate measures to manage emissions. Depends on type of activity.
12	<input checked="" type="radio"/>	Any project supporting employment opportunities is likely to have a positive effect, especially on mental health and well-being.
13	<input type="radio"/>	No obvious link.
PRIORITY AXIS 2 - SME COMPETITIVENESS		
2 To increase the number of SME start-ups through the provision of information, advice and guidance and support for entrepreneurship.		
1	<input type="radio"/>	No obvious link.
2	<input type="radio"/>	No obvious link.
3	<input type="radio"/>	No obvious link.
4	<input type="radio"/>	No obvious link. Advice could include optimal environmental measures.
5	<input type="radio"/>	No obvious link. Advice could highlight optimal environmental quality.
6	<input type="radio"/>	No obvious link. Depends on type of guidance.
7	<input type="radio"/>	No obvious link. Advice could include optimal environmental measures.
8	<input checked="" type="radio"/>	Potential to provide advice on waste management/recycling.
9	<input type="radio"/>	No obvious link. Depends on type of guidance.
10	<input checked="" type="radio"/>	Potential to provide advice on climate change adaptation measures.
11	<input checked="" type="radio"/>	Potential to provide guidance about emissions, air quality. Depends on activity.
12	<input checked="" type="radio"/>	Any project supporting employment opportunities is likely to have a positive effect, especially on mental health and well-being.
13	<input type="radio"/>	No obvious link.

PRIORITY AXIS 2 - SME COMPETITIVENESS		
3 To increase SME productivity through the provision of advice and guidance, in particular through encouraging ICT exploitation.		
1	x?	Depending on location, type and scale of ICT infrastructure, there might be a slight visual impact in sensitive areas.
2	O	No obvious link.
3	O	No obvious link.
4	O	No obvious link. Advice could include optimal environmental measures.
5	O	No obvious link. Advice could highlight optimal environmental quality.
6	O	No obvious link. Depends on type of guidance.
7	O?	No obvious link. Advice could include optimal environmental measures. Minimal increase in energy demand will be offset by reductions in the need to travel.
8	✓?	Small positive arising from increased use of e-data?
9	✓?	Depends on type of guidance. Increased use of ICT should result in reductions in travel. But may be offset by expansion in international markets?
10	✓?	Potential to provide advice on climate change adaptation measures. Reduced need to travel will contribute to reductions in carbon emissions.
11	✓?	Potential to provide guidance about emissions, air quality. Reductions in travel should improve local air quality in areas of congestion.
12	✓?	Any project supporting employment opportunities is likely to have a positive effect, especially on mental health and well-being. Potential for reductions in travel-related stress.
13	O	No obvious link.
PRIORITY AXIS 2 - SME COMPETITIVENESS		
4 To increase the growth of those SMEs with growth potential, in particular through accessing new markets (both domestic and international).		
1	?	Depends on the scale, type and location of SMEs.
2	x?	Depends on the scale, type and location of SMEs. Potential impacts from development arising from expansion of successful enterprises.
3	x?	As above.
4	O	No obvious link. Depends on the type of SME.
5	O	No obvious link. Depends on the type of SME.
6	✓?	Weak link. Re-use of previously used land/buildings?
7	✓x	Potential for increased application of energy conservation/renewables. But also potential for increased energy demand.
8	?	Depends on application of high standards of waste management. Potential growth area?
9	x?	Growth in productivity may lead to increase in travel, especially for export purposes. Depends on type of SME.
10	✓?	Depends on the scale, type and location of SME. Focus on renewables/energy sectors may be positive.
11	?	Focus on renewables/energy sectors may be positive, but the likelihood of increased travel in order to secure markets may have a negative effect on air quality, especially around airports and ports.
12	✓?	Depends on the SME – potential for employment opportunities associated with mental health and wellbeing effects.
13	O	No obvious link.

PRIORITY AXIS 2 - SME COMPETITIVENESS		
5 To address market failures in the availability of finance, in particular risk capital, for Welsh SMEs to undertake innovation and commercialise R&D.		
1	<input type="radio"/>	No obvious link.
2	<input type="radio"/>	No obvious link.
3	<input type="radio"/>	No obvious link.
4	<input type="radio"/>	No obvious link.
5	<input type="radio"/>	No obvious link.
6	<input type="radio"/>	No obvious link. Depends on finance targets.
7	<input type="radio"/>	No obvious link.
8	<input checked="" type="checkbox"/>	Potential to support SMEs relating to waste management/recycling.
9	<input type="radio"/>	No obvious link.
10	<input checked="" type="checkbox"/>	Potential to provide finance to support expansion into climate change adaptation markets.
11	<input checked="" type="checkbox"/>	Potential to support R&D linked to air quality. Depends on activity.
12	<input checked="" type="checkbox"/>	Employment opportunities promote positive mental health and well-being.
13	<input type="radio"/>	No obvious link.

