

Strategy for the Severn Estuary



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- Alpha Quest Associates
- Associated British Ports
- Avonmouth Responsible Care Group
- Avon Wildlife Trust
- British Association of Shooting and Conservation
- Bristol Channel Federation of Sea Anglers
- Bristol Channel Yachting Conference
- Bristol City Council
- British Geological Survey
- British Horse Society
- British Marine Aggregates Producers Association
- British Marine Industries Federation
- Bristol University
- British Waterways
- Cadw: Welsh Historic Monuments
- Caldicot and Wentlooge Internal Drainage Board
- Cardiff Bay Harbour Authority
- Cardiff County Council
- Cardiff University
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- Confederation of British Industries
- CEFAS Lowestoft Laboratory
- Cheltenham & Gloucester College
- Chemical Industries Association
- City and County of Swansea Bay Coastal Cell Group
- CoastNET
- Coastal Zone Canada Association
- Community Council of Goldcliff
- Congresbury Parish Council
- Countryside Council for Wales
- Country Landowners Association
- Council for the Preservation of Rural Wales
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- Environment Canada
- Esturiales
- Ewenny Community Council
- Exmoor National Park
- Flat Holm Project
- Forest of Dean District Council
- Friends of the Earth
- Gifford and Partners
- Glamorgan Heritage Coast
- Glamorgan/Gwent Archaeological Trust
- GlosNet
- Gloucester City Council
- Gloucester Harbour Trustees
- Gloucestershire County Council
- Gloucester Wildfowling Association
- Greenpeace
- Gwent Authorities Emergency Planning Services
- Hinckley 'B' Power Station
- ICI Estates
- Inland Waterways Association
- Internal Drainage Boards
- Joint Strategic Planning and Transportation Unit
- Kenneth Allsop Memorial Trust
- Kinston Seymour Parish Council
- Laing GTM
- Local Agenda 21 Officers
- Ministry of Agriculture Fisheries and Food
- Marine Conservation Society
- Maritime and Coastguard Agency
- Monmouthshire County Council
- Monsanto Chemicals UK Ltd
- National Assembly for Wales
- National Coasts and Estuaries Advisory Group
- National Farmers Union
- National Museum of Wales
- Newport County Borough Council
- North Devon Somerset & S. Avon Coastal Cell Group
- North Petherton Town Council
- North Somerset Council
- Pembrokeshire College of Further Education
- Rhone Poulenc Chemicals
- Royal Commission Historical Monuments England
- Royal National Lifeboat Institution
- Royal Society for the Protection of Birds
- Royal Yachting Association
- Sedgemoor District Council
- Severn Estuary Net & Fixed Engines Fishermen's Association

- SABINA
- Sedgemoor District Council Tourism Association
- Severn Estuary Levels Research Committee
- Severn Estuary Coastal Cell Group
- Severn Estuary Conservation Group
- Severn Tidal Power Group
- Society for Underwater Technology
- Somerset County Council
- Somerset Trust for Nature Conservation
- South Gloucestershire Council
- South Wales Sea Fisheries Committee
- South West Tourism
- Sports Council for Wales
- Sports Council South West Region
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- The Bristol Port Company
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Preface

The Severn Estuary is one of the largest estuaries in Britain, has the second highest tidal range in the world, and has a natural and cultural heritage which deserves special attention. It is also a living and working environment for many people who live around it's shores and care about it's future.

This Strategy is the result of the first five years of progress towards the integrated management of the Severn Estuary and its resources, and provides a framework for the sustainable management of the Estuary to meet the needs of present and future generations. It is the starting point for delivering tangible results and will be a catalyst for future action plans that will help foster an integrated and co-operative approach to addressing issues and opportunities on the Estuary. It is a voluntary Strategy and therefore it is through existing statutory powers, remit, interest and enthusiasm of all Partnership members, and of the wider community, that the aims of the Partnership and action on the ground will be realised.

I hope that you will be able to work with us at this exciting time on the Severn Estuary and look forward to your support and participation in the implementation of the *Strategy for the Severn Estuary*.



Cllr Charles S. Price
Bristol City Council
(On behalf of the Severn Estuary Partnership)

September 2001

Contents

1. Setting the scene.....	1
Introduction	1
The Severn Estuary Partnership	3
Strategy for the Severn Estuary.....	6
Implementation of the Strategy for the Severn Estuary.....	9
2. Planning and management in the Estuary	12
3. Sustainable land use, development and transport.....	25
4. Agriculture	32
5. Coastal protection and flood defence	37
6. Tourism, recreation and access	47
7. Ports, shipping and navigation	56
8. Waste management and pollution	62
9. Aggregates and other minerals	81
10. Water resources	91
11. Fisheries	99
12. Landscape and seascape	105
13. Nature conservation and wildlife	111
14. Archaeology and the historic environment.....	121

Figures

Figure 1. SES management area.....	2
Figure 2. Severn Estuary Partnership organisational structure.....	4
Figure 3. Benefits of being involved with the SEP	5
Figure 4. Links between elements of the Strategy document.....	7
Figure 5. How organisations/communities can become involved	11
Figure 6. The Severn Estuary planning framework: SEP and selected, related plans	17

Appendices

Appendix 1. Summary of issues.....	127
Appendix 2. Stakeholder Decision Analysis Ranking.....	130
Appendix 3. Summary of the SES process.....	131
Appendix 4. SES Steering Group members	132
Appendix 5. Who does what on the Estuary	133
Appendix 6. Acronyms	141
Appendix 7. Glossary.....	144
Appendix 8. Maps	150

Our vision for the Severn Estuary

*A vibrant and prosperous community,
working in partnership for a clean and
pleasant Estuary environment, valued and
protected for generations to come*

1. Setting the scene

Introduction

1.1. Estuaries support a wide variety of activities across the whole spectrum of our lives. The Severn Estuary, *Môr Hafren* in Welsh, is one of the largest estuaries in Britain, having the second highest tidal range in the world. It is internationally recognised for nature conservation, has major industries sited around its shores and attracts several million visitors each year to a variety of tourist attractions. Some of the many activities that make the Severn Estuary important to its many users have the potential to damage its long-term future. It is crucial therefore that a balance is achieved between economic, social and environmental interests and that those demands on the Estuary are carefully managed.

1.2. The *Strategy for the Severn Estuary* is the result of extensive participation and consultation from a wide range of organisations and individuals with an interest in the Estuary and many organisations representing the key interests on the Estuary have been involved in developing it.

1.3. This Strategy document, which will be guided by the Severn Estuary Partnership, will be part of a mechanism for establishing a strategic framework to address the need for an integrated approach to management on the Estuary. It covers a wide range of issues and opportunities and has been developed to provide detailed justification for an integrated and co-operative approach to action on the Severn Estuary. The Severn Estuary Partnership aims to complement the work of other organisations around the Estuary and will provide a flexible service to all those involved in the management of or with an interest in the Estuary. For the Strategy to be successful all those with an interest in the Estuary are encouraged to accept it as a strategic framework to inform the future good management of the Estuary, to adopt the policies contained within it and to commit themselves to future agreed action plans.

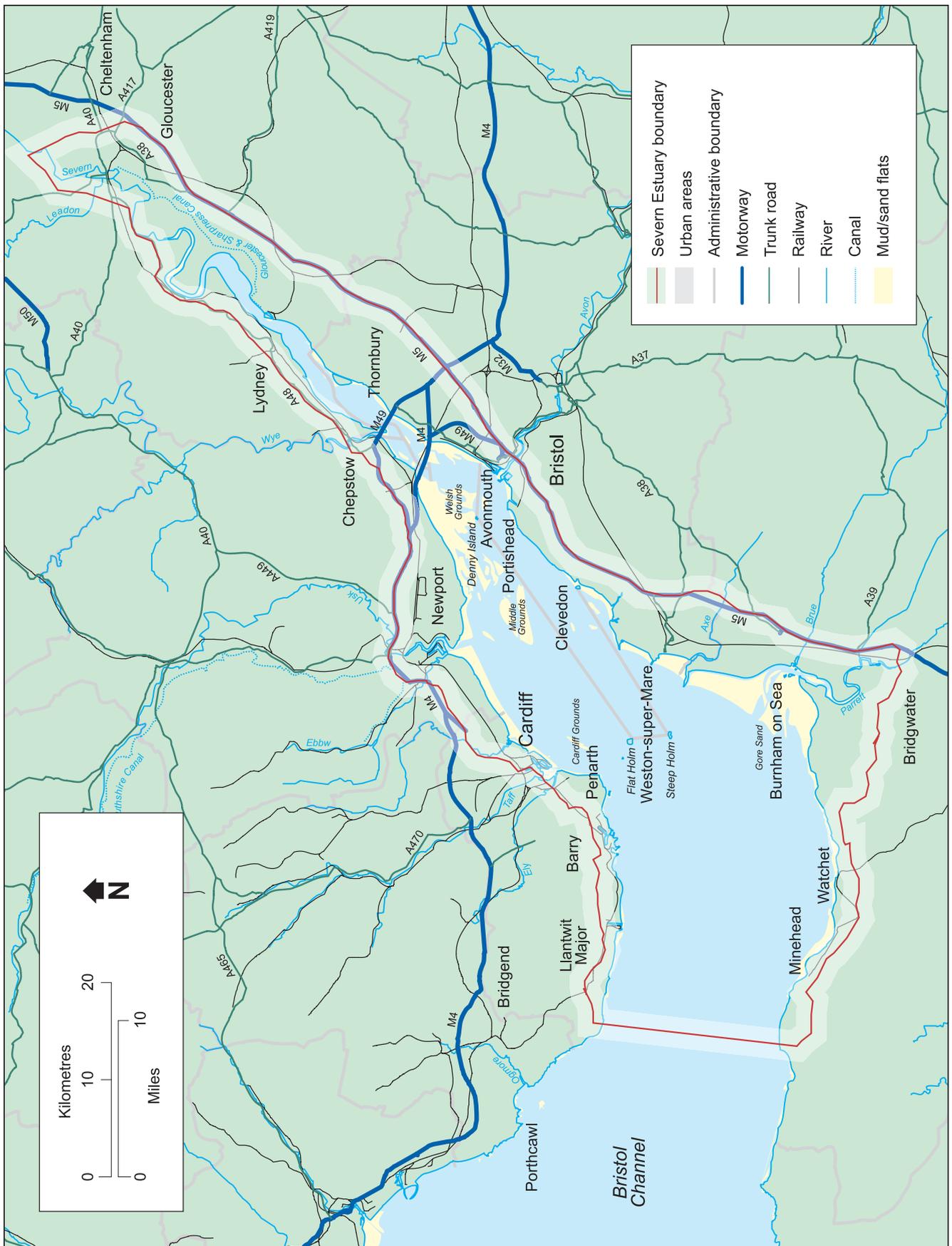
The Severn Estuary

1.4. The Severn Estuary is located on the west coast of Britain. As with many other estuaries in England and Wales, it has long been a focus for human activity, a location for settlement, a source of food, water and raw materials and a gateway for trading and exploration. The Estuary and its coastal hinterland supports major cities including Cardiff, Bristol and Gloucester, and its ports are a gateway to the Atlantic, and have links to motorways through Wales and the South West of England. The Estuary's beaches and undeveloped coastline, including low-lying levels, wetlands, and cliff scenery are enjoyed by many for recreation and appreciation of the Estuary's wildlife.

1.5. The Estuary is internationally recognised for nature conservation, having the status of Special Protection Area (SPA) under the EC Conservation of Wild Birds Directive and is a Ramsar site (a wetland of international importance). A significantly large area of the Estuary, including the subtidal zone, is a possible Special Area of Conservation (pSAC) under the European Habitats Directive. The area is of national and local conservation status with a variety of national and local conservation designations. The Estuary is an important migratory route for salmon and internationally rare fish species such as Shad. It supports commercial elver fisheries and is a habitat for a range of other species. It is also well known for the wealth of archaeological and historic interest features, as well as its high quality historic landscape. Having a high tidal range, the Severn Estuary presents a challenging and dynamic environment to coastal defence.

1.6. Today, major industries are sited around the Estuary's shores. There are modern port installations, chemical processing companies and nuclear power stations among others, and all play a vital role in the economy and social structure of the area. The service industry is the major employment sector with tourism attracting several million visitors each year to a large and varied number of attractions, accommodation types and transport services.

Figure 1. SES management area



The Severn Estuary Partnership

1.7. The Severn Estuary Partnership (SEP), originally called the Severn Estuary Strategy, is an independent Estuary-wide project set up in 1995 by Local Authorities, the Environment Agency and the countryside agencies. It is a partnership of all organisations and individuals who have declared their interest in caring for the Estuary and want to encourage a more co-ordinated approach between organisations and agencies and their management activities. The key aim of the project to date has been to develop a strategic management framework to guide and support the sustainable development and wise use of the Estuary.

1.8. The area covered by the SEP is shown in Figure 1. The area extends between Gloucester and Hurlstone Point near Minehead on the English coast, and Nash Point (Vale of Glamorgan), on the Welsh coast. The area spans the boundary between Wales and the South West of England, and includes parts of thirteen local authority areas.

1.9. The SEP will endeavour to ensure that best use is made of the *Strategy for the Severn Estuary* and to guide the implementation process. It will not however have powers to impose particular management regimes on the Severn and its users. The duty of regulating activities will remain the responsibility of statutory bodies. The Partnership will provide a focus for co-ordination and a framework for integrating the diverse uses of the Estuary. It will aim to gain the support and participation of a wide range of organisations and individuals to adopt the policies, and by working together, and/or through their respective roles, implement the proposals for action and collaborate on agreed future project-related action plans.

Aim:

To bring together all those involved in the development, management and use of the Estuary within a framework which encourages the integration of their interests and responsibilities to achieve common objectives.

General Principles:

- Create mechanisms and provide opportunities for improving communication, understanding and co-operation between managing agencies, users and local people;
- Encourage and facilitate partnerships between all those involved in management or with an interest in the Estuary;
- Provide a flexible and supportive service to all those involved in management or with an interest in the Estuary;
- Be a focal point for research and information about the Estuary;
- Review existing information on the Severn Estuary, identify what further information is required to inform future management, provide an information based service and be a forum for information exchange;
- Highlight examples of good and bad practice and assist in disseminating this information;
- Co-ordinate and report on a programme of projects as identified in the Partnership's Action Plans;
- Encourage organisations to adopt policies that are complementary to each other and relate to policies outlined in the *Strategy for the Severn Estuary*.

The need for integrated management and a *Strategy for the Severn Estuary*

1.10. Within England and Wales, the House of Commons Select Committee on the Environment established a special inquiry into '*Coastal zone protection and planning*'. The Committee's report (1992) concluded that management of coastal areas had suffered from uncoordinated decision-making and called for an integrated approach to planning and management. Both *Planning Policy Guidance Note 20 'Coastal Planning'* (PPG 20) and *Planning Guidance (Wales) Technical Advice Note 14: Coastal Planning* (TAN 14), advocate that Estuary users and managers work together in a voluntary manner to produce estuary management plans. In addition, *Policy Guidelines for the Coast* (Department of Environment 1995) encourage wide consultation to take full account of the views and expertise of local bodies and interests.

1.11. Some of the many activities that make the Severn Estuary so important to its users have the potential to damage its long-term future. It is crucial that a balance is achieved between economic, social and environmental interests, including the need for conservation of biodiversity, and that those demands on the Estuary are carefully managed. This sustainable development approach to managing the Estuary must also involve the local

communities in decision-making. This is an important process in providing a broad-based consensus for action and in encouraging ‘ownership’ of the Strategy.

1.12. The need for integrated management is particularly pressing because the Severn Estuary includes the boundary between Wales and South West England. This results in parallel agencies and organisations and, because of the different systems under which these operate, sometimes leads to different management practices.

The Structure of the Severn Estuary Partnership

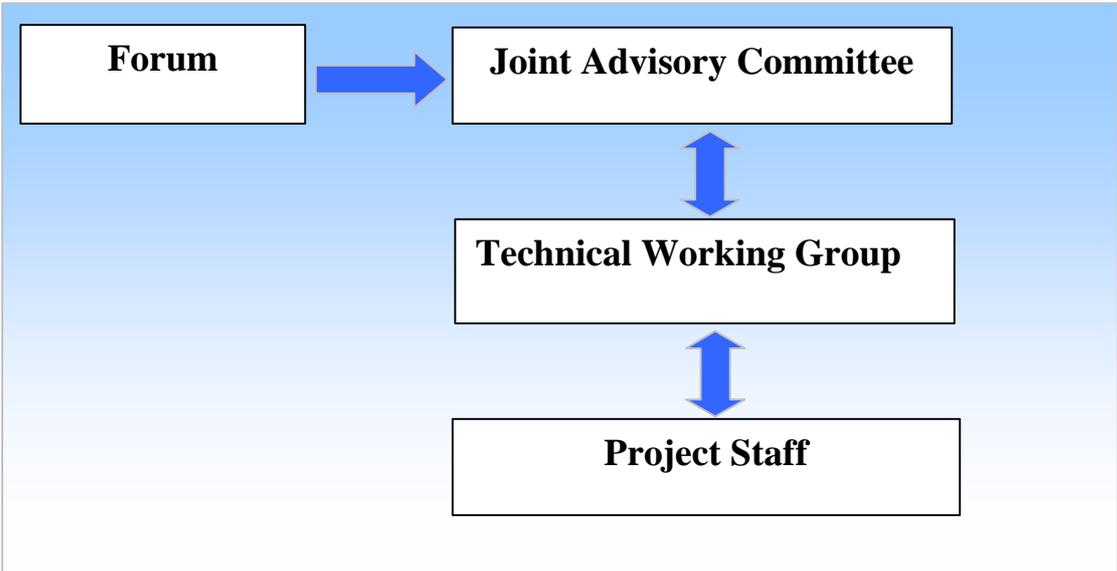
1.13. The Partnership encompasses all those who have had a valued input into the Severn Estuary Strategy (prior to the SEP), and incorporates a wide range of interests including Local Authorities, national agencies, industry, voluntary bodies and community interests.

1.14. All of those with an interest in the Estuary are encouraged to become members of the Severn Estuary Partnership Forum, which will meet annually to debate major issues and the progress being made. The Joint Advisory Committee (JAC) will be established to ensure the continued endorsement by members of Local Authorities and other key organisations. The JAC will meet bi-annually to inform on SEP progress and endorse the implementation programme.

1.15. The Partnership Project Officer is hosted by Cardiff University and serves as an impartial promoter of the Partnership, a catalyst for the implementation of future action plans, and a facilitator of communication and networking.

1.16. The structure of the SEP is shown in Figure 2.

Figure 2. Severn Estuary Partnership organisational structure



Benefits of the SEP process

1.17. Being involved with the SEP up to and including production of the Strategy document primarily benefited partners through improved communication, understanding and integration between organisations and agencies and partners having a sense of ownership of the products (*Joint Issues Report, Strategy document*) produced.

The SEP has:

- Given structure to previous ad-hoc consultation between organisations and identified opportunities for collaboration;
- Provided a mechanism for working towards consensus in relation to management of the Estuary;
- Developed consensus on the key issues that need to be addressed on the Severn Estuary;
- Developed a clear structure with a logical progression for issues, prioritisation, policies and proposals for action;
- Helped promote awareness of each other's perspectives on issues;
- Promoted the importance of a strategic Estuary-wide view;
- Provided factual information on matters around the Estuary;
- Published the SEP newsletter, *Severn Tidings*, bringing together news from the Estuary;
- Developed a database of organisations and individuals with an interest in the management of the Severn Estuary;
- Developed a web site with the potential for diverse use in the future;
- Established a Severn Estuary Biodiversity Group to address biodiversity issues around the Estuary;
- Raised the profile of the Severn Estuary area and its management.

1.18. The project is soon to start the implementation stage. Although some of the benefits of being involved will still be related to the process of a co-operative approach to managing the Estuary, the following outline of projects likely to be undertaken, indicate how you could benefit by being involved (Figure 3).

Figure 3. Benefits of being involved with the SEP

What the SEP intends to do	Benefit to you
Source & collate data and information that is useful to all organisations/agencies/interests. <ul style="list-style-type: none"> • 'Who's Who' • Internet-based data • Progress of organisations/agencies on their work/statutory duties 	<ul style="list-style-type: none"> • Access to a single source of data/information on a wide range of Estuary-related issues. • Prevent duplication of work. • Improved understanding of the roles and responsibilities of agencies/organisations.
Develop mechanisms to make this information available and raise the profile of partners and their role in the management of the Estuary. <ul style="list-style-type: none"> • Web site • Newsletters • Presentations • Action Plans • Media & PR strategy 	<ul style="list-style-type: none"> • A flexible and developing platform to promote your organisation/interest to a wide and relevant audience. • Improved understanding of your work and needs by other organisations and the public.
Create a flexible structure that encourages involvement, co-operation and exchange of information. <ul style="list-style-type: none"> • Annual Standing Conference • Specific sub-groups • Workshops 	<ul style="list-style-type: none"> • The opportunity to network with other agency, organisation and interest representatives. • The opportunity to influence local, regional and national policy. • The opportunity to influence the work/direction of the SEP. • The opportunity to work collaboratively with partner organisations on particular projects with mutual goals.
Identify and address information gaps and information required by decision-makers in organisations/businesses/agencies. <ul style="list-style-type: none"> • Research Forum • Information system 	<ul style="list-style-type: none"> • The opportunity to influence research on and around the Estuary. • Access to best available information for decision-making. • Central point for obtaining information relating to the Estuary.
Maintain a database of organisations/contacts including their commitment to working towards Proposals for Action outlined in the Strategy document.	<ul style="list-style-type: none"> • Access to contacts around the Estuary. • Source of potential partners for collaborative working towards mutual goals. • Access to a wide variety of organisations/interests for use in consultation purposes.
Monitor, evaluate and report on the progress of the SEP. <ul style="list-style-type: none"> • Reports to committees • Presentations 	<ul style="list-style-type: none"> • Feedback on the service provided by the SEP. • Feedback on the work being undertaken by partners of the SEP.

Strategy for the Severn Estuary

Introduction

1.19. The preparation of the *Strategy for the Severn Estuary* has focused on reaching consensus and agreement on the issues and opportunities that exist across the wide cross section of users and interests. The SEP has worked to achieve this over the past five years. Initially a scoping study was undertaken to identify Estuary values and issues. Extensive participation and consultation took place through a variety of channels, including public meetings, seminars with key players, fliers, questionnaires, the local media and the project's website. As a result of two years participation and consultation a *Severn Estuary Joint Issues Report (JIR)* was produced (1997) in partnership with the Environment Agency.

1.20. Once the issues and concerns had been identified, there was a need to prioritise the issues in relation to the work of the SEP and the future economic, social and natural health of the Estuary. The SEP arranged a series of workshops (Stakeholder Decision Analysis workshops) where partners of the SEP ranked issues raised in the JIR. These results provide an insight into stakeholders' perception of the importance of the issues at the time and can be found in Appendix 2. These workshops also provided a mechanism for SEP partners to exchange information and strengthen working relationships.

1.21. The primary purpose of all these efforts has been to ensure that the Partnership is working to address the concerns of all those who live, work and relax in the Estuary area. A significant step in this process was the publication of the *Consultation Draft, Strategy for the Severn Estuary*, which suggested policies and proposals for action to address the issues raised in the JIR. Many organisations representing the key interests on the Estuary were involved in drafting it. Over 1000 copies were distributed around the Estuary and an encouraging response received with about 1000 separate comments made.

1.22. As a result of this consultation and the co-ordinated efforts of many key partners in dealing with responses, numerous appropriate changes have been incorporated into this final document.

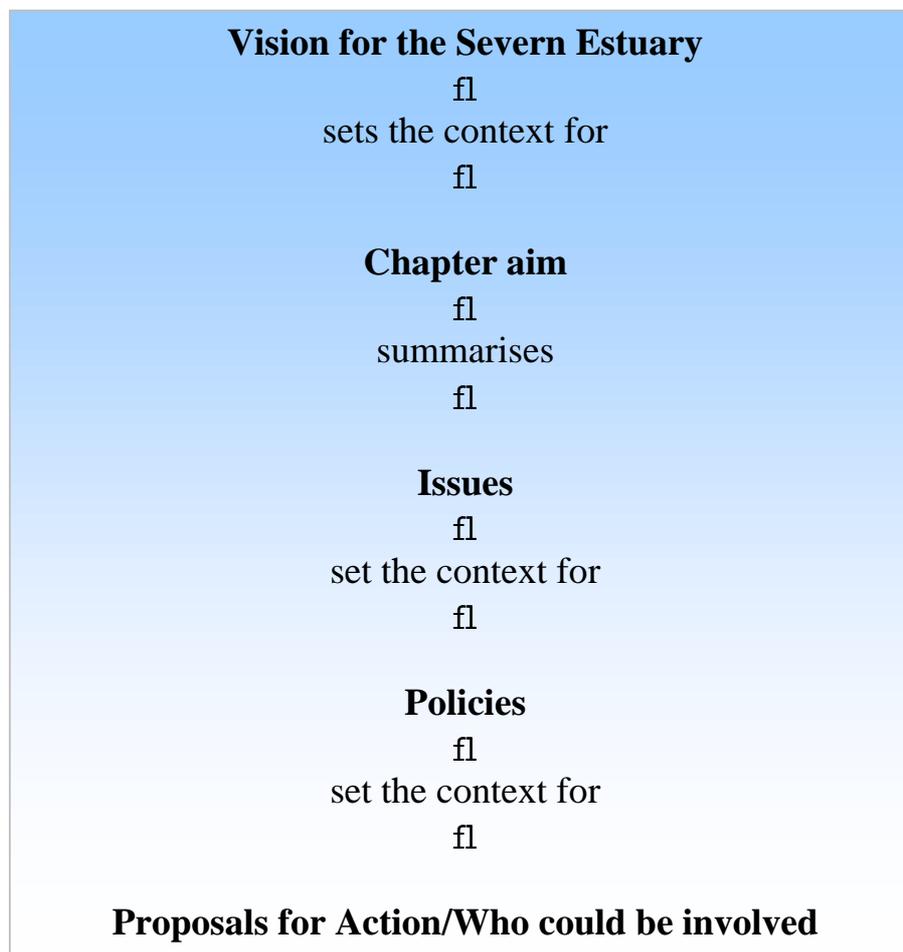
1.23. The *Strategy for the Severn Estuary* has been produced as part of a strategic management framework for the Severn Estuary. It covers a wide range of issues and opportunities and has been developed to provide detailed justification for an integrated and co-operative approach to action on the Severn Estuary. It aims to involve all the users, cross sectoral, statutory and non-statutory bodies and commercial organisations around the Estuary in its future management.

1.24. It promotes a series of policies that will lead to more sustainable management practice on the Estuary and addresses the challenge of realistically and sustainably managing competing demands. To help illustrate how the policies could be acted upon, the Strategy lists 'proposals for action' which will act as a catalyst for the preparation of agreed action plans and as an indication of what work could be undertaken by partners when the opportunity arises. A summary of this Strategy document will include all the policies contained within. Agreed action plans will be produced following the publication of the Strategy document.

1.25. The main objectives of the *Strategy for the Severn Estuary* are to:

- Provide a detailed overview of estuarine themes;
- Highlight issues and opportunities that need to be addressed to ensure the future well-being of the Estuary;
- Outline policies to address the issues and opportunities, with detailed background and justification;
- Outline proposals for action to act as a catalyst for the preparation of agreed action plans, to address the issues and opportunities;
- Support and inform the policies and decision-making framework of existing regulatory, statutory, private and public sector organisations;
- Influence organisations, such as those within the voluntary sector and commercial and industrial sectors, to use the Strategy document to inform their own policy statements and work plans (e.g. tourism development plans and environmental charters);
- Act as an overarching document for Local Environment Agency Plans (LEAPs) around the Estuary.

Figure 4. Links between elements of the Strategy document



Elements of the Strategy document	
Chapter aims	Provide an overarching aim for the issues addressed in each chapter.
Issues	Issues are closely related to those raised in the <i>Severn Estuary Joint Issues Report</i> (SES/Environment Agency 1997).
Policies	Policies to address the issues and opportunities outlined in the Strategy document. Many of the policies will be related to other policies in different chapters, which supports the need for an integrated approach to management on the Estuary.
Proposals for action	Suggestions for taking policies forward and to act as a catalyst for the preparation of future agreed project-based action plans. The SEP would welcome additions and/or amendments to these proposals for action to help develop action plans in the future.
Who could be involved	Give an indication of those organisations with possible interests in proposals for action.

How does the Severn Estuary Partnership link to the work of other organisations and bodies on the Estuary?

1.26. The SEP aims to complement the work of other organisations around the Estuary and will provide a supportive and flexible service to all those involved in the management of or with an interest in the Estuary. However, the SEP will not have powers to impose particular management regimes on the Severn and its users, and the duty of regulating activities will remain the responsibility of statutory bodies acting within the bounds of current legislation and terms of reference. The SEP relies on the appropriate agencies, organisations and individuals working together voluntarily to take steps to adopt the policies in the Strategy document, consider the proposals for action for future action plans and implement actions agreed in future action plans.

Association of Severn Estuary Relevant Authorities (ASERA) – ‘Scheme of Management’

1.27. ASERA has been set up to develop a scheme of management initially for the Severn Estuary SPA, and in advance of its formal submission by the Government to Europe as a candidate Special Area of Conservation (cSAC). A more detailed explanation can be found in Chapter 13, Nature Conservation and Wildlife. This will be the single scheme of management for the Severn Estuary European marine site. The Severn Estuary Partnership, with its wider objectives and aim to complement the work of other organisations, will be in a position to provide a service to ASERA as it deems appropriate.

Local Environment Agency Plans (LEAPs)

1.28. The Environment Agency has produced LEAPs which outline its local actions within a five-year planning horizon. The *Strategy for the Severn Estuary* has been produced using a similar approach to that used in the production of LEAPs and therefore will serve as a basis for actions by the Environment Agency in relation to the Estuary. LEAP areas are shown in Map 1 (see Appendix 8).

Shoreline Management Plans (SMPs)

1.29. SMPs are non-statutory documents prepared by Coastal Cell Groups and provide a strategic management framework for managing coastal defence including the option of managed retreat.

1.30. The role of coastal cell groups is complementary to (and supportive of) the existing roles of the statutory authorities, and again, the SEP, with its wider objectives and aim to complement the work of other organisations, will be in a position to provide a service to the coastal cell groups as they deem appropriate. A Memorandum of Understanding already exists between the SEP, the Environment Agency and the coastal cell groups to share information and expertise and reduce unnecessary repetition of work.

The Standing Conference of Severnside Local Authorities (SCOSLA)

1.31. SCOSLA, which representatives of the Ports, other public bodies and governmental organisations and the Severn Tidal Power Group also attend, is a forum in which local authority members can meet to exchange information and debate matters of common concern. This group is complementary to the SEP as it encourages close liaison between Local Authorities and others around the Estuary. It is anticipated that SCOSLA will have a representation on the SEP Joint Advisory Committee.

Local Planning Authorities (LPAs)

1.32. LPAs are required to prepare development plans for their areas and to review these at least at 5-yearly intervals. They also control development through the planning permission process. The *Strategy for the Severn Estuary* is one of a number of documents that LPAs bordering the Severn Estuary will take into account in the preparation of their respective development plans and in controlling development. It provides a convenient summary of policies relating to the Estuary and it will provide an invaluable context for further development plan policy preparation.

1.33. Further information on all these bodies can be found in Chapter 2, Planning and management in the Estuary.

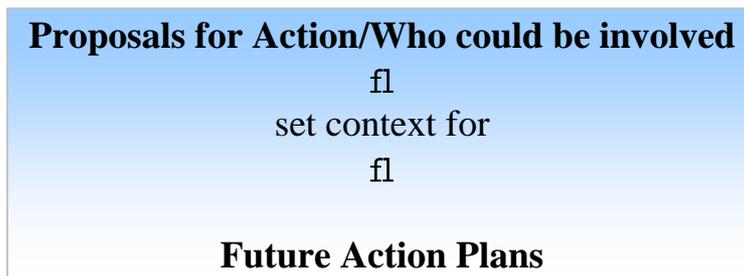
Implementation of the Strategy for the Severn Estuary

Implementation overview

1.34. The *Strategy for the Severn Estuary* is non-statutory. Therefore, to be successful, it will involve a voluntary and co-operative approach that requires all those with an interest in the Estuary to accept it as a strategic framework to inform the future good management of the Estuary, and adopt the policies contained within. Those with such an interest include:

- Local Authorities, in the preparation and review of their development plans and in the exercise of development control;
- Other Local Authority departments with environmental protection and land management functions;
- National agencies;
- The private sector;
- The voluntary sector;
- Communities and individuals.

1.35. The Partnership provides a focus for co-ordination and a framework for integrating the diverse uses of the Estuary. The proposals for action within the Strategy document will act as a catalyst for the SEP to prepare annual action plans agreed by all organisations with commitments within the action plan. The action plans will encourage collaborative working, when funding and other resources are available, and will be put into action through the operational programmes of existing statutory and non-statutory organisations around the Estuary.



1.36. The SEP aims to encourage participation and gain the support and participation of the wide range of organisations and individuals involved to date, to adopt the policies and work together on future agreed action plans. It will work to achieve this by adopting the general principles outlined previously, and more specifically by:

- Establishing and facilitating issue-specific groups to address projects which require integration of interests;
- Encouraging you as partner agencies, Local Authorities, local communities and the private and voluntary sector to take an active role (Figure 5 outlines the active roles that need to be adopted); and
- Seeking funding from all sectors.

Reviewing progress and responding to new issues and opportunities

1.37. The publication of this Strategy document is merely a first step in working to provide a better long-term future for the Severn Estuary. It provides a starting point for us all to work from. The SEP is aware that the policies in the Strategy are mostly related to the issues raised in the JIR, which is a conscious effort to develop the consensus approach that has been adopted as part of the Partnership process. However, it is important to realise that the document and the policies it contains will evolve in time, as new challenges and opportunities arise.

1.38. In order to assess changing issues and priorities in the Estuary and evaluate the effectiveness of the Partnership, a structured process of review is required. This will be achieved by an action plan report and an annual Forum meeting.

Progress report

1.39. A report will be produced on projects within the agreed action plan. This will include a review of projects undertaken by the SEP. The report will inform on implementation progress, problems encountered and ideas and opportunities for further progress and action plans.

Annual Forum meeting

1.40. A Forum meeting will be held annually to bring together as wide a range of interests as possible to report on progress of the Partnership, provide a further opportunity to share information and identify new issues and opportunities.

Preamble to Topic Chapters

1.41. All policies and proposals for action apply to the Severn Estuary Partnership area, as defined in the introductory text and accompanying map (Figure 1). However, some policies may be relevant beyond the boundary if issues, actions, or developments are likely to have an effect on the SEP area.

Figure 5. How organisations/communities can become involved

Organisation	Involvement
<p>National and regional organisations A number of policies and proposals for action contained within the Strategy document overlap with government agency remits (e.g. waste management, fisheries, nature conservation, dredging control).</p>	<ul style="list-style-type: none"> • Ensure that the issues concerning the Severn are considered in the development of policies/objectives; • Incorporate policies and proposals for action into regional and local programmes and business plans; • Support projects that develop from SEP policies and proposals for action; • Provide advice, guidance and data on issues concerning the Estuary; • Ensure a consistent approach is adopted across the Estuary; • Become a member of the Severn Estuary Partnership Joint Advisory Committee
<p>Local Authorities (including Town and Parish Councils) It is fundamental for the success of the Severn Estuary Partnership that all constituent Local Authorities endorse its policies and proposals for action where appropriate.</p>	<ul style="list-style-type: none"> • Adopt a corporate approach to the Estuary across all service responsibilities, • Ensure that policies included within their plans are consistent with the Strategy document, • Implement the policies through development control practice, • Provide staff time, funding or other contributions in kind to aid the implementation of proposals for action and projects that develop from them, • Ensure that a consistent approach to the Estuary is adopted with partner organisations, • Become a member of the SEP Joint Advisory Committee.
<p>Private sector The private sector, including landowners and farmers, has a major role to play in the management of the Estuary. The SEP seeks to encourage and support private sector involvement.</p>	<ul style="list-style-type: none"> • Consider incorporating the policies and proposals for action within work programmes and business plans; • Provide funding for projects that develop from SEP proposals for action; • Provide advice, guidance and data on issues concerning the Estuary; • Become a member of the Severn Estuary Partnership and ensure your interests are represented.
<p>Voluntary sector Collectively, voluntary groups have a substantial stake in the management of the Estuary. They include nature conservation organisations, archaeological and history groups, sports clubs and their governing bodies and many more.</p>	<ul style="list-style-type: none"> • Incorporate policies and proposals for action into their work programmes, • Seek outside funding for specific projects, • Help to conserve and manage the Estuary through practical action, • Become a member of the Severn Estuary Partnership and ensure your interests are represented.
<p>Local communities Each of us can play a significant role in working to achieve the aims of the SEP. The SEP seeks to encourage and support individual and community involvement in the future management of the Estuary.</p>	<ul style="list-style-type: none"> • Get involved with projects that result from policies and proposals for action, • Organise talks, walks or interpretative information, • Undertake practical conservation management projects, • Participate in surveying and monitoring programmes, • Become a member of the Severn Estuary Partnership and ensure your interests are represented, • Aim to develop a better understanding of Estuary matters.

