

# COREPOINT SEVERN ESTUARY EXPERT SURGERY and LAUNCH Programme

- 09:45**      **Registration / Coffee**
- 10:00**      **Introduction**
- 10:10**      **Welcome to the COREPOINT Expert Surgery** – Dr. Rhoda Ballinger (Cardiff University)  
**Introduction to the Severn Estuary** – Natasha Barker (Severn Estuary Partnership)
- 10:30**      **The Offshore Perspective – observational cruise with commentary, Cardiff Bay and the Severn Estuary**
- Within Cardiff Bay  
*Welcome and introduction* - Cmdr. Nick Rogers (Cardiff University)  
*Brief history of Cardiff Bay area* - Cmdr. Nick Rogers (Cardiff University)  
*Development history (pre-barrage)* - Dr. Rhoda Ballinger (Cardiff University)  
*Cardiff Bay – benefits / achievements / plans* - David Hall (Cardiff Harbour Authority)
- Lock-Out / Wider Severn Estuary  
*Characteristics of barrage* - David Hall (Cardiff Harbour Authority)  
*Tidal / hydrological characteristics of Severn* - Cmdr. Nick Rogers (Cardiff University)  
*Offshore resources – marine renewable energy and marine aggregates*
- Cmdr. Nick Rogers (Cardiff University)
  - Dr. Iwan Ball (Cardiff University)
- Coastal conservation opportunities and issues* – Dr. Jessica Poole (Countryside Council for Wales)  
*General development aspects* – Dr. Rhoda Ballinger (Cardiff University)
- Lock-In / Cardiff Bay Cruise II  
*Port-related opportunities and issues* - Capt. Phillip Holliday (Associated British Ports)  
*Barrage issues – fish migration* - David Hall (Cardiff Harbour Authority)  
*Management of Cardiff Bay – environmental aspects*
- David Hall (Cardiff Harbour Authority)
  - Rhys Morgan / Jonathan Reeves (Environment Agency Wales)
- 12:30**      **Estuary Issues and Management: the wider perspective** - Dr. Rhoda Ballinger (Chair)  
*Severn Estuary perspective* - George Ashworth (Monmouthshire County Council)  
*COREPOINT partner perspective* – Valerie Cummins / Jeremy Gault (Coastal and Marine Resources Centre, University of Cork)
- 13:00**      **COREPOINT Launch & Lunch**  
*Keynote speech* by Christine Gwyther, AM (Chair of the Economic Development & Transport Committee, National Assembly for Wales)
- 14:15**      **Severn Estuary Workshop**  
*SEP, Cardiff University and COREPOINT partners*
- 15:15**      *Tea break*
- 15:30**      **Closing comments**

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## PREFACE

I was delighted to learn of the COREPOINT project and in particular, the involvement of the Severn Estuary Partnership and Cardiff University. Integrated coastal zone management is a vitally important concept and I fully endorse the project's aims of spreading good practice, capacity building and support for practical projects, including training.

The coast of Wales is of major importance – in terms of its rich environment, economic significance and social context. Around 60% of the population of Wales lives and works on the coast, and 70% of the coastline is designated for its environmental value, including the UK's only designated coastal national park in Pembrokeshire. It is essential therefore that the coastal resources of Wales are managed properly and sustainably.

But as we know, the coastal areas of North West Europe, including those of Wales, are under an increasing range of pressures, not least those posed by climate change. I am convinced that Integrated Coastal Zone Management (ICZM) can play an important part in securing an effective management framework at the local and all Wales levels – and one that will support sustainable development objectives.

The Welsh Assembly Government is developing with the Wales Coastal and Maritime Partnership a new ICZM strategy for Wales. I am sure that COREPOINT can assist the practical implementation of the strategy by helping to raise awareness of ICZM principles and demonstrating their practical application through meaningful projects.

I wish the project well and look forward to hearing of its successes in the future.



**Carwyn Jones AM**

Minister for Environment, Planning and Countryside  
Welsh Assembly Government



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

# BACKGROUND TO THE COREPOINT PROJECT

## Introduction

Funded under the INTERREG IIB programme, *Corepoint* is a €4.2m project with 12 Partners from Ireland, UK, France, Netherlands and Belgium. The expertise within the project consortium will be optimised to progress the development and implementation of Integrated Coastal Zone Management (ICZM) solutions across the Northwest Europe (NWE) region.

## Objectives

The principle goal of Corepoint is:

### ***To Establish NWE as an Internationally Recognised Region of Excellence in Coastal Management***

This goal can only be achieved by successfully utilising trans-national cooperation, and by harnessing the experience of the Project Partners in order to meet the following **objectives**:

- Build European and local capacity to implement ICZM programmes.
- Provide concrete solutions for current problems in the Northwest region using current best practice approaches and identify models for sustaining ICZM initiatives.
- Promote social and political responsibility for the coastal environment.
- Influence national spatial policy development in response to the EU Recommendation on ICZM.
- Develop an integrated coastal information management system for NWE.

## Activities

The following **activities** will be undertaken to meet these objectives:

**Determine the effectiveness of current spatial policies for ICZM** - Review international approaches to ICZM; quantify the economic benefits of natural coastal ecosystems; identify financial models for sustaining ICZM initiatives; review the EU ICZM Stocktake process; analyse key coastal issues and conflicts; and determine the status of ICZM as an approach to spatial planning in NWE.