PRIORITY AXIS 3 - RENEWABLE ENERGY AND ENERGY EFFICIENCY		
1 Increase the number of wave and tidal energy devices being tested in Welsh waters and off the Welsh coast, including multi-device array deployments, thereby establishing Wales as a centre for marine energy production.		
1	O?	No obvious link. However, this depends on the location and scale of e.g. shoreside facilities, connections etc.
2	x	Potential impacts to coastal landscape and inland (shoreside infrastructure, connections etc.).
3	x	Potential for significant impact on marine environment, depending on scale, location and type of development.
4	O?	No obvious impact on water quality.
5	✓	Does not set out to protect the water resource, but explicitly sets out to exploit sustainable use of marine environment.
6	O	No obvious link.
7	✓	An explicit purpose of the theme is to increase the use of renewables.
8	✓	Aims to reduce reliance on non-renewable resources, with resulting waste by-products.
9	O	No obvious link.
10	✓✓	Potential for significant contribution to this objective.
11	✓	Aims to exploit alternatives to carbon-based non-renewable resources.
12	O	No obvious link.
13	O	No obvious link.
PRIORITY AXIS 3 - RENEWABLE ENERGY AND ENERGY EFFICIENCY		
2 To increase the number of small-scale renewable energy schemes established.		
1	O	No direct positive effect likely. There may be some visual impact linked to the use of hardware.
2	x?	Not likely to positively promote this objective without parallel measures.
3	O?	Small hydro schemes need to be appropriately located. Potential for impacts on protected species associated with buildings?
4	O	No obvious link.
5	✓	Potential to use water capture and recycling systems together with natural heating/cooling systems, as well as hydro.
6	✓	Some potential for encouraging the re-use of existing buildings by retrofitting. Use of ground source heating systems in otherwise redundant land?
7	✓✓	Significant potential to address this objective.
8	✓	Potential for reducing demand for carbon based fuels - reduction on waste by-products.
9	O	No obvious link.
10	✓✓	Potential for significant contribution to this objective.
11	✓✓	Achieving zero carbon energy systems will improve air quality.
12	✓	Potential to reduce health inequalities especially in urban contexts.
13	O	No obvious link.

PRIORITY AXIS 3 - RENEWABLE ENERGY AND ENERGY EFFICIENCY		
3 To increase the energy efficiency of the existing Welsh housing stock, particularly in areas of fuel poverty.		
1	✓?	Some local positives linked to reductions of carbon emissions.
2	✓?	As above.
3	○?	No obvious link.
4	○?	Potential to reduce acidity in watercourses?
5	○	No obvious link.
6	○	No obvious link.
7	✓✓	Potential for significant contribution to this objective.
8	○?	No obvious link. Potential for temporary increase in waste by-products linked to retrofitting? Opportunity to use waste for energy generation?
9	○	No obvious link.
10	✓✓	Potential for significant contribution to this objective.
11	✓✓	Increasing efficiency will improve air quality by reducing demand.
12	✓	Potential to reduce health inequalities especially in urban contexts.
13	○	No obvious link.

PRIORITY AXIS 4 - CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT		
1 To address issues of peripherality and improve private investment in local areas through improvements to the functioning of the Trans-European Transport Network (TEN-T).		
1	✓x	Depends on siting and scale. Potential for significant impacts. EIA will inform.
2	x	As above. Need to ensure high quality measures.
3	x	As above – critical not to disrupt biodiversity corridors and important sites.
4	x?	There is a potential risk to water quality from expansion in road infrastructure and resultant increases in traffic volumes. This may include diversions in water courses, as well as pollution from emissions.
5	x?	Potential risk to the water environment as outlined above.
6	O	No obvious link.
7	x	All such schemes are energy intensive. Important to optimise efficiency through appropriate EMS.
8	x?	Depends on materials used – re-use of local materials where possible.
9	x?	Improvements in road networks may increase the volume of traffic without parallel measures such as improvements to ICT and rail/bus links.
10	✓x	Likely to promote increase in traffic volumes. Reductions in congestion will reduce fuel use and will contribute.
11	✓x	Potential for local improvements to air quality. Increased volumes may offset this positive.
12	✓	Potential for reductions in stress linked to travel/local congestion.
13	✓?	Potential for small benefits linked to improvements for cycling/walking – release of land?
PRIORITY AXIS 4 - CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT		
2 To increase urban and labour mobility to and from key urban and employment centres.		
1	O	No obvious link.
2	✓?	Potential for reduction in urban car use will generally enhance amenity.
3	O	No obvious link.
4	O	No obvious link.
5	O	No obvious link.
6	✓?	Opportunity to relocate employment opportunities to more accessible transport hubs?
7	✓	Potential for reduction in urban car use will generally promote this objective.
8	O	No obvious link.
9	✓x	Depending on implementation and on other measures.
10	✓x	Depends on the type of measures.
11	✓x	As above.
12	✓	Improved access to employment opportunities will help to reduce health inequalities.
13	O	No obvious link.