2. Planning and management in the Estuary

Aim:

To aid the development of a planning and management system through partnerships to create a diverse and sustainable Estuary environment.

2.1 Current and future management of the Severn Estuary must be seen in an international, European, national and regional context as well as from a local viewpoint. Coastlines are the world's most intensely used areas. Estuaries are dynamic environments at the interface between the land, rivers, and the sea. Achieving sustainable development in coastal areas is difficult, but without proper planning, it is impossible. Legislation and management relating to coastal uses, activities and the environment is complex and can cause confusion amongst users and managers.

2.2 In accordance with the principles of sustainable development to which the UK Government, the National Assembly for Wales and the Government Office for the South West are committed, environmental improvements and a vibrant and healthy Estuary economy must go hand in hand.

International context

2.3. In 1996, the European Commission set up a Demonstration Programme on Integrated Coastal Zone Management (ICZM) (jointly conceived by the Directorate General for Environment and Fisheries and Regional Policy) to provide technical information about sustainable coastal zone management, and to stimulate a broad debate among the various actors involved in the planning, management or use of European coastal zones.

2.4. During 1998 – 1999, the Environment Section of the European Commission (DGXI) funded, supported and assessed a range of 'demonstration programmes', including some in the UK. Consultation on and consideration of the document '*General Principles and Policy Options Towards an Integrated Coastal Zone Management Strategy for Europe*' followed. The SES was represented and involved in the process.

2.5. Based on the experiences of the Demonstration Programme the Commission presented a document to the European Council and Parliament outlining a strategy for ICZM in Europe (EC COM/2000/547) as well as proposing a Recommendation from the European Parliament and Council for the implementation of ICZM in Europe (EC COM(2000)545). The European Parliament has recently adopted the Recommendation, which strengthens the call on national governments to take action on ICZM.

EC Strategic Environmental Assessment (SEA) Directive

2.6. The purpose of the emerging SEA Directive is to ensure that environmental consequences of certain plans and programmes are identified and assessed during their preparation and before their adoption. SEA will contribute towards more transparent planning by involving the public and by integrating environmental considerations and will help to achieve the goal of sustainable development. Adoption of the final Directive is expected later this year (2001). Afterwards Member States will have three years for integrating the new instrument into their national systems.

EC Water Framework Directive

2.7. In response to concerns that current water policy is fragmented, a single piece of framework legislation, the EC Water Framework Directive, has been proposed. The new legislation will be based on the management of river catchments and nearshore coastal waters as natural geographical and hydrological units, traversing administrative and/or political boundaries.

2.8. The new Directive will require Member States to draw up river basin management plans and update them every six years. The Directive aims to address the management of aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water, and to aim for integration of these objectives. This new European Water Policy was developed in an open consultation process involving interested parties and an EU Legal Notice states: "Caring for Europe's waters will require more involvement of citizens, interested parties, and non-governmental organisations. To that end the Water Framework Directive will require information and consultation when river basin management plans are established." Final adoption is expected this year (2001).

EC Habitats and Birds Directives

2.9. The EC Habitats and Birds Directives and the related UK Regulations (*Conservation (Natural Habitats &c) Regulations 1994*) place responsibility on certain statutory authorities to assess plans, projects, activities and operations which may cause a significant effect on the habitats and species noted in the pSAC and the designated SPA for Birds. On the Severn, ASERA will produce a 'Scheme of Management' for the SPA and will include a shadow scheme of management for the pSAC. A more detailed explanation of the Habitats Directive can be found in Chapter 13: 'Nature conservation and wildlife'.

UK general coastal policy

2.10. The UK Government is committed to protecting and preserving our coastline for future generations whilst recognising and balancing this commitment against current needs. The document, *Policy Guidelines for the Coast* (DoE 1995); brought together all the existing major national policies affecting the coast. In addition it gave new emphasis to integrated management of the coast and improved links between the different sectors. Specific guidance, *Coastal Zone Management, Towards Best Practice* (DoE, 1996), was issued the following year: to promote best practice by all those involved in managing the coast in order to seek sustainable use and development of the coastal zone. Amongst other things, it stressed the importance of taking a long-term, strategic approach to coastal management as well as promoting consensus through early and comprehensive participation.

UK coastal planning policy

2.11. The UK Government aims to create a fair and efficient land-use planning system that reflects regional differences and promotes development which is sustainable and of a high quality. The Government is committed to decentralising decision-making and to achieving better integration of policies. It places great importance on raising awareness of and participation in the regional planning process.

Wales

2.12. In 1998, Parliament passed the *Government of Wales Act*, which established the National Assembly for Wales, and the *National Assembly for Wales (Transfer of Functions) Order 1999*, which enabled the transfer of the devolved powers and responsibilities from the Secretary of State for Wales to the Assembly. The National Assembly for Wales has control over the drafting and review of planning and other policy guidance for Wales. Recently the National Assembly for Wales embarked on a major review of planning policy guidance for Wales and a formal consultation document, *Planning Policy Wales*, was issued in February 2001. A series of topic-based Technical Advice Notes (TANs), including one specifically related to coastal planning (TAN 14, Welsh Office, 1998), provides supplementary guidance to *Planning Guidance (Wales): Planning Policy*. Guidance is also emerging on other relevant issues such as *Minerals Planning Policy (Wales)* published in December 2000 and *Unitary Development Plans (Wales)* in February 2001. A draft of *Marine Aggregate Dredging Policy (South Wales)* was issued for consultation in May 2001.

England

2.13. Detailed land-use planning issues are dealt with in a series of Planning Policy Guidance notes (PPGs) together with Regional Planning Guidance notes (RPGs) and Mineral Planning Guidance notes (MPGs). A new strand of relevant guidance – Marine Mineral Guidance notes (MMGs) – is in preparation, and a draft of MMG 2 (*Guidance on the Extraction by Dredging of Sand, Gravel and other Minerals from the English Seabed*) was issued for consultation in February 2001. These provide national guidance to shape local planning policy. PPG 20 *Coastal Planning* (HMSO 1992) provides guidance for planning in coastal areas of England.

Regional Planning

South West England Region

2.14. The South West Regional Development Agency (SWRDA)(England) is responsible for a number of programmes to facilitate development of land and property throughout the region. A Regional Strategy, launched in October 1999, is being translated into action through a number of Regional Frameworks for Action, covering

issues including inward investment, infrastructure improvements and regeneration. Although the SWRDA has taken the lead in developing and drafting these Frameworks, they are largely the result of the participation of a range of agencies, organisations, partnerships and other regional groups. A SWRDA Coastal Issues Group has also been involved in the SWRDA Regional Gateway Strategy, which deals with the region's ports and airports.

Wales

2.15. Strategic Planning Guidance is emerging for South East Wales, prepared by the Planning Authorities of the South East Wales Strategic Planning Group. Volume 1 of *Strategic Planning Guidance for South East Wales* is complete (January 2000) and Volume 2 is currently being printed (summer 2001). Volume 1 includes planning guidance on Population and Housing, Transportation, Land Reclamation and Landscape and Nature Conservation. Volume 2 includes guidance on Minerals, Waste Management, Energy, Recreation, Tourism and Coastal Issues. The National Assembly for Wales has also recently begun work on a National Spatial Planning Framework which will guide LPA decision making and address development and restraint issues across Wales as a whole.

Schemes and plans relevant to the Severn Estuary (see Figure 6)

The Strategy for the Severn Estuary

2.16. The Strategy document is the only document with an overall perspective for the complex range of issues that have to be managed on the Estuary. Representatives from a wide and diverse range of interests are involved in the Partnership, who have produced the Strategy document, including port authorities and harbours, business and industry, conservation, recreation, landowners, farmers and archaeological groups. The SEP provides a mechanism for different interests to work together. Benefits include increased co-ordination and collaboration between organisations, a better understanding of Estuary issues, and the production of this Strategy guiding the management of the Severn Estuary over the next decade.

Development plans

2.17. Local Planning Authorities around the Estuary have to prepare statutory development plans (either Unitary Development Plans, or a combination of Structure Plans, district wide Local Plans, Minerals Local Plans and Waste Local Plans, as appropriate). All development plans involve extensive consultation with statutory consultees, non-statutory consultees and the public. If necessary, issues are discussed at a Public Local Inquiry/Examination in Public. Plans should be reviewed or replaced every five years or so though the process takes several years. Authorities with coastlines along the Severn Estuary are at different stages in the preparation of their development plans.

2.18. A study undertaken by the University of Wales, Cardiff in 1995 for the former National Rivers Authority highlighted development plan policies of Local Authorities within the SEP area. It identified policies that have a particular relevance to Estuary management, including those referring to coastal erosion and unstable land, tidal and fluvial defences, the river/estuary and coastal landscape, fluvial and coastal nature conservation, and coastal pollution. The study provided baseline information for further studies.

2.19. In 1999 a further study was commissioned by the Environment Agency and undertaken by University of Wales, Cardiff: *A Review of Development Plans in the Severn Estuary Strategy Area*. It builds on the 1995 study to provide an updated analysis of development allocations within the current and emerging development plans, and an evaluation of development plan policies from within the same documents. The study provides a reference source for environmental policies and identifies where the environmental content of individual development plans within the Severn Estuary area can be improved. This study is designed to be of direct use to the SEP and will be a tool for longer term monitoring of policy development around the Estuary. Publication of the study will help Local Planning Authorities move towards a more consistent planning framework for the SEP area.

The Environment Agency and Local Environment Agency Plans (LEAPs)

2.20. The Environment Agency is a Government Sponsored Public Body and the major environmental regulator. Its primary aim is to protect and enhance the environment and make a contribution towards the delivery of sustainable development through the integrated management of air, land and water. Its vision is a better environment in England and Wales for present and future generations. It has many interests and responsibilities in the Estuary and is committed to working with others to address the issues raised in *the Severn Estuary Joint Issues Report* (SES/Environment Agency 1997).

2.21. LEAPs are the Agency's means of contributing to sustainable development of river catchment areas, including estuaries. The plans prioritise the needs of the environment in an integrated way across the Agency's

interests. As such, they address flood defence, water resources, inland navigation, conservation, fisheries, and pollution as well as waste, integrated pollution control, contaminated land and air quality issues.

2.22. In 1996 the Environment Agency signed a Memorandum of Understanding with the SES to help to minimise confusion, avoid duplication of work, and share expertise and information. There are individual LEAPs for each river catchment leading into the Severn Estuary which outline the Environment Agency's local actions within a five-year planning horizon. The *Strategy for the Severn Estuary* has been produced using a similar approach to that used in the production of LEAPs and therefore will serve as a basis for actions by the Environment Agency in relation to the Estuary.

River Basin Management Plans

2.23. The EC Water Framework Directive is in the process of being implemented in the UK. Recent guidance on the Directive from the National Assembly for Wales and DETR (now DEFRA), suggests that the River Severn (including the Estuary) will be assigned as a distinct River Basin District for which there will be a comprehensive River Basin Management Plan due to be published by 2009. The details of the implementation of the Directive and the production of such plans have yet to be finalised. However, the *Strategy for the Severn Estuary*, existing Environment Agency LEAPs (see Chapter 1) and other plans will help to provide a foundation for the River Basin Management Plan and the action required by the Directive. It is currently suggested that the Environment Agency will be responsible for production of the River Basin Management Plan."

Association of Severn Estuary Relevant Authorities (ASERA) – Scheme of Management

2.24. A substantial area of the Severn Estuary is designated as a SPA for Birds under the Birds Directive (79/409/EEC) and is a pSAC under the 1992 Habitats and Species Directive (92/43/EEC). The *Conservation (Natural Habitats &c) Regulations (1994)* build the requirements of the Habitats Directive onto existing regulatory mechanisms and enable relevant authorities to establish management schemes for SPA and SAC European sites. In view of the size and complexity of the Severn Estuary European marine site, a co-ordinated inter-agency approach is being taken. ASERA has been set up to develop a scheme of management initially for the Severn Estuary SPA, and in advance of its formal submission by the Government to Europe as a candidate SAC.

Shoreline Management Plans

2.25. SMPs are non-statutory documents prepared by Coastal Cell Groups and provide a strategic management framework for maintaining and enhancing coastal defence including the option of managed retreat. There are three coastal cell groups within the SEP area:

- Swansea Bay from Worms Head to Lavernock Point;
- The Severn Estuary upstream from Lavernock Point and Brean Down;
- North Devon and Somerset from Hartland Point to Brean Down.

2.26. The SMP for the Severn Estuary has been initiated by the Severn Estuary Coastal Group with the encouragement of both the former Ministry of Agriculture, Fisheries and Food and the National Assembly for Wales. The aim of the SMP is to provide the basis for sustainable coastal defence policies within the Severn Estuary and to develop objectives for the future management of the shoreline. The SMP is intended to be a 'live' plan which will be reviewed and updated about every five years and which will give rise to activities in the intervening periods. The role of coastal cell groups is complementary to (and supportive of) the existing roles of the statutory authorities.

The *Esturiales* network

2.27. *Les Esturiales* is a European network of regions and cities bordering European estuaries, including the Severn and the Wear in the UK, the Tagus and the Douro in Portugal and the Loire and Gironde in France. All of these bodies share their differing experiences of estuaries and related issues – the organisation and planning of riverside areas, reorganising port activities, sustained estuary management and protection of the environment, cultural heritage and landscape. The Severn Estuary is currently represented on *Les Esturiales* by members from South Gloucestershire Council, Cardiff County Council, Vale of Glamorgan Council and Bristol City Council, though it is hoped to widen representation. *Les Esturiales* initiates projects and studies to solve problems, identify measures needed to attenuate the excesses caused by economic activity, and support joint measures to preserve the ecological and economic future of estuarine communities.

Standing Conference of Severnside Local Authorities (SCOSLA)

2.28. SCOSLA was originally set up in 1983 in response to a major proposal to build a barrage that would harness the tidal power of the Estuary. The group was re-inaugurated in 1996 and now has a wider remit to cover and co-ordinate all matters of mutual interest within and adjacent to the Estuary. Membership currently consists of two representatives from each of the 16 constituent authorities: one being an elected member and one being an officer. Representatives of the port authorities, other public bodies and governmental organisations and the Severn Tidal Power Group also attend. The group continues to meet to exchange information and debate matters of concern from a local authority perspective. SCOSLA is currently considering a proposal to set up a sub-group of their members to represent their interests on the proposed Joint Advisory Committee of the SEP.

Other plans and strategies

2.29. A range of other statutory and non-statutory plans and strategies contribute to the planning and management of the Estuary. These include:

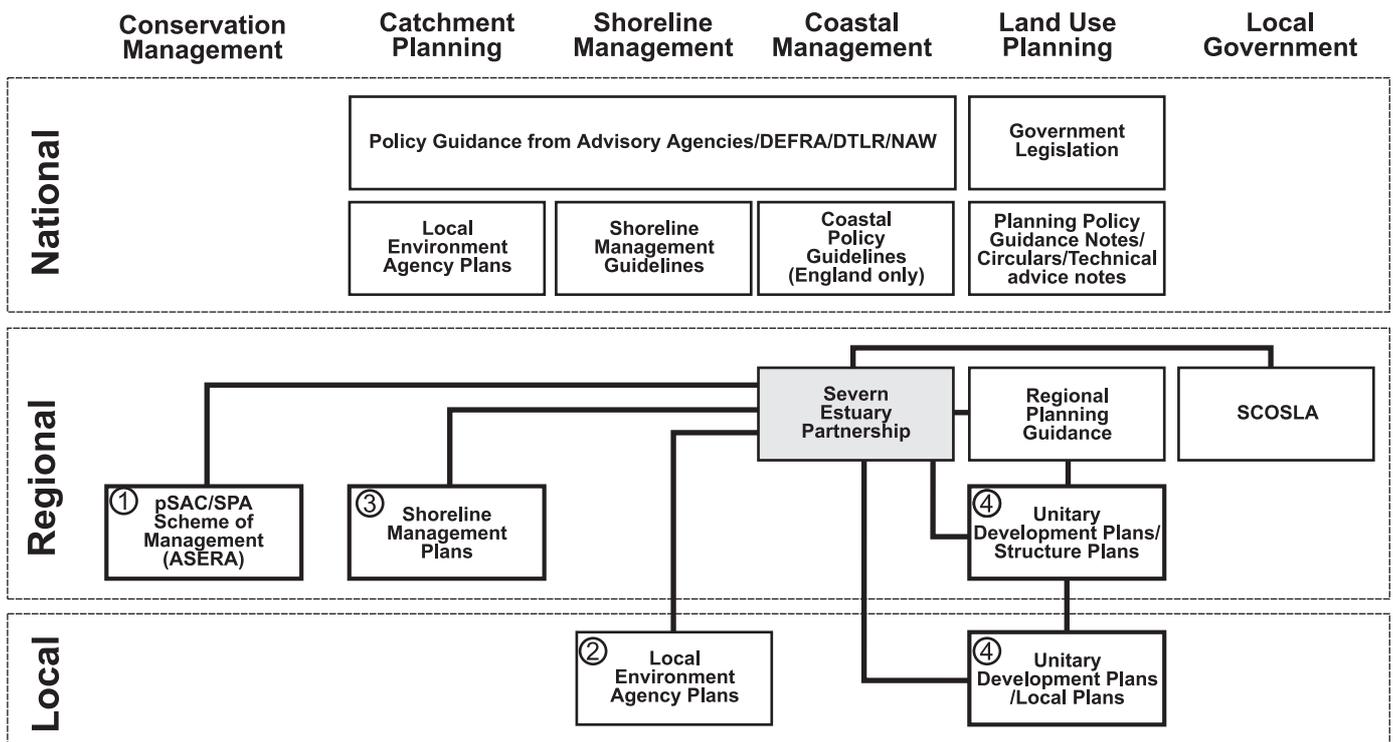
- Air Quality Plans
- Biodiversity Action Plans
- Community Plans
- Countryside/Landscape Strategies
- Local Agenda 21 Strategies
- Local Sustainability Plans
- Local Transport Plans
- Waste Management Strategies

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Sustainable development is addressed in Chapter 3: 'Sustainable land use, development and transport'.
- Coastal defence issues and Shoreline Management Plans are included in Chapter 5: 'Coastal protection and flood defence'.
- The Habitats Directive and management of the SPA and pSAC is explained in more detail in Chapter 13: 'Nature conservation and wildlife'.
- Landscape issues are addressed in detail in Chapter 12: 'Landscape and seascape'.

Figure 6. The Severn Estuary planning framework: SEP and selected, related plans



- ① possible Special Area of Conservation/Special Protection Areas (under EU Habitats and Birds Directives).
- ② Local Environment Agency plans for water catchment areas.
- ③ Shoreline Management Plans covering coastal defence.
- ④ Development plans prepared by Local Planning Authorities.

— The SEP aims to work closely with these groups and organisations to complement their work and provide a flexible and supportive service that helps them in preparing plans and other aspects of their work.

NB. Also included in planning framework are plans listed in section 2.23

Issue reference M1

Complexity of the organisational framework, especially the planning framework, and the need for co-ordination between organisations, management initiatives and plans

Implementing the legislative framework in the coastal zone (including estuaries) is the responsibility of a variety of organisations. Managing all aspects of a large Estuary such as the Severn necessitates a wide range of organisations with different responsibilities producing plans relevant to their work. This results in a complex planning framework. Specific reference has been made to the need for co-ordination between plans covering the Estuary.

As highlighted by many responses to the Joint Issues Report, there is a need to clarify organisations' powers and responsibilities. Appendix 5 of this document contains 'Who does what on the Estuary' which sets out the key responsibilities for each organisation.

The SES has already encouraged and facilitated co-operation between organisations including the public, private and voluntary sectors and has brought together English and Welsh organisations. Major restructuring in regional and local government and the redefinition of the roles of key organisations highlight the need to strengthen the partnership approach and to continue to promote the aims of the SES.

Policy M1

Continue to encourage and facilitate co-ordination, collaboration and partnerships between organisations on the Estuary

Proposals for Action	Who could be involved	Benefits
M1(i) Explain and disseminate information on 'who does what' on the Estuary.	SEP	<ul style="list-style-type: none">Improved understanding of organisations' roles and responsibilities.
M1(ii) Explain and disseminate information arising from legislation that affects management of the Estuary.	SEP	<ul style="list-style-type: none">Improved understanding of how legislation may affect the Estuary.
M1 (iii) Explore and develop opportunities for dialogue, debate, co-operation and collaboration, and partnership working between organisations on the Estuary.	SEP, Estuary management groups such as ASERA, LAs, GoSW, NAW, SCOSLA, Coastal Cell Groups	<ul style="list-style-type: none">Increased understanding of Estuary matters.Improved co-ordination between organisations, authorities and their plans.A co-ordinated approach to planning on the Estuary and adjacent coastal land.
M1 (iv) Encourage neighbouring authorities to continue to collaborate on matters relating to the Estuary.	LAs, GoSW, NAW, SEP	<ul style="list-style-type: none">A co-ordinated approach to planning on the Estuary and adjacent coastal land.

Issue reference M2

Inadequacy of coastal policy

A strategic overview and more comprehensive national and regional policy guidelines in estuary management have been called for.

Policy M2

Support and encourage development of improved estuary and coastal management guidance at regional, national and international levels.

Proposals for Action	Who could be involved	Benefits
M2 (i) Develop estuary and coastal management guidance.	DTLR, NAW, GoSW, CCW, EN, LAs, Environment Agency, ASERA, SEP	<ul style="list-style-type: none">Guidance that reflects the conclusions of the SEP.

Issue reference M3

Definition of an Estuary management zone

A number of comments have been made regarding confusion about coastal zone boundaries in the SEP area. The definition of coastal zone boundaries for various schemes and plans depends on many factors, including administrative/political boundaries as well as ecological, physical and pragmatic considerations.

Policy M3

Provide co-ordination, rationalisation and clarification of the different coastal boundaries employed for statutory and non-statutory planning and management.

Proposals for Action	Who could be involved	Benefits
M3 (i) Map the various coastal zone boundaries of all organisations.	SEP, ASERA, LAs, EN, CCW, Environment Agency, Coastal Cell Groups	<ul style="list-style-type: none">• Overview of the current complexity of coastal zone boundaries.• Improved understanding of the current situation.
M3 (ii) Explore and develop opportunities with organisations to co-ordinate, rationalise and clarify coastal boundaries.	SEP, ASERA, LAs, Coastal Cell Groups	<ul style="list-style-type: none">• Improved understanding of the role of coastal zones.• Consistent and clear coastal zone boundaries.

Issue reference M4

Extent and enforcement of legislation

Several organisations have commented on difficulties encountered in enforcing legislation for users of the Estuary, including for example, the regulation of offshore recreation and fishing.

Policy M4

Promote improved understanding, awareness and enforcement of legislation and byelaws.

Proposals for Action	Who could be involved	Benefits
M4 (i) Develop partnerships to address issues concerning management of activities on and around the Estuary.	SEP, ASERA, LAs, Boating organisations, e.g. RYA, Landowners, Crown Estate Commissioners, User groups, Commercial users, e.g. BMAPA, Wildlife Trusts, Sea Fisheries Committees, Fishing interests etc.	<ul style="list-style-type: none">• Improved consensus on the implementation of directives and regulations.
M4 (ii) Develop interpretation programmes for users for activities such as fishing and water sports.	SEP, Environment Agency, Sea Fisheries Committees, Fishing interests, Appropriate harbour authorities, RYA, Local watersports interests	<ul style="list-style-type: none">• Improved awareness of and compliance with byelaws and regulations• Wise use of the Estuary

Issue reference M5

Public participation in management of the Estuary

A considerable number of individuals and non-governmental organisations have expressed a desire for further public participation and consultation at an early stage on Estuary-related matters.

Policy M5

Encourage wider consultation of all interests on Estuary-related matters concerning development and management.

Proposals for Action	Who could be involved	Benefits
M5 (i) Increase public understanding and awareness of existing consultation procedures for development and management issues.	SEP, organisations concerned with development and Estuary management, and landowners.	<ul style="list-style-type: none">• Increase and enhance public participation in existing consultation procedures for development and management issues.
M5 (ii) Create further opportunities for public participation and consultation on development and management.	SEP, organisations concerned with development and Estuary management, town parish and community councils	<ul style="list-style-type: none">• Development and management policies on the Estuary will better reflect the wishes and needs of the public.
M5 (iii) Work with Community Strategies and liaise with Local Agenda 21 Officers to involve the public in development and management issues on the Estuary.	SEP, Local Authorities, including Agenda 21 officers	<ul style="list-style-type: none">• Greater involvement of the public and local interest groups in management of the Estuary.• A sense of ownership of the Estuary by local communities.

Issue reference M6

Variations in the regional guidance around the Estuary

There are potential difficulties in reconciling development plan policies around the Estuary, because of differences in planning guidance between Wales and England.

Policy M6

Encourage, where appropriate, the harmonisation of regional planning guidance that affects the Estuary.

Proposals for Action	Who could be involved	Benefits
M6 Encourage continuing collaboration between organisations at national, regional and local levels on regional planning guidance issues.	SEP, NAW, GoSW, SEWSPG, DTLR, SCOSLA, LAs	<ul style="list-style-type: none">• Consistent regional guidance for issues that affect the Severn Estuary.

Issue reference M7

Co-ordination of information and research, and the need for sound science for Estuary management

A concern has been expressed about the general lack of data, in particular the lack of long-term data sets relating to certain activities and the quality of existing information. Results of research conducted on the Estuary and information collected may not be generally available to those who need it. In order to make informed decisions managers and planners need to make use of the best information available. There is a need to identify gaps in the scientific advice and information for decision-makers. Where surveying and monitoring is undertaken, codes of good practice, such as those used by English Nature, should be considered.

Development of a database/GIS specifically for integrated Estuary management has been called for. Existing databases developed for specific uses on the Estuary could be further developed to meet this need.

Policy M7a

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.

Proposals for Action	Who could be involved	Benefits
M7a Raise awareness and disseminate information on the availability of relevant research.	SEP, Universities, LAs GoSW, NAW, ASERA, Environment Agency, Coastal Groups, Wildlife Trusts, Local Record Centres and other organisations involved in commissioning and undertaking research	<ul style="list-style-type: none">Increased knowledge of the best available information.

Policy M7b

Promote collaboration between researchers and managers to provide co-ordinated, accessible and accurate data based on sound science that informs management decisions and facilitates monitoring of sustainability.

Proposals for Action	Who could be involved	Benefits
M7b (i) Seek and create opportunities for the exchange of information between researchers and planners, managers, and developers.	SEP, Universities, LAsGoSW, NAW, ASERA, Environment Agency, Coastal Groups, Wildlife Trusts, Local Record Centres and other organisations involved in commissioning and undertaking research	<ul style="list-style-type: none">• Increased dialogue and understanding between researchers and planners, managers, and developers.• Improved understanding of the natural dynamics of the Estuary and its relationship with social, cultural and economic needs.
M7b (ii) Identify gaps in science advice and information needs of managers.	SEP, Universities, GoSW, NAW, ASERA, Environment Agency, Coastal Groups, Wildlife Trusts, Local Record Centres and other organisations involved in commissioning and undertaking research	<ul style="list-style-type: none">• Identify research needs on the Estuary.
M7b (iii) Promote studies that provide information required by decision-makers.	SEP, Universities, Consultants	<ul style="list-style-type: none">• Improved and informed decision-making.
M7b (iv) Co-ordinate management of data on the Estuary.	SEP, Universities and research organisations, ASERA, Coastal Groups, NAW, DTLR, CCW, EN, Environment Agency, Local Record Centres	<ul style="list-style-type: none">• Access to the best available information for decision-makers.
M7b (v) Promote a co-ordinated approach to GIS databases in support of Estuary management.	As M7b (iv)	<ul style="list-style-type: none">• Best use of available information.• Avoidance of duplication.

Issue reference M8

The provision of public information and awareness-raising

There is a need for better public information and interpretation on a wide range of topics associated with cultural, economic and environmental issues.

Policy M8

Promote greater understanding of the Severn Estuary and its management.

Proposals for Action	Who could be involved	Benefits
M8 (i) Continue public participation and monitor dissemination of 'A Strategy for the Severn Estuary.'	SEP	<ul style="list-style-type: none">• Greater understanding of management needs on the Estuary.• Public involvement in Estuary management planning.
M8 (ii) Develop and promote the SEP web site.	SEP	<ul style="list-style-type: none">• As M8 (i)
M8 (iii) Encourage public participation in implementation of this Strategy through workshops, focus groups and actions.	SEP, Interested groups and individuals	<ul style="list-style-type: none">• Raised awareness and knowledge of Estuary matters.• Public contribution to Estuary management planning.
M8 (iv) Explore and develop opportunities to disseminate information to the public.	SEP, All organisations with an interest or involvement in managing the Estuary	<ul style="list-style-type: none">• As M8 (iii)

Issue reference M9

The need for Strategic Environmental Assessment

Comments have been made relating to the need for Strategic Environmental Assessment, i.e. the large-scale environmental assessment of plans and projects in the Estuary. It is important that individual plans and projects are not considered in isolation of each other. Environmental assessment should be part of a wider strategic assessment that considers social and economic factors.

Policy M9

Sustainability appraisal should be undertaken of plans and activities on and around the Estuary.

Proposals for Action	Who could be involved	Benefits
M9 (i) Develop and promote strategic sustainability appraisal of plans, management schemes and activities.	SEP, Universities and research organisations, ASERA, Coastal Groups, NAW, DTLR, CCW, EN, Environment Agency, LAs	<ul style="list-style-type: none">• Progress towards sustainable development.
M9 (ii) Develop a 'State of the Estuary' report.	Environment Agency, SEP	<ul style="list-style-type: none">• Provision of an overview of the current state of the environment on the Estuary.
M9 (iii) Undertake a sustainability appraisal of the SEP Strategy via stakeholder workshops.	SEP, LA21 Officers	<ul style="list-style-type: none">• Progress towards sustainable development.

Further reading:

1. A proposal 'concerning the implementation of Integrated Coastal Zone Management in Europe' presented to the European Parliament by the Commission EC COM(2000)545 final, September 2000.
2. Integrated Coastal Zone Management: a Strategy for Europe, Communication from the Commission to the Council and the European Parliament (EC COM/2000/547), adopted 27 September, 2000.
3. Information on emerging EC Environmental Policy, EC, 2000, http://europa.eu.int/comm/environment/index_en.html
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6. Coastal Zone Management - towards best practice, DoE, 1996.
7. Good Practice Guidelines for Ports and Harbours Operating within or near UK European Marine Sites. Prepared for UK Marine SACs, Project by ABP Research and Consultancy Ltd, July 1999.
8. A Sustainable Wales – Learning to Live Differently. Consultation paper, NAW, 2000. http://www.wales.gov.uk/polinifo/sust_dev/sustaina1_e.htm
9. Planning Policy Guidance Note 12: Development Plans, HMSO, 1990.
10. Planning Policy Guidance Note 20: Coastal Planning, HMSO, 1992.
11. Planning Policy Wales, Consultation Draft, National Assembly for Wales, Feb. 2001.
12. Technical Advice Note 14 on Coastal Planning (Wales), Welsh Office, 1998.
13. Regional Planning Guidance for the South West, SW Government Office, 1994.
14. Proposed changes to draft South West Regional Planning Guidance (RPG10), Public Consultation, Government Office for the South West, December 2000.
15. A Review of Development Plans in the Severn Estuary Strategy Area: 1999 update. Prepared for the Environment Agency, Cardiff University, 1999.
16. First Consultation paper on the implementation of the EC's Water Framework Directive (2000/60/EC). DETR/National assembly for Wales, 2001.
17. Strategic Planning Guidance for South East Wales (Vols. 1 & 2): SE Wales Strategic Planning Group, 2000 and 2001

3. Sustainable land use, development and transport

Aim:

To develop a prosperous, vibrant and sustainable economy whilst protecting and promoting the natural, cultural and historical heritage.

The need for sustainable development on the Estuary

3.1. Environmental improvements and a vibrant and healthy Estuary economy and society will be complementary if development is sustainable and causes no net loss to biodiversity. The UK Government, the National Assembly for Wales and the Government Office for the South West are committed to sustainable development i.e. "Development that meets the need of the present without compromising the ability of future generations to meet their own needs."

Government aims

3.2. The Government seeks to maintain high and stable levels of economic growth and employment whilst respecting environmental limits; the guiding principles are set down in *A strategy for sustainable development in the UK*, published in May 1999.

3.3. The Government set up a Sustainable Development Commission in 2000. The Commission's main responsibility will be to advocate sustainable development across all sectors in the UK and monitor progress towards it.

Regional and Wales guidance

3.4. The Government Office for the South West states that policies for the coast should:

- protect coastal areas as a strategic environmental resource, and recognise their role in underpinning the tourist economy
- support the regeneration of resorts, port improvements, agricultural, fishing and tourism diversification
- support integrated coastal management based on geographic features such as estuaries to secure environmental enhancement, maximum biodiversity and appropriate location and development of uses which require a coastal location.
- protect areas liable to flood or at risk of coastal erosion where appropriate.

3.5. The latest Draft Guidance sees two key objectives as being:

- To regenerate coastal towns and communities, reinforcing their economic and social role in coastal areas and the wider region.
- To conserve the environment of the coast and coastal waters, particularly protecting undeveloped coast from inappropriate development.

The South West Regional Assembly (SWRA) shares this commitment to sustainability.

3.6. The National Assembly for Wales (NAW) has a duty under section 121 of the Government of Wales Act 1998 to promote sustainable development. The NAW intends to build on the UK Strategy for sustainable development. In November 2000 the National Assembly approved its Sustainable Development scheme *Learning to Live Differently*. In this scheme, the Assembly made a number of commitments that are particularly relevant to the Severn Estuary Strategy. For example, it intends that its key strategies should not only be underpinned by Sustainable Development principles but also linked together. Key policies in this respect include:

- National Economic Development Strategy
- National Spatial Planning Framework

- Transport Framework
- Strategic Energy Framework
- Planning Guidance Wales

3.7. In February 2000 the Assembly approved its draft action plan for the scheme with indicative time-scales for reviewing these policy areas. The Welsh Development Agency (WDA), funded by the NAW, is committed to sustainable development as set out in its policy document “Learning to Work Differently”.

3.8. In the preparation of development plans, for coasts and estuaries, PPG20 in England and TAN 14 in Wales are key documents that guide planning policies and decisions.

3.9. Strategic Planning Guidance is also emerging for both South East Wales and South West England (see also Chapter 2).

Local Planning

3.10. Local Planning Authorities prepare statutory Development Plans to guide development over 10-15 year periods. Authorities may also produce non-statutory plans and policies or guidance in response to various issues. Supplementary guidance, such as this Strategy for the Severn Estuary, Countryside Strategies and Waste Management Strategies can have a significant influence on development.

Local Agenda 21 (LA21)

3.11. Local Agenda 21 officers were appointed by Local Authorities following the Earth Summit (United Nations Conference on Environment and Development) held in Rio de Janeiro in 1992, where world leaders signed a global environmental action plan called Agenda 21. Local Authorities play a key role and are encouraged to develop a local sustainable development strategy and to involve partners from business, community and voluntary groups in their work. Their approach, therefore, is very similar to those of the SEP. The SES has worked with LA21 on several occasions including setting up a workshop for LA21 Officers on the Severn Estuary in 1998. LA21 officers also helped with a scoping study of LA21 initiatives and local Biodiversity Action Plans on the Estuary.

Development pressures on the Estuary

3.12. Although a tidal barrage across the Estuary is currently not a firm proposal, developments to provide ‘alternative’ energy, such as the use of wind turbines and underwater turbines, may pose new challenges in the planning process. (See D6)

3.13. The major development adjacent to the Estuary, the Cardiff Bay Barrage, is now complete and the responsibility for its management has been passed to Cardiff County Council under an agreement with the National Assembly for Wales. Management of the Cardiff Bay Barrage has implications for the water quality and development of water-based recreation in the SEP area.

3.14. The proposed M4 Relief Road to run through Newport County Borough would become part of the national highway, and if implemented would have major implications for the Gwent Levels. The regeneration of ports and waterfronts is bringing new opportunities for recreation, housing and tourism developments to coastal towns such as Portishead, Watchet, and Barry Waterfront.