**Implement best practice in ICZM** - Taking the concept of 'think global, act local' this action recognises the importance of spatial planning and decision making at the local level for bringing real change to coastal communities. This action will implement ICZM initiatives in local study areas throughout NWE, by building on the lessons learned from the EU Demonstration Programme on ICZM.

**Engage European decision-makers and citizens in ICZM** - A series of workshops, open days, field trips, networking activities and expert ICZM surgeries will take place. Combined with positive outcomes from the local studies implementing ICZM and support for the process among citizens, these will help guide national policy and influence decision-makers.

**Attain excellence in ICZM for NWE** - Capacity-building for coastal management by educating decision-makers and strengthening links between local authorities and university research centres using ICZM school and exchange programmes.

**Establish the Northwest Europe Coastal Resource Centre** - Development of a Virtual Coastal Resource Centre for NW Europe. The centre will house the following features: a Geographic Information System (GIS); Coastal Atlas for NW Europe; Local Information System (LIS); decision making tools for local authorities; a Media Information Resource Centre and a Coastal Zone Youth Club.

# CEFNDIR PROSIECT COREPOINT

## Cyflwyniad

Prosiect €4.2m gyda 12 Partner o Iwerddon, y DU, Ffrainc, yr Iseldiroedd a Gwlad Belg sy'n cael ei ariannu dan raglen INTERREG IIB yw *Corepoint*. Bydd arbenigedd consortiwm y prosiect yn cael ei ddefnyddio i'r eithaf i ddatblygu a gweithredu atebion Rheolaeth Integredig ar Barthau Arfordirol (ICZM) ledled rhanbarth Gogledd Orllewin Ewrop.

## Amcanion

Prif amcan *Corepoint* yw:

### ***Sefydlu Gogledd Orllewin Ewrop fel Rhanbarth o Ragoriaeth Rheolaeth Arfordirol a Gynnydd yn Rhyngwladol***

Mae'r amcan hwn yn bosib trwy ddefnyddio cydweithrediad traws-genedlaethol yn llwyddiannus, a thrwy fanteisio ar brofiadau Partneriaid y Prosiect i fodloni'r **amcanion** canlynol:

- Datblygu gallu Ewropeaidd a lleol i weithredu rhaglenni ICZM.
- Darparu atebion pendant i broblemau cyfredol yn rhanbarth Gogledd Orllewin Ewrop gan ddefnyddio arferion gorau a nodi modelau ar gyfer cynnal mentrau ICZM.
- Hyrwyddo cyfrifoldeb cymdeithasol a gwleidyddol ar gyfer yr amgylchedd arfordirol.
- Dylanwadu ar ddatblygiad polisi gofodol cenedlaethol mewn ymateb i argymhelliad yr UE ar ICZM.
- Datblygu system rheoli gwybodaeth arfordirol integredig ar gyfer Gogledd Orllewin Ewrop.

## Gweithgareddau

Bydd y **gweithgareddau** canlynol yn cael eu cyflawni i fodloni'r amcanion hyn:

**Asesu effeithiolrwydd y polisiau gofodol cyfredol ar gyfer ICZM** – Adolygu agweddau rhyngwladol at ICZM; mesur manteision economaidd ecosystemau arfordirol naturiol; nodi modelau ariannol ar gyfer cynnal mentrau ICZM; adolygu proses Stocktake ICZM yr UE; dadansoddi materion a gwrthdaro arfordirol allweddol; ac asesu statws ICZM fel dull o gynllunio gofodol yng Ngogledd Orllewin Ewrop.

**Defnyddio arferion gorau mewn ICZM** – Gan gymryd y cysyniad o 'feddwl yn fyd-eang a gweithredu'n lleol' mae'r cam gweithredu hwn yn cydnabod pwysigrwydd cynllunio a gwneud penderfyniadau gofodol yn lleol er mwyn cyflwyno newidiadau gwirioneddol i gymunedau arfordirol. Bydd y cam hwn yn gweithredu mentrau ICZM mewn ardaloedd astudio lleol ledled rhanbarth Gogledd Orllewin Ewrop, trwy adeiladu ar y gwersi a ddysgwyd o Raglen Arddangos ICZM yr UE.

**Cynnwys gwneuthurwyr penderfyniadau a dinasyddion Ewrop mewn gwaith ICZM** – Cynhelir cyfres o weithdai, diwrnodau agored, teithiau maes, gweithgareddau rhwydweithio a meddygfeydd ICZM arbenigol. Gyda chanlyniadau cadarnhaol o'r astudiaethau lleol sy'n gweithredu ICZM a chefnogaeth ar gyfer y broses ymysg dinasyddion, bydd y rhain yn helpu i lywio polisi cenedlaethol a dylanwadu ar wneuthurwyr polisi.

**Sicrhau rhagoriaeth ym maes ICZM ar gyfer rhanbarth Gogledd Orllewin Ewrop** – Datblygu gallu rheolaeth arfordirol trwy addysgu gwneuthurwyr penderfyniadau a chryfhau cysylltiadau rhwng awdurdodau lleol a chanolfannau ymchwil prifysgolion gan ddefnyddio rhaglenni ICZM ysgolion a rhaglenni cyfnewid.