PRIORITY AXIS 4 - CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT		
3 To increase the access of Welsh businesses to high speed ICT networks in peripheral areas and strategic sites.		
1	○	Slight possibility of visual impacts but otherwise none.
2	○	As above.
3	○	No obvious link.
4	○	No obvious link.
5	○	No obvious link.
6	○	No obvious link.
7	○	No obvious link.
8	○	No obvious link.
9	✓✓	High-speed broadband and fast mobile networks may significantly reduce the need to travel.
10	✓✓	Reductions in the need to travel will contribute to this objective.
11	✓	Positive, insofar as decreased traffic volumes, especially in urban settlements, will help improve air quality.
12	✓✓	Access to high speed networks is likely to contribute significantly – improving access to disadvantaged communities, reducing stress in workers.
13	✓?	Potential for improved information on access opportunities.
PRIORITY AXIS 4 – CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT		
4 To increase employment through investments in prioritised local or regional infrastructure supporting a regional or urban economic strategy.		
1	○	No obvious link. Depends on type and scale of infrastructure.
2	○	No obvious link. Depends on type and scale of infrastructure. Project EIA/planning processes will apply.
3	○?	No obvious link. Opportunity to add value by providing for biodiversity.
4	○	No obvious link.
5	○?	No obvious link. However, there may be an opportunity to use water as a natural cooling/heating/pollution management system as part of design.
6	✓?	Opportunity to re-use redundant land/buildings to develop economies.
7	✓?	No strong link. However, investment will support infrastructure that is energy efficient and linked to renewables where possible.
8	○	No obvious link. Depending on economic activity envisaged.
9	○?	Although no obvious link here, planning policy and strategy will focus on economic activity that promotes this objective – investment should follow.
10	✓?	As in 7 above.
11	✓?	As in 7 above.
12	○?	Planning policy and strategy will focus on economic activity that promotes this objective – investment should follow.
13	○	No obvious link.

Table 6: Synthesis of assessment matrices

Testing compatibility between the proposed Operational Programme and SEA objectives																	
SEA Objectives	Priority Axes and Specific Objectives																
	PRIORITY AXIS 1: Research and Innovation					PRIORITY AXIS 2: SME Competitiveness					PRIORITY AXIS 3: Renewable Energy and Energy Efficiency			PRIORITY AXIS 4: Connectivity and Sustainable Urban Development			
	1	2	3	4	5	1	2	3	4	5	1	2	3	1	2	3	4
1	O	✓x	?	?	?	O	O	x?	?	O	O?	O	✓?	✓x	O	O	O
2	O?	✓x	x?	?	?	O?	O	O	x?	O	x	x?	✓?	x	✓?	O	O
3	O	✓x	x?	✓?	✓?	O	O	O	x?	O	x	O?	O?	x	O	O	O?
4	O	O	O	✓?	✓?	O	O	O	O	O	O?	O	O?	x	O	O	O
5	O	O	O	O	O	O	O	O	O	O	✓	✓	O	x?	O	O	O?
6	O?	✓?	✓?	O	O	O?	O	O	✓?	O	O	✓	O	O	✓?	O	✓?
7	O	✓	✓x	✓	✓	✓?	O	O?	✓x	O	✓	✓✓	✓✓	✓x	✓	O	✓?
8	O	✓?	?	✓?	✓?	✓?	✓?	✓?	?	✓?	✓	✓	O	x?	O	O	O
9	✓?	x?	x?	✓?	✓?	x?	O	✓?	x?	O	O	O	O	x?	✓x	✓✓	O?
10	✓?	✓	✓?	✓	✓✓	✓?	✓?	✓?	✓?	✓?	✓✓	✓✓	✓✓	✓x	✓x	✓✓	✓?
11	✓?	✓	✓?	✓	✓✓	✓?	✓?	✓?	?	✓?	✓	✓✓	✓✓	✓x	✓	✓	✓?
12	✓?	O	O	✓?	✓	✓?	✓?	✓?	✓?	✓?	O	✓	✓	✓x	✓	✓✓	O?
13	O	O	O	O	O	O	O	O	O	O	O	O	O	✓?	O	✓?	O