3.15. A major construction project is situated on the east shores of Cardiff. The site, being developed for Welsh Water, will provide ‘state of the art’ wastewater treatment for a large area of South East Wales. When complete, the new treatment facility will service a large area and result in improved water quality in the Estuary. To minimise the disturbance to wildlife and farmland, the pipeline is being laid underground to the site at Tremorfa. It is one of the many developments arising from the Water Framework Directive mentioned in 2.7.

3.16. Other significant developments include expansion of Avonmouth and the possibility of major employment and housing proposals east of the M49 in South Gloucestershire. Major proposals are underway at Portishead, including the redevelopment of a former power station site together with former industrial land and tipped areas, in line with adopted local plan proposals that also include the re-use of the former dock area as a new marina. It is anticipated that several thousand new homes, a new district centre, and employment areas could arise from this scheme, together with areas to be ecologically safeguarded and managed. Studies have been undertaken to assess the potential reopening of the adjacent disused Portishead to Bristol railway line which, if implemented, would boost the sustainability credentials of this, the largest regeneration project in North Somerset. Other significant

developments currently in progress around the estuary include Cardiff Bay, Barry Waterfront and Rhoose Point on the Welsh shore.

Other plans and schemes

3.17. Recommendations for coastal protection and flood defence are set out in the Shoreline Management Plans on the Estuary (see Chapter 5 on Coastal protection and flood defence).

3.18. Authorities with statutory duties on the Estuary are involved in producing a management scheme for the bird life covered by the Special Protection Area for Birds. In the future the scheme may include the conservation interests on the Estuary for the pSAC. The statutory management scheme will guide considerations of development that may affect the birds and their habitats and/or the conservation interests of the pSAC (see also Chapter 13 on 'Nature conservation and wildlife').

3.19. Map 2 (see Appendix 8) summarises the potential development pressures within the Severn Estuary as at Summer 2001.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Planning Guidance is also discussed in Chapter 2: 'Planning and management in the Estuary'.
- Coastal protection and flood defence issues and Shoreline Management Plans are also included in Chapter 5: 'Coastal protection and flood defence' and in Chapter 2: 'Planning and management in the Estuary'.
- The management of the SPA and pSAC is covered in Chapter 13: 'Nature conservation and wildlife', and Chapter 2 'Planning and management in the Estuary'.
- Landscape issues are addressed in detail in Chapter 12 on 'Landscape and seascape'.
- Development affecting archaeology is also addressed in Chapter 14: 'Archaeology and the historic environment'.

Issue reference D1

Concern about the amount of development in coastal areas

Development is needed for many reasons including tourism, leisure, jobs, homes and transport. The Government provides guidance on the various factors that need to be considered when assessing development proposals. However, it is also important to allay fears about the adverse impact of development on the Estuary as one large system, and therefore to consider the cumulative effects of various developments around the Estuary. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy D1

Support the identification of coastal zones where new greenfield development will only be permitted if a coastal location is necessary, where it does not compromise environmental objectives and where it takes account of cumulative impacts.

Proposals for Action	Who could be involved	Benefits
D1 (i) Identify and consider possible adverse impacts of development on the Estuary of proposals in development plans.	LAs, NAW, GoSW Environment Agency, SWRA, SEWSPG	<ul style="list-style-type: none"> Minimise adverse effects of development on the Estuary
D1 (ii) Consider the cumulative effects of development on the Estuary as a whole in planning/development proposals.	SEP, LAs, ASERA NAW, GoSW, Environment Agency, SWRA, SWRDA, SEWSPG	<ul style="list-style-type: none"> Adverse cumulative effects of development on the Estuary kept to a minimum.
D1 (iii) Enable inclusion/participation of Estuary users, relevant bodies and the public in consideration of development proposals.	SEP, LAs, ASERA, NAW, GoSW, Commercial developers, Port Authorities	<ul style="list-style-type: none"> Development proposals that reflect local priorities and concerns.

Issue reference D2

Impact of development on areas of natural, cultural, built, archaeological or scientific interest

Many areas of the Estuary and its shores are valued for wildlife, archaeology or cultural and built heritage, and may include scientific interests. Conservation designations highlight the areas of greatest interest and these should be given the most comprehensive protection through development control and other means. However, species and natural and cultural features of considerable importance may also be present in or rely upon areas outside those designated sites. New development, including housing, commerce and ports, needs to be undertaken sensitively to minimise the impacts on wildlife. Paradoxically however, the complexity of consents and planning procedures which this creates are being seen by some as a constraint on environmentally responsible development. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy D2

Encourage development and land uses which conserve and enhance the cultural, natural and built heritage.

Proposals for Action	Who could be involved	Benefits
D2 (i) Develop guidance that directs development to minimise the adverse impacts on natural, archaeological and scientific interests on the Estuary.	NAW, GoSW, SWRA, ASERA, CCW, LAs	<ul style="list-style-type: none"> Reduced impacts on wildlife, archaeology and other scientific interests (such as geology).
D2 (ii) Work towards the preparation of clearer guidance on, and better co-ordination of current complex consents procedure.	CCW, EN, LAs, NAW, DEFRA, DTLR, SWRA, Environment Agency, EC, UK government	<ul style="list-style-type: none"> Reduced complexity Better understanding and guidance.
D2 (iii) Continue to develop established techniques such as Environmental Impact Assessments (EIA) where appropriate to identify and mitigate potential environmental impacts of development.	Competent Authorities DEFRA, NAW, SWRA, CCW, Environment Agency, LAs	<ul style="list-style-type: none"> Environmentally responsible development. Conserve and enhance nature conservation interests.

Issue reference D3

The impact of new roads and transport infrastructure

New roads and other transport developments can have a major impact on the landscape and air quality around the Estuary (see also W9 in Chapter 8). There may also be adverse impacts on the Estuary during construction. Runoff and lighting schemes associated with transport infrastructure may also have an adverse effect. There are opportunities for increased facilities for freight transport by rail and sea on the Estuary. Responses to the Joint Issues Report have called for a transport strategy and for new ferry services across the Estuary to be considered.

Policy D3a

Liaise and co-ordinate plans across boundaries to achieve an integrated approach to developing sustainable transport systems.

Policy D3b

In working towards sustainable transport systems, encourage consideration of the wider benefits of mechanisms such as rail freight terminals, port facilities and ferry services, as well as their potential cumulative impacts.

Proposals for Action	Who could be involved	Benefits
D3 a&b (i) Liaise on transport proposals across boundaries in the SEP area.	GoSW, NAW, SWRA, LAs, CLA, SEWSPG, Transport Fora	<ul style="list-style-type: none">• More 'sustainable' transport plans.
D3 a&b (ii) Note and alleviate potentially adverse impacts on the SEP area as a whole in proposals for new road and transport infrastructure.	Developers, LAs, GoSW, NAW, SWRA, Rail Companies	<ul style="list-style-type: none">• Minimal adverse impacts of new road and transport developments on the Estuary.
D3b (i) Give landscape features of the Estuary full consideration in transport proposals.	LAs, GoSW, NAW, SWRA, Strategic Rail Authority	<ul style="list-style-type: none">• Minimal adverse impacts on the coastal landscape of the Estuary.
D3b (ii) Identify benefits and opportunities in the SEP area through transport proposals for sustainable use of rail, port and ferry services.	Developers, Port Authorities, SWRA, Commercial organisations, NAW, GoSW, LAs	<ul style="list-style-type: none">• Best and sustainable use of water and rail transport on and around the Estuary.

Issue reference D4

The impact of one-way bridge tolls on traffic in west Gloucestershire

Tolls for the Severn bridges are one-way – charged going into Wales only. It is widely believed that this leads to increased traffic on the roads of west Gloucestershire, in particular the increase in numbers of heavy goods vehicles.

Policy D4

Encourage and support research and initiatives to minimise the impact of one-way bridge tolls on environmental and traffic infrastructure.

Proposals for Action	Who could be involved	Benefits
D4 Encourage lorries and other through-traffic to use appropriate routes.	LAs, GoSW, NAW, SWRA, Severn Bridge Company	<ul style="list-style-type: none">• Lessen adverse impact on local communities and roads.

Issue reference D5

Concern about new development in areas at risk from flooding or coastal erosion

Certain coastal locations around the Estuary are low-lying and therefore at risk either from flooding or coastal erosion. Rising sea levels due to global warming raise additional threats and may increase the areas at risk. Land-raising or landfill can also have significant implications for flood risk in some locations. New development on land that depends in perpetuity on the well-being of a flood defence and/or pumping may not be considered sustainable. Cliffs and areas suffering erosion are unsuitable for development, see also Chapter 5, on coastal defence.

Policy D5a

Support the avoidance of new development on low-lying land that is at risk from flooding, or would exacerbate flooding elsewhere, or on coastal sites liable to erosion.

Policy D5b

Where the development of flood/coastal defence proves to be unacceptable because of socio-economic constraints or because of environmental interests, support schemes for ‘managed retreat’, if accompanied by appropriate financial compensation to the landowner and user and continuation of the rights of way network.

Proposals for Action	Who could be involved	Benefits
D5a Encourage collaborative research to assess the impacts of sea level rise and predictions of storminess specifically for the coasts of the Severn Estuary.	Universities, Research establishments, Environment Agency	<ul style="list-style-type: none">• Enable assessment of coastal defence needs on the Estuary.• Best use made of resources for coastal defence and flood protection.
D5b (i) Identify areas on the Estuary where managed retreat is appropriate.	Coastal Cell Groups, Environment Agency, LAs, DEFRA, IDBs	<ul style="list-style-type: none">• Creation of new wetland areas for Estuary wildlife.
D5b (ii) Encourage the payment of proper compensation where managed retreat is an option.	DEFRA, Environment Agency, LAs, CLA, NFU/NFUW	<ul style="list-style-type: none">• Avoid loss of income for landowners and users.

Issue reference D6

Environmental effects of barrages, weirs and renewable energy schemes, and their impact on economic regeneration

Barrage schemes and to a lesser extent new weirs tend to be controversial because of the changes they would produce in parts of or throughout the entire Estuary. The changes to tidal processes, water velocity, sediment movements, the impacts on wildlife habitats and fish movements, loss of mudflats and changes in groundwater levels all have to be taken into account. However, barrages and weirs can provide a source of renewable energy, can assist in economic regeneration, improve access and recreation facilities and contribute to flood defence. A 16km barrage from Brean Down to Lavernock Point has been proposed in the past primarily to generate electricity. The scheme could meet up to 7% of the electricity demand of England and Wales and would help reduce global warming and acid rain by reducing the amount of carbon dioxide emissions from conventional fossil fuel power stations.

Further offshore and onshore wind turbines may be proposed for the Estuary in the future. New technology is also being developed for ‘stand alone’ underwater turbines that harness tidal power but do not require a barrage.

Policy D6a

Encourage wide consultation when barrage, weir and renewable energy schemes are proposed, and encourage the possible local and regional socio-economic, environmental and flood defence benefits of future barrage and weir schemes to be weighed against their impacts on landscapes/seascapes and the sensitivity of wildlife habitats on the Estuary.

Policy D6b

Collaborate and exchange information between organisations that results in the use of the best scientific data in consideration of proposed new barrages, weirs and renewable energy schemes.

Proposals for Action	Who could be involved	Benefits
D6a Consult widely when barrage, weir or other renewable energy schemes are proposed.	SEP, NAW, GoSW, LAs, Developers, Port Authorities	<ul style="list-style-type: none">• Improved understanding of the views of stakeholders.
D6b Identify opportunities for information about renewable energy to be made available to decision makers.	SEP, Universities, Scientific establishments	<ul style="list-style-type: none">• Best use of available scientific information.• Improved decision making.• Better understanding of Estuary science.• Identify the 'gaps' in current information.

Further reading:

1. Policy guidelines for the coast, Department of the Environment, 1995.
2. A strategy for sustainable development for the UK, DETR, 1999.
3. Planning Policy Guidance Note 20: Coastal Planning, Department of the Environment, 1992.
4. Planning Guidance (Wales) Technical Advice Note (Wales) 14: Coastal Planning, Welsh Office, 1998.
5. Seas, shores and coastal areas: Maritime Policy, Countryside Council for Wales, 1996.
6. Learning to Live Differently, NAW, November 2000.
7. Draft Action Plan for Sustainable Development Scheme, NAW, February 2001.
8. On the Edge, the LGA Coastal Strategy, 2001.

4. Agriculture

Aim:

To promote viable and sustainable agriculture and associated communities, so they may operate in a way that is sensitive to the Estuary environment and surrounding countryside.

Government aims

4.1. The Government's long term policy is to secure a more competitive and sustainable industry with a stronger market orientation. It aims to protect the rural and marine environment within a thriving rural economy. Its strategy for the future of the agricultural industry is that it must respond better to consumer wishes, be environmentally responsible, and play an integral part in the wider rural economy.

4.2. Rural Development Plans for England and for Wales have been developed to help deliver the Government's Strategy.

Background

4.3. Agriculture is the most common use of land around the Estuary, with a long and continuing history of private ownership and farming activities alongside traditional farming communities. Agriculture is important to the rural economy, and there is a need to encourage sustainable farming practices. Management of the rural landscape contributes to the character and distinctiveness of the Severn Estuary, therefore landowners and occupiers will play an important part in its future management.

Farming and rural employment

4.4. Farming is the major land use in the Estuary. Although historically grassland has predominated, in recent years, (in response to the Common Agricultural Policy), there has been increasing conversion to arable farming. Some intensive farming practices have the potential to cause environmental damage. However, the majority of farmers are aware of this danger, which is reduced by adherence to good practice codes and avoided by wildlife-friendly farming practices.

4.5. Several thousand people work in agriculture and the rural environment around the Estuary, but employment in agriculture is declining, with a shift towards part-time work since 1984. Ancillary industries that service agriculture employ labour and contribute to the economy of rural communities. Farmers face the continual challenge to maintain farm incomes, yet as custodians of the countryside, their work cannot be valued simply in monetary terms. The activities of farmers will influence not only the landscape character, but also the wildlife and coastal protection and flood defence of the Estuary.

4.6. There is continued financial pressure for farmers to diversify their activities, such as providing facilities for commercial re-use, recreation and tourism with a view to increasing their income, and to provide for public access. Conservation initiatives may also be a source of income, whilst providing positive help for farmers to conserve and enhance wildlife. These measures are positively encouraged by Government initiatives.

4.7. Other businesses depend on the rural environment independent of farming practices, such as those associated with tourism and leisure activities. It is essential to ensure that they are conducted in sympathy with the rural character of the Estuary.

Low-lying areas

4.8. Much of the Severn Estuary rural landscape is low-lying, often below the level of Mean High Water, such as the Somerset, Avon and Gwent Levels. Areas of low-lying land have been artificially reclaimed since Roman/Mediaeval times. Appropriate drainage of the Levels is key to their management. The many drainage channels characteristic of the Levels are of important historical and wildlife value.

Saltmarsh management

4.9. The narrow strip of Estuary saltmarsh borders much of the extensive mudflats and is an important natural feature of the Estuary. Areas of saltmarsh are dwindling in the UK as a whole, therefore the Severn Estuary saltmarsh (over 1100 hectares in total) is increasing in value as a wildlife habitat. It is an important component of the Severn Estuary SSSI, SPA and possible SAC. Saltmarsh vegetation holds sediment from the Estuary, in some cases maintaining a natural intertidal “buffer” for coastal protection and flood defence. The management of the saltmarsh, including the intensity of grazing, affects not only the wildlife value of this habitat, but also maintenance of the net area of saltmarsh on the Severn Estuary.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Access and leisure use of farmland through diversification schemes is also addressed in Chapter 6: ‘Tourism, recreation and access’.
- Coastal protection and flood defence issues will affect farmers and landowners and are addressed in Chapter 5: ‘Coastal protection and flood defence’.
- Issues relevant to rural management are also addressed in Chapter 12: ‘Landscape’, and Chapter 13: ‘Nature conservation and wildlife’.
- Water resource issues are addressed in Chapter 10.

Issue reference R1

Representation of farming interests in land use planning and management

Farming has a key role to play in the rural economy and management of the environment. Farmers and landowners feel that they are under pressure from many different interests who have different objectives for land use, for example nature conservation, landscape enhancement and protection and the historic environment. They wish to be fully involved in land use planning and management schemes.

Policy R1

Raise awareness of existing mechanisms that allow farmers to engage in the land-use planning process and other initiatives.

Proposals for Action	Who could be involved	Benefits
R1 (i) Participate in agri-environmental consultation.	NFU/NFUW, CA, CCW, EN	<ul style="list-style-type: none">• Opportunities for farmers to be involved in agri-environment/ Government planning.
R1 (ii) Raise awareness of opportunities for farmers and landowners to be involved in Countryside Strategy Fora (Wales), LBAPs, LEAPS and the LA21 process.	LAs, SEP, FFWAG, CLA, NFU/NFUW, DEFRA, Environment Agency, NAWAD	<ul style="list-style-type: none">• Establishment of working relationships between those with statutory duties and those who manage the land.• Better understanding of each other's roles and needs.• Better management and use of the countryside.• Co-operation between all organisations involved.
R1 (iii) Raise awareness and understanding of the farming community of existing strategic and development control planning processes.	LAs, SEP, FFWAG, CLA, NFU/NFUW, DEFRA, Environment Agency, NAWAD	
R1 (iv) Encourage the farming community to contribute to and influence the outcome of existing strategic planning and development control processes.	LAs, SEP, FFWAG, CLA, NFU/NFUW, DEFRA, Environment Agency, NAWAD	

Issue reference R2

Participation of farmers in diversification schemes

Farmers are under pressure to develop new sources of income, especially by diversifying their activities to serve commercial purposes, tourism and recreational interests. It is important that new diversification schemes do not have an adverse impact on the countryside and the Estuary, for example through unacceptable increases in traffic or by causing damage to fragile ecosystems, or on account of poorly designed and sited new buildings.

Policy R2

Encourage and support diversification schemes which do not have an adverse environmental impact.

Proposals for Action	Who could be involved	Benefits
R2 (i) Promote farming diversification schemes such as farm trails, cycle hire facilities, converted barns for accommodation, coastal trails and other infrastructure for "green tourism".	Wildlife Trusts, LAs, NFU/NFUW, CLA, YHA, CA, CCW, NAWAD, WDA	<ul style="list-style-type: none">• Progress towards a sustainable rural economy.• Best use of farm facilities.• Appropriate access for the general public.
R2 (ii) Raise awareness of examples of good practice.	National and regional organisations	<ul style="list-style-type: none">• Raise understanding of sustainable schemes.
R2 (iii) Facilitate links with tourist boards on diversification schemes.	Wales Tourist Board, West Country Tourist Board	<ul style="list-style-type: none">• Development of best practice schemes to suit tourism and farmers.

Issue reference R3

Participation of farmers in conservation initiatives

Farmers would like to see further incentives for conservation initiatives, to ensure that farming for wildlife is a financially viable alternative to intensive farming methods.

Policy R3a

Raise awareness of agri-environment schemes (such as Rural Development Plans (England) and Tir Gofal (Wales)) and other incentives available to farmers that enhance wildlife and landscape, and maintain the nature conservation status of designated and other sites.

Proposals for Action	Who could be involved	Benefits
R3a (i) Continue agri-environment schemes including Tir Gofal in Wales and under England Rural Development Plans, such as Countryside Stewardship.	NAW, CCW, EN, Forestry Authority, farmers, landowners, DEFRA, NAWAD	<ul style="list-style-type: none">• Financial support for farmers to care for wildlife.• Wildlife gain.
R3a (ii) Uptake of DEFRA incentives for the conservation of saltmarshes.	DEFRA/FFWAG, farmers, landowners	<ul style="list-style-type: none">• Support for farmers and landowners to care for the coast of the Estuary.• Wildlife gain.
R3a (iii) Involve farmers and landowners in Local Biodiversity Action Plans.	Farmers, landowners, LAs, LBAP Groups, LA 21 Officers, FFWAG, Environment Agency, CCW, EN, Wildlife groups	<ul style="list-style-type: none">• Greater support by farmers and landowners of LBAPs.

Policy R3b

Support further funding for farmers and landowners to maintain designated and other sites at favourable nature conservation status.

Proposals for Action	Who could be involved	Benefits
R3b Encourage appropriate funding including new initiatives to provide support and enable proper management of all designated sites, including SINC, all wildlife interests such as Whole Farm Plans.	NAW, DTLR, CCW, EN, DEFRA, LAs, CA	<ul style="list-style-type: none">• Financial support for farmers to care for wildlife.• Wildlife gain.

Issue reference R4

Concern about the effects of intensive farming practices

Intensive farming practices involve the use of pesticides, fertilisers and the spraying of slurry on the land. Such substances can ‘run off’ into the Estuary, via streams, drainage systems and rivers, aided by rainwater. Run off from farmland can result in pollution in the Estuary and its tributaries. However, organic inputs may provide a food source for wildlife. Ploughing near cliff edges, watercourses or footpaths can exacerbate problems and encourage erosion. Buffer zones along field margins encourage wildlife habitats.

Policy R4a

Publicise codes of practice and pollution prevention measures in relation to agricultural activity and encourage regular monitoring to check the effectiveness of such measures.

Policy R4b

Discourage intensive farming methods that result in the deterioration of the Estuary hinterland, such as destruction of hedgerows and ploughing close to cliff edges.

Proposals for Action	Who could be involved	Benefits
R4a&b (i) Raise awareness of the implications of intensive farming practices.	SEP, Environment Agency, DEFRA, NFU/NFUW, CLA, FFWAG, NAWAD, EN	<ul style="list-style-type: none">• Increased understanding of how intensive farming may affect the Estuary.
R4a (i) Raise awareness of inner and outer source protection zones.	Environment Agency, DEFRA, NFU/NFUW	<ul style="list-style-type: none">• Better protection of farmland and the coast against agricultural pollutants.
R4a (ii) Promote the development and implementation of Whole Farm Plans covering biodiversity, nutrient budget planning and waste management planning.	Environment Agency, DEFRA, ADAS, NAW, NFU/NFUW, CLA	<ul style="list-style-type: none">• More effective control.• Reduced risk of pollution to the environment.• Simplifies farmers' compliance with existing and proposed legislation.
R4a&b (ii) Encourage and facilitate close liaison between farmers and managers of the coast.	SEP, Vale of Glamorgan Heritage Coast, Countryside Strategy groups, farmers and landowners.	<ul style="list-style-type: none">• Safeguard against erosion of coastal land.
R4a&b (iii) Disseminate and implement Codes of Practice on soils, air and water in relation to agricultural activity.	DEFRA, Environment Agency, farmers and landowners	<ul style="list-style-type: none">• Safeguard against erosion.• Enhancement of biodiversity.• More additional benefit.

Further reading:

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2. The Severn Estuary Agricultural Issues Report, MAFF, June 1996.
3. Planning Guidance (Wales), Technical Advice Note 6: Development Involving Agricultural Land, Welsh Office, 1996.
4. Planning Guidance (Wales), Technical Advice Note 17: Rural Development, Welsh Office, 1998.
5. Introducing Farm Woodlands: an essential guide, MAFF, WOAD, The Scottish Office and Forestry Authority, 1998
6. A Working Environment for Wales, Environment Agency Wales, 1999
7. Agriculture and the Environment – an impact statement, Consultation Draft prepared by the Environment Agency, 2000.
8. A Working Countryside for Wales, Welsh Office, 1996.
9. Our Countryside, and Future, DETR, November 2000.
10. Planning Policy Guidance note 7: The Countryside – Environmental Quality and Economic and Social Development, DETR, 1997.
11. Codes of Good Agricultural Practice for the protection of air, soil and water, MAFF/WO, 1998.

5. Coastal protection and flood defence

Aim:

To provide sustainable flood defence and coastal protection, developed through a holistic understanding of the Estuary and its communities, heritage and processes.

Government aims

5.1. To reduce the risks to people and the developed and natural environment from flooding and coastal erosion by:

- Encouraging the provision of adequate and cost-effective flood warning systems,
- Encouraging the provision of adequate and technically, environmentally and economically sound and sustainable flood and coastal defence measures,
- Discouraging inappropriate development in areas at risk from flooding and coastal erosion.

Introduction

5.2. This chapter covers two issues:

- Sea and tidal defence: defence to reduce the risk of flooding from the sea and tidal rivers;
- Coastal protection: protection of the land from erosion and encroachment by the sea

In this chapter, the term ‘coastal defence’ refers to both these types of defence. For fluvial flooding issues in areas bordering the Estuary please refer to the relevant Local Environment Agency Plan (LEAP).

The need for coastal defences

5.3. The Severn Estuary presents a challenging environment for coastal defence. The tidal range in the Estuary is the second highest in the world. Adverse weather conditions can raise water levels by more than two metres above predicted levels. In addition, average sea levels have been rising since the last Ice Age and the rate of rise is now increasing due to global warming. Current predictions are that sea level rise will be in the order of 5mm/year. Coastal processes are outlined in Map 3 (see Appendix 8).

5.4. Over hundreds of years, coastal defences have been constructed to reduce the risks from tidal flooding and coastal erosion. 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. In parts of the lowlands in the upper Estuary, the Somerset Levels & Moors, and the Gwent Levels many square kilometres of land are more than 3m below the highest tides. The extent of coastal defences are shown in Map 4 (see Appendix 8) .

Shoreline Management Plans (SMPs)

5.5. SMPs are prepared by Coastal Cell Groups and form the basis for sustainable coastal defence policies. They provide a strategic management framework for maintaining and enhancing coastal defence including the option of managed retreat. All potential options should be considered on their merits and within the framework of the relevant SMP. SMPs are intended to support future management of the shoreline, including the provision of new and improved sea and tidal defences and coastal protection measures, decisions relating to managed retreat, and opportunities to protect or enhance shoreline habitats and other environmental assets. This is essential in order to take into account the effects of any proposed coastal defences on areas up and down the coastline, including effects on landowners and wildlife habitats. SMPs for the SEP area are also discussed in Chapter 2.

The state of coastal defences

5.6. Wind-induced waves and tidal currents are constantly shaping the shoreline and sometimes threaten natural and man-made assets. Surveys of the condition of all sea and tidal defences are carried out by the Environment Agency or other bodies where appropriate. Similar surveys of coastal protection works are undertaken on behalf of DEFRA and the National Assembly for Wales. These surveys are carried out in order to assess the risks, including whether standards for protection from flooding are being met, and the need for investment. SMPs also contain useful summaries of such information.

5.7. With regard to the provision of sea and tidal defences, complete protection against flooding cannot be provided. Instead defences are built to protect against floods of specified magnitude. DEFRA and the National Assembly for Wales have published indicative target standards of protection which can be used as an initial guide to appropriate levels of defence for different land use categories (see MAFF *Flood and Coastal Defence Project Appraisal Guidance 3*). However, DEFRA rules state that each capital and maintenance scheme must be technically feasible, economically viable, environmentally acceptable and sustainable. During option appraisal, soft engineering methods are considered. In some cases it is not economical to maintain the existing line of defence and, with agreement and where practicable, the defence is set back to a more sustainable location. This is often known as managed retreat, set-back or coastal realignment.

5.8. Where necessary and viable, sea and tidal defence maintenance and improvement works may be carried out by the relevant operating authorities to:

- Raise the level of defences,
- Increase the life of the defences,
- Protect the defences against erosion.

5.9. With regard to provision of coastal protection, erosion and accretion are continuous natural processes. Increases in sea level and storminess due to global warming are expected to affect these processes. Interference with the natural process of erosion can threaten the supply of new beach material and should be avoided unless important assets are at risk. Maritime Local Authorities have permissive power to carry out coastal protection works in general and the Environment Agency has similar powers where erosion of the sea or tidal defence is involved. When coastal protection is put into place it can shift the erosion problem onto another section of coast. It is therefore necessary to look at erosion problems (and sea defence) in a strategic context so that problems are not just shifted from one site to another. Such issues will be addressed by Shoreline Management Plans.

5.10. Coastal protection works will only be carried out where the benefits of protection exceed the costs, in both monetary and environmental terms, and where funding is available. During option appraisal, soft engineering methods are considered.

The role of coastal Internal Drainage Boards (IDBs)

5.11. IDBs¹ have powers regarding drainage matters relating to significant areas of land along the Estuary. These areas are totally dependent on complex systems of flood defences and land drainage to enable the land to be used in a productive way. IDBs have powers to raise money and undertake drainage works. The Boards' role is to ensure the protection and free drainage of rateable land, while in general, the Environment Agency manages sea and tidal defences that protect these areas. Any works affecting the drainage in IDB areas require the relevant Board's consent.

New development in areas at risk from flooding and erosion

5.12. Government guidance² 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 expected sea-level rises. The Environment Agency advises LPAs to guide all new development away from flood risk areas. Any proposal to provide mitigation, including the raising of land levels, should not increase risks elsewhere.

¹ Internal Drainage Boards and their areas of operation known as Internal Drainage Districts are defined in the Land Drainage Act 1991.

² For England, see DoE *Circular 30/92: Development and Flood Risk* (to be superseded by *PPG25: Development and Flood Risk*), and *PPG20: Coastal Zone Planning*. For Wales, *TAN 15: Development and Flood Risk* and *TAN 14: Coastal Planning* contain the relevant guidance.

Flood warning

5.13. Tidal flooding can occur any time that certain climatic conditions coincide with high tides, although the risk of tidal flooding is greatest from September to April. The Environment Agency undertakes flood warning for both river and sea flooding where practicable and economically viable.

5.14. Flood forecasting and warning systems enable emergency services, operating authorities and individuals to take measures to lessen the impact of flooding. A national Storm Tide Forecasting Service is operated by the Meteorological Office. The Environment Agency uses this information, together with meteorological forecasts and its own network of tide level gauges, to forecast flooding problems and to inform maritime Local Authorities or emergency services who may be affected. The tidal and storm flood warning service is not as comprehensive as the river flood warning schemes, and investigations are underway to extend and improve this service.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters as follows:

- New development should not exacerbate flood risk elsewhere; Chapter 3.
- There are special provisions where development is proposed within the coastal zone; Chapters 2 and 3
- Any proposals for managed retreat have implications for agriculture and rural land use; Chapter 4
- Flood defences need to be carefully appraised in order to ensure their impacts on landscape; Chapter 12, nature conservation and wildlife; Chapter 13 and archaeology and the historic environment; Chapter 14 are acceptable.

Issue reference C1

The need for strategic planning of coastal defences – Shoreline Management Plans

The need for strategic coastal defences is being addressed through the emerging and developing SMPs in compliance with DEFRA guidance. Coastal defences need to be planned within a strategic framework that recognises the physical influences acting upon the coastline and the interests that are affected. Strategic planning of coastal defences therefore encompasses all the issues in this chapter and will form a framework within which they can be resolved. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy C1

An integrated, strategic framework to guide the planning and provision of sustainable coastal defence should be developed, implemented and monitored.

Proposals for Action	Who could be involved	Benefits
<p>C1 (i) Integrate the suite of SMPs for the management of the Estuary through collaboration and co-ordination on the development and implementation of:</p> <ol style="list-style-type: none"> 1. Swansea Bay from Worms Head to Lavernock Point. 2. North Devon and Somerset from Hartland Point to Brean Down. 3. Severn Estuary upstream from Lavernock Point and Brean Down to Haw Bridge. 	<p>Coastal Cell Groups, involving: DEFRA, NAW, Environment Agency, Maritime LAs, IDBs, EN/CCW, CLA, NFU/NFUW, British Waterways, landowners and tenants, general public.</p>	<ul style="list-style-type: none"> • Coastal defence work and managed retreat will be planned within an agreed strategic framework. • Improved understanding of coastal processes and the likely future evolution of the shoreline. • Identification of assets at risk. • Improved consultation between organisations with an interest in the shoreline. • Identification of potential environmental enhancements. • Better targeting of resources within the framework of a Shoreline Management Plan.
<p>C1 (ii) Monitor the levels of intertidal land to identify trends in coastal evolution to inform management actions.</p>	<p>Environment Agency, Maritime LAs, ASERA, Research Institutions, IDBs</p>	<ul style="list-style-type: none"> • Better information on environmental change to inform planning and management decisions relating to coastal defence and nature conservation.
<p>C1 (iii) Encourage approaches to individual flood defence and coastal protection schemes that are consistent with the preferred option identified in the SMP and other plans such as the Gwent Levels Foreshore Management Plan.</p>	<p>Environment Agency, Maritime LAs, DEFRA, NAW, IDBs</p>	<ul style="list-style-type: none"> • Schemes are carried out in harmony with natural processes as far as possible.
<p>C1 (iv) Promote adoption of the Severn Estuary SMP by Local Authorities.</p>	<p>Coastal Cell Groups, involving: DEFRA, NAW, Environment Agency, Maritime LAs, IDBs.</p>	<ul style="list-style-type: none"> • Schemes are carried out in harmony with natural processes as far as possible. • Protection of the landscape character, heritage, amenity and cultural assets through the Town and Country Planning process. Policies in Statutory Plans to protect the Estuary.
<p>C1 (v) Review and update Shoreline Management Plans on an agreed timescale.</p>	<p>As C1 (iv)</p>	<ul style="list-style-type: none"> • Plans include the best available knowledge and are achievable.

Proposals for Action	Who could be involved	Benefits
C1 (vi) Undertake a prioritised programme of monitoring and research in order to better understand the physical processes shaping the Severn Estuary, and raise awareness of stakeholders as appropriate.	As C1 (iv) plus: Stakeholders, Research organisations, IDBs	<ul style="list-style-type: none"> • Strategy and plans are based on sound science and knowledge.

Issue reference C2

The implications of raised sea levels resulting from global warming for coastal defence

It is likely that sea levels will rise because of global warming. Storms and related storm surges may also become more frequent and severe. This may create a need for improved defences to retain the same standard of service. In some cases, however, the provision of new defences or maintenance of existing defences may not be economically viable. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy C2

Promote and encourage a better understanding of the implications of sea level rise and increased storminess for the Severn Estuary in order to inform the preferred option within Shoreline Management Plans and to raise stakeholder understanding.

Proposals for Action	Who could be involved	Benefits
C2 (i) Review the best available advice on rates of sea level rise and storminess in the SEP area and identify any need for new research.	Environment Agency, EN, CCW, Maritime LAs, DEFRA, NAW, IDBs	<ul style="list-style-type: none"> • Better information on environmental change to inform planning and management decisions relating to coastal defence and nature conservation.
C2 (ii) Further monitoring and research into the implications of sea level rise and storminess for the Estuary and how coastal defence planning may best respond to change.	Environment Agency, DTLR, DEFRA, NAW, EN, CCW, Maritime LAs, Coastal Cell Groups, Research Institutions, IDBs	<ul style="list-style-type: none"> • Better information on environmental change to inform planning and management decisions relating to coastal defence and nature conservation.
C2 (iii) Use the findings of monitoring and research under C2 (i) and C2 (ii) to inform reviews of SMPs and the preferred option for coastal defence.	Coastal Cell Groups, including: DEFRA, NAW, Environment Agency, Maritime LAs, IDBs.	<ul style="list-style-type: none"> • Up-to-date information on sea level rise and storminess is taken into account when planning coastal defences.
C2 (iv) Improve stakeholder awareness and understanding of the implications of sea level rise and storminess for the coastal zone and for coastal defence.	Environment Agency, IDBs, SEP	<ul style="list-style-type: none"> • Implications of sea level rise and storminess are more widely understood.
C2 (v) Improve stakeholder awareness and understanding of how sea level rise and storminess is taken into account in decisions relating to specific coastal defence and managed retreat schemes.	Environment Agency, Maritime LAs, DEFRA, NAW, IDBs	<ul style="list-style-type: none"> • Better understanding of the reasons for decisions relating to the design of coastal defence schemes or managed retreat.
C2 (vi) Address the issue of compensation for farmers, landowners and other users whose land is no longer protected.	DEFRA, NAW, NFU/NFUW	<ul style="list-style-type: none"> • Economic impact of managed retreat on affected landowners is reduced.

Issue reference C3

The need for new and improved coastal defences

The need for new and improved coastal defences must be assessed where standards of service for flood protection are not currently being met or where problems of coastal erosion have been identified. This need is likely to increase with rising sea levels and increased storminess associated with global warming. However, the overall benefits of coastal defence must equal or outweigh the overall costs. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy C3

Encourage detailed decisions regarding specific schemes to be compatible with the overall Shoreline Management Plan and be based on principles of sustainability which do not result in an unacceptable increase in problems elsewhere.