**Sefydlu Canolfan Adnoddau Arfordirol Gogledd Orllewin Ewrop** – Datblygu Canolfan Adnoddau Arfordirol Rithwir ar gyfer Gogledd Orllewin Ewrop. Bydd y ganolfan yn cynnwys y nodweddion canlynol: System Wybodaeth Ddaearyddol (GIS); Atlas Arfordirol ar gyfer Gogledd Orllewin Ewrop; System Gwybodaeth Leol (LIS); dulliau gwneud penderfyniadau ar gyfer awdurdodau lleol; Canolfan Adnoddau Gwybodaeth Cyfryngau a Chlwb Ieuencid Parth Arfordirol.

# COREPOINT AND THE SEVERN ESTUARY

## Benefits of COREPOINT to the Severn Estuary and Severn Estuary Partnership

COREPOINT is good news for the Severn Estuary. It will raise the profile of SEP within the UK and North West Europe. This is particularly important given the review of the EC Recommendation on Integrated Coastal Zone Management next year (2006). The project will also facilitate a number of key work packages, supporting and building on the work of the Severn Estuary Partnership and the COASTATLANTIC project. In particular, the project will enable the fulfilment of a number of key actions which were proposed within the *Strategy for the Severn Estuary* (2002), notably:

**Issue Reference M7:** *the Co-ordination of information and research, and the need for sound science for estuary management;* and

**Policy M7a:** *To encourage the availability of recent studies and ongoing research on the Estuary to aid understanding and awareness of its natural dynamics and the interrelationship with social, cultural and economic needs.*

## COREPOINT Work-Packages Relevant to the Severn Estuary

### **Local Information System** (November 2005 – October 2007)

This work package focuses on getting coastal partners and stakeholders to 'buy into' and to get involved in using information systems and will complement and build on the current GIS component of the Severn Estuary Partnership's other INTERREG project, the COASTATLANTIC project. The aim will be to develop a positive, systematic, easily communicated and clearly understandable 'common methodology' for information use.

### **Estuary-Wide Research Strategy and Forum** (November 2005 – October 2006)

This COREPOINT work package has been designed specifically to improve the scientific and research base of the SEP programme and other estuary-wide initiatives. To achieve this, 'expert couplets' between Research Centres of Excellence and Local Authorities are being established and developed by the COREPOINT project across NW Europe. In the Severn this will include the compilation of a searchable database of relevant research institutions, publications and projects; the establishment of an estuary-wide research forum and hosting of a related conference on Severn estuary research; and the development of a research strategy for the Severn Estuary.

### **Maritime Heritage Interpretation and Education Strategy** (November 2006 – 2007)

This work package will raise awareness of the maritime heritage of the Estuary through a range of interpretation and educational activities, including the development of a maritime interpretation and education strategy for the estuary and the establishment of a maritime heritage forum. This which will evaluate the existing range of interpretation sites and programmes and identify gaps in maritime history interpretation.

### **Evaluation of the Management of the Severn Estuary Against ICZM Principles** (2007)

The COREPOINT project will provide for the testing and demonstration of the European principles of ICZM at local levels. In the Severn Estuary, the COREPOINT project will include:

- a review and evaluation of the estuary management programme, including recommendations
- a strategic, scoping exercise on the future programme development, focusing on long-term trends and pressures, external policy shifts and triggers for change

The COREPOINT project will also allow coastal practitioners in the Severn Estuary (on both English and Welsh side) to learn from their European neighbours and will focus international expertise on the coastal regions of the Severn Estuary and Inner Bristol Channel.

# THE SEVERN ESTUARY

## Geography of the Estuary

The Severn Estuary, *Môr Hafren* in Welsh, is Britain's second largest estuary with an area of 557 km<sup>2</sup> including an intertidal area of 100 km<sup>2</sup>. When its seaward extension, the Bristol Channel, is included, the intertidal habitat of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain, occupying an area of around 2000 km<sup>2</sup>. The Estuary has the second highest tidal range in the world, on occasions in excess of 14.5m, which presents unique challenges for coastal defence (page 9). The Severn bore, a tidal wave which may reach 2m in height under certain circumstances, occurs in the lower reaches of the Severn during high tides. The extremely high tidal range and classic funnel shape make the Severn Estuary unique in Britain and rare on a wider European scale.

The Estuary itself is underlain by carboniferous limestone, which forms the islands of Steep Holm and Flat Holm, as well as headlands along the Estuary. The upper Severn includes extensive areas of mudflats and sandflats bordered by saltmarsh, which grades through to neutral pasture. There are numerous drainage channels and ditches, known locally as *rhymes* or *reens*, on both sides of the Estuary, which drain the Severn Estuary Levels. The Levels, which comprise some 850 km<sup>2</sup>, are characterised by flat meadows and scattered arable fields defined by water-filled ditches, lying almost at sea level on the edge of the inner Bristol Channel.

## Nature Conservation

The Estuary is internationally recognised for nature conservation (page 10), and is designated as a Special Protection Area (SPA) and as a wetland of international importance under the Ramsar Convention. It support nationally and internationally important numbers of over-wintering and passage migrant waders and wildfowl. A significantly large area of the Severn Estuary, including the subtidal zone, has also been recommended as a possible Special Area of Conservation (pSAC) under the Habitats Directive, because it contains habitat types and / or species which are rare or threatened within a European context. There are also a variety of national and local conservation designations. It is also renowned for the wealth of archaeological and historic interest (page 11), as well as its high quality historic landscape.

A high proportion of the Estuary is subtidal, with a diversity of aquatic estuarine communities present. The energetic tidal characteristics dominate many of the properties of the Estuary as a whole, including its community distribution. The Estuary is an important migratory route for salmon and internationally rare fish species such as Shad. It also supports commercial elver fisheries.