KEY	Positive/strong positive		Possible/slight negative	
	Possible/slight positive		Negative/strong negative	
	Neutral		Positive and negative aspects	

5.2 Risk analysis – probability and significance

- 5.2.1 Of the 221 elements compared, 81 are thought to be likely to have a strong or qualified positive effect, and 101 are likely to be neutral overall. Setting aside the nine elements that appeared too indeterminate to arrive at a conclusion, 13 elements were thought to have some potential negative effects, and five elements are likely to have a strong negative effect, depending on scale, siting and type of proposal or enterprise. In twelve cases, the effects could be both positive and negative, amounting to 30 potentially negative effects arising from the Specific Objectives of the OP as it currently stands. It is worth pointing out that in most cases the negative effects are mitigated or offset by positive effects within the same intervention.
- 5.2.2 Regulations on standards for waste and recycling, water, emissions and air quality, as well as on buildings, will apply, as will regulations linked to avoidance, mitigation, compensation and enhancement for biodiversity effects. National and local planning policy, together with appropriate assessment and environmental impact assessment will also apply at project level.
- 5.2.3 Unsurprisingly, the SEA objectives that are most likely to emerge positively are those linked to climate change adaptation, air quality, waste and recycling, and energy efficiency (SEA objectives 7, 8, 10 and 11). Equally unsurprisingly, the broader land- and seascape, as well as biodiversity (SEA objectives 2 and 3), are considered to be subject to most of the potential negative effects. Minimising the need to travel and providing alternatives to car use (SEA objective 9) was also seen as difficult to achieve.
- 5.2.4 The two Specific Objectives thought to have the likeliest potential for negative effects (again unsurprisingly) are the development of marine renewables and the upgrade of the road network linked to TEN-T.
- 5.2.5 The analysis below (table 7) focuses only on the negative effects of nine Specific Objectives, and considers the **likelihood** of such effects, and should they occur, the **significance** of those effects **without avoidance, mitigation or compensatory measures**. The comments are a reflection of the reasoning behind the level of risk assigned.

Table 7: Potential negative effects arising from OP Specific Objectives

PRIORITY AXIS 1 – RESEARCH AND INNOVATION	SPECIFIC OBJECTIVE 2 To increase the level of innovation undertaken across all sectors of the Welsh economy, in particular within Welsh SMEs, leading to a growth in productivity.	SEA Objective	Likely?	Significant?	Comment
		1, 2, 3, 9	Possible	<p>Moderate</p> <p>May be locally high depending on type of expansion and sensitivity of local site</p>	<p>There is some risk of local impacts on sensitive sites in the built environment from successful and economically important SMEs seeking to expand their productivity. This may require relocation, which has implications for travel, as well as for redundant buildings.</p> <p>Whilst this is a matter for local planning policy, the support given to SMEs needs to take into account the implications of expansion. Growth in productivity may have implications in terms of travel. This may in part be addressed by improvements in high-speed networks, however international markets will demand travel in most cases.</p>

PRIORITY AXIS 1 – RESEARCH AND INNOVATION		SEA Objective	Likely?	Significant?	Comment
SPECIFIC OBJECTIVE 3 . To increase the successful translation of research and innovation processes into new and improved commercial products, processes and services, in particular through improved technology transfer from HEIs.		2, 3, 7, 9	Probable	Moderate/ locally high, depending on the type of enterprise	<p>Since the purpose of the objective is to promote successful commercialisation, effects arising from expansion in productivity are inevitable. The extent to which these are likely to be significant will depend on the type of products, processes and services envisaged, as well as some measure of what constitutes success in terms of new enterprises.</p> <p>Where such enterprises are energy intensive and may require significant levels of travel or delivery, there may be associated impacts.</p> <p>The planning system will determine development proposals locally. Government policy will be a significant factor in determining such proposals.</p>

PRIORITY AXIS 2 – SME COMPETITIVENESS	SPECIFIC OBJECTIVE 1 To increase the amount of finance available to SMEs for both business start-up and for business expansion.	SEA Objective	Likely?	Significant?	Comment
		2, 9	Unlikely by itself	Low	As above, there is always some risk that successful SME's will wish to expand, which may have an impact on the local environment, and may generate some increase in travel, not least in order to expand markets.