Proposals for Action	Who could be involved	Benefits
C3 (i) Identify flood risk areas.	Environment Agency, Maritime LAs, IDBs	<ul style="list-style-type: none"> Better targeting of resources for flood defence measures.
C3 (ii) Update asset surveys on a frequency based on risk to monitor the condition of existing sea and tidal defences.	Environment Agency, Maritime LAs, IDBs	<ul style="list-style-type: none"> Information provided in order to maintain defences in optimum condition.
C3 (iii) Carry out asset surveys to monitor the condition of existing coastal protection schemes.	Maritime LAs	<ul style="list-style-type: none"> Information provided in order to maintain defences in optimum condition.
C3 (iv) Produce an annual report on the state of coastal defences.	Maritime LAs , Environment Agency, IDBs	<ul style="list-style-type: none"> Better targeting of resources for coastal defence measures.
C3 (v) Implement a rolling programme of maintenance of sea and tidal defences, according to cost-benefit assessment.	Environment Agency, Maritime Las, IDBs	<ul style="list-style-type: none"> Defences are maintained in optimum condition.
C3 (vi) Deliver prioritised programme of technically, economically and environmentally sound and sustainable improvement works to flood defences, subject to funding being available.	Environment Agency, Maritime LAs, IDBs	<ul style="list-style-type: none"> Defences are provided to an appropriate standard of service.
C3 (vii) Deliver prioritised programme of technically, economically and environmentally sound and sustainable coastal protection works where appropriate.	Maritime LAs, Environment Agency	<ul style="list-style-type: none"> Protection of property from erosion or encroachment by the sea.
C3 (viii) Carry out full consultation with all interested parties on proposed flood defence and coastal protection schemes.	Environment Agency, Maritime LAs, all interested parties, IDBs	<ul style="list-style-type: none"> Options pursued take into account all interests that may be affected.
C3 (ix) Raise public awareness of coastal protection and flood defence schemes, including their aims, positive and negative impacts, the range of options considered and the reasons for final choice of design.	Environment Agency, Maritime LAs, IDBs	<ul style="list-style-type: none"> Improved public awareness of the aims, benefits and reasons for coastal defences, and improved consensus building for final choice of design.

Issue reference C4

Reduced drainage from coastal land because of sea level rise

In some areas, sea level rise may impede drainage from the land. Increased 'tide-lock' may cause water logging of the land and lead to increased dependence on storm water storage and pumping. It may also have significant effects on the drainage of river systems and discharges into the Estuary. Lengthening of tidal pills because of tidal accretion can also be a problem, as outfalls through flood defences silt up. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy C4

The predicted implications of sea level rise must be taken into account when the future management of land drainage is planned.

Proposals for Action	Who could be involved	Benefits
C4 (i) Undertake periodic surveys of drainage outfalls and sluices.	Environment Agency, Maritime LAs, IDBs	<ul style="list-style-type: none">• Drainage problems identified at an early stage.
C4 (ii) Maintenance and dredging regimes for main drainage channels and the drainage infrastructure elsewhere should be reviewed in light of the implications of sea level rise, and altered accordingly.	IDBs, Environment Agency, Maritime LAs, Landowners and tenants.	<ul style="list-style-type: none">• Drainage is optimised within the constraints of tide-lock conditions.
C4 (iii) Investigate the need for improved drainage systems, stormwater storage and pumping, and provide these where justified.	IDBs, Environment Agency, landowners	<ul style="list-style-type: none">• Land is drained and maintained to prevent waterlogging.
C4 (iv) Encourage new development not to have an adverse effect on drainage, flood storage or defences.	LPAs, Environment Agency, IDBs, Developers.	<ul style="list-style-type: none">• Flood risk is not increased as a result of development.
C4 (v) Management Regimes for Water Level Management Plans covering SSSIs should take into account sea level rise.	Operating Authorities, including: Environment Agency, IDBs, LAs, EN, CCW, DEFRA, landowners, CLA, NFU/NFUW, Wildlife Trusts.	<ul style="list-style-type: none">• Integrated management of water levels at water-related SSSIs for conservation, agricultural and land drainage purposes.

Issue reference C5

Concern about the loss of saltmarsh and other intertidal and beach habitats because of coastal squeeze

The Severn Estuary has significant saltmarsh and wetland areas, particularly in the upper reaches. Rising sea levels caused by climate change are likely to increase erosion and cause the shoreline to move inland. Soft shores, particularly saltmarshes, can be ‘squeezed’ between the advancing sea and hard cliffs or coastal defences. This intertidal zone provides both an important habitat, protected under the EU Habitats Directive within the Severn Estuary SPA, pSAC, and, in many cases, an important coastal defence function because it provides a natural buffer against wave attack.

Managed retreat may be a viable option in areas of low flood defence priority. In some cases, this may provide opportunity for environmental gain, such as an increase in saltmarsh.

Policy C5

Saltmarsh and other intertidal and beach habitats should be conserved and enhanced in a manner which balances coastal protection, flood defences and nature conservation needs through the SMP framework, Coastal Habitats Action Plans (ChaMPs)³, and other emerging plans, and by meeting the requirements of the Habitats Directive.

Proposals for Action	Who could be involved	Benefits
C5 (i) Assess those areas of the Severn Estuary that are subject to coastal squeeze and identify the options for managed retreat or other method of reducing coastal squeeze.	Coastal Cell Groups, Maritime LAs, Environment Agency, EN, CCW, NFU/NFUW, CLA, Landowners and tenants, ASERA, DEFRA, IDBs	<ul style="list-style-type: none"> • Identification of areas where managed retreat is the best possible option for all those involved; • Account is taken of economic impact upon landowners and tenants • Nature conservation, coastal defence and economic benefits of managed retreat are maximised.
C5 (ii) Assess the impacts of coastal defence measures on intertidal habitats and monitor the response of these habitats.	EN, CCW, Environment Agency, Maritime LAs, ASERA, Research Institutions, IDBs	<ul style="list-style-type: none"> • Better information on environmental change to inform planning and management decisions relating to coastal defence and nature conservation.
C5 (iii) Encourage the uptake of agri-environment schemes by farmers and landowners in areas suitable for the creation of saltmarsh or other intertidal and beach habitats (see also Issue R3 in Chapter 4).	DEFRA, NAW, EN, CCW, Voluntary Conservation Organisations, ASERA, CLA, NFU/NFUW, Landowners and tenants	<ul style="list-style-type: none"> • Contributing towards sustainable farming economy; • Nature conservation, coastal defence and economic benefits of managed retreat are maximised.
C5 (iv) Assess the use of flora and fauna as indicators of environmental stress.	EN, CCW	<ul style="list-style-type: none"> • Better information on environmental change to inform planning and management decisions relating to coastal defence and nature conservation.
C5 (v) Increase accessibility of information and encourage awareness-raising campaign on environmental processes during implementation of coastal defence schemes.	Environment Agency, DEFRA, Coastal Cell Groups, British Waterways, CLA, NFU/NFUW, LAs, SEP, IDBs	<ul style="list-style-type: none"> • Greater awareness of coastal and riverine processes and understanding of coastal defence initiatives.

³ ChaMPs do not apply in Wales

Issue reference C6

The impact of coastal protection and flood defences on other interests

Coastal defences can lead to alterations in the natural flow regime or the natural character of the Estuary, and can influence the use of adjoining land. Coastal defence works can lead to loss, gain or changes to land, natural vegetation, wildlife habitats, access to the shore and views of the Estuary. Earth moving work can expose buried archaeological remains or features of geological interest, with risk of damage or destruction. Changes in erosion patterns can also adversely affect such features. In addition, the defences themselves may be of significant archaeological importance. This issue was considered a priority at the Stakeholder Decision Analysis Process (see Appendix 2).

Policy C6a

Decisions regarding the provision of flood defences or coastal protection should take full account of the need to protect nature conservation, landscape character, amenity and features of geological and archaeological interest.

Policy C6b

Full consideration should be given to soft engineering options and managed retreat, and the potential impacts where coastal protection works are proposed.

Proposals for Action	Who could be involved	Benefits
C6a (i) Carry out appropriate level of investigation of environmental, amenity and archaeological impacts for all proposed schemes, in compliance with the Habitats Directive requirements and with due regard to Shoreline Management Plans and any other relevant schemes or plans, and implement mitigation measures as appropriate.	Environment Agency, Maritime LAs, EN, CCW, EH, Cadw, NFU/NFUW, landowners and tenants, IDBs	<ul style="list-style-type: none">• The most environmentally acceptable outcome is achieved for all coastal defence proposals.
C6a (ii) Carry out research into the management of intertidal and shoreline species in order to inform Shoreline Management Plans and options appraisal for coastal defences.	Biodiversity Action Plan Partners including: EN, CCW, Environment Agency, LAs, Wildlife Trusts, RSPB, industry and others	<ul style="list-style-type: none">• Better information for the protection and enhancement of species and habitats for nature conservation, including meeting BAP targets.
C6b (i) Consider a wide range of possible options for all proposed coastal defence schemes, including soft engineering and managed retreat.	Environment Agency, Maritime LAs, Coastal Cell Groups, IDBs	<ul style="list-style-type: none">• The most environmentally acceptable outcome is achieved for all coastal defence proposals.
C6b (ii) Consider funding mechanisms to help deliver soft engineering/managed retreat options.	DEFRA, NAW, Operating Authorities	<ul style="list-style-type: none">• Environmentally acceptable schemes are more financially viable.

Issue reference C7

The need to improve tidal flood warning systems

Tidal flooding can occur at any time of year. The speed of tidal flooding and the force of water leads to significant risk to life and property. Formal warnings of tidal flooding are issued downstream of Avonmouth and Chepstow on both coasts. At present, on the Severn Estuary upstream of Avonmouth, only Severn Beach and Gloucester receive formal warnings, although there are plans to extend this service from Avonmouth to Gloucester.

Policy C7

Operate a reliable and timely flood warning system for flooding around the Estuary.

Proposals for Action	Who could be involved	Benefits
C7 (i) Provide reliable and timely flood forecasting and flood warning systems in areas at risk from tidal flooding and storm surges.	Meteorological Office, Environment Agency	Emergency services, operating authorities and individuals can take measures to reduce risk to life and property from flooding.
C7 (ii) Increase public awareness of flood risks, the flood warning service, and appropriate action to take. Including media campaigns, literature, direct mailing, and signage at the water's edge.	Environment Agency, Las	The public can take effective measures to reduce risk to life and property from flooding.

Further Reading:

1. Severn Estuary Shoreline Management Plan (being developed), Severn Estuary Coastal Group.
2. Bridgwater to Bideford Bay Shoreline Management Plan, North Devon and Somerset and Coastal Group, 1998.
3. Swansea Bay Shoreline Management Plan (being developed), Swansea Bay Coastal Group,
4. Strategy for Flood and Coastal Defence in England and Wales, MAFF, 1993.
5. Coastal Defence and the Environment – A guide to good practice, MAFF, 1993.
6. Coastal Defence and the Environment – A strategic guide for managers and decision makers in the National Rivers Authority, Local Authorities and other bodies with coastal responsibilities, MAFF, 1993.
7. Flood and Coastal Defence Appraisal Guidance Notes 3, MAFF, 1999.
8. Flood and Coastal Defence Appraisal Guidance Notes 2, MAFF, 2000.
9. Policy Guidelines for the Coast, Department of the Environment, 1995.
10. Policy and Practice for the Protection of Floodplains, Environment Agency, 1999.
11. Development and Flood Risk (to be superseded by PPG25: Development and Flood Risk, currently in preparation), DoE Circular 30/92, 1992
12. Planning Policy Guidance 20: Coastal Planning, DETR, 1992
13. Planning Guidance (Wales) Technical Advice Note 15: Development and Flood Risk, Welsh Office, 1998.
14. Planning Guidance (Wales) Technical Advice Note 14: Coastal Planning, Welsh Office, 1998.
15. Local Flood Warning Plans for Gloucestershire, Somerset & the Avon Unitary Authorities Area, and Monmouthshire, Environment Agency, 2000.
16. Guidance for Flood Warning Codes for England and Wales, Environment Agency, 2000.
17. Flood Warning Fact Sheets 1-7, Environment Agency, 2000.
18. Flood Directories for relevant areas, Environment Agency, 2000.
19. Gwent Levels Foreshore Management Plan, Environment Agency Wales, 2000. (being developed).
20. Flood & Coastal Defence Project Appraisal Guidance Note 5 – Environmental Appraisal, MAFF, 2000.
21. River Parrett Catchment Flood Management Strategy;2001.

6. Tourism, recreation and access

Aim:

To maintain and improve the accessibility and availability of sustainable tourist and recreational facilities that enhance the economy, whilst considering the local environment.

Government aims

Tourism

6.1. The Government has stated that it aims to create the conditions that will encourage foreign and domestic tourism, so that the industry can contribute to increasing opportunities for access to our culture and heritage and increase tourism revenue. It promotes the sustainable development of tourism, to contribute, rather than detract from, the quality of our environment.

Recreation

6.2. The Government aims to promote responsible sport, physical recreation and sustainable leisure activities and help reconcile possible conflicts between different sport and leisure uses on the coast, in coastal waters and in the countryside. It encourages the safe management and protection of the environment in sport and recreation activities.

Access

6.3. The Government aims to ensure that recreation is well managed, and to avoid conflicts and bring positive benefits to those who live in areas where recreation takes place. Regular exercise, gained through enjoyment of the countryside by visitors, can positively contribute to both personal health and the economic health of an area.

6.4. Access to the countryside can be obtained through the use of the Public Rights of Way network, common land, and other dedicated access land. The Government supports a target for all rights of way to be legally defined, properly maintained and well promoted. Many Local Authorities own and manage land specifically for open-air access and enjoyment, land such as Country Parks and picnic places. Other organisations own and manage land for wildlife or for the landscape value and permit informal access where appropriate. These organisations include Wildlife Trusts, the Woodland Trust and the National Trust.

6.5. The Countryside and Rights of Way Act (CROW) 2000 provided additional opportunities for access to open country in England and Wales. These additional opportunities will apply to registered common land and mountain, moor, heath and down as mapped by the statutory agencies.

6.6. The CROW Act 2000 leaves the option available to the Secretary of State in England and the National Assembly in Wales to amend the definition of open country to include a reference to coastal land.

Tourism

Background

6.7. Tourism has an economic and physical influence on the Estuary, being one of the largest employment sectors. There are several million visitors to the Estuary each year, sustaining a large and varied number of tourist attractions, accommodation types and transport services based in both the towns and countryside. Tourism, in many ways however, is a fragmented industry. There is therefore a need to involve and agree a direction from the many partners involved, both public and private.

6.8. Tourism along both sides of the Estuary is shaped by the pattern of principal towns and cities, traditional coastal resorts, small historic market towns, villages and natural landscape features. Traditional holiday locations such as Minehead, Burnham-on-Sea, Weston-super-Mare and Barry Island as well as having developed tourism infra-structures, benefit from the intrinsic attraction of the coast and provide centres for exploring the Quantocks, Mendip Hills, Exmoor National Park, Somerset Levels and the Vale of Glamorgan's Heritage Coast. Developments at Cardiff Bay cater for a new generation of tourism with its concentration on the arts, music,

shopping and business tourism. The network of small historic market towns and villages, and associated historic and wildlife attractions are important to the fabric of the area, particularly Chepstow and the Wye Valley, Lydney and the Forest of Dean, Berkeley and Slimbridge in the higher reaches of the Estuary. Other visitor attractions include boat trips to the islands of Steep Holm and Flat Holm as well as fishing and pleasure trips from most other resorts.

6.9. Around the Estuary the overseas tourism market has been growing steadily, but in the domestic market the main growth potential lies in the short holiday market and in business-related tourism.

6.10. Tourism is recognised by Government as a key wealth creator, and it is already an integral part of the economy and way of life around the Estuary. It brings economic, environmental and social benefits and supports local services. However, tourism can have negative effects, including difficulties of visitor management, traffic congestion and environmental degradation, eventually leading to damage to the features that the tourists come to enjoy.

Recreation and Access

Background

6.11. Outdoor recreation uses the natural environment as its main resource and it is recognised that participation in sporting or recreational activities often serves to foster attitudes of environmental awareness and leads to concerns for conservation and sustainable use.

6.12. The Estuary offers a diverse and often challenging environment for a wide variety of sporting and recreational interests. Sailing and boating are very popular activities, and each part of the Estuary is host to different types, such as sailing, dinghying, canoeing and large cruisers. Sea angling is popular from many locations along the shore, and many vessels are used privately or for charter. Large numbers of waders and wildfowl can be seen around the Estuary, particularly in winter. Thousands of people come to the Estuary to watch the birds and visit nature reserves, historic monuments and ancient woodlands. Wildfowling clubs affiliated to the British Association for Shooting and Conservation, and recognised for integrating their activities with conservation in estuaries, own or lease sporting rights over the foreshore and adjacent land. Walking, horse-riding and cycling are favoured pursuits and there is demand for further long distance routes (e.g. Gloucestershire Coastal Path and developing the missing links in the ROW system). Recreational pastimes such as bathing, land yachting, kite buggies and beach racing occur at various locations around the Estuary where lengthy stretches of sand form the primary tourist attraction .

6.13. Major tourist attractions and recreational areas are shown in Map 5 (see Appendix 8).

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Loss of beach material; Chapters 5 and 9
- Litter; Chapter 8
- Water quality; Chapter 8
- navigational safety; Chapter 7
- Development and transport issues are addressed in Chapter 3.
- Participation of farmers in rural diversification schemes; Chapter 4.

Issue reference T1

Promoting sustainable tourism

To achieve sustainable tourism, it is important to maintain the balance between the needs and demands of the visitors, the protection of the environment and the interests of local communities. Sustainable tourism emphasises the quality of visit to an area, including facilities, service, welcome and the provision of something that is locally distinctive.

Policy T1a

Adopt current best practice guidelines for sustainable tourism to reduce impact on the environment, improve the quality of life for host communities and improve the enjoyment of visitors.

Policy T1b

Promote tourism initiatives that encourage the natural and cultural history interest of the Severn Estuary.

Proposals for Action	Who could be involved	Benefits
T1a (i) Identify opportunities for sustainable tourism in the SEP area including assistance for tourist related businesses to become more sustainable, through training and financial support and visitor payback schemes.	NAW, GoSW, LAs, Tourist Boards / companies, RDAs, Transport operators, Trade associations, Local businesses, Resident association groups, Conservation groups	<ul style="list-style-type: none"> Prevent duplication of effort. Sharing of ideas from a variety of interests. Integration of sustainability ethos in local tourism. Reduced impact on the environment.
T1a (ii) Develop sustainable tourism indicators and integrate tourism more fully into planning policies and sustainability initiatives such as Agenda 21.	As T1a (i)	<ul style="list-style-type: none"> As T1a (i)
T1a (iii) Develop clear guidelines for tourism developments that take into account their impact on the environment.	As T1a (i)	<ul style="list-style-type: none"> As T1a (i)
T1a (iv) Improve data available for better management of tourism around the Estuary.	As T1a (i)	<ul style="list-style-type: none"> Aid decision making.
T1a (v) Utilise information on tourism and recreational carrying capacity to guide decisions on visitor management.	As T1a (i)	<ul style="list-style-type: none"> Help encourage appropriate decisions to be made on visitor management.
T1a (vi) Establish a working group to investigate improved information sharing on sustainable initiatives, including raising the awareness and appreciation of tourist providers and training so that they can pass on their awareness to visitors.	As T1a (i) plus the SEP	<ul style="list-style-type: none"> As T1a (i) Bring different groups together to learn from experiences and discuss ways forward.
T1a (vii) Promote joint working between landowners, LAs and conservation bodies to develop visitor management strategies.	LAs, CLA, NFU/NFUW, Conservation groups, Environment Agency, CA, EN, CCW, SEP	<ul style="list-style-type: none"> As T1a (vi)
T1a (viii) Involve local communities in decisions being made about the development of sites and both the positive and negative implications of increased promotion to visitors and year-round tourist trade.	As T1a (vii) plus resident groups	<ul style="list-style-type: none"> Generates community ownership of issues.
T1a (ix) Consider options to restrict car access and so control visitor numbers to areas where use may have a negative impact on the environment.	As T1a (i)	<ul style="list-style-type: none"> Prevent overuse of visitor sensitive areas.

Proposals for Action	Who could be involved	Benefits
T1a (x) Investigate and encourage alternative modes of transport other than the private car, including support of infrastructure to promote cycle use, walking routes and rural bus and train services, and taking into consideration visitors travelling to the area.	As T1a (i) plus Sustrans	<ul style="list-style-type: none"> • Encourages people to use the countryside in a more sustainable way. • Improved infrastructure for local communities.
T1a (xi) Encourage farmers, landowners, local planning authorities and other users to investigate alternative uses for redundant buildings.	CLA, NFU/NFUW, LAs	<ul style="list-style-type: none"> • Best use of farm facilities. • Alternative income for farmers. • Maintain character of countryside.
T1a (xii) Include policies in development plans that encourage new holiday developments and landscaping of existing holiday developments, that respect the distinctive character of the Estuary.	As T1a (i)	<ul style="list-style-type: none"> • Maintain character of Estuary. • Improve character of Estuary around holiday developments.
T1b (i) Identify sites around the Estuary that could accommodate cultural and natural history related tourism initiatives in addition to improving sustainability of the existing tourism product.	LAs, Conservation agencies, Tourist Boards/companies, WWT	<ul style="list-style-type: none"> • Promotion of a sustainable form of tourism. • Raise awareness of Estuary conservation status.
T1b (ii) Develop a co-ordinated marketing strategy for cultural and natural history related tourism.	LAs, Conservation groups, Tourist Boards/companies, National Museum of Wales, WWT	<ul style="list-style-type: none"> • As T1 a (i) • Prevent duplication of effort.

Issue reference T2

The regeneration of existing resorts

One way of promoting sustainable mass tourism within the area is to regenerate the existing coastal resorts rather than develop new areas. This outlook should also apply to areas such as docks and old docklands. They have the public transport and service infrastructure and are organised to deal with large numbers in an environment that can withstand the pressure. Traditional resorts will have to continually upgrade to retain present levels or increase numbers of visiting tourists.

Policy T2

Support the regeneration and enhancement of existing resorts and dockland areas, in order to minimise adverse impact on the environment of new sites and improve the quality of life for the host communities.

Proposals for Action	Who could be involved	Benefits
T2 (i) Include policies in development plans that favour the location of new facilities close to existing transport links and within urban areas.	LAs, RDAs	<ul style="list-style-type: none"> • Maintain character of Estuary. • Prevent urban spread. • Rejuvenate existing urban areas.
T2 (ii) Develop marketing strategies for resorts in need of regeneration to increase the number of visitors and extend the 'tourist season', in accordance with PPG 21 and TAN 13.	LAs, Tourist boards/companies, Transport operators, Trade associations, Local businesses, Resident association groups, RDAs, WWT	<ul style="list-style-type: none"> • Prevent duplication of efforts. • Sharing of ideas from a variety of interests. • Have a co-ordinated approach to regeneration of existing resorts.
T2 (iii) Reinforce links between existing tourist attractions and encourage visitors to combine visits to several attractions in the local area.	As T2 (ii)	<ul style="list-style-type: none"> • Improve visitor experience of the area. • Encourage visitors to spend more time in the area.
T2 (iv) Encourage interested parties to work together to explore opportunities that expand the tourism market in existing resorts.	As T2 (ii)	<ul style="list-style-type: none"> • As T2 (ii)

Issue reference T3

Provision of water-based tourism facilities

There is the potential to increase ferry and pleasure trips to increase the opportunities for visitors and tourists to enjoy both sides of the Estuary, scenic views from the water and to provide more opportunities to visit the islands of Steep Holm and Flat Holm (within the capacity of their nature conservation status). The promotion of water-based tourism would likely aid in the regeneration of existing resorts.

Policy T3

Promote appropriate water-based tourism as a means of increasing visitors' enjoyment of the Estuary.

Proposals for Action	Who could be involved	Benefits
T3 (i) Consider increasing ferry and pleasure trips of financial viability and environmental acceptability.	LAs, Tourist boards/companies, Ferry operators, Conservation groups, British Waterways.	<ul style="list-style-type: none"> • Increase the opportunity for visitors to view the Estuary. • Help develop closer links between English and Welsh coastlines.
T3 (ii) Consider a car ferry service between South Wales and the West Country.	LAs, Tourist boards, Ferry operators, British Waterways.	<ul style="list-style-type: none"> • Increase tourism between coasts of the Estuary.
T3 (iii) Consider connections between the Estuary and inland waterways.	LAs, Inland Waterways Association, Tourist operators, British Waterways.	<ul style="list-style-type: none"> • Increase the opportunities for visitors to explore the area. • Encourage visitors to spend more time in the area.

Issue reference T4

Provision of Public Rights of Way around the Estuary and impacts from recreational use.

There is a growing use of the countryside for informal recreation, such as walking, cycling and horse-riding. Many of these users would like to see better provision of Public Rights of Way and access to the Estuary shore. However, there is also the need for further research into the impacts of human activity on areas of Special Protection.

Policy T4

Support the improvement of Public Rights of Way along the banks and in the vicinity of the Estuary and enhance the recreational and ‘green’ transportation network, particularly where this will contribute to the transportation and sustainable recreation objectives, and where it does not conflict with other interests.

Proposals for Action	Who could be involved	Benefits
T4 (i) Extend opportunities for public access as appropriate through the development of access agreements.	LAs, CCW/EN, CA, User groups, CLA, NFU/NFUW, Environment Agency	<ul style="list-style-type: none">• Increase quality of visitor experience.• Encourages sustainable forms of tourism.
T4 (ii) Establish a Recreation Forum to involve all major interest groups on the Estuary, encourage dialogue and understanding to seek voluntary solutions to conflicts.	As T4 (i), RYA, SEP, BASC, RA, RSPB, Port Authorities, British Horse Society (BHS), Federation of Sea Anglers (FSA), CTC	<ul style="list-style-type: none">• Sharing of ideas from a variety of interests.• Integration of sustainability ethos in local tourism.• Raise awareness of other users needs.• Help develop co-operation.• Generate ownership of issues.
T4 (iii) Improve publicity and interpretation of Public Rights of Way, permissive and agreement paths.	LAs, Tourism, Companies/Boards, CCW, EN, BHS	<ul style="list-style-type: none">• As T4 (i)
T4 (iv) Encourage all definitive Rights of Way to be clearly delineated, in a good state of repair and unobstructed.	LAs, RA, BHS	<ul style="list-style-type: none">• As T4 (i)

Issue reference T5

Access to the shore

There is a need for public access to the Estuary shore wherever practicable. Access may be limited because there is a need for further parking facilities, public transport, and slipways for boat access.

Policy T5

Support measures for additional access to the shore where appropriate, including access that meets the needs of disadvantaged groups where practical, and increased access facilities for craft on Estuary waters. Additional access will need to be considered in the context of safety, wildlife conservation, the needs of landowners and other users.

Proposals for Action	Who could be involved	Benefits
T5 (i) Encourage the need for access to and along the shore to be taken into account in the planning of Estuary coastal development.	LAs, CCW/EN, CA, User groups, CLA, NFU/NFUW, Environment Agency	<ul style="list-style-type: none">• Improved access and facilities to the Estuary where appropriate.
T5 (ii) Consider options for improving access to the shore including needs and sites for access for disabled groups.	As T5 (i)	<ul style="list-style-type: none">• As T5 (i)

Issue reference T6

The impact of recreation and tourism on farming and the rural environment

Initiatives to manage visitors are being promoted, such as well maintained and way-marked footpaths (e.g. Severn Way), including interpretation and education. The National Cycle Network serves the Estuary well with many coastal routes planned. However, the number of people visiting the countryside, often by car, is putting pressure on the rural environment and has impact on nature conservation interests. With a large area of the Severn Estuary to be covered by several conservation designations, the potential impact of activities must be evaluated against conservation objectives. Farmers and landowners are also concerned about disturbance and damage as a result of an increase in recreational activity. In addition, levels of rural crime have been shown to rise where there is increased public access to the countryside.

Policy T6

Adopt current best practice for sustainable tourism in order to minimise the impact on the natural environment.

Proposals for Action	Who could be involved	Benefits
T6 (i) Identify the qualities, sites and carrying capacities within particularly sensitive areas, which are not sufficiently robust to accommodate intensive visitor pressure.	LAs, CCW/EN, CA, User groups, CLA, NFU/NFUW, Environment Agency, BHS, British Waterways.	<ul style="list-style-type: none">• Protect sensitive sites from recreational use.• Provide data for visitor management strategies.
T6 (ii) Encourage further development of rural strategies.	LAs, Landowners, Farmers, Recreational groups, BHS, British Waterways.	<ul style="list-style-type: none">• Encourages the appropriate recreational use of rural areas.

Issue reference T7

Provision of facilities for recreational boat users

Some fishermen and other users would like to see improved moorings, slipways and harbours, and improved maintenance of those that already exist.

Policy T7

Encourage the improvement of facilities for recreational boat users around the Estuary where they do not conflict with other interests.

Proposals for Action	Who could be involved	Benefits
T7 Establish a working group to discuss mechanisms for funding and operating improved facilities.	SEP, BMIF, Recreational boat users, LAs, Harbour Authorities, MCA, NFU/NFUW, SECG, User groups, Crown Estate, Environment Agency, Lydney Docks Partnership, British Waterways.	<ul style="list-style-type: none">• Improved facilities for recreational boat users.• Improved co-operation and sharing of ideas.

Issue reference T8

Marinas

Related to the request for improved facilities are proposals to develop marinas, which could be a factor in helping to regenerate existing resorts. However, there is concern about the environmental impact of marinas.

Policy T8

Continue to encourage the siting of marina development close to other development and appropriate infrastructure, subject to the mitigation of environmental impacts.

Proposals for Action	Who could be involved	Benefits
T8 (i) Encourage the need for marina development to be taken into account in the planning of Estuary coastal development.	LAs, NAW, GoSW	<ul style="list-style-type: none">Marina development considered where appropriate.
T8 (ii) Encourage the use of the British Marine Industries Federation (BMIF) Environmental Code of Good Practice and Environment and Boating Facilities Service by marina users.	LAs, Private developers, Harbour Authorities, Local boating clubs	<ul style="list-style-type: none">Positive public perception of marina use and development.

Issue reference T9

Accommodating motorised watersports in the Estuary

Motorised watersports are popular in several areas of the Estuary, but there is concern for the safety of other Estuary users, and from conservationists about effect on wildlife.

Policy T9

Work in partnership to achieve voluntary controls on motorised watersports.

Proposals for Action	Who could be involved	Benefits
T9 Identify opportunities for designated zones for motorised watersports.	LAs, BMIF, Local user groups, Navigation authorities, CCW, English Nature	<ul style="list-style-type: none">A place for motorised watersports that does not conflict with other users enjoyment of the Estuary.

Issue reference T10

Reducing perceived conflicts between recreational users

Recreational users generally co-exist well with other users and with each other. However, problems do occur, which are often caused by a minority of users who are not fully aware of the implications of their actions on others and the natural environment. Careful planning and liaison between user groups, managers and local communities can avoid much of this conflict.

Policy T10

Support and promote codes of conduct and guidelines prepared by relevant governing bodies and the preparation of further codes of conduct to address conflicts with other interests.

Proposals for Action	Who could be involved	Benefits
T10 Develop a framework to guide recreation management in the Estuary and its environs to encourage integration between recreation groups and with other interests.	LAs, Sports Councils, BMIF, User groups, Navigation authorities, BHS	<ul style="list-style-type: none">Greater understanding of recreation issues.Improved relations between user groups.

Issue reference T11

Public understanding of recreation management

Some users of the Estuary are confused about who does what in the management of recreation. In part, this is due to the wide range of organisations involved and also the variety of regulations and byelaws they enforce.

Policy T11

Promote the public understanding of recreation management as part of a wider educational programme such as 'Navigate with Nature'.

Proposals for Action	Who could be involved	Benefits
T11 (i) Produce, disseminate and maintain a 'recreation directory' of organisations responsible for management of recreation, and regulatory bodies of club contacts, facilities and activities.	SEP, LAs, BMIF, User groups.	<ul style="list-style-type: none">• Single source of information for recreation users.
T11 (ii) Encourage regulatory bodies to publicise their activities.	User groups	<ul style="list-style-type: none">• Greater awareness among users of regulatory bodies and activities.
T11 (iii) Produce and disseminate an up-to-date summary of water-based recreation byelaws in the Severn Estuary.	SEP, LAs, Port Authorities, Harbour Commission	<ul style="list-style-type: none">• Greater awareness among users.

Further reading :

1. Towards 2020 A Tourism Strategy for the Southwest, West Country Tourist Board, March 1999.
2. South East Wales Regional Tourism Strategy, Competing With Confidence, South East Wales Economic Forum, August 1999.
3. Planning Policy Guidance Note 21: Tourism, Department of the Environment, 1992.
4. Planning Policy Guidance Note 17: Sport and Recreation, Department of the Environment, 1992.
5. Planning Guidance (Wales) Technical Advice Note 13: Tourism, Welsh Office, 1997.
6. Coastal Recreation Report, English Sports Council, 1998.
7. A Model Approach to Resolving Conflict in the Countryside, The Sports Council for Wales & Countryside Council for Wales, 1998.
8. Recreation on the Living Coast, Royal Yachting Association, 1995
9. Managing Personal Watercraft. A guide for local and harbour authorities, British Marine Industries Federation, 1999.
10. Planning Guidance (Wales) Technical Advice Note 16: Sport and Recreation, Welsh Office, 1998.
11. A sustainable Wales – Learning to live differently, The National Assembly for Wales, 1999.
12. A Better Quality of Life, a strategy for sustainable development for the UK, Department of Environment, Transport and the Regions, 1995
13. RYA Policy Paper – Recreation of the Living Coast, RYA,
14. Achieving Our Potential – A Tourism Strategy for Wales,
15. RYA Leaflet – 'Tidelines', RYA, 2001
16. The economic impact of recreation and tourism in the English countryside, Countryside Agency, 1998

7. Ports, shipping and navigation

Aim:

To promote and support the sustainable development and the continued viability of the Estuary's ports, wharves and harbours, and their associated navigation infrastructure.

Government aims

7.1. The UK Government aims to take account of the importance of the shipping industry to the economy; to achieve and maintain a thriving ports industry; to protect the marine environment from ship-borne pollution; and to ensure adequate compensation is available from the polluter in the event of marine pollution.

Ports

7.2. The Severn Estuary's ports are extremely important to the regional and, in some cases, national economy. Coastal shipping typically uses around 20% of the energy used by road transport and can help to lead to substantial reductions in road congestion. The very good motorway connections on both sides of the Estuary mean that there are significant environmental as well as economic benefits gained from delivering goods directly to the heart of the country when compared with the transporting of goods by road, for example from ports in the south-east.

7.3. The major ports within the SEP area are Bristol (Royal Portbury and Avonmouth), Cardiff, Newport and Barry, with smaller facilities at Sharpness, Gloucester and Bridgwater. A new authority inside the Barrage at Cardiff, the Cardiff Bay Harbour Authority is under the auspices of Cardiff County Council.

7.4. The Port of Bristol, which is privately owned, has undergone significant expansion over the last ten years and handles cars (import and export), timber and forest products, coal and coke, animal foodstuffs, petroleum products (including Liquid Petroleum Gas), raw materials for manufacturing, container traffic and marine dredged aggregates.

7.5. The ports of Barry, Cardiff and Newport are operated by Associated British Ports (ABP). Barry handles predominantly liquid bulks of oil and chemicals, regular fruit and vegetable cargoes and some dry bulks. Cardiff handles petroleum products, steel, timber, dry bulks, containers and fruit juices. Newport handles steel imports and exports, agri-bulks, solid fuels, timber, plywood and glass. All three handle marine dredged aggregates.

7.6. British Waterways is the port authority for Sharpness Dock where cargo operations are carried out by private companies. Sharpness Dock handles dry bulk, grain, foodstuff, fertiliser, scrap and other goods. Leisure facilities at Sharpness include a small marina and a dry dock for ship repairs is in regular use. Gloucester Harbour Trustees are the competent harbour authority for the tidal waters of the River Severn from a point seaward of the Second Severn Crossing to Gloucester, and the tidal river Wye to Bigsweir Bridge. Newport Harbour Commissioners control the tidal waters of the river Usk.

7.7. Sedgemoor District Council is the Harbour Authority at the Port of Bridgwater, where all the commercial wharves are in private hands. Trade at Bridgwater is currently increasing, particularly dry bulk imports from the near continent. Cardiff Bay is used for recreational boating and by small fishing craft. Portishead town dock is being developed as a marina and Watchet Harbour also plans to upgrade mooring facilities when a new tidal sill is in place.

7.8. Port and Harbour Authorities are shown in Map 6 (see Appendix 8).

7.9. Representatives of port and harbour authorities on the Severn Estuary together form a group known as 'The Ports Panel'. This Panel originated from the need for a co-ordinated ports response to issues emanating from the Severn Barrage studies. Ports Panel meetings are now held on an ad-hoc basis, to discuss topical items and issues affecting the Estuary that are of mutual interest or concern.