## Human Use of the Estuary

There are several major industries located around the shores of the Estuary (page 6). Historically, these have included smelting, incineration, fertiliser and numerous other chemical plants in the Avonmouth area; coal and steel industry, paper mills, chemical and pharmaceutical manufacturers in South Wales; nuclear power plants and modern port facilities along the Estuary. Today, however, the service industry is the major employment sector with tourism attracting several million visitors each year to a large and varied number of attractions, allied with diversification of accommodation types and strengthening of transport networks (page 7). Some of the many activities that make the Severn Estuary important to its many users also have the potential to threaten its long-term future. It is critical, therefore, that these activities and uses are carefully managed in order to ensure the sustainable development of the Estuary.

*For further information:*

SEP (2001) *Strategy for the Severn Estuary*. Severn Estuary Partnership. Available at: <http://www.severnestuary.net/sep/>

# DEVELOPMENT: OPPORTUNITIES AND PRESSURES

## General Development

### Patterns and Change

The Severn Estuary has been shaped historically by human activity and its associated development. The growth of ports such as Cardiff, Newport and Avonmouth, has influenced the strategic and spatial patterns of land-based transport and port-related industrial development (page 7). Spatial distribution of urbanisation is well established around the Estuary, reflecting the historical development of industry and seaports along the coast as well as the associated growth of urban hinterlands and supporting infrastructure, including marine and land-based transport and communication links.

Much of the coastal land around the Estuary is rural, with the main population centres around Cardiff, Newport, Bristol and Gloucester. Pasture has been the traditional land use activity along the Severn Estuary throughout history, but its extent has reduced in recent years due to increasing conversion to arable farming.

There are also major industries sited around the Estuary's shores, including modern port installations which are centres of maritime industry, including heavy industry and transport, commercial fisheries and mineral extraction; petro-chemical; and power-generation plants amongst others.

### Development Pressures

Development pressures identified by the Severn Estuary Partnership (Severn Estuary Strategy, 2001) include sites allocated for:

**Employment:** This includes manufacturing, warehousing and offices. Whilst some sites have been located close to motorway junctions in order to attract inward investment, most employment land is associated with the main urban areas, e.g. Newport and Bridgwater.

**Housing:** The major land allocations are associated with the main urban areas. Examples include sites at Locking Castle / St. Georges and Portishead.

**Large infrastructure projects:** These include roads and rail facilities as well as port developments, for example the Cardiff and Avonmouth rail freight terminals, the Gloucester South West bypass and the proposed M4 Relief Road south of Newport on the Gwent Levels.

**Retail and commercial:** These sites mainly occur in the vicinity of urban areas. Examples include Weston-super-Mare and Chepstow.

**Mixed and other development:** This includes waste, minerals, recreation, tourism, utilities, education and housing. A number of sites, including Cardiff Bay, have benefited from ambitious urban regeneration projects with associated waterfront development, with the aim of creating an attractive waterside location to enhance the development potential of the area.

### Future Development

Despite the risk of flooding (page 9), the tidal floodplain is under pressure for development, for example around Avonmouth. This is partly due to the pressure on planning authorities to expand their allocation of land for housing, commercial and industrial uses, and partly due to commercial pressures to find inexpensive, available land. Due to extensive development within the estuary, many of its floodplains are not functioning naturally or effectively, and guidance notes state the need for future development to shift away from the floodplain.

New roads can have a major impact on the landscape around the estuary. Three major transport routes cross the Severn Estuary – the older M48 Severn Road Bridge between Aust and Beachley Point, the newer M4 crossing between Severn Beach/Pilning and Caldicot, and the Severn rail tunnel which connects rail services between Bristol and South Wales. There are several road improvement schemes planned including the proposed improvements to the M4 south of Newport, which have attracted concern over their potential environmental impact.

The Wales Spatial Plan recognises the south east M4 corridor as a key driver of the Welsh economy, encouraging inward investment along the south Wales coast and providing the catalyst for urban and industrial development. However, given the close inter-relationship between economic development and accessibility, the future of the south east 'Gateway to Wales' is closely linked to the neighbouring English economic hubs, centred around Bristol and south Gloucestershire.

**For further information**, please refer to:

SEP (2001) *Strategy for the Severn Estuary*. Available at <http://www.severnestuary.net>

## **Transport, Ports and Shipping on the Severn**

A number of transport issues face those responsible for the management of the Severn Estuary in the next two decades. Traffic volumes for all transport modes are growing, creating pressures requiring farsighted and possibly novel solutions to resolve the problems.

The predicted growth in road transport poses the most immediate problem. Motorway congestion occurs but only for a relatively small proportion of any day and at certain times of the year. A new M4 relief route across the Gwent levels will provide a short term solution to congestion problems around Newport but at what environmental cost? On the English side of the Severn the major routes are complete and the issue has become traffic management rather than building infrastructure.

Rail transport could provide a partial solution to transport problems in the region but long-term investment and an overall improvement in availability and performance will determine whether rail becomes a major factor in resolving transport congestion. The new Cardiff/Airport/Bridgend rail link is a positive example. With air transport passenger volumes growing significantly the pressure to build new airport car parks, access roads or even runways will increase and any major developments would be contentious.

On the water side the Severn provides a major transport artery into both England and Wales. With 4 major ports in the Severn Estuary significant volumes of freight are already moved and this could be substantially increased given the right environment for the ports industry to expand its business.