PRIORITY AXIS 2 – SME COMPETITIVENESS	SPECIFIC OBJECTIVE 3 . To increase SME productivity through the provision of advice and guidance, in particular through encouraging ICT exploitation.	SEA Objective	Likely?	Significant?	Comment
		1	Possible	Low/ locally moderate, depending on the type of ICT infrastructure and its design	<p>The risk is the possible visual impact of infrastructure in sensitive landscapes or in historic sites.</p> <p>Locally, such issues will be resolved via the planning system, ensuring that appropriate Landscape and Visual Impact Assessment (LVIA) studies are carried out.</p> <p>There may a small risk of threat to birds and bats, depending on scale, siting and type of infrastructure proposed.</p>

PRIORITY AXIS 2 - SME COMPETITIVENESS	SPECIFIC OBJECTIVE 4 To increase the growth of those SMEs with growth potential, in particular through accessing new markets (both domestic and international).	SEA Objective	Likely?	Significant?	Comment
		2. 3, 7, 9	Probable	Moderate/ locally high, depending on the type of enterprise	<p>The growth of businesses seeking international markets into which to export is likely to increase the demand to travel during the Operational Programme period, even with parallel measures in place such as ICT. This can be mitigated by using public transport and car sharing wherever possible, but may be unfeasible internationally. Where possible alternatives to road freight should be encouraged.</p> <p>There is some risk that in needing to increase productivity, successful enterprises will increase their demand for both energy and for spatial expansion. Limiting and adapting to climate change will not be achieved unless other measures are introduced, including ecological design, reduced car use, energy awareness and appropriate technology, as well as an increase in renewable energy use.</p>

PRIORITY AXIS 3 – RENEWABLE ENERGY AND ENERGY EFFICIENCY	SPECIFIC OBJECTIVE 1 Increase the number of wave and tidal energy devices being tested in Welsh waters and off the Welsh coast, including multi-device array deployments, thereby establishing Wales as a centre for marine energy production.	SEA Objective	Likely?	Significant?	Comment
		2, 3	Probable	High	<p>This objective may entail development of port infrastructure. The effects of this may be significant locally, where such infrastructure is located within the setting of historic sites, and sensitive landscapes and buildings.</p> <p>There is a potential for significant local/ regional impacts, in relation to both terrestrial and marine biodiversity, and ultimately for wider impacts resulting from networks needed to deliver marine energy generation. The potential for transporting invasive marine species is of particular concern.</p> <p>EIA and AA will almost certainly be necessary in order to avoid/mitigate potential effects.</p>

PRIORITY AXIS 3 – RENEWABLE ENERGY AND ENERGY EFFICIENCY	SPECIFIC OBJECTIVE 2 To increase the number of small-scale renewable energy schemes established.	SEA Objective	Likely?	Significant?	Comment
		2, 3	Possible	Locally moderate/ high	<p>The main concern relates to the cumulative landscape and visual impact that may result from the proliferation of farm- and community scale wind turbines. Such proposals will be determined through the normal planning process, applying LVIA and EIA where appropriate.</p> <p>There may be a minor, but probably negligible negative impact from micro-hydro schemes. Appropriate assessment may be necessary where such schemes are likely to impact on European sites.</p>

PRIORITY AXIS 4 - CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT	SPECIFIC OBJECTIVE 1 To address issues of peripherality and improve private investment in local areas through improvements to the functioning of the Trans-European Transport Network (TEN-T).	SEA Objective	Likely?	Significant?	Comment
		1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12	Probable	Moderate/locally high	<p>Road developments have in some cases modified watercourses, resulting in increased run-off and diffuse pollution. Approvals of plans and projects that entail road infrastructure should be conditional on ensuring that sustainable drainage systems are incorporated.</p> <p>Depending on the type of development, there may be an increase in car use as a result of improved road network. Developing ICT networks will help to offset the use of cars. Promotion of highway design plus improvements to technology will mitigate some of the effects.</p> <p>It is possible that there may be changes to patterns of air quality. The effect is likely to be low overall, where measures are applied through design and technology.</p>

PRIORITY AXIS 4 - CONNECTIVITY AND SUSTAINABLE URBAN DEVELOPMENT	SPECIFIC OBJECTIVE 2 To increase urban and labour mobility to and from key urban and employment centres.	SEA Objective	Likely?	Significant?	Comment
		9, 10	Possible	Low, possibly regionally moderate	<p>If the explicit purpose is to increase accessibility through the improvement of public transport facilities and infrastructure, and through the improved provision of ICT to peripheral regions, any negative effect is likely to be negligible.</p> <p>If, however, part of the mix is to develop or to improve the road network in order to alleviate bottlenecks, there may result an increase in car and lorry volumes unless some parallel measures are put in place to reduce incentives to use cars.</p>