Shipping and navigation

7.10. Most shipping types use the Estuary. Ship sizes vary from small coasters to bulk carriers of 300m length. The ports of south-east Wales can handle vessels up to 40,000 tonnes dead-weight. Newport has the largest lock in south Wales and can handle vessels up to 224m long and 10.5m draught. Subject to tidal availability, the Royal Portbury Dock at Bristol can accommodate vessels of up to 300m in length and drawing 14.5m.

7.11. The Severn Estuary is an important shipping route with large vessels from national and international destinations using the Estuary's ports. The Estuary has a good safety record, depths being adequate for the sizes of vessels handled and the incidence of fog being low. Trinity House, the organisation responsible for ensuring the adequacy of navigation aids for shipping, and the port and harbour authorities provide and maintain aids to navigation. Port and harbour authorities are the local lighthouse authority within their boundaries.

7.12. Authorised pilots are available for every port, their use being regulated by Pilotage Directions. In many cases, pilotage will be compulsory for vessels of a certain type or above a certain size. Tugs are available at all the principal ports. The Port of Bristol maintains a 24-hour Vessel Traffic Service with radar coverage of all approaches to the port. Gloucester Harbour Trustees have full recorded radar coverage from seaward of the Second Severn crossings to Sharpness.

Dredging

7.13. Port maintenance dredging takes place at most of the ports in the SEP area. The material dredged comprises almost entirely fine silts which are disposed of at designated disposal sites, licensed by DEFRA under the 1985 Food and Environment Protection Act Part II. The lack of accumulation at these sites indicates that the deposited material is quickly taken back into the Estuary's fine sediment circulation system: in excess of 30 million tonnes of fine silt is in suspension on a typical spring tide (Severn Barrage Project, Detailed Report) compared to the 4.5 million tonnes typically dredged and deposited annually by the ports.

7.14. The ability to undertake capital dredging is essential to ensure the continued viability of port operations. Proposals for capital dredging requirements (whether to enable the port to take deeper draught vessels or associated with port development) will be the subject of site-specific environmental studies. Emergency dredging requirements (to maintain safe access to a port) have legislative sanction that seldom needs to be invoked. Mineral dredging (mainly for aggregates) is dealt with in Chapter 9.

Pollution prevention

7.15. All major ports and harbours have produced comprehensive and rigorous Oil Spill Contingency Plans that are approved by the Maritime and Coastguard Agency (MCA). These have been developed in conjunction with Local Authorities, the Environment Agency, DEFRA and English Nature/Countryside Council for Wales as statutory consultees. Local Authorities, port and harbour authorities, the Environment Agency, English Nature, Countryside Council for Wales and the Maritime and Coastguard Agency are working together to develop an Estuary-wide Counter Pollution Plan for the Bristol Channel. This plan will form a facilitating framework for the implementation of the National Contingency Plan for Maritime Pollution from Shipping and Offshore Installations (NCP) together with comprehensive environmental sensitivity data to assist with decision-making. This initiative will enable an effective and efficient response if a pollution incident affects a number of Local Authorities, port and harbour authorities and other agencies. Recent research has shown that a pollution incident in the middle of the Estuary may reach north and south shores within 24 hours, aided by the large tidal excursion and the strong currents in the Estuary. Pollution issues are also addressed in Chapter 8, 'Waste management and pollution' and it is also worth noting that the ports, harbours and wharves themselves have statutory duties in respect of waste management.

Safety

7.16. All commercial ports in the area are working towards compliance with the Port Marine Safety Code, which was launched by the MCA in March 2000. By the end of 2001, all harbour authorities in the region will have produced plans, policies and procedures based on formal safety assessment and will have formal safety management systems. Formal competence standards are being developed for all port personnel. These measures will build on the Severn Estuary ports' already excellent safety record.

7.17. The Royal National Lifeboat Institution (RNLI) has a lifeboat moored at Barry and inshore lifeboats at Penarth, Weston-super-Mare, Minehead and Atlantic College at Llantwit Major. Other voluntary organisations operate inshore rescue boats at Sharpness, Beachley, Portishead and Burnham-on-Sea.

7.18. The Maritime and Coastguard Agency (MCA) provides 24-hour Search and Rescue co-ordination cover from its Maritime Rescue Co-ordination Centre (MRCC) located at Tutt Head, Mumbles, Swansea. The Maritime District covers an area stretching from the mouth of the Towy River in Carmarthenshire to the

Devon/Cornwall border just south of Hartland Point. The MRCC at Tutt Head is also the Regional Headquarters for the Wales and West of England Region.

Recreational water use

7.19. The Estuary's tidal regime with its associated strong currents means that its waters can be dangerous for inexperienced users. Recreational use of the water area is widespread, particularly in the vicinity of Oldbury, Chepstow, Portishead, Cardiff, Newport, Penarth and Barry. In general, however, the use of the Severn Estuary by recreational craft is significantly less than around "honeypot" areas of the south and east coasts of England. The tidal range of the Severn Estuary places considerable limits on the areas accessible for use by recreational and leisure users.

7.20. Some ports have developed codes of practice for leisure users. The Port of Bridgwater has developed a code for use in the waters around Burnham-on-Sea and the Parrett Estuary. This code has the strong support of local boat clubs and aids self-regulation by users. Similarly, some ports have developed local recreational user forums, for example Burnham Water Users Forum is co-ordinated by the Port of Bridgwater Harbour Master, and Gloucester Harbour Trustees User Forum meet regularly.

7.21. Recreational boating on the Estuary is increasing. Moorings within Cardiff Bay Barrage are expected to increase from 1,000 boats to 2,500 in the next five years. Marinas exist at Penarth, Bridgwater and Sharpness, and better facilities are being developed at Portishead and Watchet. British Marine Industries Federation (BMIF) is the trade body to which marinas may be affiliated. Many other craft are based on the Estuary on river moorings and in local harbours. Yacht clubs in the Severn Estuary also affiliate to the Royal Yachting Association and are members of a forum known as the Bristol Channel Yachting Conference. Members of BMIF and the RYA are therefore amongst the recreational groups who have interests in the management of the Severn Estuary. Other craft, from sailing dinghies and speedboats to personal watercraft, are able to launch at public slipways and may travel from far afield to use the Estuary. Recreational water use is covered in Chapter 6 (Tourism, recreation and access).

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- 'Sustainable landuse, development and transport'; Chapter 3.
- Watersports issues are also contained in Chapter 6, 'Tourism, recreation and access'.
- Ports are required to develop Port Waste Management Plans and comply with Waste Reception Regulation requirements; Chapter 8: 'Waste management and pollution'.
- Legislation and responsibilities for nature conservation are explained in more detail in Chapter 13, 'Nature conservation and wildlife'
- Planning issues that may relate to ports are covered in Chapter 2, 'Planning and management in the Estuary';
- Chapter 9: 'Aggregates and other minerals' deals with mineral dredging

Issue reference P1

Future port development

Sustainable development opportunities for ports and harbours on the Severn Estuary will continue to be needed if the viability of the sector's operations is to be assured, and if the socio-economic well-being of the region is to be maintained.

Policy P1

Support the Estuary's ports and harbours in promoting sustainable development.

Proposals for Action	Who could be involved	Benefits
P1 (i) Support planning policies which make appropriate provision for port expansion	LAs, RDAs, WDA	<ul style="list-style-type: none">• Opportunities for sustainable development• A thriving ports industry and local/regional/national economy• Continued employment
P1 (ii) Encourage high levels of environmental responsibility when proposing port and harbour developments (such as thorough Environmental Impact Assessments, where appropriate, to identify and mitigate against impacts)	Port and harbour authorities, Competent authorities	<ul style="list-style-type: none">• Environmentally acceptable development proposals
P1 (iii) Promote the relative environmental benefits of waterborne transport	SEP, Port and harbour authorities, DTLR, LAs	<ul style="list-style-type: none">• Increased awareness and understanding of relative benefits

Issue reference P2

Impacts of maintenance dredging

Regular maintenance dredging within active docks, berths and power station cooling water installations is necessary for activities to continue, and dredging to maintain acceptable depths for the safety of navigation is usually a statutory requirement for port and harbour authorities. All maintenance dredging is subject to regular reviews including a requirement to assess possible beneficial use options before a sea disposal licence is issued. Concern has been expressed about possible impacts on the sediment regime. However, sedimentological studies and investigations conducted over a number of years have revealed no detectable impacts on the sediment regime. Nonetheless, beneficial use options for maintenance dredged materials, such as recycling within the Estuary system or saltmarsh restoration, should be considered where this is appropriate.

Policy P2

Continue to implement environmentally responsible dredging via the current licensing arrangements.

Proposals for Action	Who could be involved	Benefits
P2 Raise awareness of current environmentally responsible maintenance dredging practices and current licensing arrangements.	DEFRA, DTLR, Port and harbour authorities, Power stations, SEP.	<ul style="list-style-type: none">• Allay concerns about maintenance dredging.

Issue reference P3

Adequacy of aids to navigation and advice to sea operators

Navigational users on the Estuary wish to see the continuance of adequate aids to navigation and continued support by appropriate advisory services such as the MCA. Port and harbour authorities have a statutory duty to provide and maintain navigation aids within port/harbour limits and Trinity House has a statutory responsibility to ensure their continued adequacy.

Policy P3

Support measures to encourage the adequacy of aids to navigation and advice to commercial sea operators and leisure craft.

Proposals for Action	Who could be involved	Benefits
P3 (i) Continue to ensure the adequacy of aids to navigation (buoys, marks, lights, etc.) for commercial sea operators and leisure craft in line with statutory requirements (see above).	Trinity House, Port and harbour authorities (within port waters and their immediate approaches)	<ul style="list-style-type: none">Continued safe navigation.
P3 (ii) Continue to support advisory services for navigational users.	MCA	<ul style="list-style-type: none">Adequate advice and guidance for safe navigation, including craft unused to the area.

Issue reference P4

Untrained recreational users affecting navigational safety

The Estuary is a busy commercial waterway for large and small ships. Whilst many recreational users are well trained, there is a concern that untrained sailors who use the Estuary do not have adequate seamanship skills or local knowledge and may put themselves and others in danger.

Policy P4

Support training and other initiatives aimed at raising awareness and improving safety amongst recreational users.

Proposals for Action	Who could be involved	Benefits
P4 (i) Continue to develop training initiatives for recreational water users (e.g. RYA courses, RNLI lectures).	MCA, RYA, RNLI, Local boat clubs, Port and harbour authorities	<ul style="list-style-type: none">Improved safety;Reduced potential for conflict between user groups and between recreational and commercial navigation.
P4 (ii) Continue to provide VTS (Vessel Traffic Services) and radio monitoring of port channels wherever practicable.	Appropriate port and harbour authorities	As P4 (i)
P4 (iii) Where relevant, continue to use byelaw regimes to regulate recreational navigation.	Appropriate port and harbour authorities	As P4 (i)
P4 (iv) Provide boat users with safety guidance notes, and checklist and MCA Safety Afloat codes of practice.	MCA, Port and harbour authorities, Yacht and boat clubs, RNLI, SARA, Burnham Area Rescue Boat, SEP	<ul style="list-style-type: none">Improved knowledge and appreciation of safety in the Estuary environment.
P4 (v) Provide advisory signs about safety at appropriate access points.	MCA, Port and harbour authorities, Yacht and boat clubs, RNLI, SARA, Burnham Area Rescue Boat, SEP	<ul style="list-style-type: none">Improved knowledge and appreciation of safety in the Estuary environment.

Issue reference P5

Adequacy of search and rescue in the Estuary

Given the level of shipping and boating activities on the Estuary there is a need to continue with an efficient level of search and rescue support. A recent review found the voluntary Bristol Channel Plan to be ineffective. Any major maritime incident would be co-ordinated using the MCA's own Search and Rescue (SAR) contingency plans. In addition, it is proposed to set up a Memorandum of Understanding with port authorities' own emergency plans.

Policy P5

Continue to provide adequate co-ordinated emergency plans and search and rescue facilities in the Estuary, and the further development of associated lines of communication.

Proposals for Action	Who could be involved	Benefits
P5 (i) Support the ongoing initiatives to provide adequate search and rescue services, and further develop appropriate lines of communication.	MCA, SARA, RNLI, Small boat users, Port and harbour authorities	<ul style="list-style-type: none">Reassurance to seafarers.
P5 (ii) Co-ordinate a review of Estuary emergency plans and procedures.	MCA, Port and harbour authorities, , Police, Fire Brigade, RNLI	<ul style="list-style-type: none">A co-ordinated approach to emergency planning.
P5 (iii) Raise awareness of current and developing emergency plans.	As P4 (i), plus SEP	<ul style="list-style-type: none">Reassurance to seafarers of adequacy of search and rescue in the Estuary.

Issue reference P6

Safety of canal craft using the Estuary below Sharpness

Some traditional canal craft that venture out into the Estuary below Sharpness may not be designed for such open waters and therefore may be considered unsafe.

Policy P6

Raise awareness amongst canal boat users of the potential dangers of using canal craft on the Estuary below Sharpness.

Proposals for Action	Who could be involved	Benefits
P6 Disseminate copies of safety guidance leaflet and safety checklist to canal boat users.	MCA, Port and harbour authorities, SARA, British waterways, Canal boat user groups, LAs	<ul style="list-style-type: none">Reduced risk of incidents involving canal craft

Further reading:

1. Good Practice Guidelines for Ports and Harbours Operating within or near UK European Marine Sites. Prepared for UK Marine SACs, Project by ABP Research and Consultancy Ltd, July 1999.
2. Pollution Prevention Guidelines: Marinas and Craft,. Environment Agency.
3. Planning Policy Guidance 14: Development on unstable land, Department of Environment, 1990.
4. The code of practice for the construction of operation of marinas and yacht harbours 3rd edition, The Yacht Harbour Association, 1992.
5. Safe sea guide, Maritime and Coastguard Agency, 1998.
6. Oil spill contingency plan guidelines for ports, harbours, and oil handling facilities, MCA Southampton, May 1998.
7. Modern Ports: A UK Policy., DETR, November 2000.
8. Focus on Ports: National Statistics, DETR, November 2000.
9. British Shipping Charting a New Course, DETR, December 1998.
10. Ports in the South West, South West Regional Planning Conference, January 1996
11. Food and Environmental Protection Act 1985, Part II.
12. British Waterways Boat Safety Scheme – Code of Practice document.
13. Institution of Civil Engineers, Design and Practice Guide: Dredging, Thomas Telford, 1995.
14. British Standard: Marine Structures Part 5. Code of Practice for Dredging and Land Reclamation, BS 6349, 1991.

8. Waste management and pollution

Aim:

To maintain and improve air, land and water quality through using resources wisely, adopting appropriate waste management practices, minimising pollution and developing water management strategies.

Government aims

8.1. The Government aims to protect human health and Estuary ecology by maintaining and improving land, air and water quality. This is to be achieved by reduction and better utilisation of waste.

Introduction

8.2. The Estuary area is heavily urbanised and industrialised and produces significant and increasing quantities of waste. Unless the maintenance and disposal of waste is effectively controlled, waste can be hazardous to the environment and can impact upon human health.

8.3. The Environment Agency is the primary Government regulatory body responsible for managing and regulating waste and polluting activities. The Agency is responsible for licensing, monitoring and enforcing control over waste and other potentially polluting activities. Local Authorities are responsible for some aspects of the regulation of waste and other potentially polluting activities through planning and environmental health responsibilities.

8.4. Since the publication of the Joint Issues Report in 1997, many key legislative changes have occurred which will influence the way the Estuary is managed and regulated. Specific key changes are mentioned under each particular topic heading later on in the Chapter. However the 'Habitats' Directive and Pollution Control Regulations/IPPC Directive have far-reaching implications on the way many activities around the Estuary will be regulated and managed.

Water quality

8.5. There is a wide range of discharges direct to the Estuary that can affect its quality. These vary from point source discharges of sewage and industrial effluent, to diffuse agricultural run-off, highway drainage and spillage from industrial premises and marine vessels. Contaminants in rivers can also affect the water quality of the Severn Estuary. Major sewage and industrial discharges are shown in Maps 7 and 8 (see Appendix 8).

8.6. The water quality of the Estuary is controlled by UK legislation, including that derived from International conventions and EC Directives and implemented via UK Regulations. In the future, management and monitoring requirements are likely to be determined by the implementation of the EC Water Framework Directive.

8.7. The Environment Agency currently monitors the quality of the Estuary to assess compliance with the Environmental Quality Standards (EQS) stipulated by the EC Dangerous Substances Directive. As part of this process, it monitors sediments and mussels at specific sites to determine any long-term bioaccumulation effects. The Environment Agency also monitors designated bathing waters in line with the EC Bathing Water Directive (1976). This directive sets out mandatory and more strict guideline quality standards based on the concentrations of bacteria measured in water samples. Estuary water quality and statutory monitoring sites are shown in Map 9 (see Appendix 8).

8.8. The Estuary is classified under the National Water Council classification system mainly as good quality in the upper Estuary and fair quality in the middle and lower Estuary. Compliance with EQSs under the EC

Dangerous Substances Directive is generally good. However, copper levels are close to the EQS at a number of sites and in 1996 and 1998 there were failures for zinc around Avonmouth.

Sewage Effluents

8.9. Water companies are responsible for complying with the consented limits for sewage effluent discharges that are set by the Environment Agency. A prioritised programme of improvements to sewage effluent discharges, the Asset Management Programme (AMP), is being carried out by the water companies. The current phase of the programme, AMP3, will be operational during the period 2000 to 2005. Several initiatives have already been undertaken by water companies in advance of regulatory requirements. For example, Dwr Cymru (Welsh Water) and the Wales Tourist Board implemented a programme in 1996 entitled the Green Sea Initiative.

Industrial Effluents

8.10. Much of the heavy industry in the Estuary area is centred around Avonmouth and between Newport and Barry in South-East Wales. Most of these process facilities are large and are located on the Estuary to take advantage of water available for cooling and the high dilution available for large volume trade effluent discharge into the Estuary.

8.11. The Environment Agency regulates these discharges through authorisations allowing control of the quality of effluent discharged and the standard of treatment provided. Many of these discharges contain organic compounds and heavy metals. Many of the industrial effluent discharges will fall under the Pollution Prevention and Control (PPC) Regulations which require continued reductions in specific contaminants released. The Environment Agency liaises closely with dischargers to ensure this is achieved through the application of the principles of Best Available Technology (BAT).

Sludge to Sea

8.12. Disposal of sewage and industrial waste at sea has ceased following the Oslo Convention and Paris Commission (OSPAR 1992). One of the objectives of the Urban Waste Water Treatment Directive (1991) was the phasing out of sewage sludge disposal to sea by December 1998.

Discharges from Vessels

8.13. International conventions have been designed to protect the marine environment from dumping of waste at sea by marine vessels, but this is very difficult to police at sea. Port authorities on the Estuary have produced and implemented port waste management plans in recent years and these are subject to regular review. This requirement to manage the provision of appropriate waste reception facilities in ports under the Merchant Shipping Regulations encourages shipping companies to deal with their waste in a responsible manner. It is expected that these Regulations will be slightly modified in 2002 in order to comply with the requirements of the Port Waste Reception Facilities Directive 2000.

Air quality

8.14. Significant discharges of both domestic and industrial waste to the atmosphere occur from major industries, car exhausts, landfill sites, waste burning and natural pollution. Local Authorities are responsible for monitoring air quality and for achieving National Air Quality Strategy targets that are set to protect human health. The Environment Agency is responsible for authorising emissions to the atmosphere for large industrial processes, whilst Local Authorities are responsible for authorising emissions from other significant processes. Major atmospheric discharges are shown in Map 10 (see Appendix 8).

Emergency/Contingency plans

8.15. Local ports are actively assisting in the formulation of an Estuary-wide Counter Pollution Strategy for the Bristol Channel, led by the Maritime and Coastguard Agency (MCA) and in liaison with Local Authorities.

8.16. Local Authorities are required to develop co-ordinating plans, covered by such legislation as Civil Defence Regulations, Control of Major Accident Hazard regulations, and the Pipelines Safety regulations. Within the Estuary, agencies and organisations collaborate on emergency planning. For instance, the Gwent Emergency Services are developing a joint agency to co-ordinate those organisations responsible for delivering emergency services, including Local Authorities, utilities, voluntary agencies, private companies and the health service. A formal liaison structure has been established to promote awareness, understanding and integration of the emergency planning, training and exercise arrangements of organisations in the Gwent Police area. The Gwent Joint Services and Emergency Planning and Liaison Group includes representatives from the Local Authorities of Monmouthshire County Council and Newport County Borough Council on the Estuary.

8.17. Elsewhere, the Severnside Emergency Planning Forum comprises representatives from the Local Authorities, emergency services, COMAH (Control of Major Accident Hazards) site operators, neighbouring industrial premises and The Bristol Port Company. An Emergency Data Sharing Group has been set up in the Bristol area to explore opportunities for the use of data held by various organisations. Shared GIS data is seen as a support for the implementation of contingency planning.

Land quality

8.18. Disposal of waste to land can cause serious problems, including contaminating soil and water, creating dust, odours and noise and producing greenhouse gases such as methane. National Waste Strategies provide a framework for sustainable waste management of Municipal Solid Waste (MSW) and compliance with the EU Landfill Directive. It includes statutory targets for local authority recycling, reducing the amount of waste going to landfill and has financial provisions through the Landfill Tax Scheme for environmental improvements. Local Authorities seek to comply with these responsibilities by developing their own local strategies and plans that identify potential waste management facilities and actions to comply with the targets. Since 1999, significant aquatic discharges to land have been controlled by the Groundwater Regulations 1998.

Waste Management Facilities

8.19. The Environment Agency is responsible for the licensing and regulation of waste management facilities. Local Authorities are responsible for preparing appropriate development plans such as Waste Local Plans or Unitary Development Plans to provide a coherent land use strategy for future facilities. Within the boundary of the Estuary there are over 60 sites. Major domestic landfills exist at or near Cardiff, Newport, Bristol and Gloucester. Inert wastes such as subsoil, hardcore and building and demolition wastes are usually deposited at small landfill sites specifically licensed to take only these wastes. Specific non-domestic wastes are dealt with at purpose-built facilities such as waste chemical treatment facilities in Newport and Gloucester, a solvent and oil recovery plant and a clinical waste incinerator at Avonmouth. In addition to licensed sites, there are a significant number of exempt facilities that do not require waste management licenses. These include sites used for spreading waste on to land for agricultural benefit, deposits of specific inert wastes for permitted development and facilities for recyclable wastes and scrap metal.

Fly-tipping

8.20. Fly-tipping is a common and increasing problem in this area and can range from small scale tipping of domestic waste to larger scale dumping of industrial and commercial wastes. However, prosecution of fly-tipping offences is not easy, as there is often no evidence against the offender. Fly-tipped waste has a detrimental impact on the local amenity value of the area and the presence of decaying organic material may pose a threat to public health.

8.21. The Environment Agency and Local Authorities have joint responsibility for investigating and dealing with fly-tipping. There is a protocol between them that sets out who should deal with particular incidents and in some places the Agency in conjunction with Local Authorities and other organisations have set up a 'Fly-tipping Stakeholders Forum for Action' to help tackle the fly-tipping issue.

Contaminated Land

8.22. Land that is contaminated includes any land where intense industrial activity such as chemical manufacturing, metal refining and finishing, steel production, old landfill sites, oil refining, oil storage and gas production has occurred. There are many of these sites around the Estuary.

8.23. The principle of sustainable development has seen a shift of emphasis from the development of new 'greenfield' sites to previously-used 'brownfield' sites. Where such sites are contaminated a greater risk of pollution can occur during reclamation through the potential mobilisation of contaminants. When development at these sites is proposed, extensive ground contamination surveys are required, including Environmental Assessments.

8.24. Under the new Contaminated Land Regulations, Local Authorities are responsible for surveying their areas and identifying sites which may give rise to environmental or human health problems. Local Authorities and the Environment Agency will then discuss the nature of the sites and those that are designated as 'special' will become the responsibility of the Environment Agency. Sites will then have action plans to remedy the contamination.

Sludge to land

8.25. Spreading of sewage sludge to agricultural land is a common and accepted practice and is regulated by the Environment Agency, which protects the environment by ensuring compliance with the EC Sewage Sludge to Land Directive. Provided suitable locations are selected, adverse effects upon the environment should be minimal, although the process can adversely affect the amenity value of the land to local residents. Farm slurry and effluents should be discharged onto land in accordance with the former MAFF (now DEFRA) Code of Good Agricultural Practice.

Coastal Litter

8.26. The significant problems associated with coastal litter principally involve public health issues, detrimental effects on the aesthetic quality of the coast and related economic factors. The mobile nature of litter creates management problems, in particular identification of the source of waste items. In the short term Local Authorities are using cleansing techniques to keep the beaches free of debris coupled with provision of rubbish bins. At Cardiff, river- and bay-derived debris is collected within the Bay for disposal to landfill. Hence the litter contribution to the Estuary from the rivers Taff and Ely is much reduced.

8.27. The British Marine Industries Federation has developed excellent guidelines that set out how to manage waste in a sensible manner for small harbours and marinas. There are also initiatives to encourage leisure sailors to look after the marine environment, such as the “Navigate with Nature” scheme that distributes information to boat users, the Keep Wales Tidy Ports Waste scheme initiative and Blue Flags for Marinas.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Adopting best practice for pollution control through planning guidance is covered under Chapter 2: ‘Planning and management in the Estuary’.
- Actions to reduce pesticide levels from agriculture are covered in Chapter 4: ‘Agriculture’.
- The management of sea-faring vessels is also considered in Chapter 7: ‘Ports, Shipping and Navigation’.
- Dredging is covered under Chapter 9: ‘Aggregates and other minerals’.
- The wise use of water resources is covered in Chapter 10: ‘Water Resources’.
- Actions relating to waste from fishing are covered in Chapter 11: ‘Fisheries’.
- Issues related to managing authorisations within the pSAC area are covered in Chapter 13: ‘Nature conservation and wildlife’.

Issue reference W1

Coastal litter

Good aesthetic quality of beaches has a positive effect on the visitor experience with a direct impact on tourism, recreation and ultimately economics. Visual impairment of beaches occurs to a large extent through deposition of litter. The main sources are riverine/estuarine, sewage inputs, recreational/visitor and shipping. The major inputs of sewage debris include partially treated sewage discharges and combined sewer overflows that discharge to rivers and estuaries during heavy rainfall. The water companies are actively addressing the issue of sewage-related debris along the coast as part of their AMP programme. The cessation of sludge dumping to sea and the adoption of secondary treatment at virtually all sewage treatment works should have significantly decreased inputs of sewage-derived litter.

Policy W1a

Encourage further research into the sources of litter to identify polluters and support the national research programme aiming to standardise litter management co-ordinated by the National Aquatic Litter Group.

Policy W1b

Encourage further collaboration between authorities responsible for designing strategies to tackle the problem of beach litter.

Proposals for Action	Who could be involved	Benefits
W1a (i) Encourage the cleansing of resort beaches and other areas to remove litter whilst retaining the nature conservation interest of the strandline(s).	LAs	<ul style="list-style-type: none"> • Minimisation of injury risk to public from hazardous litter. • Maintenance/promotion of recreational and visitor experience at beaches.
W1a (ii) Encourage and promote local stewardship schemes at rural beaches and promotion of the Waterside Code to the public.	NAW, GoSW, LAs, Environment Agency, Green Seas, Wildlife groups, Local interest groups, Keep Britain Tidy, Keep Wales Tidy, Parish and Community Councils	<ul style="list-style-type: none"> • Minimisation of injury risk to public and wildlife due to hazardous litter. • Improvement of aesthetic quality of rural beaches. • Improvement of recreational and visitor experience at beach. • Protection of local flora and fauna.
W1a (iii) Introduce further general educational programmes encouraging avoidance or reduction of waste and responsible disposal of litter and rubbish.	LAs, Keep Britain Tidy, Keep Wales Tidy, UK CEED	<ul style="list-style-type: none"> • Reduction in litter and rubbish leading to improved aesthetic quality.
W1a (iv) Increase funding given to litter research, including the National Aquatic Litter Group, standardise litter management and continue to identify litter sources.	LAs, Environment Agency, Keep Britain Tidy, Keep Wales Tidy, Water Companies	<ul style="list-style-type: none"> • Incentive for companies to introduce better waste disposal practices.
W1a (v) Further promote codes of practice for disposal of waste at marinas and harbours and implementation and review of Port Waste Management and Oil Pollution Plans.	BMIF, RYA, WYA, MCS, Port Authorities	<ul style="list-style-type: none"> • Reduction of litter at marina and harbour sites.
W1a (vi) Support international efforts to curb disposal of marine waste at sea.	NAW, GoSW, SEP, Port Authorities	<ul style="list-style-type: none"> • Reduction of marine borne litter.
W1b (i) Design partnership strategies that deal with the issues of litter.	LAs, Port Authorities, Litter groups, NAW GoSW, BMIF, RYA	<ul style="list-style-type: none"> • Reduction of coastal litter.

Proposals for Action	Who could be Involved	Benefits
W1b (ii) Improve sewage treatments systems and inland combined sewer overflows.	Water companies	<ul style="list-style-type: none"> • Reduction of public health risk. • Improvement to beach aesthetics and public enjoyment. • Improvement to local economies.
W1b (iii) Design and promote educational programmes on disposal of personal hygiene items, (e.g. the “Bag It and Bin It” campaign).	Water companies, Environment Agency, LAs, Keep Britain Tidy, Keep Wales Tidy, UK CEED	<ul style="list-style-type: none"> • Reduction in load to sewerage network.

Issue reference W2

Fly-tipping

Fly-tipping of waste occurs in numerous places, including the Gwent levels. Some occupiers of land may contribute to problems by attempting to stabilise riverbanks with the unauthorised deposition of rubble and building waste.

Policy W2

Support strategies to combat fly-tipping around the Estuary.

Proposals for Action	Who could be involved	Benefits
W2 (i) Implement Local Authority/Environment Agency protocol on fly-tipping.	LAs, Environment Agency	<ul style="list-style-type: none"> • Reduction of amount of fly-tipped debris.
W2 (ii) Set up fly-tipping forum to co-ordinate action at a local level.	LAs, Environment Agency	<ul style="list-style-type: none"> • Increased momentum for action and pooled resources.
W2 (iii) Undertake specific campaigns e.g. surveillance of blackspots and provision of educational material to landowners.	LAs, SEP, Environment Agency, police, landowners, building and construction companies	<ul style="list-style-type: none"> • Increased surveillance leading to more prosecutions and reduction in incidence of fly-tipping.

Issue reference W3

Visual effects of untreated and partially treated sewage discharges

Untreated and partially treated sewage is discharged at sources into the upper Estuary. Exposure of these point sources at low tide and the plume of sewage entering the Estuary can significantly retard public enjoyment, therefore affecting recreation and visitor numbers and resulting in revenue reduction generated from their activities. There may also be pressure for new development where the sewage infrastructure requires upgrading to cope with the extra demand. Environmentally-friendly treatment options, such as reedbed systems, may be appropriate.

Policy W3

Encourage water companies to improve sewage treatment in general and upgrade the sewerage infrastructure to accommodate new and proposed development.

Proposals for Action	Who could be involved	Benefits
W3 (i) Apply appropriate sewerage systems to all untreated (including storm overflows) or partially treated sewerage discharges in accordance with the EC Waste Water Treatment Directive (UWWTD).	Severn Trent, Dwr Cymru (Welsh Water), Wessex Water, private discharges	<ul style="list-style-type: none"> • Minimise amount of sewage related debris on the shoreline. • Improvement to shoreline aesthetics and public enjoyment. • Improvement to local economies.
W3 (ii) Develop an appropriate sewerage infrastructure to cope with new development planned in the SEP area.	Severn Trent, Dwr Cymru (Welsh Water), Wessex Water, LAs, Building industry	<ul style="list-style-type: none"> • Avoidance of further adverse impacts on water quality of the Estuary.

Issue reference W4

Oil pollution from contaminated surface water run off

Public concern has arisen over identification of surface oil at particular hotspots along the Estuary. There are a variety of sources from which the oil is derived including road run off, spillages from boats and industrial discharges.

Policy W4

Support measures to reduce inputs of oil to the Estuary, including the promotion of such schemes as the ‘Oil Care Campaign’ and ‘Navigate with Nature’

Proposals for Action	Who could be involved	Benefits
W4 (i) Support and promote the ‘Oil Care Campaign’.	Environment Agency, SEP	<ul style="list-style-type: none">• Reduction and prevention of surface oil on the Estuary.• Improved aesthetics and enjoyment of the recreational experience gained from the Estuary.• Benefits to marine ecology.
W4 (ii) Undertake an education campaign for motorists to keep vehicles regularly maintained.	Motorist Organisations (e.g. AA, ETA, RAC)	<ul style="list-style-type: none">• As W4 (i)
W4 (iii) Undertake improvements to sewerage systems to reduce inputs of oil to the Estuary.	LAs, Water utilities	<ul style="list-style-type: none">• As W4 (i)
W4 (iv) Promote waste management guidance for boat users, such as the ‘Navigate with Nature’ Scheme.	RYA, WAY, Marina operators, MCS, SEP	<ul style="list-style-type: none">• As W4 (i)

Issue reference W5

EC Directive failures at designated bathing waters

A number of beaches along the Estuary are failing to comply with the mandatory standards stipulated in the EC Bathing Waters Directive. However, the environmental quality of bathing waters has generally improved and continued progress with new sewage treatment systems, through prioritised AMP schemes, should ensure that such improvements are enhanced and maintained. Diffuse sources of bacterial pollution are also a concern and are harder to remedy. However, investigations are being carried out to identify and quantify diffuse sources.

Policy W5

Support water companies to invest to encourage compliance with the Guideline Standards at designated Bathing Waters.

Proposals for Action	Who could be involved	Benefits
W5 (i) Identify and remedy the cause of failure of the designated beaches not meeting EU bathing water standards.	Dwr Cymru (Welsh Water), Wessex Water, Environment Agency	<ul style="list-style-type: none">• Safer beaches for bathing and water-based recreation.
W5 (ii) Aim to elevate water quality of designated bathing waters to meet EU Guideline standards.	Dwr Cymru (Welsh Water), Wessex Water, Environment Agency	<ul style="list-style-type: none">• Increase the number of beaches eligible to apply for Blue Flag and Green Coast status.

Issue reference W6

Monitoring of other bathing waters

Nine popular bathing waters in the Estuary are not designated as EC Bathing Waters. Although there is no statutory need for them to comply with EC Bathing Waters Directive standards, they are monitored for compliance against the Directive standards. Some are still failing to meet Directive standards and this is a concern for those who use them and those who are responsible for them.

Policy W6

In the short term, support bringing all non-designated bathing waters up to the minimum Mandatory Standards laid out in the EU Bathing Waters Directive, and in the long term, bringing them up to Guideline Standards.

Proposals for Action	Who could be involved	Benefits
W6 (i) Seek to identify the cause of failure of the non-designated beaches not meeting EU bathing water standards and explore possible remedies.	Dwr Cymru, Welsh Water, Wessex Water, Environment Agency	<ul style="list-style-type: none">• Safer beaches for bathing and water-based recreation.
W6 (ii) Consider elevation of water quality standards of non-designated bathing waters to meet EU Guideline standards.	As W6 (i)	<ul style="list-style-type: none">• Increased number of beaches eligible to apply for Blue Flag and Green Coast status.

Issue reference W7

Pollution risk to Gloucester - Sharpness Canal drinking water supply to Bristol

The Gloucester-Sharpness Canal is the main navigation for both commercial shipping and recreational craft from Gloucester to Sharpness, the Estuary and beyond. There are a number of abstractions from the canal, including that by Bristol Water at Purton, which supplies drinking water to most of Bristol. The canal is operated by British Waterways who maintain the navigable depth by abstracting water into the canal at Gloucester and by dredging, and it has been designated a Sensitive Area (Eutrophic) under the EC Urban Waste Water Treatment Directive (UWWTD). There is a need to protect the canal from pollution in order to safeguard the abstraction at Purton, other abstractors, the ecology, and recreational users. A number of sources pose a risk:

- Oil from vessels passing through the canal;
- Failures of sewage treatment works during cold weather;
- Saline intrusion through the Gloucester abstraction and operation of the locks at Sharpness;
- Sediment re-suspended during dredging operations;
- Industrial pollution both from the Severn and from sources along the canal itself;
- Seasonal agricultural pollution from the Severn and along the canal itself. Although pesticide levels comply with Water Supply Regulations, concentrations can reach relatively high levels. In winter, nitrate levels in the canal can exceed standards laid out for drinking water supply (50mg/l).

Remote monitoring is now carried out by Bristol Water, the Environment Agency and British Waterways to provide an early warning of pollution. There are already agreements between Bristol Water and British Waterways covering water resources and dredging issues on the canal, and a similar agreement for water quality matters would enable existing arrangements to be reviewed and formalised. There is also a need for ongoing monitoring and pollution prevention work at sites along the canal.