A sustainable approach to the development of any transport project will need to balance the requirements of the local population and business, and national transport infrastructure, with the need to protect an environmentally sensitive region. This can be achieved through provision of technical and managerial solutions to reduce the impact of different transport modes, and by providing opportunities for a more environmentally friendly mix through initiatives such as Short Sea Shipping.

**For further information**, please refer to:

Associated British Ports (ABP) website: <http://www.abports.co.uk/index.htm>

## Marine Aggregate Dredging

In South Wales, there is a unique dependence on marine aggregate to provide sand and gravel – around 95% of the sand used in SE Wales comes from marine sources. Sand and gravel has been dredged from the Severn Estuary since the early part of last century, and the Estuary and wider Bristol Channel are currently the main source of fine aggregates for South Wales. Marine aggregates are landed at ports and wharves on both sides of the Estuary, with Avonmouth, Cardiff and Newport handling over 65% of the total tonnage landed. It is estimated by the industry that 1,700 jobs are linked directly or indirectly to aggregate dredging in South Wales.

The strategy for dredging marine aggregates in the Severn Estuary and Bristol Channel is set out in the Assembly's Interim Marine Aggregates Dredging Policy (IMADP) (2004). Currently, aggregate extraction is licensed at seven sites within the IMADP area. Although licensed capacity within this area is currently about 2.7mt, current extraction rates typically average around 60% of permitted tonnage.

The Strategy set out in the IMADP provides for a measured change of dredging operations so that within 10 years the majority of dredged aggregates will be provided from offshore and outer channel areas, providing this meets sustainability criteria. Although it is recognised that there are benefits to maintaining the local and varied supplies from the Severn Estuary, in the longer term only a small amount of material will be dredged from this potentially vulnerable area.

**For further information**, please refer to:

WAG (2004) *Interim Marine Aggregates Dredging Policy: South Wales*. Welsh Assembly Government, November 2004.

Available at <http://www.wales.gov.uk/subiplanning/content/guidance/madp/index-e.htm>

## Tourism, Recreation and Access

The Severn Estuary's extensive size means one can find everything from busy seaside resorts to quiet agricultural levels. Where activity is greatest, Victorian towns such as Weston, Minehead, and Penarth still provide a seafront experience for millions of visitors a year. Other areas, such as the remote Arlingham Peninsula in the upper Estuary, provide a network of rights of way but relatively little in terms of tourism and access infrastructure and associated pressure. Taking an integrated estuary wide view is a bold but essential element to managing tourism, recreation and access in these widely differing areas.

Over a million people live close to the estuary and with increases in leisure time and disposable income, recreational and tourism pressure as well as tourism related benefits will increase in the future. Housing development will also lead to a rise in demand for recreational amenities.

The CROW (Countryside and Rights of Way) Act (2000) includes a commitment for open access to be extended to the coast by 2009, potentially opening up areas of coast which have historically received little tourism and recreation pressure.

A major issue currently being grappled with is the effect of recreation and access on the Severn Estuary Marine Site, particularly the issue of disturbance by human activity on over-wintering bird sites. Management techniques such as mapping of recreational pressures and conservation data are proving useful in addressing this issue to ensure that recreation and access improve rather than compromise the features of the marine site, e.g. developing interpretation for the visitor about the site and how to mitigate effects.

## Coastal Protection and Flood Defence

Over hundreds of years, coastal defences have been constructed to reduce the risks from tidal flooding and coastal erosion. The tidal range in the Estuary is the second highest in the world, and adverse weather conditions can raise water levels by more than two metres above predicted levels. The risk of tidal flooding is greatest from September to April, although the risk of flooding may increase in future if current predictions of sea level rise of around 5mm/year are accurate.

Today, thousands of people around the Estuary depend upon constructed defences to protect coastal land and property from flooding and erosion. These defences may protect only a few properties, a seaside town or, in the case of Avonmouth, a major industrial area. Large areas of land around the Estuary are more than 3m below the highest tides, particularly around the lowlands of the upper Estuary, the Somerset Levels and Moors, and the Gwent Levels.

The Severn Estuary Coastal Group was formed in 1993 to share knowledge and experience initially to deal with the preparation and completion of the first Shoreline Management Plan (SMP) for the Estuary. The group will shortly begin revising the first SMP, based on revised guidance from Defra. The group has also become a forum for exchanging information and good practice on coastal issues generally, as well as Estuary matters.

UK Government guidance on Development and Flood Risk and on Coastal Zone Planning requires Local Planning Authorities (LPAs) to take into account the risk of flooding and coastal erosion, both present and future, when considering new development. These issues will become increasingly important given predicted sea-level rises.

**For further information**, please refer to:

Defra Shoreline Management website: <http://www.defra.gov.uk/envIRON/fcd/policy/smp.htm>

Severn Estuary Coastal Group website: <http://www.severnestuary.net/secg/>

## Marine Renewable Energy

Due to its large tidal range and the very strong tidal currents and streams, the Severn Estuary offers considerable potential for renewable energy generation. Proposals to take advantage of the huge tidal range to generate electricity date back to the early 20<sup>th</sup> Century. Many schemes have been suggested since then, including plans for a 16km barrage between Lavernock Point (Cardiff) and Brean Down (Weston-super-Mare) with a total capacity of 8640MW.