5.3 Conclusion

- 5.3.1 Overall, we have identified 30 potentially negative effects across eleven of the 13 SEA objectives, SEA Objective 6 (guard against land contamination/encourage re-use of existing buildings/previously developed land of low ecological quality) and SEA Objective 13 (improve public access to land) being the exceptions. Nine of the seventeen Specific Objectives raise concerns, albeit largely of a relatively minor nature. They are the focus of the discussion in table 7 above.
- 5.3.2 Two of the OP Specific Objectives are of concern in that the effects are considered to be both direct and significant: **Priority Axis 3 Specific Objective 1** relates to the expansion of demonstration renewables in the marine environment in order to increase marine energy development; **Priority Axis 4 Specific Objective 1** relates to the upgrade of the strategic road network. Close attention will be needed in developing the final Operational Programme to ensuring that these potential negative effects are considered further. It will be critical to ensure that statutory measures are applied in order to avoid and mitigate, and where this is not possible, to appropriately compensate for any negative effects. Given WG's aspirations to lead on sustainable development, it anticipated that high standards would be applied in order to promote environmental enhancement.

6 ALTERNATIVES

6.1 Selection and discussion of alternatives to the proposed Operational Programme

- 6.1.1 The SEA Directive requires a discussion of reasonable alternatives to the proposed Operational Programme, and why they are not considered to be the best option. 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 Operational 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 critical for achieving the overall Operational Programme objectives.
- 6.1.3 It might be possible to consider a variety 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, but that would be inappropriate, since the EU and the Welsh Government have both indicated that the scenario they seek is a 'sustainable development' scenario in which social, environmental and economic priorities are balanced. 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 alternative programmes, including:
- Time - the Operational Programme 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 therefore not reasonable to discuss timescales beyond the remaining five-year window.
 - Funding - this has yet to be finalised and allocated. Although negotiations have yet to be completed, the indications at the time of this report are that the budget is likely to be reduced, perhaps significantly^{99,100} It would

⁹⁹ <http://www.bbc.co.uk/news/world-europe-21377378>, accessed 08/02/2013

¹⁰⁰ <http://wales.gov.uk/newsroom/businessandeconomy/2013/130125eu/?lag=en&skip=1&lang=en>, accessed 08/02/2013

therefore not be reasonable to discuss alternatives in terms of any likely increase in funding.

- Deployment of funds - discussion of alternatives on this is constrained by the size of the compulsory spending element, as defined by European legislation which requires 50% of the funding to be devoted to two of more of TO1, 2, 3, and 4.
- Policy - it would not be reasonable to consider alternatives that are not consistent with EU, UK and Wales policies.

6.1.5 It is worth considering a continuation of the previous Operational Programme as an alternative. Whilst there are broad similarities - the promotion of sustainable businesses, ICT, renewables and infrastructure for ease of access and connectivity - there is a significant emphasis in the proposed Operational Programme on climate change management and low-carbon living. There is less emphasis on environmentally led programmes (such as flood defence) unless they are integral to business growth. There is also a marine renewables component in the proposed Operational Programme which was not highlighted in the 2007-13 Programme, although it is known that some research into marine-based renewable energy was funded under the current (2007-13) Programme.

6.1.6 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.

6.1.7 Table 7 therefore considers the likely effect on the SEA objectives of each of the options:

- 1 Do nothing
- 2 Continue the existing Programme
- 3 Implement the proposed Programme.

The results of the analysis are considered in Section 7 below.

6.1.8 It should be noted that the scoring for option 2 was taken directly from the 2006 SEA. The criteria used for that assessment differ from the criteria used in this one, and the basis for scoring may therefore have been different. Whilst most of the objectives in this SEA can be linked to those of the 2006 SEA, they do not necessarily correspond directly, in which case the score used is a 'best guess' based on a reading of the 2006 SEA.

Table 8: Options assessment

SEA Objective	1	2	3	Comment
1. Protect places, landscapes and buildings of historic, cultural and archaeological value	x?	✓?	O?	Opportunities for enhancement of historic sites and buildings through enhanced funding and advice on design.
2. Protect and enhance landscapes, seascapes, townscapes and the countryside	x	✓?	O?	Opportunities for enhancement of historic sites and buildings through enhanced funding and advice on design.
3. Protect and enhance biodiversity	x?	✓?	O?	Without funding and promotion, it is possible that the proposed OP will be less effective than the existing Programme. Option 1 will result in continued pressures. Possibility of funding linked to RDP?
4. Protect and improve the region's water quality	x	O	O	A need to focus on water quality to remediate current challenges. Doing nothing would result in continued reductions in quality. Previous programmes may not have addressed this adequately. Link to RDP funding?
5. Protect the water resource and ensure its sustainable use	x?	✓?	✓O	Whilst the proposed OP is limited in how far it can address this objective, appropriate design and advice will have some positive effect.
6. Guard against land contamination, encourage reuse of existing buildings and of previously developed land of low ecological quality	x	?	✓	Significant opportunity to promote this objective via targeted funding and CCT guidance; careful project selection.