Policy W7a

A continued programme of monitoring, awareness raising and pollution prevention measures will be carried out along the Gloucester – Sharpness canal.

Policy W7b

An agreement between major operators on the canal will be formalised in order to reduce the risk of pollution without compromising the operation of the Gloucester - Sharpness canal.

Proposals for action	Who could be involved	Benefits
W7a (i) Maintain current levels of permissive sampling on the canal to identify pollution inputs and polluters.	Environment Agency	<ul style="list-style-type: none">• Improved knowledge of the canal's water quality• Improved ability to enforce and carry out remedial action.
W7a (ii) Reduce industrial pollution entering the canal through awareness raising and pollution prevention measures.	Environment Agency, Industrial operators.	<ul style="list-style-type: none">• Improved water quality of the canal;• Reduced threat to abstractors.
W7a (iii) Implement programme of improvements to discharges under AMP3 (in order to meet the requirements of the UWWTD and Surface Water Abstraction Directive).	Water Companies, Environment Agency, OFWAT.	<ul style="list-style-type: none">• Improved water quality of the canal;• Reduced threat to abstractors.
W7a (iv) Reduce pollution from shipping and recreational craft using the canal through awareness raising and pollution prevention measures (e.g. provision of sanitary stations and oil recycling banks, promotion of codes of practice for disposal of waste at Gloucester and Sharpness docks).	British Waterways, Gloucester Harbour Trustees, Water Companies, Environment Agency, BMIF, RYA.	<ul style="list-style-type: none">• Improved water quality of the canal;• Reduced threat to abstractors.
W7a (v) Reduce agricultural pollution entering the canal through awareness raising and pollution prevention measures.	Environment Agency, FFWAG, NFU/NFUW, CLA, farmers and landowners.	<ul style="list-style-type: none">• Improved water quality of the canal;• Reduced threat to abstractors.
W7b Agree a Memorandum of Understanding between British Waterways and Bristol Water (on restricting operations, pollution investigation and remedial action) to protect drinking water supplies in the event of a pollution incident.	British Waterways, Bristol Water, Environment Agency.	<ul style="list-style-type: none">• Risk of pollution to drinking water abstraction is reduced without compromising the operation of the canal for navigation.

Issue reference W8

Radioactive discharges from nuclear licensed sites

Four nuclear power stations are situated within the boundary of the Estuary: Berkeley (non-operational), Oldbury and Hinkley A and B. In addition, Nycomed Amersham is a nuclear licensed site located at Cardiff which produces pharmaceutical products and discharges trade effluent containing radionuclides into the foul sewerage system, which ultimately discharges into the Estuary. To date, levels of activity within all the discharges have been well within authorisation limits.

A major consultation exercise is being carried out by the Environment Agency regarding the transfer of the authorisations for these power stations (with the exception of Hinkley B) to British Nuclear Fuels plc.

The discharge of tritium from the Nycomed Amersham premises has currently been significantly reduced as a precautionary measure pending more extensive investigation into bioaccumulation effects of tritium in the marine environment. There is concern because of the potential link between organically bound tritium (OBT) and bioaccumulation in some sediment-living species. The Environment Agency is also reassessing the impact of tritium discharges from all nuclear facilities in England and Wales and working on developing a standard, auditable, assessment procedure for OBT.

The Environment Agency received an application from Nycomed Amersham in Jan 2001 to vary their current authorisations. The application includes detail of lower discharge limits and proposals for substantial reductions in actual discharges in the next 3-4 years. The application should take just over 12 months to determine following an extended period of public consultation.

Policy W8

Continue with stringent monitoring of nuclear discharges from the four nuclear power stations and Nycomed Amersham by the operators and Environment Agency and continue efforts to reduce emissions.

Proposals for Action	Who could be involved	Benefits
W8 (i) Maintain radioactive discharges within authorised limits from all four nuclear power stations around the Estuary and from Nycomed Amersham.	Environment Agency, FSA, Nuclear Installations Inspectorate, British Energy, Magnox Electric plc, CCW, Nycomed Amersham	<ul style="list-style-type: none">• Maintenance of a safe environment for public health and the wildlife of the Estuary.
W8 (ii) Further reduce radioactive emissions.	As W8(i)	<ul style="list-style-type: none">• As W8 (i)

Issue reference W9

Air Quality

Emissions to the atmosphere can impact adversely on human health and the ecology of the Estuary area. The impact of air quality on biota is being dealt with by the review of integrated pollution control authorisations under the Habitats Directive. Combating air pollution requires close collaboration between all those organisations that are responsible.

Local Authorities have a duty to review and assess air quality in their areas. The Air Quality Regulations 1997 define a staged process of review and assessment related to the objectives of the National Air Quality Strategy. Once the air quality has been assessed, if there are any areas which are not likely to meet the objectives then an Air Quality Management Area must be designated and local air quality strategies developed.

Policy W9

Support the minimisation of emissions to air by all industrial processes, householders and vehicles in order to meet National Air Quality Standards.

Proposals for Action	Who could be involved	Benefits
W9 (i) Minimise all industrial discharges.	Environment Agency, LAs, CCW, EN, Water companies	<ul style="list-style-type: none">Improvement of air quality around the Estuary for the benefit of public health and the wildlife in and around the Estuary.
W9 (ii) Reduce traffic congestion and build-up of emissions at hot spots through the planning system and financial incentives.	LAs, DTLR	<ul style="list-style-type: none">As W9 (i)
W9 (iii) Identify and invest in public transport and park and ride schemes as appropriate.	LAs, Strategic Rail Authority	<ul style="list-style-type: none">As W9 (i)
W9 (iv) Promote green transport plans amongst companies.	LAs, companies, Waste Minimisation Clubs, Green Business Clubs, Groundwork, Environment Agency	<ul style="list-style-type: none">Reduced mileage and better use of public transport as well as improvements in health.
W9 (v) Increase the amount of planting alongside roadsides.	LAs	<ul style="list-style-type: none">Increased adsorption of pollutants.
W9 (vi) Support and promote research and development into alternative energy vehicles	LAs, DTLR, DTI, EU,	<ul style="list-style-type: none">Provide alternative to petrol/diesel and in the long term reduced emissions.
W9 (vii) Produce Air Quality Action plans for Air Quality Management Areas (AQMA's)	LAs	<ul style="list-style-type: none">Determines priority actions to take regarding air quality.

Issue reference W10

Nutrient levels

Concern has been expressed over high levels of nitrates and phosphates in the Estuary, linked to sewage effluents and agricultural run off. Excessive nutrient concentrations could contribute to the formation of algal blooms in certain areas, which cause nuisance problems.

Significant reductions in phosphate to the Estuary will result from phosphate reduction treatment at major Sewage Treatment Works which discharge to rivers designated as Sensitive Waters (Eutrophic). However, nitrate is more likely to be a limiting nutrient in the marine environment.

Policy W10a

Undertake research to identify the significance of eutrophication in the Estuary and sources of nutrient inputs to the upper and middle Estuary.

Policy W10b

Support the reduction of nutrient loadings in the upper and middle Estuary, prioritised according to those sources identified as having the greatest impact.

Policy W10c

Support the application of the Urban Wastewater Treatment Directive (Eutrophic) and Nitrates Directive as appropriate.

Proposals for Action	Who could be involved	Benefits
W10a Investigate the scale of eutrophication. Monitor and model nutrient balance, including inputs to the Estuary, taking into account the Environment Agency's Eutrophication Strategy 2000 where appropriate.	Severn Trent, Dwr Cymru (Welsh Water), Wessex Water, Environment Agency	<ul style="list-style-type: none">Better understanding of nutrient input levels.
W10b (i) Promote good management of the waters inside impoundments adjacent to the Estuary.	Cardiff County Council	<ul style="list-style-type: none">Minimal pollutants and toxins released into the Estuary caused by weeds, algal blooms and run off within the impoundment.
W10b (ii) Encourage best practice (e.g. Codes of Good Agricultural Practice) in the application to land of chemicals and organic fertilisers that produce high nutrients in water.	DEFRA, NAW, FFWAG, NFU/NFUW, Environment Agency	<ul style="list-style-type: none">Determines best approach for nutrient control.
W10c Assess whether the Estuary is eligible for potential Sensitive Area status in accordance with the Urban Waste Water Treatment Directive (UWWTD) and Nitrate Vulnerable Zone status (Nitrate Directive).	Environment Agency	<ul style="list-style-type: none">Reduction in nutrients in the water.

Issue reference W11

Thermal pollution

Cooling water discharged from power stations and industries will generally have a temperature higher than the water abstracted. There is concern this elevation in temperature may have detrimental impacts on the marine environment in close proximity to the discharge points. Dischargers are responsible for investigating any potential environmental impact that may be caused by their cooling water discharge.

Policy W11

Co-ordinate investigations into the impacts of cooling waters discharging to the Estuary, and encourage liaison between the Environment Agency, the dischargers and conservation bodies.

Proposals for Action	Who could be involved	Benefits
W11 (i) Research localised impacts of discharged cooling waters to the Estuary.	Environment Agency, Major dischargers, Conservation bodies, MCS	<ul style="list-style-type: none">Information on ecological impacts of discharged cooling waters on the marine environment.
W11 (ii) Set and enforce acceptable temperature limits for cooling waters where appropriate.	Environment Agency	<ul style="list-style-type: none">Protection of the marine environment in close proximity to discharged cooling waters

Issue reference W12

Heavy metals

Heavy metals enter the Estuary through rivers, sewage effluents, industrial effluents, highway drainage and contaminated surface water run off. They can have potentially damaging effects on marine life and may contaminate the food chain. The Estuary is monitored by the Environment Agency for compliance with the requirements of the EC Dangerous Substances Directive. The Directive specifies Environmental Quality Standards (EQSs) for each metal and compliance with these standards is good, although copper levels are close to the EQS at a number of sites around the Estuary. Heavy metals, however, readily adsorb to sediments and can bioaccumulate within the food chain through ingestion by filter feeding organisms.

Policy W12

Encourage dischargers to comply with their authorisations and with the requirements of the EU Dangerous Substances Directive and Oslo and Paris Conventions (OSPAR).

Proposals for Action	Who could be involved	Benefits
W12 Minimise/prevent the release of heavy metals into the marine environment.	Environment Agency, Major dischargers	<ul style="list-style-type: none">Improved quality of the Estuary's waters, safeguarding public health and protection of marine life.

Issue reference W13

Organic chemicals, polychlorinated biphenyls (PCBs)

Excessive concentrations of organic compounds discharged to aquatic systems can have detrimental environmental impacts and public health implications. Most organic compounds enter the Estuary via industrial discharges. Concern has been expressed that levels of organic compounds in the Estuary may be high, although EQS levels are infrequently breached. In the past high levels of PCBs have been detected in the middle Estuary, a large proportion of which have been linked to a former UK manufacturing plant. Production of PCBs at the site was voluntarily terminated in 1977 but PCBs still enter the Estuary through leaching of contaminated groundwater into the site's trade effluent drainage system. The company has invested heavily in minimising the presence of PCBs in its effluent discharge and has achieved the reduction required by the OSPAR, leading to significant reductions in PCB levels, both within the discharge and within the Estuary.

The application of new regulations will phase out the use of PCBs by significant industries by 2001. This will in turn ensure continued reductions in the levels in the environment.

Policy W13

Support the minimisation of organic compounds introduced to the Estuary with the ultimate aim of preventing these compounds finding their way into the marine environment.

Proposals for Action	Who could be involved	Benefits
W13 Minimise/prevent the release of organic compounds into the marine environment.	Environment Agency, Water companies, major dischargers	<ul style="list-style-type: none">Improved quality of the Estuary's waters, the safeguarding of public health and protection of marine life.

Issue reference W14

Pollution from land that is contaminated

Contaminated land sites can present a problem through the leaching of contaminants into groundwaters and surface waters and restricts the future use of the land. However, a greater risk of pollution can occur when sites are reclaimed. Nevertheless, this is the most economic method of remediation of contaminated land and the best use of available land where adequate measures are taken to reduce the risks involved. Local Authorities and the Environment Agency also need to meet the requirements of the Contaminated Land Regulations.

Policy W14

Identify sites that may affect the environment or human health under the requirements of Part IIA of the Environmental Protection Act 1990 and encourage redevelopment of contaminated sites where there is a good design strategy for dealing with the contamination.

Proposals for Action	Who could be involved	Benefits
W14 (i) Identify and quantify contaminated land around the Estuary and produce an inspection strategy by July 2001 (Contaminated Land Regulations).	LAs, Environment Agency, Landowners, Developers, Industry, SEP	<ul style="list-style-type: none">Improved information on the extent of contaminated land around the Estuary.
W14 (ii) Produce remediation plans for sites not subject to redevelopment.	LAs, Environment Agency	<ul style="list-style-type: none">Improved quality of land and aquatic environments around and within the Estuary, with the objectives of safeguarding public health and protection of marine life.
W14 (iii) Minimise/prevent the discharge of hazardous substances to both land and aquatic environments.	LAs, Environment Agency, landowners, developers, industry	<ul style="list-style-type: none">Improved quality of the environment.
W14 (iv) Promote existing contaminated land sites for appropriate use in Local Authority Development Plans.	LAs	<ul style="list-style-type: none">Contaminated land sites would be managed appropriately.

Issue reference W15

Pollution from land based waste disposal

Several major landfill sites around the Estuary discharge leachate. Problems can be encountered through the tide locking of discharges and drainage ditches that prevent effective dispersion and by high water tables that may penetrate the landfill mass. Waste management licences issued by the Agency require site operators to monitor the leachate discharged and to maintain and enhance leachate treatment systems to ensure consented leachate quality does not fall below an agreed standard.

Recent concerns have been raised over the health risks associated with landfill sites and the potential for impact on the Severn Estuary pSAC. Noise, dust, odour and gas production from the decaying waste are issues often identified with landfill sites. By attaching conditions to licences and planning permissions the Agency and Local Authorities seek to control these impacts and new Pollution Control Regulations will strengthen the controls. Gas controls also reduce the release of substances that may promote climate change.

Policy W15

Improve leachate and gas management systems where justified on the grounds of safeguarding human health or the environment.

Proposals for Action	Who could be involved	Benefits
W15 (i) Implement leachate management systems to minimise/prevent contamination of the Estuary by leachate.	Site operators, Environment Agency, LAs	<ul style="list-style-type: none">Improved quality of land and aquatic environments around and within the Estuary, with the objectives of safeguarding public health and protection of marine life.
W15 (ii) Utilise gas management systems, e.g. methane recovery	Site operators, Environment Agency, LAs	<ul style="list-style-type: none">Reduced greenhouse gas emissions, energy generation.

Issue reference W16

Public concern at the level of Environmental Quality Standards

There is public concern that standards set to protect the environment from harmful substances are not stringent enough. Environmental Quality Standards (EQSs) are set to protect the environment from harmful substances. The best available scientific knowledge is used to set EQSs and they are reviewed periodically by environmental and scientific organisations. Where there are no statutory standards we will look to work to use non-statutory standards and to influence national standards. Direct Toxicity Assessment is a potential tool to assess the significance of mixtures of substances for which the application of EQSs may be impracticable. There may be applications for this method for complex discharges to the Estuary.

Policy W16

Continue research into the effects of harmful substances on the environment and setting of Environmental Quality Standards (EQS) and support the development and implementation of Direct Toxicity Assessment.

Proposals for Action	Who could be involved	Benefits
W16 (i) Promote research into identifying the effects of harmful substances on the environment and the setting and review of appropriate EQS.	DEFRA, European Community, Environment Agency	<ul style="list-style-type: none">Improved quality of aquatic environments around and within the Estuary, with the objectives of safeguarding public health and protection of marine life.
W16 (ii) Provide advice on setting standards for substances that have no EQS.	Environment Agency	<ul style="list-style-type: none">As W16 (i)
W16 (iii) Encourage use of Direct Toxicity Assessment as a tool to assess discharges that potentially contain a cocktail of harmful substances for which there are no EQS.	Environment Agency, Industry	<ul style="list-style-type: none">As W16 (i)

Issue reference W17

Public concern over levels of substances in consented discharges

There is public concern that the levels of contaminants in discharges into the Estuary are too high, that monitoring of discharges is not adequate and that companies breaching their authorisations are not penalised. Authorised discharges are regulated and reviewed by the Environment Agency which works with dischargers to reduce emissions under national legislation. The Environment Agency is also responsible for the enforcement of authorisations and breaches are dealt with in accordance with the Agency's National Enforcement and Prosecution Policy.

Policy W17a

Promote research into assessing the environmental impact of harmful substances discharged into the Estuary and programmes to effect minimisation of the discharge of these substances.

Policy W17b

Widely publicise data from monitoring programmes, including compliance and enforcement action taken.

Proposals for Action	Who could be involved	Benefits
W17a (i) Continue monitoring of authorisations.	Environment Agency	<ul style="list-style-type: none">• Safeguard of the aquatic environment of the Estuary.
W17a (ii) Minimise harmful substances discharged to the Estuary.	Environment Agency	<ul style="list-style-type: none">• Improvement of the quality of the Estuary's waters.• Cost savings to industry.
W17a (iii) Continue research into identifying the environmental impact of harmful substances entering the Estuary.	DEFRA, European Community, Environment Agency	<ul style="list-style-type: none">• Improved quality of aquatic environments around and within the Estuary, with the objectives of safeguarding public health and protection of marine life.
W17b Effectively publicise results of monitoring programmes conducted by the Environment Agency, regarding control and enforcement of discharge consents	Environment Agency, SEP	<ul style="list-style-type: none">• Increased confidence of the general public in the discharge consent monitoring programme, carried out by the Environment Agency.

Issue reference W18

Concern about pollution from major marine accidents

Concern has been expressed over the potential for marine accidents through the movement of vessels through the Estuary and also during port activities, such as loading and unloading (see also Chapter 7). The Port of Bristol Authority has taken the lead and has promoted the formation of the Bristol Channel Counter Pollution Association to co-ordinate liaison between organisations on the Estuary and to work towards production of a marine counter-pollution contingency plan. The Government has now published the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations, which specifies the procedures for dealing with major marine oil and chemical pollution, co-ordinated through the Maritime and Coastguard Agency.

Policy W18

Encourage and support liaison between appropriate bodies, including the Port Authorities, Environment Agency, Maritime and Coastguard Agency, Local Authorities and conservation bodies for further integration of marine pollution counter measures.

Proposals for Action	Who could be involved	Benefits
W18 (i) Further integrate marine pollution counter measures	Port Authorities, Environment Agency, MCA, DEFRA, LAs, CCW, EN	<ul style="list-style-type: none">• Reduction in risk potential of marine accidents through both movement of shipping on the Estuary and during loading and unloading at ports.• Sharing of resources and expertise.• Efficient Estuary-wide operations in the event of a marine accident.
W18 (ii) Produce a 'Severn Estuary counter-pollution contingency plan'.	As W18 (i)	W18 (i)

Issue reference W19

Accidents from nuclear installations

There is public concern over the potential of major nuclear accidents through the presence of four nuclear power stations in close proximity to the Estuary. Nuclear power stations are licensed by the Nuclear Installations Inspectorate under the Health and Safety Executive. Public concern has also been expressed over whether living close to a nuclear power station causes increased susceptibility to radioactive induced illnesses. Decommissioning of most of these power stations will require careful risk management. Berkeley is being decommissioned and the residual radioactivity on the site is no higher than that of a medium sized hospital.

Policy W19a

Promote safety measures to reduce the potential of a nuclear accident

Policy W19b

Conduct further research into the environmental and public health impacts of living close to a nuclear power station and encourage wide publication of information on the safety of these stations, to inform the general public.

Proposals for Action	Who could be involved	Benefits
W19a Continue work into safety measures taken to prevent a nuclear accident and contingency measures in the event of a nuclear pollution incident.	British Energy, Magnox Electric, FSA, HSE, LAs	<ul style="list-style-type: none">• Reduction in risk potential from nuclear accidents.
W19b (i) Research into the environmental and health effects of living in close proximity to a nuclear power station and remedial action taken if necessary.	British Energy, Magnox Electric, NRPB, FSA, HSE, LAs, Medical profession	<ul style="list-style-type: none">• Identification and minimisation of potential environmental and public health effects of living in close proximity to a nuclear power station.
W19b (ii) Carry out further work into effective publication of safety programmes in place to safeguard against nuclear accident.	As W19b (i) except medical profession	<ul style="list-style-type: none">• Increased confidence of the general public in the measures taken to safeguard against nuclear accidents.

Issue reference W20

Accidents at major industrial sites

There is public concern over major accidental and potentially hazardous releases from large industrial complexes situated around the Estuary. A number of sites are designated as Control of Major Accidents and Hazards (COMAH) sites and these are regulated jointly by the Health and Safety Executive and the Environment Agency, and therefore will be required to have detailed emergency plans in the event of accidents or plant failures. In addition, Local Authorities will also be required to have offsite emergency plans for these sites. The major chemical complexes on the Estuary have set up warning procedures for the local community, such as sirens that warn of a possible accidental release.

Policy W20

In the long term, undertake research into the utilisation of alternative substances or processes which have significantly less impact upon the environment than those currently in use and in the short term, use the safeguard procedures currently in place.

Proposals for Action	Who could be involved	Benefits
W20 (i) Continue work into safety measures taken to prevent accidental discharge of hazardous substances from large industrial complexes and contingency measures in the event of a major pollution incident.	HSE, LAs, Environment Agency	<ul style="list-style-type: none">• Reduction in risk potential from accidental discharge of hazardous substances from major industrial complexes.
W20 (ii) Further publicise current safety programmes to safeguard against major accidents from these sites.	As W20 (i)	<ul style="list-style-type: none">• Increased confidence of the general public in the measures taken to safeguard against nuclear accidents.

Issue reference W21

Achievement of waste strategy targets

There is a need to implement the Government strategy for sustainable management of waste, the National Waste Strategy 2000 England and Wales, at local level. The strategy is aimed at Local Authorities, industry and the Environment Agency with the objective of reducing, reusing and recycling waste. Reduction in levels of waste will result in a reduced need for landfill sites in the SEP area. One significant change may be the increase in waste to energy plants.

Policy W21

Encourage implementation of National Waste Strategies.

Proposals for Action	Who could be involved	Benefits
W21 (i) Develop strategies and development plan policies for waste using the Best Practical Environmental Option (BPEO) taking into account the Landfill Directive.	LAs, Environment Agency, Waste Industry	<ul style="list-style-type: none">• Identifies how waste will be disposed of.
W21 (ii) Promote effective minimisation, reuse and recycling of waste in the Estuary area and share management best practice in industry.	LAs, Waste producers, Environment Agency, DEFRA, NAW, Institute of Waste Management	<ul style="list-style-type: none">• Reduction of waste input to the SEP area and effective use of waste for sustainability.• Encourages industries to take on best practice.
W21 (iii) Promote Waste exchange programmes.	Environment Agency, LAs, voluntary bodies, Universities/colleges of Higher Ed., TECs, DEFRA, NAW	<ul style="list-style-type: none">• Better use of waste products and minimises waste produced.
W21 (iv) Continue to implement and review Port Waste Management Plans.	Port Authorities	<ul style="list-style-type: none">• Compliance with waste reception and management regulations and reduction of waste produced.
W21 (v) Establish Waste Resources Action Programmes in England and Wales to encourage the purchase of recycled products.	DEFRA, NAW, Private Industry	<ul style="list-style-type: none">• Creates markets for recycled products and allows more waste to be recycled.
W21 (vi) Achieve the LA recycling of household waste targets.	LAs, householders	<ul style="list-style-type: none">• Reduce amount of waste going to landfill.
W21 (vii) Undertake research and development into new technologies and materials.	LAs, Environment Agency, EU, DTI, DEFRA, NAW, Industry	<ul style="list-style-type: none">• Will create alternative waste management solutions and markets for recycled products.

Issue reference W22

Achievement of energy strategy

The Government's overall energy strategy was updated in the Energy Report Volume 1 1998. DTI produced the document *New and Renewable Energy – Prospects for the 21st Century* (March 1999) which states that we are working towards a target of providing 10% of UK electricity from renewable resources as soon as possible and it hopes to achieve this by 2010. This may increase the demand for barrages, wind farms and hydropower plants in the Estuary.

Policy W22

Support the development of renewable energy schemes providing there is acceptable impact on the environment and human health and support from local communities.

Proposals for Action	Who could be involved	Benefits
W22 (i) Encourage the development of appropriate renewable energy schemes.	LAs, NAW, DEFRA, DTi, Energy 21, CREATE, Severn Wye Energy	<ul style="list-style-type: none">Reduction in the use of non-renewable energy sources
W22 (ii) Encourage efficient use of energy by industry and general public.	All	<ul style="list-style-type: none">Minimises amount of non-renewable resources used.

Further reading:

1. Waste Strategy 2000 England and Wales, DETR.
2. "Making Waste Work" full and summary document, Department of the Environment, Transport and the Regions (DETR) and the Welsh Office 1995.
3. Less Waste More Value – Government Consultation paper on the waste strategy for England and Wales, DETR, 1998.
4. Energy Report Volume 1, Government document, 1998.
5. New and Renewable Energy – Prospects for the 21st Century, Department Trade and Industry, March 1999.
6. Opportunities for Change. DETR consultation paper on the revised UK strategy for sustainable development February 1998 – Planning Chapter.
7. EC Framework Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community 76/464/EEC.
8. Council Directive concerning Urban Waste Water treatment 91/271/EEC.
9. EC Directive concerning the quality of Bathing Water 70/160/EEC.
10. A Code of Good Agricultural Practice for the Protection of Soil, MAFF, December 1993.
11. A Code of Good Agricultural Practice for the Protection of Water, MAFF, July 1997.
12. The United Kingdom National Air Quality Strategy, March 1997.
13. The State of the Environment of England and Wales : the Atmosphere (March 2000 ISBN 0 11 310167 8); the Land (Feb 2000 ISBN 011310166X); Coasts (April 1999 ISBN 0113101627); Fresh Water (May 1998 ISBN 0113101481) – four separate reports produced by the Environment Agency.
14. Introduction of the Groundwater Regulations, Environment Agency, 1999.
15. Bringing in Integrated Pollution Prevention and Control, Environment Agency, December 1998.
16. The Landfill Directive, Environment Agency, June 2000.
17. Contaminated Land – Part IIA of the Environmental Protection Act 1990, August 2000.
18. The Essential Guide to UK and European Pollution Control Legislation 1998, National Society for Clean Air and Environmental Protection,
19. Port Waste Management Planning – How to do it, DETR, June 1998.
20. Port Waste Management Planning – A guide for marina operators and coastal clubs, BMIF and RYA, June 1998.
21. Strategic Waste Management Assessment 2000, Wales Environment Agency, 2000.
22. Managing Water Sustainably – A Consultation Paper, National Assembly for Wales, July 2001.
23. Planning Policy Guidance note 10: Planning and Waste Management, DETR 1999
24. Draft Planning Policy (Wales): Technical Advice Note 21: Waste, National Assembly for Wales 2000

9. Aggregates and other minerals

Aim:

To meet society's need for minerals by maximising the use of secondary and recycled materials and encouraging the use of marine and land based sources in a way that least harms the Estuary's off-shore and on-shore environments.

Government Policy

9.1. The Government aims to ensure the sustainable provision of marine dredged aggregates for construction and beach management, consistent with the limit of the resource and the potential environmental impact. It also aims to encourage exploration to discover new oil and gas fields and extend existing fields whilst safeguarding navigation through the grant of DTLR and NAW consents for the location of offshore installations.

Background

9.2. Sand and gravel has been dredged from the Severn Estuary since the early part of this century. The Estuary bed is an important source of aggregates (sand) and some other minerals. Mineral extraction is licensed at five sites on the Estuary and there are applications for new and renewed licences (two of these are outside the SES area, but are of relevance to the strategy). Marine dredged aggregates make a significant contribution to the local economy of the region, providing the major sources of fine aggregates for the construction industry, for example, 80-90% of the sand used for construction in South Wales comes from the Bristol Channel area. Aggregates are landed at ports on both sides of the Estuary. Dredging license areas are shown in Map 11 (see Appendix 8).

9.3. Using marine-derived minerals helps to reduce the pressure on land-based sources around the Estuary and beyond, thus avoiding impacts on local residents and the landscape, and minimising loss of land valued for agriculture and nature conservation. Marine extraction also reduces transport and environmental impacts associated with terrestrial sources since minerals are landed at ports near to centres of demand, require little processing and produce few if any waste products. However, this must be assessed against the environmental impacts that may be associated with extraction from marine-based sources for example on adjacent shorelines, habitats and marine wildlife, fishing and fisheries, archaeological sites, water quality and more localised impacts arising from landing, processing and distribution of material.

The 'Government View' procedure

9.4. At the time of writing (summer 2001) depending on where the proposal lies within the Estuary, marine extraction is licensed in the light of formal views from either the NAW or DTLR, in conjunction with other Government departments. The Crown Estate, as landowner of most of the Estuary sea-bed, licenses dredging operations and also monitors the location of dredging via an electronic monitoring system. The Crown Estate will only issue a licence subject to a favourable Government View, so ultimately, it is the DTLR/NAW that determines whether or not a dredging licence is given. However draft Marine Minerals Dredging Regulations are in an advanced stage of preparation to replace the licensing system with a system of dredging permissions administered directly by NAW/DTLR. In addition much of the SES area is within Local Authority jurisdiction, in particular the majority of the tidal areas upstream of the Second Severn crossing and the marine extent of Bristol as far as Flat Holm and Steep Holm. Proposals for dredging in these parts of the Estuary require planning permission rather than a licence or dredging permission. In addition licences to dredge may be required from other agencies.

9.5. Under the informal Government View procedure applications must be made to DTLR or NAW as appropriate and an Environmental Impact Assessment and coastal impact study is required for this type of proposal. In reaching its decision, DTLR/NAW considers all the information submitted with the application, including reports on the environmental effects of the proposed dredging and the results of public consultation. Where an inquiry or hearing is held into an application, the recommendation of the Planning Inspector will also be taken into account. In addition, as the majority of the Severn Estuary is designated as a European marine site (both a SPA and a SAC) an "appropriate assessment" may be required under the Conservation (Natural Habitats &c) Regulations 1994.

9.6. In those parts of the SES area within Local Authority jurisdiction any proposals for mineral extraction should be made through a planning application to the relevant Local Planning Authority who in consultation with relevant agencies will advise whether an Environmental Impact Assessment is required. In reaching its decision the Local Planning Authority will consider all the information submitted with the application together with the results of public consultation. Such applications may be called in by the NAW or DTLR if they raise issues of more than local significance or depart fundamentally from the Development Plan. Again since the majority of the Severn Estuary is designated as a European marine site an “appropriate assessment” may be required under the *Conservation (Natural Habitats &c) Regulations 1994*.

Research

9.7. The size and complexity of the Severn Estuary and the larger Bristol Channel area means it has been difficult to gain an understanding of the links between different aggregate deposits and the potential effects from exploiting them. As a result, it is increasingly difficult to decide where the most appropriate extraction sources are and which minerals resources should be left alone for environmental or any other reasons.

9.8. In response to this the former DETR, NAW and The Crown Estate commissioned the *Bristol Channel Marine Aggregates Resources and Constraints Research Project (BCMAP)* which also covers the Severn Estuary. This recently published research has addressed some of the difficulties and uncertainties currently surrounding assessing dredging proposals. The BCMAP has identified and reviewed existing information on the aggregates resource, ecological, archaeological and economic factors; undertaken primary research and modelling to cover identified information gaps and also developed a conceptual sediment transport model. The model breaks the Bristol Channel up into four main compartments or ‘cells’ – one of which is the Severn Estuary. The outputs from the project are held by the NAW and DTLR on databases and accessed through a Geographical Information System (GIS).

9.9. Due to the size and complexity of the study area, the project provides strategic/coarse scale rather than detailed site-specific information. However, as new information becomes available from any further research or specific studies, this could be fed into the BCMAP system. The BCMAP has also devised a methodology for identifying suitable areas for dredging and assessing future proposals. The final report and a summary of the study have been produced and disseminated.

9.10. Other relevant data was also collected, such as the location of archaeological interests, seabed ownership and fishing areas. The study results do not provide site-specific evidence that would substantiate or disprove links between dredging activities and erosion of the foreshore.

9.11. The Bristol Channel study is being taken forward through a follow-on project called MARMPS (Marine Aggregate Resources Management and Planning System). The information derived from this study will be plotted on a GIS database and will provide policy makers with information tools to assist with decisions on marine dredging proposals in relation to marine, land-based and secondary minerals resources. The study will last two years (from February 2000) and is being undertaken by Cardiff University for NAW and DTLR.

9.12. In relation to improving environmental protection associated with marine minerals dredging, a consultation draft of *Mineral Planning Guidance (Wales) Planning Policy* was published in November 2000. Paragraph 22 states

“the use of marine dredged material should be considered when there will be no significant effects on the marine and coastal environment.”

In addition DTLR and NAW have published for consultation draft marine guidance for the English and Welsh Seabed respectively, entitled *Marine Mineral Guidance note 2 (MMG2)* and *Marine Aggregate Dredging Policy South Wales (MADP)*.

9.13. The National Assembly for Wales has recently commissioned two further projects related to the future of dredging in the Estuary:

9.14. The first of these projects is an appraisal of the potential for land-based sand and gravel extraction in South East Wales (by Symonds Group Limited), the aims of which are:-

- To analyse the commercial potential for land-based sand and gravel extraction in South East Wales in relation to planning and environmental designations, markets and relative accessibility

- To make recommendations on how the planning system should operate to safeguard the resources for future working.

9.15. The above report concludes that potential land-based resources could yield up to 393 million tonnes of sand and gravel, though planning constraints or environmental designations affect three-quarters of these. However, the report's economic analysis shows that the existing supply scenario, currently dominated by marine sources, is unlikely to change unless triggered by environmental or political concerns. In the meantime the study recommends that identified land-based resources should be protected from unnecessary sterilisation by other development.

9.16. For the second of these projects British Geological Survey (BGS) have undertaken a study of the feasibility of using crushed rock sand in South East Wales as a substitute for marine won sand. The study concludes that crushed rock sand produced from certain rock samples of Carboniferous sandstones could possibly be used as fine aggregate for concrete, subject to further research and trials. However, even if crushed rock sands were produced in large quantities, there would still be a need for natural sands for supplementation to achieve acceptable workability in concrete. The study recommends that additional hard rock resources will need to be identified and protected for the future, particularly in those rock types better suited for crushing as rock sand.

9.17. The minerals dredging industry is committed to supporting research, by providing its own research data and advising and supporting other research projects.

The use of recycled materials in place of primary aggregates

9.18. The Government is to place a tax on newly extracted aggregates to encourage the use of recycled materials for construction purposes.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Aggregate and mineral issues overlap with those concerned with development in Chapter 3: 'Sustainable land-use, development and transport', and the delivery of marine aggregates and port dredging in Chapter 7: 'Ports, shipping and navigation'.
- Use of secondary materials is related to Chapter 8: 'Waste management and pollution'.
- The character of the Estuary's landscape may be affected by mineral extraction near the coast, see Chapter 12: 'Landscape and seascape'. Issues of marine aggregate extraction are also a consideration in relation to Chapter 13: 'Nature conservation and wildlife', Chapter 14: 'Archaeology and the historic environment' and for planning issues in Chapter 2.

Issue reference A1

Meeting society's need for minerals

Society uses minerals in a wide variety of projects to support economic growth and to maintain the standard of living. It is important therefore that an adequate supply of minerals is available for society's needs, for both present and future generations. This need however should be reconciled with the need to protect the environment. Presently the need for fine aggregates is largely met from marine-dredged sand, as there are few suitable land-based alternative sources not protected by conservation designations or planning constraints.

Policy A1a

Encourage further research and dissemination of current studies to aid understanding of the availability of both marine and alternative land-based sources of primary aggregates and their associated environmental impacts.

Policy A1b

Support the development of a policy framework to guide future proposals for both marine and land-based aggregate extraction that minimises environmental impact.