The Government has not entirely eliminated the possibility of exploring major tidal barrage technology in future, and novel ideas such as offshore tidal lagoons suggest that there may be new ways to develop the tidal barrage concept. There may also be opportunities to further enhance the power output of offshore tidal lagoons through hybridisation with wind or wave power technologies.

Although the potential for tidal power remains large, the prospect for the practical development of tidal energy has moved away from large barrage projects to smaller-scale systems that harness tidal streams. Tidal stream technology is a variation on the conventional concept of harnessing tidal energy, and involves capturing and converting the energy found in tidally generated coastal currents. A couple of prototype devices have been tested in the Severn Estuary, but to date, none have been deployed commercially. Nevertheless, several energetic locations around the Estuary may have sufficient velocity over a large enough area to permit the installation of much larger devices when the technology matures.

**For further information**, please refer to:

Department of Trade & Industry's (DTI's) renewables webpages: <http://www.dti.gov.uk/renewables/>

# THE CONSERVATION AND HERITAGE OF THE SEVERN ESTUARY

## Nature Conservation

### Trends

The Severn Estuary is one of the most important estuaries in the UK for wintering wildfowl and waders, especially when there is severe weather affecting other sites further north and east. It supports populations of wild birds that are of European importance. These bird populations rely on the mudflats, sandflats and saltmarsh habitats around the Estuary, and the coastal grazing marsh, often close to the seawall for breeding and over-wintering. The Estuary is also one of the most important British estuaries for several rare fish species that use the Severn as a migratory passage to and from their spawning and nursery grounds in the rivers that run into the Estuary. The importance of the Severn Estuary is reflected in its nature conservation designations.

It is designated as a Special Protection Area (SPA) and a possible Special Area of Conservation (pSAC) under the EU Birds and Habitats Directives respectively. As the Severn Estuary SPA incorporates intertidal areas, it is known as the Severn Estuary European marine site.

The Estuary is also a Site of Special Scientific Interest (SSSI), as are many of the levels areas around the Estuary. The Estuary is also designated as a Wetland of International Importance (Ramsar site) under the Ramsar Convention, and has numerous national and local designations such as national and local nature reserves around its shores.

### Trends and Future Developments

The bird numbers on the Estuary, for which the site is designated as a Special Protection Area, have been reduced in recent years and the nature conservation bodies are monitoring bird numbers, as well as the condition of supporting habitats as part of their statutory requirements, and will be reporting to Europe on a five-year basis. Part of the decline is a result of climate change; milder winters mean that the birds can take advantage of the more productive estuaries in N and E of Britain. Other, localised factors may also be affecting numbers on the Severn.

### Potential Issues

Urban development has the greatest potential to impact on the nature conservation interests around the Estuary, from perspectives of both habitat reduction and disturbance to species and habitats. In addition, the reduced nutrient input to the Estuary, mostly due to improved water treatment, may be affecting the food source available to over-wintering bird populations.

The Relevant Authorities on the Severn (ASERA) have identified that land and water based recreation, at their current levels, are thought likely to be causing deterioration or significant disturbance to the designated species and habitats. The effects of these activities are not occurring throughout the Estuary, and are in localised areas only.

**For further information**, please refer to:

ASERA's webpages on the Severn Estuary European Marine Site:

<http://www.severnestuary.net/asera/severn.html>

Countryside Council for Wales' Marine webpages:

<http://www.ccw.gov.uk/generalinfo/index.cfm?Subject=Marine&lang=en>

English Nature's website:

<http://www.english-nature.org.uk/>

## Archaeology and Cultural Heritage

### Status

The Severn Estuary is well known for the wealth of features of archaeological importance and historic interest. A significant part of the archaeological resource probably remains to be discovered and recorded in the nationally designated Scheduled Ancient Monuments or in the Regional Sites and Monuments Records. A maritime heritage of Bronze age, Roman and Medieval boats has remained sealed within the accumulation of marine sediments and peats which make up the Severn Levels. In such areas, the environment remains waterlogged, preserving organic evidence of past environments and maintaining an environmental sequence of good quality and length.

A brief overview of important sites would include later prehistoric sites which can be found at Brean Down, Gwent Levels, Caldicot and Goldcliff. Roman settlement and drainage systems are apparent on the North Somerset and Wentlooge levels. Strategic defences from more modern times are found on Flat Holm and Steep Holm, dating from Napoleonic and 2<sup>nd</sup> World Wars, not to mention industrial heritage and important geological sites.

### Trends and Future Development

There is great potential for loss and disturbance of sites from pressures such as tourism and urban development and associated infrastructure. Increased rates of erosion from storminess may aggravate the situation. An overview is required to allow protection on a strategic rather than site by site basis. The Severn Estuary Levels Research Committee identifies the definition of archaeological field records as of utmost regional importance, given the importance of coastal defence works in defining the historic landscape. Use of rapid coastal and inter-tidal surveys at key sites will help to further identify the status of the resource. Protection through careful attention in development plans and raised awareness will help conservation. If preservation is not possible, the sponsorship of National agencies and Local Archaeological trusts is important in recording this non-renewable resource, which forms an important record of human endeavour.