7. Minimise the requirement for energy generation use, promote efficient energy use and increase the use of energy from renewable resources	x?	x✓?	✓✓	Significant opportunity to contribute to this objective. The priority to promote a low carbon economy is a key element.
8. Minimise waste increase re-use, recycling and recovery rates	x	✓?	✓?	Whilst this is a matter of social behaviour, the proposed OP can provide opportunities to promote this objective through targeted funding/CCTs
9. Minimise the need to travel; provide alternatives to car use	x	?	x✓?	Appropriate selection of schemes to avoid increased car use and to promote alternatives. The proposed OP is limited in influencing societal behaviour
10 Limit and adapt to climate change	x?	x✓?	✓✓	The priority to promote a low carbon economy specifically aims to address this, although the contribution it will make is limited. Depends on selection of projects.
11. Protect and improve air quality	x?	✓?	✓?	The proposed OP aims to reduce emissions as far as possible. Enhanced funding will ensure that projects will minimise effects.
12. Improve physical and mental health and reduce health inequalities	x	✓?	✓○	There is an opportunity to address some of the well-being issues described. Improvements to air quality, building design and travel will promote this.
13. Improve public access to land	?	?	○	Not likely to be a significant factor.

7 ASSESSMENT OF THE PROPOSED OPERATIONAL PROGRAMME

7.1 Summary of findings

- 7.1.1 The purpose of the proposed Operational Programme is to promote sustainable economic development, by which is meant economic development that does not compromise environmental or social priorities. In trying to ensure an appropriate balance, it is inevitable that some tensions will arise, and the proposed Operational Programme will need to carefully target its priorities to optimise economic opportunities and at the same time to optimise environmental and social benefits.
- 7.1.2 The alternatives considered above are based on a number of unknowns and assumptions, but the conclusion is that the proposed Operational Programme provides an opportunity to deliver significant environmental benefits, provided that funding is carefully considered and goes for maximum benefit not just to the economy but seeks environmental and social positive outcomes as well.
- 7.1.3 It should be noted that economic growth could lead to an increase in energy and material use, and potentially waste. The issue is therefore a management one rather than one of principle. However, if the envisaged intervention types were not to occur at all, there would be greater uncertainty about the environmental outcomes. The proposed Operational Programme aims to address two of the three key indicators of Wales' ecological footprint, namely household energy demand and travel.
- 7.1.4 There are some potential risks, and some of the effects, both positive and negative, may not become immediately apparent. Some effects may be immediate, direct and positive, such as supporting projects that will ameliorate air pollution or minimise the demand for energy. Others may be less immediate, indirect and negative, and may include the transportation of marine-borne organisms on the hulls of vessels into new sites as a result of marine renewables development (even where these are of a relatively small scale), or the impacts of demand for expansion of successful operations on sensitive sites.
- 7.1.5 There is considerable convergence between the themes promoted by the proposed Operational Programme and those promoted by the Welsh Government's own programmes, based as they are on furthering sustainable development. Without the proposed Operational Programme it is arguable that significant and urgent interventions would not take place, and some of these aim to address the Welsh Government's targets to reduce carbon emissions, to improve air quality and to reduce Wales' ecological footprint.

- 7.1.6 In conclusion, the proposed Operational Programme offers an opportunity to promote positive effects on the environment, particularly on energy conservation, carbon reduction, waste management, re-use of redundant land and local health and well-being issues.
- 7.1.6 The environmental sustainability Cross-Cutting Themes reflect the environmental objectives of the 2007-13 Operational Programme. Since the objectives and the projected supported actions of the proposed Operational Programme are different in certain aspects, the scope of the guidance on CCTs may need to be revisited and revised, as will the criteria and indicators for monitoring the environmental effects of the proposed Operational Programme (see section 8).