Proposals for Action	Who could be involved	Benefits
A1a (i) Support the dissemination and consideration of the findings of research into the availability of land-based sand and gravel resources undertaken by Symonds.	DTLR, NAW, Environment Agency, RAWPs, Mineral Planning Authorities, Mineral Operators	<ul style="list-style-type: none"> Will assist in the formulation of a policy framework for future extraction proposals. Will assist in the assessment of both marine and land won applications.
A1a (ii) Support the analysis of the findings of the research into the current resources and environmental, technical, economic and infrastructure constraints of marine aggregate extraction in the Estuary undertaken by Posford Duvivier and ABP.	As A1a(i), DEFRA, CEFAS	<ul style="list-style-type: none"> As A1a (i)
A1a (iii) Encourage further research into the feasibility of working more environmentally acceptable deposits so that sensitive parts of the Estuary are protected.	DTLR, NAW, DEFRA, CEFAS, Mineral Planning Authorities, BMAPA, Mineral Operators	<ul style="list-style-type: none"> Will avoid need to extract minerals from sensitive parts of the Estuary (both on and off shore) and avoid the associated environmental impacts.
A1b (i) Support the development of new planning guidance on marine dredging which provides a clear understanding of the differences between marine and land-won resources in terms of comparative environmental impact, economic and social benefits.	DTLR, NAW, DEFRA, CEFAS, RAWPs	<ul style="list-style-type: none"> Will provide a clear policy framework for ensuring an adequate and steady supply of primary minerals . Will allow stakeholders to participate in policy formulation process. Will encourage all environmental effects to be properly debated.
A1b (ii) Encourage national and local government to ensure all decisions on future extraction proposals and policies in Development Plans are made in accordance with this framework.	DTLR, NAW, DEFRA, Mineral Planning Authorities	<ul style="list-style-type: none"> As A1b (i)
A1b (iii) Maintain and improve the GIS and database systems used to provide strategic marine minerals information, including investigation of links with SMPs and ASERA.	DTLR, NAW, Environment Agency, SEP	<ul style="list-style-type: none"> Will ensure good information is available to assist in the decision-making process for marine aggregate dredging applications.

Issue reference A2

Use of alternative materials

At present it is often accepted to be more economically and practically attractive to use natural sources of minerals than to use secondary materials. However, in keeping with its encouragement of sustainable development, the Government is committed to increasing significantly the level of use of secondary materials and new codes of practice to promote the use of secondary minerals are to be introduced. However it must also be recognised that firstly there are natural limits to the availability of secondary materials so that an element of primary materials will still be required, and secondly that production of secondary materials creates its own environmental impacts from processing waste products and transport.

Policy A2a

Encourage maximum use of secondary and recycled minerals, as a means of conserving both marine and land-based primary sources.

Policy A2b

Encourage and support further research into sources of both secondary and re-cycled minerals in order to increase understanding of these resources and to minimise the use of primary resources.

Proposals for Action	Who could be involved	Benefits
A2a (i) Support the development of policies giving greater emphasis and support to the use of secondary rather than primary minerals.	DTLR, NAW, Environment Agency, Mineral Planning Authorities	<ul style="list-style-type: none">• Will encourage greater use of secondary materials and reduce the demand for primary minerals and associated impacts.
A2a (ii) Encourage the establishment of more materials recovery facilities.	DTLR, NAW , Environment Agency, Mineral & Waste Planning Authorities, Mineral Operators, Waste Industry	<ul style="list-style-type: none">• As A2a (i)
A2a (iii) Support further and tougher fiscal measures to favour secondary minerals.	HM Treasury, DTLR, NAW	<ul style="list-style-type: none">• As A2a (i)
A2a (iv) Encourage the development of national specifications for secondary minerals.	DTLR, NAW, Construction Industry Research and Information Association (CIRIA), Building Research Establishment	<ul style="list-style-type: none">• As A2a (i)
A2b Support more research into how greater use can be made of secondary minerals.	DTLR, NAW , Environment Agency, Mineral Operators	<ul style="list-style-type: none">• As A2a (i)

Issue reference A3

Minerals dredging and relationships with coastal erosion, sediment transport and beach levels

The coast is continually changing as a result of the natural environment. Changes can also occur as the result of coast and port developments, including coastal protection schemes. Assessment of individual licence applications includes detailed studies on a range of matters including potential impact on coastal erosion. However, as indicated by the lack of scientific evidence it has been difficult to establish whether, collectively, marine sand and gravel extraction might lead to increased coastal erosion due to changes in sediment transport patterns and alterations in beach levels with resultant implications for coastal defence, nature conservation and amenity beaches and possibly tourism. As part of the regulation of the marine dredging industry monitoring is undertaken on a regular basis to assess any impact on the coastline.

Policy A3a

Encourage and support further research into the impact of dredging on coastal erosion, sediment transport and beach levels to aid and inform decision-making.

Policy A3b

Support adequate monitoring and mitigation measures through the licensing system.

Proposals for Action	Who could be involved	Benefits
A3a (i) Encourage the development of existing research on the impact of dredging on the coastline.	DTLR, NAW, Environment Agency, Mineral Operators	<ul style="list-style-type: none"> • Will allow for better understanding of the relationship between marine aggregate extraction and coastline, especially to tourist beaches and sea defences. • Will assist formulation of policy and the assessment of future applications for dredging licences.
A3a (ii) Encourage and promote the continued dissemination of research results to decision-makers.	DTLR, NAW, Environment Agency	<ul style="list-style-type: none"> • Informed management decisions. • Improved understanding of man-made and natural effects.
A3b (i) Support the continuation of the requirement of all licences issued to monitor changes where there may be potential environmental impacts to areas such as sand bars and coastlines and seek to extend this to all authorised dredging operations.	DTLR, NAW, DEFRA, CEFAS, Mineral Planning Authorities, Mineral Operators	<ul style="list-style-type: none"> • Will help to safeguard against environmental impact and provide information on the rate of change occurring.
A3b (ii) Support the continuation of the monitoring and enforcement of all conditions of licences and seek to extend this to all authorised dredging operations.	DTLR, NAW, Mineral Planning Authorities	<ul style="list-style-type: none"> • As A3 (ii)
A3b (iii) Support the continued limitation of licences to 15 years with reviews at a minimum of every five years, in line with recent dredging licences and seek to extend this to all authorised dredging operations.	DTLR, NAW, Mineral Planning Authorities	<ul style="list-style-type: none"> • Will allow for a review of environmental impact and changes in technology.

Issue reference A4

Effect of marine aggregate extraction on fisheries and wildlife

Disturbance and resuspension of sediments, increases in turbidity and noise from marine dredging can affect a range of plants and animals such as seabed communities, shellfish, fisheries and bird life. This has implications for nature conservation in the Severn Estuary. Any licensed sites within or adjacent to the Severn Estuary SPA or pSAC would have to be reviewed to assess if there are any adverse impacts on these sites. Research has shown that the extent of impact around a dredging site will be very localised; research into the effects of dredging on marine life is currently in progress around the south coast of England and in the southern North Sea.

Policy A4a

Support and promote increased understanding of aggregate extraction issues within the wider Estuary ecosystem.

Policy A4b

Support a full environmental impact assessment for aggregate extraction proposals.

Policy A4c

Encourage further research into the impact of minerals dredging on fisheries and wildlife and the sharing of data to inform managers and decision makers.

Policy A4d

Minimise the adverse impacts of mineral extraction on wildlife and its habitats in the Estuary.

Proposals for Action	Who could be involved	Benefits
A4a Raise awareness and understanding of aggregate extraction issues within the wider Estuary ecosystem.	SEP, NAW, DTLR, DEFRA	<ul style="list-style-type: none">• Greater understanding of aggregate issues.
A4a & c Encourage and promote dissemination of results of research projects.	DTLR, NAW, DEFRA	<ul style="list-style-type: none">• Improved awareness among concerned parties of the effect of minerals dredging on fisheries and wildlife.
A4b Support a full Environmental Assessment of all mineral dredging proposals to identify and minimise environmental impact.	NAW, DTLR, DEFRA, Crown Estate, CCW, EN, Mineral Operators	<ul style="list-style-type: none">• Will encourage all environmental impacts to be fully considered before allowing a proposal.• Protection of wildlife habitats and diversity of wildlife.
A4c (i) Promote suitable surveys in association with licence applications, with a detailed monitoring programme and provision for mitigation if applicable.	DTLR/NAW, DEFRA/CEFAS	<ul style="list-style-type: none">• Assessment of the true value of marine minerals and the wildlife that is supported by aggregate resources in the Estuary.
A4c (ii) Promote research to consider the impact of minerals dredging on fisheries and wildlife.	DTLR, NAW, DEFRA, CEFAS	<ul style="list-style-type: none">• Improved understanding of the impact of minerals dredging on the ecology of fisheries and wildlife.
A4d Support the development of guidelines for processing licence applications based on the results of the Posford Duvivier study	DTLR, NAW, DEFRA, CEFAS, Mineral Operators, CCW, EN, SEP	<ul style="list-style-type: none">• Improved understanding of the impact of minerals dredging on the ecology of fisheries and wildlife.

Issue reference A5

Effects of minerals dredging on archaeology

The impact of dredging proposals on known marine archaeology is included in environmental assessments and can therefore be kept to a minimum. A code of practice for seabed developers has been prepared by the Joint Nautical Archaeology Policy Committee (JNAPC) in conjunction with amongst others BMAPA and the Crown Estate. In addition BMAPA are currently involved in a joint research project, in tandem with Royal Commission on Historical Monuments of England (RCHME) and English Heritage which aims to provide a set of revised guidelines specifically for assessing the potential impact of marine dredging extraction upon maritime archaeology.

Policy A5

Promote measures to minimise the effects of dredging on archaeology.

Proposals for Action	Who could be involved	Benefits
A5 Support the establishment and maintenance of a GIS based database of all known archaeological sites in the Estuary and encourage the assessment of all dredging proposals for their potential impacts.	DTLR, NAW, Cadw, RCHME, RCAHMW, English Heritage, Mineral Operators, Archaeologists	<ul style="list-style-type: none">Will help encourage such sites to be protected from any future marine aggregate extraction proposals.

Issue reference A6

Visual and other impacts of onshore mineral working

Shoreline quarries and sand workings can deny access to the coastline and damage the visual attraction of the coastline.

Policy A6

Support and encourage measures to both minimise the visual impact of onshore mineral working on the character of the Estuary and allow full access to the coastline.

Proposals for Action	Who could be involved	Benefits
A6 (i) Encourage early restoration of non- operational mineral sites.	Mineral Planning Authorities, Mineral Operators	<ul style="list-style-type: none">Early restoration helps to reduce impacts.
A6 (ii) Encourage appropriate screening and/or landscaping of existing, and any new mineral operations that are approved.	Mineral Planning Authorities, Mineral Operators	<ul style="list-style-type: none">Will help minimise the visual impact.

Issue reference A7

Local accountability of minerals dredging control

Concern was expressed at the time of the Joint Issues Report over the accountability of dredging control as the Crown Estate is both landowner and regulator, which leads to a potential conflict of interests. In addition the Government View procedure is perceived by some as not accountable to local interests, as it is administered by the DTLR and NAW, rather than Local Authorities, even though they are consulted at all key stages of the assessment process. The current split of the regulatory process between central and local government also risks a lack of co-ordination and consistency in assessing marine and land-won alternatives. The first concern is being addressed as a result of imminent changes to the licensing process, with statutory regulations being introduced, though the latter issue still remains a concern to be addressed.

Policy A7

Encourage increased access and involvement of local stakeholders in the procedure for issuing licences and permissions for dredging in the Estuary.

Proposals for Action	Who could be involved	Benefits
A7 (i) Encourage proposed reforms to procedure to introduce greater accountability.	DTLR, NAW	<ul style="list-style-type: none">Will increase accountability of procedure by removing decision process directly from the land owner.
A7(ii) Support the review of these reforms to assess stakeholder satisfaction.	DTLR, NAW	<ul style="list-style-type: none">Allows assessment of reforms to be undertaken and any need for further improvements to be identified.
A7 (iii) Support the continuation of effective consultation to actively involve stakeholders in decision-making process.	DTLR, Mineral Planning Authorities	<ul style="list-style-type: none">Generates ownership of issues.
A7 (iv) Support measures to publicise the decision-making process and monitoring activities.	DTLR, NAW, Mineral Planning Authorities, Mineral Operators	<ul style="list-style-type: none">Aids understanding of procedures and issues.
A7 (v) Promote effective co-ordination and consistency between central and local government in assessing proposals for marine and land-based aggregate extraction.	DTLR, NAW, RAWPs, Mineral Planning Authorities	<ul style="list-style-type: none">Will allow an appropriate balance to be achieved in assessing marine and land-based extraction proposals.

Issue reference A8

Regulation of minerals dredging

The Crown Estate issues dredging licences and ensures compliance with those licences, although it will only issue a licence with a favourable 'Government View'. However conflicting concerns have been expressed about the system. On the one hand there is concern that the system is not sufficiently stringent and on the other hand some parts of the marine minerals extraction industry have at times expressed concern that it suffers from over-regulation, although BMAPA which represents many operators have indicated they are happy with present arrangements.

Policy A8

Encourage regular review of the system for issuing licences and planning permissions.

Proposals for Action	Who could be involved	Benefits
A8 Review legislative requirements on mineral operators to assess effectiveness of current legislation.	DTLR, NAW	<ul style="list-style-type: none">Allows an assessment of current legislation and any need for further improvements to be identified.

Further Reading:

1. Draft Marine Minerals Guidance Note 2: Guidance on the extraction by dredging of sand, gravel and other minerals from the English seabed, DETR, consultation paper, February 2001.
2. Cambell J.A., Guidelines for assessing marine aggregate extraction. MAFF, Directorate of Fisheries Research. Lab leaflet no 73, 1993.
3. CIRA, Beach recharge materials – demand and resources. CIRA Report 154, 1996
4. CIRA, Regional seabed sediment studies, Assessment of maritime aggregate dredging, CIRA Report C505., 1998
5. Nash Bank Environmental assessment for aggregate extraction from Nash Bank, Bristol Channel (Draft), Emu Environmental Ltd, 1999.
6. Dredging on Nash Bank: Application for continued extraction. Coastal Impact Study, HR Wallingford, 1999.
7. Bristol Channel Marine Aggregates Resources and Constraints Research Project, DETR/National Assembly for Wales, August 2000.
8. Strategic and Cumulative Effects of Marine Aggregates Dredging (SCHEMAD), Oakwood Environmental Ltd, Feb. 1997.
9. Government View: New Arrangements for the Licensing of Minerals Dredging, DETR and Welsh Office, May 1998.
10. Marine Aggregate Dredging Policy South Wales, NAW Consultation paper, May 2001.
11. Mineral Planning Guidance (Wales) Planning Policy, NAW, December 2000.
12. Mineral Planning Guidance: Guidelines for Aggregates Provision in England (MPG6), DETR, April 1994.

10. Water resources

Aim:

To manage water resources in order to meet society's needs while protecting the natural environment.

Government aims

10.1. The UK Government seeks to ensure that water resources are managed sustainably so that the aquatic environment is protected and, where possible, enhanced while at the same time allowing economic development and acceptable living standards. Properly managed demands for water resources should be met but water should not be used in ways that endanger the ecosystems that rely upon it. Better use should be made of existing resources and timely plans put in place to ensure the future provision of sustainable water supplies.

Introduction

10.2. The Rivers Severn and Wye are major strategic water resources and any activities within these catchments may have a resultant impact on the Estuary.

10.3. Management of water resources affecting the Severn Estuary must meet the requirements of the EC Habitats Directive, as implemented through the Habitats (Nature Conservation, etc.) Regulation. To this end, the Environment Agency will be undertaking a review of existing and new abstraction licences, so that the conservation objectives for the Estuary European Marine Site are not compromised.

10.4. The Environment Agency is investigating how water resources can be managed sustainably to meet future water demands while protecting and enhancing the aquatic environment. The Agency's vision for this was published in National and Regional Water Resources Strategies in March 2001. These documents are a 25-year water resources strategy which identifies a wide range of potential demands, and takes into account the potential impact of climate change. They propose minimal resource development balanced with water conservation. Their measures help to protect our water environment and add to its value.

10.5. In March 1999, the UK Government published *Taking Water Responsibly*, which sets down its proposals, following consultation, for far-reaching changes to the abstraction licensing system in England and Wales. The UK Government has also asked the Environment Agency to prepare Catchment Abstraction Management Strategies (CAMS). These will allow public consultation about how much water should be available for the environment. They will also identify any other changes that need to be made to the catchment abstraction regime to achieve sustainability. A 6-year rolling programme to develop CAMS in England and Wales started in April 2001. The Environment Agency has also developed Drought Management Plans to help mitigate and manage adverse impacts to rivers and groundwaters during severe droughts.

10.6. The way in which the fresh water inflows to the Estuary need to be managed may change as work progresses on CAMS, the Habitats Directive review is implemented, and the actions highlighted in the National and Regional Water Resources Strategies are developed. In doing these things, the Environment Agency will aim to:

- Consult widely with all interested parties
- Ensure full Environmental Impact Assessments and sustainability appraisals are carried out on significant developments.

Flows to the Estuary

10.7. Water resources impacts on the Estuary are dependent on the volume of water flowing from rivers (and sewage treatment works) into the Estuary. The demands of society on the water resources of these rivers include abstractions for public water supply, agriculture and industry (see below), and in-river uses such as navigation and recreation.

10.8. To meet environmental ‘demands’, there needs to be sufficient flow of fresh water into the Estuary at certain times of the year to attract migratory fish and allow them to travel upstream and negotiate the navigation weirs. Sufficient flows are also required to support other species that are sensitive to increases in salinity, and may be required during the summer to provide nutrient or organic input to the Estuary. However, the effect of changes in freshwater flows on the ecology of the Estuary is not well understood. Water must also flow in sufficient quantity to minimise both saline intrusion and transportation of sediment upstream. In addition, flows into the Estuary are required to maintain water quality, including the dilution of sewage effluent discharges and the maintenance of dissolved oxygen levels.

10.9. Each river discharging water to the Estuary will also have specific flow requirements. In the **River Severn** itself, flows are required to maintain dissolved oxygen levels, to ensure acceptable suspended solids levels at the Gloucester-Sharpness Canal abstraction, to prevent saline intrusion and to provide dilution for effluent discharges. Flows are also required for migratory fish. The Environment Agency has a key role in managing the River Severn through the Severn Operating Rules, which specify how water should be released from upstream sources to support abstractions and maintain acceptable flows along its course.

10.10. For the **Bristol Avon**, flows are required to safeguard the Estuary European Marine Site, for navigation requirements in Bristol floating harbour, and for amenity and landscape considerations within the Avon Gorge.

10.11. For the **River Wye** (a candidate Special Area of Conservation in its own right under the EC Habitats Directive), uses that need protection include fisheries, water quality, amenity and recreation. The most significant issue relating to the residual flow into the Estuary is the major migratory fish population, including salmon, lamprey, and twaite and allis shad. The River Wye Regulation Scheme provides for releases to be made from the Elan Valley reservoirs to support downstream public water supply abstractions. This helps to protect residual flows to the Estuary during periods of seasonal low flow.

10.12. For the **River Usk** (a candidate Special Area of Conservation in its own right under the EC Habitats Directive), flow requirements include the protection of fish (including salmon, lamprey, and twaite and allis shad) and of water quality in the Estuary, which receives significant sewage effluent in the Newport area and is also affected by the oxygen demand of high suspended solids. During drought periods, the River Usk is also regulated to support public water supply abstraction downstream.

10.13. The **River Parrett** requires freshwater flow to the Estuary to maintain dilution of sewage discharges, to protect the elver fishery and to prevent saline intrusion into the Somerset moors and levels.

10.14. The **Rivers Taff and Ely** are now impounded by the Cardiff Bay Barrage with controlled discharges to the Severn Estuary.

10.15. Low flows can have a detrimental effect on the ecology of the Estuary. Many factors can cause the flow in rivers to be reduced. For example, during drought periods when there is little rainfall to replenish them, river flows may naturally decrease or in some instances stop completely. Although this is part of the natural cycle of a river system, proactive management of water resources during a drought period can help to mitigate the environmental impacts arising from usage of the water resources. The Environment Agency’s Drought Management Plans outline how this can be achieved.

Abstractions

10.16. With a few exceptions, no one may take water without an abstraction licence issued by the Environment Agency. The licence will specify how much water can be taken and may include conditions that stop the licence holder from taking water if continued use might damage the environment. Such conditions are usually designed to protect rivers or wetlands during periods of low rainfall. New licences are usually time-limited, allowing the Agency to review the licence and its environmental impact at regular intervals. In considering a new application for an abstraction licence, the Agency aims to ensure that the abstraction will remove from the environment only the amount of water that is truly needed.

10.17. Abstractions from the main rivers flowing to the Estuary and from the Estuary and associated tidal stretches of rivers include:

- Major abstractions direct from the Estuary for cooling water for power stations. This water is returned rapidly to the Estuary (see also Chapter 8);
- Large abstractions are made from the rivers Severn, Wye and Usk for public water supply;

- A major abstraction from the Severn at Gloucester by British Waterways in order to feed the Gloucester - Sharpness Canal and the abstractions from it, including a large abstraction for public water supply by Bristol Water Company at Purton.

10.18. Estuary processes such as salt-water intrusion and the landward movement of sediment can affect abstractions near the tidal limit. A recent operating agreement with British Waterways was put in place to modify the pumping regime from the Severn to the Gloucester-Sharpness Canal from the East Parting at Gloucester, so that the amount of water taken during adverse conditions is reduced.

10.19. Plans for a strategic water resource development to supply water from the Severn to the Thames have been considered but are not currently being taken forward. Proposals to transfer additional water from the Wye to the Severn have also been considered. The recently published Water Resources Strategies considered this option but could see no need for new large reservoir schemes. Any plans for such strategic development should be properly assessed, following consideration of a wide range of possible options, to ensure that the use of water resources in this way is sustainable.

Water Use and Water Conservation

10.20. Four water companies provide water supply in the area: Severn Trent Water, Dwr Cymru Welsh Water, Wessex Water and Bristol Water.

10.21. On average each person in the Severn Estuary area currently uses between 130 and 159 litres of water each day. Predictions suggest that this figure will rise to between 136 and 174 litres per day by 2020. Water companies now have a general duty to promote water conservation and modify their customers' demands for water, for example by promoting low water use appliances in the home or simple devices that reduce toilet flush volumes, as well as education programmes. Metering is also an essential component of any demand management strategy. The water companies must also work to reduce leakage and meet mandatory targets set by OFWAT (Office of Water Services) where the companies' Economic Level of Leakage (ELL) methodology is not considered robust.

10.22. Developers need to take water use into account when planning new developments. Demand for water should be managed as far as possible by designing buildings to include water saving devices. This can include, for example, automatic taps, waterless urinals, reduced toilet flush volumes, rainwater harvesting or greywater re-use systems. Waste minimisation initiatives in industry and agriculture have been shown to deliver significant reductions in demand for water, leaving more water for the environment. In addition, such initiatives reduce effluent volumes and energy requirements, leading to financial savings for industry. Payback periods for investment are usually very short for initial methods, however, as leakage levels decline, costs increase rapidly and payback disappears.

10.23. The Environment Agency will progress many of the proposals for action within this chapter under current statutory responsibilities e.g. abstraction licence determination, development and implementation of CAMS, the Habitats Directive Review and to "secure the proper use of water resources in England and Wales".

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Any proposed infrastructure associated with water transfer or supply may have a range of potential impacts on the environment (see Chapter 2: 'Planning and management in the Estuary').
- The management of river flows will impact on water quality, including dissolved oxygen levels, levels of suspended solids, saline intrusion, and water temperature following the return of cooling water from power stations to the Estuary (see Chapter 8: 'Waste management and pollution'). Increased regulation using cold water from upland reservoirs during summer months also impacts on river temperature.
- Wildlife may be affected by alterations to fresh water flows that support habitats and species, (see Chapter 13: 'Nature conservation and wildlife').
- Pumped abstractions may also lead to fish being killed if they are caught on screens or drawn into the pumps (see also Chapter 11: 'Fisheries').

Issue reference X1

Establishing environmentally acceptable flow regimes

The rivers that flow into the Estuary must be managed to ensure that flows are not reduced at certain times in order to:

- Maintain and protect the sites designated under the EC Habitats Directive.
- Ensure survival and induce migration of salmonids and other migratory fish.
- Protect water quality and prevent increased temperatures.
- Decrease saline intrusion into the Gloucester Sharpness Canal (important for Bristol Water) and decrease the upstream transport of suspended solids (which can create problems for the ecology of the river, navigation and the abstraction to the Gloucester Sharpness Canal).

Two of the main mechanisms for ensuring that these requirements will be met will be the review of authorisations under the Habitats Directive and the development of Catchment Abstraction Management Strategies. Completion of the Habitats Directive review is dependent upon confirmation by the Countryside Council for Wales and English Nature of the conservation objectives for the Severn Estuary SPA site.

Policy X1:

Support the determination and achievement of flow regimes into the Estuary that meet the demands placed on its water resources, including those obligations arising under the EC Habitats Directive.

Proposals for Action	Who could be involved	Benefits
X1 (i) Undertake a review of abstraction authorisations impacting on the Severn Estuary SPA site.	Environment Agency, EN, CCW, abstraction licence holders, ASERA	<ul style="list-style-type: none"> • Sites of international importance that are dependent on river flows are protected from any adverse impacts of abstraction in compliance with the Habitats Directive.
X1(ii) Develop Catchment Abstraction Management Strategy(s) for river systems flowing into the Estuary that account for the flow requirements of the Estuary.	Environment Agency, EN, CCW, Water companies, Wildlife Trusts, British Waterways, SEP, NFU/NFUW, CLA, other abstraction licence holders	<ul style="list-style-type: none"> • Integrated management of water resources is undertaken in a way that takes into consideration the requirements of all water users, including the environment.
X1(iii) Identify the ecological requirements of the Estuary area for river flow (including the impacts of flow on salinity, organic input, water quality and sediment transport).	EN, CCW, Environment Agency, IDBs, RSPB, Wildlife Trusts, DEFRA, NAW, SWSFC, Wildfowl & Wetlands Trust	<ul style="list-style-type: none"> • Better information for management of water resources to preserve the ecology of the Estuary.
X1(iv) Following the production of CAMS (see 10.5), review the impact of river regulation and abstractions on the ecology of the Estuary and identify and implement any necessary changes to the River Operating Rules of the rivers Severn, Wye and Usk.	Environment Agency, EN, CCW, RSPB, Wildlife Trusts, DEFRA, SWSFC, NAW, Water companies, British Waterways, SEP, NFU/NFUW, CLA	<ul style="list-style-type: none"> • Improved management of water resources of the Severn Estuary rivers in the light of knowledge gained over time so that any detriment to the ecology of the Estuary is reduced.
X1(v) Work to improve the long-term environmental sustainability (with particular reference to saline intrusion, siltation and timing of abstraction) of water transferred from the Severn to the Gloucester-Sharpness Canal and the subsequent direct abstraction from the canal.	British Waterways, Bristol Water, Environment Agency	<ul style="list-style-type: none"> • The impact of British Waterway's abstraction on freshwater flows to the Estuary is reduced at critical times (high tides, low flows) and the need for and thus the impact of canal dredging is reduced.

Proposals for Action	Who could be involved	Benefits
X1(vi) Continue investigations into river control structures (adjustable weirs at Maisemore and Llanthony) and develop a maintenance regime for the dredging of the East Parting (the navigation channel from Gloucester to the main river channel above Maisemore).	Environment Agency, British Waterways, Bristol Water,	<ul style="list-style-type: none"> • Abstractions are protected against saline intrusion and navigability of East Parting is improved.
X1(vii) Improve fish pass at Tewkesbury weir to investigate the relationship between fish migration and flows.	Environment Agency	<ul style="list-style-type: none"> • Better information to ensure the management of water resources that allows and induces fish migration.

Issue reference X2

Balancing the needs of abstractors with other users

Water levels and drainage practices in low-lying coastal areas can influence ecology and consequently the species that inhabit the area, including breeding waders, water voles, amphibians and valued plant species. Studies by the RSPB and Environment Agency have indicated that there are fewer breeding waders in the wetland areas of the upper Severn Estuary and tidal river area than would be expected. This may be because the area of suitable habitat has been reduced through a change in water levels, which may, or may not, be linked to the regulation of the river system and the water abstracted from it as well as flood defence works. Where the sites are designated under the EC Habitats Directive, an appropriate assessment of all significant existing and any new abstraction licence applications will be made. Remaining issues on water levels linked to abstraction are likely to be addressed through the development of Catchment Abstraction Management Strategies. The Environment Agency has developed Water Resources Strategies to give long-term guidance on water management issues (see 10.4).

DEFRA and NAW require all water-dependent SSSIs to have Water Level Management Plans (WLMPs) prepared for them by the appropriate operating authority. WLMPs seek to equate water level requirements for land drainage, agricultural and conservation needs. WLMPs will inform CAMS and the review of abstraction licences under the Habitats Directive.

Although turbines and pumps are usually screened, major abstractions can kill fish that are sucked through pumps or are caught on the screens. This is potentially a larger problem in tidal rivers than the more coastal parts of the Estuary, where the actual numbers of fish killed at sites have been demonstrated to be small in proportion to estuarine population. The clogging of screens due to large influxes of fish and weed during seasonal storm conditions can also cause major operational problems for abstractors.

Policy X2a

Seek the restoration of water levels at sites of importance for nature conservation, including the review of existing and new abstraction licences in line with the EC Habitats Directive.

Policy X2b

Seek to ensure that development of any new resource does not have an irreversible negative impact on the environment.

Proposals for Action	Who could be involved	Benefits
X2a (i) Assess the effects of water abstraction and river regulation on water levels at sites of local, national and international nature conservation importance (also land drainage, flood control works and weirs).	Environment Agency, EN, CCW, IDBs, Wildlife Trusts, Water Companies and other major abstractors. ASERA, Wildfowl & Wetlands Trust	<ul style="list-style-type: none"> • The impact of water resources management on water levels and thus on wetland ecology is better understood and thus water resources management decisions are improved so that sites of international importance are protected from any adverse impacts of abstraction.

Proposals for Action	Who could be involved	Benefits
X2a (ii) Identify and maintain the water level regimes required for wildlife habitats and to protect sites of nature conservation importance.	EN, CCW, Environment Agency, IDBs, Wildlife Trusts, landowners.	<ul style="list-style-type: none"> Improved information on the management of water levels to maintain the ecological interest of the Estuary, in particular sites designated for nature conservation.
X2a (iii) Review all existing and any new abstraction licence applications in accordance with Habitats Directive guidance to ensure appropriate water levels at designated sites of international importance adjacent to the Estuary.	Environment Agency, EN, CCW, abstraction licence holders	<ul style="list-style-type: none"> Sites of international importance adjacent to the Estuary that are dependent on water levels are protected from any adverse impacts of abstraction in compliance with the Habitats Directive.
X2a (iv) Consult on, prepare, and use Catchment Abstraction Management Strategies (CAMS) and the Water Resources strategies to guide abstraction licensing decisions and to inform abstractors' resource planning and the Town and Country Planning process.	Environment Agency, water companies.	<ul style="list-style-type: none"> Integrated management of water resources on a catchment and strategic basis. Better guidance for sustainable resource development and planning purposes.
X2b (i) Develop for implementation when needed Environment Agency drought management plans for all rivers flowing into the Estuary.	Environment Agency, water companies, British Waterways, SEP, NFU/NFUW, CLA, EN, CCW, FUW	<ul style="list-style-type: none"> Essential users of water resources (including the environment) are safeguarded during periods of drought.
X2b (ii) Produce and implement Water Level Management Plans for SSSIs.	Operating Authorities, including: Environment Agency, IDBs, LAs, EN, CCW, DEFRA, Wildlife Trusts, NAW, NFU/NFUW, CLA, and landowners, Wildfowl & Wetlands Trust	<ul style="list-style-type: none"> Integrated management of water levels at water-related SSSIs for conservation, agricultural and land drainage purposes.
X2b (iii) Manage abstractions to minimise impact on fish, e.g. installation of new pumps, new screen technology, or use of fish deterrents such as acoustic deflectors.	Major abstractors, Environment Agency, DEFRA, SWSFC NAW.	<ul style="list-style-type: none"> Reduction in number of fish killed through pumping.
X2b (iv) Raise awareness of the importance of appropriate water levels for wildlife.	Environment Agency, EN, CCW, IDBs, SEP, Wildfowl & Wetlands Trust	<ul style="list-style-type: none"> Improved understanding of the importance of water level management and the benefits to wildlife.

Issue reference X3

Managing demand for water

The drought of 1995/6 provided a timely reminder of the value of water. Wasteful use of water in the home, in commerce and industry, and in agriculture leads to additional burdens on the environment. By avoiding such wasteful use, more water can be left in rivers and estuaries to support a variety of uses and valuable ecosystems. This will also reduce other environmental impacts such as energy and chemical use associated with water treatment and pumping, as well as effluent disposal. Reducing the demand for water can also avoid the financial and environmental costs associated with new resource developments. Water efficiency programmes will be a requirement for many industries falling under the Pollution Prevention and Control Regulations.

Policy X3

Promote the wise use of water in order to safeguard the environment from unnecessary damage and to improve economic efficiency.

Proposals for Action	Who could be involved	Benefits
X3 (i) Ensure efficient use of water in the home, in commerce and industry, and in agriculture, water treatment works and in the supply infrastructure, ensuring that leakage is reduced to and maintained at the lowest achievable level at reasonable cost in line with OFWAT targets.	Water Companies, OFWAT, Environment Agency, major industrial and agricultural water abstractors.	<ul style="list-style-type: none"> Better use of abstracted water decreases demand for abstraction and therefore reduces the impact of abstraction on the aquatic environment. Reduced environmental impacts associated with reduced need for water treatment and pumping. Cost savings for water users
X3 (ii) Initiate customer demand management programmes, including programmes of metering, education, and trialing/proving drought management techniques so best use can be made of the existing water resources particularly at times of peak usage.	Water companies, OFWAT, LA21 Groups, Environment Agency, developers, WWT, other water users, NAW and DEFRA, industrial and agricultural water users.	<ul style="list-style-type: none"> Better use of abstracted water decreases demand for abstraction and therefore reduces the impact of abstraction on the aquatic environment. Reduced environmental impacts associated with less water treatment and pumping. Cost savings for metered water users.
X3 (iii) Carry out industrial and agricultural water audits to assess the scope for introducing water use minimisation techniques, and implement findings where practicable.	Large industrial and agricultural water users, water companies, Environment Agency, waste minimisation clubs (see also Chapter 8), NAW and DEFRA	<ul style="list-style-type: none"> Better use of abstracted water decreases demand for abstraction and therefore reduces the impact of abstraction on the aquatic environment. Reduced financial and environmental costs associated with reductions in energy use and effluent treatment and disposal.
X3 (iv) Encourage farmers and growers to make best use of water (e.g. through water audits, use of winter storage reservoirs, irrigation scheduling and soil moisture measurement) in order to target their water use to best effect.	Environment Agency, NFU/NFUW, CLA, FFWAG, farmers and growers, NAW and DEFRA	<ul style="list-style-type: none"> Less demand for abstraction during periods of low river flow in summer.
X3 (v) Incorporate policies in Development Plans that encourage best practice among developers so that efficient use of water is designed into new buildings and developments.	LAs, DTLR, NAW, WDA, Environment Agency, LAs, water companies, CIRIA, House Builders Federation, developers.	<ul style="list-style-type: none"> New developments are water efficient, reducing demand for abstraction and therefore the impacts of abstraction on the aquatic environment. Cost savings for owners of new homes and buildings. Increased value of new developments/ buildings.

Further Reading:

1. Water Resources and Supply: Agenda for Action, Department of Environment and Welsh Office, 1996.
2. Taking Water Responsibly: Government decisions following consultation on changes to the water abstraction licensing system in England and Wales., DETR and Welsh Office, 1999.
3. On the Right Track – A summary of current water conservation initiatives in the UK, Environment Agency, 1997.
4. On the Right Track 2 – A summary of current water conservation initiatives in the UK, Environment Agency, 1999.
5. Water Efficiency Awards, Water UK and EA, 2000.
6. Planning Public Water Supplies – The Environment Agency’s report on Water Company water resources plans to the Secretary of State for the Environment, Transport and the Regions and the Secretary of State for Wales, Environment Agency, 1999.
7. Water Resources for the future – a strategy for England and Wales, Environment Agency, March 2001
8. Water Resources for the future – a strategy for Wales, March, 2001
9. Water Resources for the future – a strategy for South West Region, March, 2001
10. Water Resources for the future – a strategy for Midlands Region, March, 2001
11. 1997 – 98 Report on leakage and water efficiency, OFWAT, 1998.
12. Severn Vale, Rural Usk, Wye Area, Eastern Valleys, Taff Area, Ely And Vale of Glamorgan, North Somerset Rivers, Brue and Axe, River Tone, West Somerset Rivers, Bristol Avon LEAP Action Plans, Environment Agency.
13. Optimum Use of Water for Industry and Agriculture: Best Practice Manual. Technical Report W254, 2000
14. Optimum Use of Water for Industry and Agriculture: Best Practice Manual. Technical Report W243, 2000

11. Fisheries

Aim:

To support and promote the sustainable use of the Estuary's fisheries and to protect estuarine habitats whilst recognising the value of the fisheries to local communities.

Government aims

11.1. The UK Government aims to conserve and manage fish stocks, promote a safe and efficient fishing industry, and seeks to encourage fisheries management to take proper account of the impact of fishing on the marine environment.