**For further information**, please refer to:

Cadw's website: <http://www.cadw.wales.gov.uk/default.asp>

English Heritage's website: <http://www.english-heritage.org.uk/>

## CARDIFF BAY: A CASE STUDY IN URBAN WATERFRONT DEVELOPMENT

### Severn Estuary Context

The demise of the traditional industrial base and the resultant decline of the coal trade led to a restructuring and modernisation of the port of Cardiff, not dissimilar to that experienced elsewhere around the Severn Estuary and in Europe. This led to the degeneration and dereliction of the southern part of the city, adjacent to the modern port. However, following the regeneration successes of London, Liverpool and other port-cities, a major regeneration programme focusing around Cardiff Bay was established in the late 1980s.

### The Development: Background

Cardiff Bay Development Corporation was established by the UK Government in 1987 to help regenerate 1,100 ha. of the inner city docklands area through an ambitious public-private investment. The regeneration programme aimed:

*'To put Cardiff on the international map as a superlative maritime city which will stand comparison with any such city in the world, thereby enhancing the image and economic well-being of Cardiff and Wales as a whole.'*

In its *Strategy for Regeneration*, the Corporation sought to create new jobs, promote new commercial and industrial development and increase housing provision as well as increasing city tourism to 2 million visitors per year.

However, the perceived barrier to investment in this inner city area was the exposure of 'unsightly' mudflats for between twelve to eighteen hours each day. To attract investment, the Corporation considered it necessary to replace the tidal mudflats and create a permanent, 'more aesthetically attractive', waterfront through the construction of a barrage across the mouths of the rivers Ely and Taff.

Such proposals were met with considerable opposition and parliamentary discussion and various impact assessments were prepared, addressing a wide range of potential impacts including those related to wildlife and groundwater levels. Finally, after several years of debate and discussion, the Cardiff Bay Barrage Act received Royal Assent in 1993 enabling the construction of the barrage, a 1.1km rock fill embankment. Following years of construction and related works, impoundment of the freshwater lake commenced in Spring 2001.

### **Socio-Economic Change**

The regeneration programme has resulted in the creation of 12.8 km waterfront and the revitalisation of the former port areas of south Cardiff and a parallel increase in land values. The regeneration programme has resulted in a range of socio-economic benefits, including:

- 16,750 jobs (58% of 1997 target);
- 4,800 new homes (75% of 1997 target), including sites at Portway Marina, Windsor Quay, Atlantic Wharf and around the Roath Basin;
- 695,000 square metres non-residential development (61% of 1997 target) including the industrial park, Ocean Park;
- 79 ha. open space (146% of 1997 target);
- increase in recreation and tourism including the construction of the St Davids Hotel, the first 5 Star hotel in the capital and Wales, the two large yacht clubs and the organisation of many water-related events.

Estimates suggest that over 80% of the targets set by the CBDC have now been achieved. Future and ongoing developments include the construction of an International Sports Village and the Debating Chamber of the National Assembly for Wales.

### **Environmental Change**

The scale of barrage construction and the impoundment of the new 200 ha. freshwater lake resulted in significant and complex environmental changes and challenges for management. However, the Cardiff Bay Barrage Act 1993 and related Side Agreements included various measures to secure environmental protection:

- *Groundwater*

To counter concerns regarding a rise in groundwater as a consequence of the barrage, pumping of groundwater from various wells and drains occurs.

- *Flood storage*

Given the need to maintain live flood storage, the Environment Agency Wales has stated that development should not encroach into the +4.5mAOD (operational level of Bay) to +8.0mAOD (lowest development level) area without appropriate compensation measures.

- *Water quality*

Prior to the completion of the barrage, shortfall sewage outlets which previously discharged into the Bay were diverted and a £180 million sewerage treatment plant was also constructed.

- *Dissolved oxygen*

The amount of oxygen dissolved in the water is critical to the survival of aquatic life in the freshwater lake. To comply with the Cardiff Bay Barrage Act's requirement for a minimum dissolved oxygen level of 5mg/l, a fixed system of aeration pipes has been installed and supplemented by a 'bubbler' barge as and when required.

- *Saltwater contamination of lake*

A flushable saline sump controls the intrusion of saline (salty) water through the locking system in the barrage and protects the water quality of the now freshwater lake. Contingency measures also enable the mixing of any saline water entering the lake through overtopping.

- *Fisheries*

As numbers of salmon and sea trout were steadily rising, a specially designed fish pass containing a system of pools and weirs was constructed to facilitate the passage of these migratory fish. A monitoring programme has been established and a fish pass counter installed.

- *Algae*

Between spring and autumn, substantial algal blooms in the freshwater lake have been predicted. Now that Cardiff Bay has been designated a Sensitive (eutrophic) Area under the *EC Urban Wastewater Treatment Directive*, nutrient stripping at sewage treatment works are included in the Dwr Cymru/Welsh Water investment programme for the Taff/ Ely catchments.

- *Conservation*

The loss of a Site of Special Scientific Interest, supporting a considerable population of over-wintering wading birds led, to a £10.5 million mitigation scheme, the Gwent Wetlands Reserve, being constructed along the estuary at Uskmouth, Saltmarsh and Goldcliff. This site consists of wet reedbeds, wet grasslands and shallow saline lagoons. In response to the duty to promote conservation in the Bay a mini-wetlands site at Hamadryad Park (adjacent to the St Davids Hotel) provides an education resource for Cardiff City Council.

- *Other issues*

*Midges* - Large numbers of midges have colonised the Bay and are a nuisance to both local residents and visitors. Various measures have been attempted to control this issue.

*Dredging* – major dredging programme was put in place to improve boat access within the Bay. Precautions were required to protect water quality during the removal of vast amounts of fine silt.