8 MONITORING

- 8.1.1 The SEA Guidance defines significant effects as positive, adverse, foreseen and unforeseen. The methods and scope for gathering information either directly or indirectly are not defined. There is no requirement, for instance, to aggregate or collate potentially relevant data from other monitoring sources under other laws or programmes¹⁰¹.
- 8.1.2 There are three key challenges related to monitoring the environmental effects of the proposed Operational Programme. Firstly, the data is dispersed across a number of statutory and non-statutory bodies. The bringing together of three statutory bodies into Natural Resources Wales will facilitate the centralising of a significant amount of environmental data related to the Operational Programme's implementation. Nonetheless, it would be helpful for WEFO to ensure some co-ordination between collating the data needed to address the Programme's objectives and that needed to address the environmental objectives in this report.
- 8.1.3 The second issue is that it in many cases environmental effects may be impossible to attribute solely to the proposed Operational Programme. The Welsh Government has a legal duty to promote sustainable development, and its Programme for Government is based on sustainable development principles. A wide range of parallel actions are likely to deliver on these objectives. It is impossible at this level to determine the synergies and tensions between the Programme and other government interventions that might determine particular environmental outcomes.
- 8.1.4 For example, whilst it is possible to calculate an output, such as the reduction in emissions from a particular sponsored project, the overall *outcome* in terms of a reduction in emissions in a particular area is likely to be influenced by a number of other factors. This makes it difficult to report genuine environmental gains (or losses) in a way that can be meaningfully attributed to the proposed Operational Programme.
- 8.1.5 The third challenge is a logistical one. Different measures are needed for different environmental targets, and they often require different measurement timescales incorporating different skills in capturing and analysing data. The costs entailed are significant, and therefore adequate monitoring may be subject to economic constraints.

¹⁰¹ (COWI/AS Denmark 2009 p133).

8.1.6 Monitoring, and especially programme evaluation, should therefore be approached with these challenges in mind.

8.1.2 Table 8 summarises the key monitoring bodies for the SEA objectives identified above. WEFO itself will monitor a number of outputs and outcomes related to the objectives, as indicated. University departments are also commissioned to carry out monitoring on behalf of the agencies. Organisations such as the Health and Safety Executive are responsible for monitoring workplace safety issues. The Forestry Commission monitors the state of Wales' woodlands and the condition of tree species, including threats from diseases. Local councils undertake monitoring of the effects of their spatial planning policies as required by the Planning and Compensation Act 2004, as well as a number of environmental and health topics including air quality and waste.

Table 9: Monitoring

SEA Objectives	Monitoring implications
1. Protect places, landscapes and buildings of historic, cultural and archaeological value	Cadw - monitors condition of historic buildings; archaeological trusts - monitor condition of sites; Royal Commission on Historic and Ancient Monuments - maintains database
2. Protect and enhance landscapes, seascapes, townscapes and the countryside	Local planning authorities - monitor building standards; conservation areas; development management; maintain EIA databases
3. Protect and enhance biodiversity	NRW monitor condition of sensitive sites/species; Wildlife NGOs monitor condition of BAP species and habitats; maintain databases; Appropriate Assessment case studies
4. Protect and improve the region's water quality	NRW monitors ecological and chemical condition of river systems; bathing water quality; maintains databases. Water companies monitor chemical quality.
5. Protect the water resource and ensure its sustainable use	Water companies/NRW monitor availability of water; losses. Flood risk databases.
6. Guard against land contamination, encourage reuse of existing buildings and of previously developed land of low ecological quality	Local planning authorities monitor land availability including 'brownfield land' and maintain databases
7. Minimise the requirement for energy generation use, promote efficient energy use and increase the use of energy from renewable resources	WEFO - Additional capacity of renewable energy production WEFO - Number of energy users connected to smart grids WEFO - Number of households with improved energy consumption classification WEFO - Decrease of primary energy consumption of public buildings WEFO - Energy saved
8. Minimise waste increase re-use, recycling and recovery rates	Local authorities monitor municipal waste including recycled waste
9. Minimise the need to travel; provide alternatives to car use	WEFO - Public transport services created or improved WEFO - Total length of new railway line (including TEN-T)

	WEFO - Total length of reconstructed or upgraded railway line (including TEN-T) WEFO - Additional households with broadband access of at least 30 Mbps
10 Limit and adapt to climate change	WEFO - Estimated decrease in GHG
11. Protect and improve air quality	EA and local authorities issue permits and monitor air quality; maintain databases
12. Improve physical and mental health and reduce health inequalities	The Public Health Observatory monitors health and wellbeing issues and maintains databases
13. Improve public access to land	WEFO - Footpath or cycleway created or reconstructed

8.1.3 The analysis above suggests some relevant data are likely to be available in respect of each of the environmental objectives but that further work may be needed to refine these before programme implementation.

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