*Waste regulation* – With any impoundment scheme, the accumulation of debris which has been washed down the rivers is likely to occur. A '*water witch*' now collects waterborne litter and arranges manual clearance of the Bay's edges.

*Land quality* – Given the area's industrial past, there are areas of contaminated land around the Bay.

**For further information**, please refer to:

Environment Agency's webpages on Cardiff Bay:

<http://www.environment-agency.gov.uk/regions/wales/426317/549459/?version=1&lang=e>

Cardiff Harbour Authority's website: <http://www.cardiff.gov.uk/marketing/harbourauthority/>

## MARINE & COASTAL ENVIRONMENT GROUP

The Marine and Coastal Environment (MACE) Group conducts both pure and applied research on the marine and coastal environment with particular reference to the use of marine information, including:

- Mapping, charting and sea surveying
- Marine environmental development & management
- Integrated coastal and sea management
- Development of education and training

### Research Capabilities

**Marine science and survey:** includes coastal and offshore surveying and related mapping and charting, both in support of specific industries and within the context of coastal and offshore environmental management.

**Marine environmental management:** includes the development of port environmental management systems and industry standards; also risk analyses relating shipping operations to environmentally sensitive areas of the coastal and offshore environment.

**Integrated coastal and marine management, governance and policy:** includes the analysis of sectoral and multi-sectoral management and frameworks (including institutional, policy and stakeholder aspects) at Welsh, UK, European and International levels.

**Education and training:** Includes development of marine geography as an academic discipline and its relationships with other marine subject areas; and fostering academic networks dedicated to the application of academic disciplines in the field of coastal and marine management.

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## SEVERN ESTUARY PARTNERSHIP

Set up in 1995, the Severn Estuary Partnership (SEP) is an independent, estuary-wide initiative led by Local Authorities and Statutory Agencies. The SEP works with all those involved in the current and future management and use of the Estuary, from planners to port authorities, fishermen to farmers and many more.

The aim of the SEP is to bring together people involved in the development, management and use of the Estuary, to encourage sharing of interests and responsibilities to achieve common objectives. Through providing services to encourage communication and co-operation between people, the SEP brings people together to find common ground and work to resolve shared problems and realise opportunities. The SEP:

- Provide mechanisms to improve communication
- Encourage a partnership approach
- Are a focal point for research
- Highlight examples of good practice
- Source funding for new projects

The SEP provides a flexible and supportive service through:

- Joint Advisory Committee
- Estuary-wide Forum (to be established)
- Technical Working Groups
- Partnership Officer
- Severn Tidings Newsletter
- Who's Who Guide to the Severn

The Partnership involves all those who have an input to delivering the Severn Estuary Strategy; Local Authorities, Port / Harbour Authorities, National Agencies, internationally important industries and many voluntary bodies and community groups.

**Project Officer:** Ms. Natasha Barker, [Severn@cardiff.ac.uk](mailto:Severn@cardiff.ac.uk)

Website: <http://www.severnestuarypartnership.org.uk>

## COREPOINT EXPERTISE



The CMRC, UCC is a multi-disciplinary research centre active in the thematic areas of integrated coastal management, coastal processes and seabed mapping, seabirds and cetaceans and GIS and remote sensing

CoastNET is a national network that supports those who care for and manage the UK's diverse coastline. Established in 1995 it has evolved to provide a practical network for the exchange of information, ideas and expertise in the sustainable management of the coastal and marine environment.



The Centre for Coastal and Marine Research, part of the University of Ulster, Coleraine, examines various aspects of coastal environments, from the physical processes to the human impacts. As well as local research programmes, investigations are being conducted in numerous international locations.

Based in the Martin Ryan Institute in the NUI, Galway, the aim of the Centre is to promote the inter-disciplinary and multi-disciplinary study of the legal, political, economic and social aspects of the ocean, the coastal zone and maritime resources.



Based in Aberdeen University, AICSM's mission is to enhance the local, national and international reputation of Aberdeen University in multidisciplinary research, training and consultancy with a clear focus on the coastal zone.

As the project leader of the Bantry Bay Charter Project, they are one of the most experienced Local Authorities in the EU. As such they will provide invaluable advice on the challenges faced by Local Authorities when engaging with stakeholders in the process of ICZM.



The purpose of the Marine and Coastal Environment (MACE) Group, University College Cardiff is to conduct both pure and applied research on the marine and coastal environment with particular reference to the use of marine information and the development of education and training.

The Coastal Union is an association with members and member organisations in 40 countries. It was founded in 1989 with the aim of promoting coastal conservation by bridging the gap between scientists, environmentalists, site managers, planners and policy makers.



Provide expertise on the ecological management of coastal zones within a broad ecosystem framework, including the development of Strategic Environmental Assessments for implementing ICZM and expertise in maritime policy & law.

Envision a consultancy and research group providing environmental services to the International community. It has extensive expertise in institutional capacity development for sustainable coastal management and experience of providing a wide range of tailored technical, management and professional training services.



**Ifremer**

Over the past 25 years they have developed experience in socio-economics and law as applied to the management of marine resources and the coastal environment. Working with IFREMER, the French National Institute for Marine Research which has developed research and expertise in coastal zone management.

A Local Authority which has over 21 years of experience of successful coastal management. They will provide invaluable insight into local models for implementing ICZM. It will also be an important test bed for the Local Information System to be developed in the project.



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Wales Coastal and Maritime Partnership  
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## NOTES