Access rights

11.2. Between 0 and 6 nautical miles from baselines (not necessarily at low water mark) in the UK, British fishing vessels have sole access rights. Between 6 and 12 nautical miles other Member States vessels with historic rights have access, but beyond 12 nautical miles (the limit of British Territorial Seas) access is open to vessels from any other Member State which has quota to fish the area and to vessels from third party countries if they have entered into a reciprocal agreement with the EU.

Legislative powers

11.3. Responsibility for the management of fisheries rests with the Directorate General XIV of the European Commission. Within the Common Fisheries policy every country manages its own fleet. Member States are free to apply national regulation measures to apply and enforce European Policy, including local sea fisheries byelaws. On the Severn Estuary, Sea Fisheries Committees and the Environment Agency have responsibilities for management of inshore fisheries out to 6 nautical miles from UK baselines. DEFRA deals with quota management and the licensing of fishing vessels and through its British Sea Fisheries Officers and the Royal Navy Fisheries Protection Squadron enforces UK and EU legislation. The Environment Agency has sole control for the exploitation of salmon, trout and freshwater eels.

Conservation

11.4. The Severn Estuary and the rivers Usk, Wye and Severn are important conservation areas largely because of the presence of the migratory fish species: salmon, sea and river lamprey, and twaite shad and allis shad, which are nationally and internationally rare respectively. The Estuary is an important migratory route for these rare and protected species together with elvers. The rivers Usk and Wye are candidate Special Areas of Conservation, for which the above species partly account for the citation. The Estuary has been given two international designations; SPA and Wetland of International Importance (Ramsar Site). The latter designation is based partly on the Estuary's migratory fish populations. The Estuary is also currently under consideration as a SAC. The routes to spawning grounds may be prevented by obstructions such as weirs and barrages, and/or poor water quality of the rivers feeding the Estuary.

11.5. Over a hundred species of fish are found in the Severn Estuary. Among the species which depend on the Estuary as a habitat are: whiting, flounder, sole, bass, cod, poor cod, thin-lipped grey mullet, sea snail, sand goby, herring, sprat and bib and some shellfish.

Fishing activities

11.6. Commercial salmon fishing has declined in productivity and importance. Drift nets, draft nets (seine or long nets), the traditional methods of 'fixed engines' (putts and putchers), and hand-held lave nets are methods once employed, but all these fisheries have reduced. This has occurred partly due to Government supported buy-outs and Net Limitation Orders such as the closure of the drift net fishery which operated off the Welsh coast between Newport and Chepstow and the putcher fishery at Goldcliff near Newport.

11.7. Angling from the shore and from boats on the Estuary is a popular leisure activity, with private and charter boats operating from ports and harbours in the area. Leisure fishing for sea fish makes a significant contribution

to local economies. There is very little shell fishing on the Estuary, but traditional activities include the use of 'mud horses' by a small number of fishermen, taken out over the intertidal mud in Bridgwater Bay to fish for shrimps.

11.8. Commercial fishing for white sea fish also takes place on the Estuary, including trawling, longlining, and the use of beach nets for cod, whiting, bass, sole, plaice and mullet.

11.9. All of the fisheries operating in the Estuary are potentially exploiting salmon destined for a number of different rivers i.e. they are mixed stock fisheries. The extent of this mixing will depend largely upon the location of each particular fishery. There is a need to assess the impact of mixed stock salmon fishing on specific stocks in some of the rivers feeding into the Estuary. Salmon Action Plans for the Severn Estuary and key rivers are currently being produced by the Environment Agency Wales. The concern that mixed stock salmon fishing may reduce the numbers of rare shad as by-catch, has largely been eliminated by modifications of the salmon fishing seasons. The future of heritage fisheries needs to be addressed, if traditional methods are not to be lost, while efforts are made to increase stocks. The major fisheries in the Severn Estuary are shown in Map 12 (see Appendix 8).

11.10. Commercial fishing and angling for leisure have an effect on other users of the Estuary, and so fishermen and anglers should work with others to seek solutions to issues of conservation, access, litter and bait digging.

11.11. The high commercial value of certain fish species can encourage unlawful fishing and steps should be encouraged to reduce it. There is also a concern that those fishing are often from outside local areas and so may have an adverse effect on the local economy. However, rod anglers who come to the Estuary to fish, particularly on charter boats may well be beneficial to the local economy.

Eels

11.12. Young eels (known as elvers or glass eels) enter the Estuary each winter at the end of their long journey from the Sargasso Sea. There is often a good market for elvers in the UK and abroad, making them an important commercial consideration. In recent years elver catches have declined on the Severn Estuary, as they have across Europe. The recent increases in fishing effort have resulted in serious concerns as to whether the current fishery is sustainable.

11.13. The decline in elvers may be caused by a change in oceanic currents in the Atlantic. It is debatable whether there are still enough elvers arriving in the Estuary to populate the upper river systems and tributaries. Barriers to migration such as weirs can prevent elvers reaching some watercourses. In the past, the Environment Agency has enhanced eel and elver populations by restocking the upper reaches of the Severn, and installing eel and elver passes. New studies underway by DEFRA and the Environment Agency will provide information to aid future management of eel stocks.

Salmon and Sea trout

11.14. There has been an increase in populations of salmon on the rivers Taff, Rhymney and Ebbw over the past 15 years as heavy industrial pollution has decreased. Yet on the established salmon rivers Usk and particularly Wye and Severn, there is a long-term decline. Evidence shows that for 1997, national salmon catch figures were among the lowest on record for England and Wales though catches improved in 2000. The rivers Taff and Usk also have significant runs of sea trout.

11.15. In June 1998 the North Atlantic Salmon Conservation Organisation (NASCO) received international scientific advice that stocks of larger, multi-seawinter (mature) salmon were dangerously low and more recently this concern has broadened to include the younger fish that have spent one winter at sea. Changes in ocean climate and continued illegal netting at sea have been identified as being significant contributing factors. Consequently significant causes for decline are likely to be beyond the immediate control of even national organisations such as the Environment Agency, though local actions to mitigate the effects of over-exploitation are likely to be required.

Other species

11.16. Analysis of long-term trends from fish captures at Hinckley Point Power Station show that common fish such as whiting and sprat are gradually increasing in abundance on the Estuary. There is a decline in the abundance of fish that favour cold conditions, such as dab and sea snail, and available fish number data corresponds to a trend in increasing water temperature. However species richness and abundance has gradually increased, at least in the Bridgwater Bay area, again thought to be attributable to an increase in water

temperature. Bass stocks in the Severn Estuary have remained comparatively high in recent years, and conger eel remains stable in numbers. Dover sole is present and has been seen in above average numbers in recent years, so has the sand goby.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- ‘Sustainable land-use, development and transport’; Chapter 3
- ‘Waste management and pollution’; Chapter 8
- ‘Water resources’; Chapter 10
- Impacts of marine aggregate extraction on wildlife including fish; Chapter 9

Issue reference F1

Decline of salmon catches

There has been a long-term decline in the number of salmon caught in the rivers Severn, Wye and Usk. Factors are thought to be complex and the decline has been observed throughout the North Atlantic range of salmon. Those in the SEP area can play a role in efforts to halt the decline in home waters.

Policy F1

Encourage a situation whereby salmon and sea trout can continue to migrate freely through Estuary waters.

Proposals for Action	Who could be involved	Benefits
F1 (i) Introduce regional byelaws to further control salmon fishing.	Environment Agency	<ul style="list-style-type: none">• Increase in salmon stocks.
F1 (ii) Continue to monitor salmon stock.	Environment Agency, DEFRA, NAW, DTLR	<ul style="list-style-type: none">• Improved fishery management of salmon populations.• Increased likelihood of sustainable outcome.
F1 (iii) Develop Salmon Action Plans (SAPS) for all rivers, including the Wye, Severn, Taff, and Usk.	Environment Agency	<ul style="list-style-type: none">• Co-ordination of actions will improve management of Severn Estuary as a whole.
F1 (iv) Continue to enforce Net Limitation Order (1997) on Usk drift nets & propose new byelaws to close the fishery.	Environment Agency	<ul style="list-style-type: none">• Reduced salmon exploitation.• Increase in salmon stocks.
F1 (v) Enforce other appropriate legislation.	Environment Agency	<ul style="list-style-type: none">• Reduced illegal fishing.

Issue reference F2

Phasing out of mixed stock salmon fisheries

Mixed stock salmon fisheries in the lower Estuary may have an adverse impact on the salmon stock in particular rivers.

Policy F2

Where there is over-exploitation of mixed stock salmon, encourage reductions in fishing in order to maintain fish stocks at a sustainable level.

Proposals for Action	Who could be involved	Benefits
F2 (i) Support national byelaws to restore salmon stocks in England and Wales.	Environment Agency	<ul style="list-style-type: none">• Reduced commercial exploitation of “spring” salmon.• Increase in salmon numbers in Estuary rivers.
F2 (ii) Produce Severn Estuary Salmon Action Plan.	Environment Agency, Fishery interests	<ul style="list-style-type: none">• Protection of stock.• Increase in salmon population.

Issue reference F3

Future of heritage fisheries

Traditional salmon fishing practices such as “fixed engines”, withy putchers and lave nets have become part of the Estuary’s cultural heritage. However, these practices are declining due partly to commercial competition from fish farms and the rising costs of licences. Remaining traditional methods of mixed stock fishing may still have an adverse impact on the Estuary’s salmon population however, this is not properly understood.

Policy F3

Conserve traditional methods such as putchers and other heritage fisheries at a sustainable level whilst encouraging that mixed stock salmon are protected.

Proposals for Action	Who could be involved	Benefits
F3 (i) Assess the value of heritage fisheries.	Fishery interests, EH, LAs, Environment Agency, SWSFC.	<ul style="list-style-type: none">Assessment for the continuation of traditional methods, versus the taking of mixed stock.
F3 (ii) Promote the preservation of traditional (heritage) methods of fisheries at a sustainable level that encourages the protection of the mixed stock.	Fishery interests, Environment Agency, SWSFC, Tourist Boards, CCW, EN, LAs	<ul style="list-style-type: none">Retaining of traditional practices.

Issue reference F4

Access to the shore for anglers and the effects of fishing activities on other users of the Estuary

Both recreational and commercial fishing activities can affect other users of the Estuary. Anglers would like better access to the Estuary shore in some areas. However, disturbance of wildlife, dropping litter and bait digging, by both individuals and commercial interests can result in conflicts with landowners and others.

Policy F4a

Promote liaison between landowners, nature conservation organisations, recreational users and fishermen to resolve apparent conflicts, by providing guidance and assisting in conflict resolution on issues of access, litter, fish stocks and bait digging.

Policy F4b

Support measures to improve access to the shore, which must be balanced against safety and conservation measures and the requirements of other users.

Proposals for Action	Who could be involved	Benefits
F4a&b (i) Set up a liaison group to seek a way forward on issues affecting anglers and other users.	SEP, British Federation of Sea Anglers, Bristol Channel Federation of Sea Anglers, SWSFC, Environment Agency, relevant port and harbour authorities, CLA, EN, CCW, ASERA, MCS, LAs,	<ul style="list-style-type: none">Raised awareness of the problems.Improved relationships between organisations involved.Responsible use of the Estuary shoreline.
F4a&b (ii) Produce a ‘Code of Practice for Anglers’ which can be widely distributed.	As F4a&b (i)	<ul style="list-style-type: none">As F4a&b (i)

Issue reference F5

Complexity of fishing regulations

Three regions of the Environment Agency and the South Wales Sea Fisheries Committee each have separate areas of responsibility on the Estuary and each organisation operates under different byelaws.

Policy F5

Harmonise and promote awareness of fish byelaws.

Proposals for Action	Who could be involved	Benefits
F5 (i) Encourage closer liaison between organisations with responsibility for fishing byelaws to work towards harmonisation of the byelaws.	Environment Agency, SWSFC	<ul style="list-style-type: none">Easier management of standardised byelaws.
F5 (ii) Disseminate information/publication of explanatory leaflets to increase awareness of use regulations.	Environment Agency, SWSFC	<ul style="list-style-type: none">Increased understanding and awareness of fish byelaws by the public and users on the Estuary.

Issue reference F6

Eel and elver fishery management

Eel and elver fisheries are important to the local economy and are ecologically important on the Estuary and its tributaries. Evidence that the elver run has decreased significantly in the last decade has resulted in initiatives to monitor the eel and elver population and work towards better management. This decline may be hastened by illegal export.

Policy F6

Support improved understanding and management of eel stocks in the Severn.

Proposals for Action	Who could be involved	Benefits
F6 (i) Maintain, improve and develop eel fisheries to permit the sustainable exploitation of the eel stock for recreational and commercial benefit, taking in to account the important conservation value, complex biology and migratory life-cycle of this species.	DEFRA, Environment Agency, NAW, DTLR	<ul style="list-style-type: none">Increased eel / elver stocks.
F6 (ii) Continue to license elver/eel fishery and to enforce legislation.	Environment Agency, SWSFC, Relevant Police Authorities	<ul style="list-style-type: none">Limitation of elver fishing to licensed activities.
F6 (iii) Increase monitoring of licence uptake/catches by elver fishermen.	Environment Agency	<ul style="list-style-type: none">Increase knowledge of numbers caught/temporal trends.
F6 (iv) Promote national review of elver fishing: byelaws, monitoring and licensing and implement recommendations of the review.	Environment Agency, DEFRA, NAW, DTLR	<ul style="list-style-type: none">Encourages a nationally consistent framework for regulation of elver fisheries.Greater escapement of elvers.Improved sustainability of populations of fisheries.
F6 (v) Introduce national byelaws to restore depleted eel/elver stocks.	Environment Agency, SWSFC	<ul style="list-style-type: none">Increased eel/elver stocks.

Further reading :

- 'Allis and twaite shad: a conservation message' information leaflet, English Nature, Countryside Council for Wales and the Environment Agency, 1997.
- 'National Eel Management Strategy', Environment Agency, 2001.

12. Landscape and seascape

Aim:

To conserve, promote and enhance and where necessary restore the special and distinctive character and quality of the Estuary's landscape and seascape.

Government aims

12.1. The Government aims to conserve and enhance the natural beauty and amenity of the coastline, and the character and local distinctiveness of the countryside.

Background

12.2. The open, flat character of much of the Estuary means that large developments may be visible over long distances, including views across the Estuary from the opposite shore. The undeveloped area has a natural, unspoilt appearance which it is important to retain, although it should be noted that this "natural" landscape has been carefully shaped by generations of human communities. On a smaller scale, it is important that good design and appropriate materials are used for buildings in order to integrate development into the Estuary setting. The main landscape designations are shown in Map 13 (see Appendix 8).

Geology

12.3. The bedrocks of the Estuary and its surrounds consist of clays, mudstones, sandstones and limestones, ranging in age from Ordovician to Jurassic, and represent past marine and terrestrial environments. The resistant Carboniferous Limestone now forms many of the east-west trending hills and ridges which surround the Estuary and provide the headlands and islands (Brean Down, Steep Holm, Flat Holm, Sully Island) which contribute to the Estuary's funnel shape.

12.4. During the late Permian and Triassic, the 'mountains' formed by the folding of the Carboniferous Limestone were weathered down to form low hills in an arid landscape. Eventually the hills were submerged beneath an extensive desert lake which was then inundated by the Jurassic sea. Limestones, clays and sandstones were deposited over the region during the Jurassic and Cretaceous. During the Tertiary, western Britain was uplifted by events related to the opening of the Atlantic. This resulted in the stripping off of much of the Cretaceous and Jurassic cover, leaving low-lying areas on which soft Jurassic clays and Triassic marls now outcrop and commonly form and surround the broader parts of the funnels of the Estuary.

12.5. High sea levels during the Pleistocene interglacials were responsible for many of the coastal features fashioned out of bedrock, while sand and mud were deposited in the low-lying embayments (e.g. Wentlooge, Caldicott and Somerset Levels). Reworked glacial sediments have also been deposited in the main Estuary flats and a substantial amount of sediment may be attributed to deforestation and the development of agriculture.

Estuary

12.6. The current character of the Estuary is defined by the continuous dynamic movement of the water. With the second highest tidal range in the world, of at least 12 metres, the waters are turbid with a high suspended sediment, creating a mass of grey, brown and yellow water depending on the status of the tide, the light conditions and the weather. In the middle of this expanse of constant movement are the Carboniferous limestone islands of Flatholm and Steepholm, and the two bridges crossing the Estuary in its upper reaches. The edge of the Estuary is characterised by the muddy interface between land and sea. Once this was a vast expanse of salt and fresh water marshes, but over the centuries the land has been drained to leave intertidal mud flats and narrow strands of saltmarsh.

12.7. The influence of the tidal Estuary extends inland across large areas of flat land known as the Levels. Here an ancient landscape of hedged fields is dissected by drainage ditches known as rhyndes (England) or reens (Wales), and is prone to flooding.

Upper Severn

12.8. The upper section of the area's landscape, north of the original Severn crossing bridge, is characterised by the mouth of the river and the meandering river itself. The landscape is intimate with a wooded backdrop on one side and open farmland on the other. The settlements are generally small and take the form of traditional villages. Significant exceptions include large developments such as the power stations at Oldbury and Berkeley and the city of Gloucester, which lend an urban influence. There is also a large area of Levels on the English bank north of the bridge.

Lower Severn

Welsh coast

12.9. Downstream of the original Severn crossing are the Gwent Levels. Further inland lie the South Wales Valleys and the Brecon Beacons National Park. The landscape is strongly influenced by human activity dating back to the Bronze and Iron Ages, through the industrial revolution to the modern-day approach to farming and land management. This is reflected in the listing of the Gwent Levels in the *Register of Landscapes, Parks and Gardens of Special Historic Interest, Part 1*.

12.10. Further downstream the landscape is dominated by Cardiff and Penarth, before reaching the limestone cliffs on the Heritage Coast of the Vale of Glamorgan. Here the natural form of the landscape once again dominates and much of the area has been defined as a Heritage Coast reflecting the quality of the coastal landscape.

English coast

12.11. On the English coast the Severnside area south of the original bridge crossing stretches between Aust and Avonmouth. Although substantially developed and dominated by modern industrial features, remnants of historic damp pastoral riverside Levels remain.

12.12. There are two distinct low-lying areas of landscape covering much of the English side of the Estuary separated in the middle by the Mendip Hills. Downstream of Severnside is characterised by expanses of flat low moor and contrasting, often wooded ridges, rising from the marshland. To the south, the Somerset Levels are open and extensive. The Mendip Hills rise above the surrounding countryside and are designated as an Area of Outstanding National Beauty (AONB). To the south of the Somerset Levels, the Quantock Hills are more gentle and rounded with farmed and wooded lower slopes and more open and exposed hilltops. Further downstream still is the Vale of Watchet coastal lowlands stretching to the seaside town of Minehead and the edges of Exmoor National Park.

Human influence

12.13. Many now redundant seawalls and drainage systems, constructed in Roman and Mediaeval times and more recently constructed coastal defence works, have affected the coastal landscape. Removal of hedgerows and natural field boundaries, or the diversion of water courses have also affected the character. The development and expansion of major ports at Avonmouth, Portishead, Cardiff and Newport since the 1880s has brought about dramatic urbanisation of the landscape, as have industrial complexes at Newport and Avonmouth and power stations at Hinckley Point, Berkeley and Oldbury on Severn. Away from these industrial areas, the development of tourist resorts and recreational activities such as holiday camps, caravan and camp sites affect the landscape.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Archaeology and the historic environment; Chapter 14
- Coastal protection and flood defence; Chapter 5
- Nature conservation and wildlife; Chapter 13
- Sustainable land-use, development and transport; Chapter 3
- Agriculture; Chapter 4
- Planning and management in the Estuary; Chapter 2

Issue reference L1

Impact of development on landscape and seascape character

Although the character of the Estuary has gradually evolved over time as a result of changes in both natural systems and human activity, current changes in practices and advancing technology relating to industry, settlement, agriculture and recreation, threaten further substantial change. Unless well managed and based on the principles of sustainable development, it is possible that the values and quality of the remaining characteristic landscapes and seascapes will be irreversibly damaged by such change. Changes are often highly visible across large expanses of the flat estuarine floodplain and therefore the design, layout materials and landscaping proposals are key considerations for any new development. Such on site measures may also be combined with securing benefits off site in order to achieve a net positive effect. Landscape assessment work is generally carried out using the LANDMAP scheme in Wales and following the Countryside Agency methodology in England.

Policy L1a

Promote the adoption of a co-ordinated, character-based approach to landscape and seascape assessment and the preparation of policies for landscape and seascape appraisal, conservation and enhancement.

Policy L1b

Co-ordinate a policy framework for landscape and seascape conservation and enhancement across authority boundaries.

Policy L1c

Plan and design all new developments including infrastructure and transport so that they conserve and enhance the character of the Severn Estuary landscape and seascape across authority boundaries.

Proposals for Action	Who could be involved	Benefits
L1a (i) Assess which landscapes and seascapes require enhancement or restoration and the most appropriate means of achieving these.	CA, CCW, WDA	<ul style="list-style-type: none">• Increase in the value of degraded areas to the overall landscape and seascape character of the Estuary.
L1a (ii) Identify the key characteristics which determine the particular character of the SEP landscapes and seascapes and develop suitable indicators as monitors of change.	LAs, CCW (LANDMAP and seascape research), CA, Rural conservation bodies, Community / Parish Councils, Local Residents.	<ul style="list-style-type: none">• Baseline information against which to judge change and support sustainable decision-making.
L1a (iii) Prepare a comprehensive appraisal of the existing landscape and seascape assessments of the SEP area, in order to bring together these assessments to encourage consistency in recommendations for landscape and seascape management.	LAs, CCW (LANDMAP), Environment Agency, CA, EN, EH (Countryside 2000 survey), WDA, CLA and NFU/NFUW, Wildlife trusts / rural conservation bodies.	<ul style="list-style-type: none">• Overall co-ordinating mechanism within which more detailed landscape and seascape assessments can sit.• Consistent methodologies.
L1b Improve the monitoring and enforcement of landscape and seascape conservation and enhancement measures through the regulatory processes.	LAs, Environment Agency and conservation bodies.	<ul style="list-style-type: none">• Effective protection and conservation measures.
L1c Prepare design guidance, as part of the development plans process, which refers to the landscape and seascape of the Estuary	LAs	<ul style="list-style-type: none">• Development that takes full consideration of the Estuary's landscape and seascape.

Issue reference L2

The need to conserve and enhance the landscape and seascape character of the Estuary

Positive steps are required to enhance the landscape and seascape of the Severn Estuary area so that the uniqueness of the Severn Estuary is retained.

Policy L2

Integrated across the SEP area, support and promote initiatives which implement the conservation of the distinctive landscape and seascape character qualities and enhancement of degraded areas.

Proposals for Action	Who could be involved	Benefits
L2 (i) Promote landscape and seascape enhancement schemes in areas of degraded character and quality.	LAs, CA, CCW, EN, CLA and NFU/NFUW, WDA, EH, DEFRA, NAWAD, Forestry Commission	<ul style="list-style-type: none">• Improved degraded landscapes and seascapes.• Opportunities for economic gain from such enhancement.
L2 (ii) Raise awareness of the value of the landscape and seascape.	SEP, LAs, CADW, Environment Agency, EH, CCW, EN, CA, NFU/NFUW, CLA, local communities and interest groups.	<ul style="list-style-type: none">• A greater understanding on the value of landscape and seascape
L2 (iii) Raise awareness of the potential impacts of activities on the landscape and seascape.	As L2 (i)	<ul style="list-style-type: none">• Create a greater understanding of the potential impact of activities on the landscape and seascape.
L2 (iv) Encourage LAs, landowners and community groups to take opportunities for implementing practices and schemes beneficial for the landscape and seascape, such as English Heritage schemes, Woodland Grant Schemes and Countryside Stewardship Schemes.	As L2 (i)	<ul style="list-style-type: none">• Enhance the landscape and seascape character of the study area.

Issue reference L3

The adverse impact of flood defences and coast and river-bank protection on the landscape and seascape of the Estuary

Much of the land around the Severn Estuary is below mean high water level and is protected from regular flooding by sea defences. The degree of protection reflects the traditional agricultural land use of the area. Increased development, together with climate change have led to the need for increased coastal protection and flood defence, including 'improved' sea defences, which can have an adverse impact on the character and quality of the landscape and seascape. These issues are not always adequately addressed in Shoreline Management and other plans. Local Authorities and the Environment Agency try to ensure that through careful consideration of desired options for coastal protection and flood defence schemes, the character and visual amenity of the Estuary landscape and seascape is conserved / and or enhanced.

Policy L3

Seek to encourage proposals for coastal and river protection that demonstrate due regard for landscape and seascape conservation and/or enhancement at both strategic and site-specific levels. Impact on landscape and seascape character and visual amenities should be a material consideration in the assessment of options for flood defence and coastal protection.

Proposals for Action	Who could be involved	Benefits
L3 Demonstrate measures to minimise the impact of flood defences and coastal protection on landscape and seascape conservation and to enhance landscape and seascape value where possible.	Coastal Cell Groups, Environment Agency, LAs, CLA, NFU/NFUW, CCW British Waterways, Riparian landowners	<ul style="list-style-type: none">Adoption of site-specific measures for minimum impact on landscape and seascape character.

Issue reference L4

Effect of farming on the landscape and seascape

Changing farming practices have the potential to produce significant effects on the estuarine landscape and seascape. These impacts may be positive or negative and arise from actions within the farmers' control and/or as a result of external influences. Assistance may be required for farmers to be able to implement positive actions to conserve and / or enhance the landscape and seascape. The SES will continue to encourage the implementation of appropriate agri-environment schemes throughout the area.

Policy L4

Encourage sustainable farming practices to secure the conservation and/or enhancement of the particular character of the SEP area landscapes and seascapes.

Proposals for Action	Who could be involved	Benefits
L4 (i) Raise awareness within the farming community of the potential impacts of their activities on the landscape and seascape and benefits of alternative approaches.	SEP, NFU/NFUW, CLA, FFWAG, LAs, CA, CCW, EN, EH, DEFRA(RDS), NAWAD	<ul style="list-style-type: none">Greater understanding of the effects of farming practices on the landscape and seascape.
L4 (ii) Encourage the agricultural community to take up sustainable farming practices beneficial for the landscape and seascape and cultural heritage.	As L4 (i) plus Environment Agency	<ul style="list-style-type: none">Preservation of cultural heritage and enhanced landscape and seascape character of the study area.Promote healthy rural communities and sustainable farming practices.

Further Reading:

1. The Cottage Tradition, Council for the Protection of Rural Wales, 1999.
2. The Welsh Landscape: A Policy Document, Countryside Council for Wales, 1996.
3. Character Assessment Guidance, Countryside Agency, 1999.
4. Landscape Assessment Guidance, Countryside Commission, 1993 (being revised by CA and SNH 2000).
5. Guidelines for the Production of Countryside Strategies and Integrated Action Programmes, Countryside Council for Wales, 1995
6. Seas, shores and coastal areas, Countryside Council for Wales, 1996.
7. LANDMAP – The Landscape Assessment and Decision Making Process Draft Handbook for Consultation, Countryside Council for Wales, 1999.
8. Landscapes Working for Wales. Welsh Development Agency/Vale of Glamorgan Council (1), Cardiff County Council (2), Newport County Borough Council (3)/Countryside Council for Wales, 1998 (1), 1999 (2) (in preparation), 1999 (3).
9. A Landscape Classification of Wales, Welsh Office, 1996.
10. A Working Countryside for Wales, Welsh Office, 1996.
11. Planning Guidance (Wales) Unitary Development Plans, Welsh Office, 1996.
12. Planning Policy Guidance Note 20: Coastal Planning, Department of the Environment, 1992.
13. Planning Policy Guidance Note 12: Development Plans, HMSO, 1990.
14. Rural England A Nation Committed to a Living Countryside, DoE / DETR., 1995.
15. Strategic Planning Guidance for South East Wales Volume 1, South East Wales Strategic Planning Group, 2000.
16. Interim Landscape Character Assessment Guidance, The Countryside Agency, 1999.
17. Planning Guidance (Wales) Planning Policy First Revision ,1999.
18. Planning Guidance (Wales) Technical Advice Note (Wales) 5: Nature conservation and planning, Welsh Office, 1996.
19. The Gwent Levels Historic Landscape Study: Characterisation and Assessment of the Landscape, Cadw.
20. Register of Landscapes of Outstanding Historic Interest in Wales, Cadw, 1998.
21. Stephen Rippon, The Gwent Levels: the Evolution of a Wetland Landscape, York, Council for British Archaeology, 1996.
22. Stephen Rippon, The Severn Estuary: Landscape Evolution and Wetland Reclamation, London, Leicester University Press, 1997.
23. Local Attraction, CPRE , 1995.
24. Severn Estuary Shoreline Management Plan (being developed). Severn Estuary Coastal Group.
25. Bridgewater to Bideford Bay Shoreline Management Plan, North Devon and Somerset Coastal Group, 1998.
26. Swansea Bay Shoreline Management Plan (being developed), Swansea Bay Coastal Group.

13. Nature conservation and wildlife

Aim:

To maintain and enhance the biodiversity and abundance of wildlife, especially the habitats and species that contribute to the character and integrity of the Estuary.

Government aims

13.1. The Government aims to meet international responsibilities and obligations for nature conservation. It aims to assist in the conservation and enhancement of the abundance and diversity of wildlife and habitats.

Background

13.2. The Estuary is one of the largest in Britain with an extremely large tidal range which combined with its funnel shape creates a unique, highly dynamic environment. Strong currents are commonplace, resulting in high turbidity with substantial levels of suspended sediment. The habitats and species which are able to survive these conditions are of considerable nature conservation interest. National and international designations are in force or proposed for a range of habitats and species including the Estuary's saltmarsh, sandbanks and over-wintering birds.

13.3. The SEP area covers not only the Severn Estuary itself (seaward of sea defences and cliffs), but also the surrounding hinterland, much of which is important for nature conservation in its own right, for example the Gwent Levels, Somerset Levels, and Rivers Usk, Wye, and Parrett. Management of the foreshore and surrounding hinterland affects the character and coastal wildlife of the Estuary and is primarily the responsibility of the many individual owners and occupiers. A range of nature conservation designations and planning policy guidance influences management of the area's wildlife. Similarly several organisations have regulatory powers and/or advisory roles that can affect the nature conservation interests in the area.

Nature conservation designations

13.4. Designated conservation areas are shown in Map 14 (see Appendix 8).

Wetland of International Importance (Ramsar site)

13.5. The Convention on Wetlands of International Importance especially as a Waterfowl Habitat was adopted at a meeting of countries concerned with wetlands and waterfowl conservation which was held in Ramsar, Iran in 1971. The objectives are to stem the progressive encroachment on, and loss of, wetlands now and in the future. A substantial area of Severn Estuary is designated as a Wetland of International Importance. Boundaries for the Ramsar site are shown on Map 14 (see Appendix 8).

Natura 2000

13.6. The same area that has been designated as a Ramsar site has also been designated as a SPA for Birds under the Birds Directive (79/409/EEC) to protect rare, vulnerable and migratory species of birds. The 1992 EC Habitats Directive (92/43/EEC) aims to maintain the rich variety of European wildlife by protecting vulnerable habitats and the plants and animals they support by designating Special Areas of Conservation (SAC). The Severn Estuary has been proposed as a possible marine SAC for a range of features including Atlantic saltmarsh and four species of migratory fish. The series of SACs across Europe, together with the SPAs designated under the 1979 Birds Directive, will together form a network of sites known as Natura 2000. Boundaries for the SPA and pSAC are shown on Map 14 (see Appendix 8).

13.7. The Habitats and Birds Directives require member states to establish conservation measures for SPAs and SACs which correspond to the ecological requirements of the relevant natural habitat types and species. Member states must take appropriate steps to avoid deterioration or significant disturbance to SPAs and SACs.

13.8. *The Conservation (Natural Habitats &c) Regulations (1994)* build the requirements of the Habitats and Birds Directives onto existing regulatory mechanisms and enable relevant authorities to establish management schemes for SPA and SAC European marine sites. Many of the necessary management measures for terrestrial SACs and SPAs will be achieved through SSSI management agreements and plans. In view of the size and complexity of the Severn Estuary European marine site, a co-ordinated inter-agency approach is being taken. ASERA has been set up to develop a scheme of management for the Severn Estuary SPA. ASERA intend to prepare a shadow scheme of management for the pSAC, in advance of its formal submission by the Government to Europe as a candidate SAC. Where a management scheme exists relevant authorities are obliged to exercise their functions under it to secure compliance with the requirements of the Habitats Directive and subsequent UK Regulations.

13.9. An explanation of Competent Authorities and Relevant Authorities can be found in Appendix 7 Glossary.

13.10. DTLR guidance is that although there can only be one scheme of management for a European marine site, a single set of objectives or measures need not apply uniformly across the whole of the site. There are already examples of various authorities, other groups, and non-statutory bodies developing management plans within the SEP boundary. The scope of such plans may extend beyond, or alternatively have a narrower focus than, that which is required of the Relevant Authorities by the Conservation Regulations, both in terms of the objectives they are intended to achieve and the geographical area they cover. The ASERA scheme of management will build on and/or incorporate these plans where they affect the European marine site. The Severn Estuary Partnership, with its wider objectives, will be in a position to support and complement ASERA in the preparation and implementation of its scheme of management.

13.11. In addition to managing activities, Relevant Authorities and other Competent Authorities have specific statutory functions to decide on applications for a range of consents, licences and other authorisations including planning permissions. The Conservation Regulations establish the procedures which must be followed for consideration of all 'plans or projects' requiring authorisation and affecting a SPA or SAC. For example, where there is likely to be a significant effect on a European site, all plans or projects must be subjected to an Appropriate Assessment when permission is sought. This process is independent of the scheme of management. Competent Authorities have a duty to have regard to the requirements of the Habitats Regulations in the exercise of any of their functions.

Sites of Special Scientific Interest (SSSIs)

13.12. SSSIs are areas of national importance for their wildlife, habitats or geological features. National Nature Reserves (NNR) represent the very best examples of SSSIs. The SSSI designation is the main site protection measure in the UK. All SPAs, Ramsar sites and terrestrial SACs have to be first notified as SSSIs. The notification process involves the countryside agency (for the Severn that is CCW and/or English Nature) considering the site against a set of quality and rarity criteria, followed by consultations with the owners and occupiers, local planning authority and the appropriate Secretary of State. The management of SSSIs hinges on a strong working partnership between CCW/EN and the owners and occupiers. Under the Wildlife and Countryside Act, landowners and occupiers must consult with CCW or EN before carrying out potentially damaging operations on SSSIs. Planning authorities must also consult CCW or EN about planning permission for developments likely to affect SSSIs. Furthermore, Public Bodies have a duty to further conservation of SSSIs. Owners and occupiers can enter into management agreements with CCW or EN to manage sites to protect their special interests. Large intertidal areas of the Severn Estuary and adjacent land are notified as SSSIs. SSSIs also underpin the Severn Estuary SPA and Ramsar designations.

Geological Conservation Review sites and Regionally Important Geological Sites (RIGS)

13.13. The Geological Conservation Review identified sites of geological importance which have been /will be notified as SSSIs for their earth science interests. In addition CCW and EN encourages a network of county-based geological conservation groups. The aim of these RIGS groups is to harness the energy, enthusiasm and expertise of local people to identify and promote the conservation of key local sites.

Local authorities

13.14. The statutory strategic planning framework and development control processes facilitate the protection and enhancement of wildlife. Plans that can result in protection and enhancement of wildlife include

Development Plans, Countryside Strategies and Local Biodiversity Action Plans. Local nature conservation designations include Sites of Interest for Nature Conservation (SINCs), RIGS and Local Nature Reserves.

Biodiversity

13.15. A range of organisations is involved in delivering the UK Government's commitment to biodiversity. This involvement is delivered through the following plans and groups:

- UK Biodiversity Action Plan (BAP) which includes individual Habitat Actions Plans (HAPs) and Species Action Plans (SAPs)
- Biodiversity Action Groups (BAGs)
- Local Biodiversity Action Plans (LBAPs).

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Nature conservation interests are relevant to and may be impacted by all activities that occur on the Estuary. Further details of some of the plans and management issues mentioned above are included in Chapter 2: 'Planning and management in the Estuary'.
- Development issues are covered in Chapter 3: 'Sustainable land use, development and transport'.
- Agricultural activities are covered in Chapter 4: 'Agriculture'; Chapter 5: 'Coastal protection and flood defence' and Chapter 10: 'Water resources' also contain issues that overlap with the concerns addressed in this chapter, such as loss of saltmarsh and water level regimes.
- Issues of pollution are addressed in detail in Chapter 8: 'Waste management and pollution'.
- The conservation of fish species and management of fish populations is covered in Chapter 11 'Fisheries'.

Issue reference N1

The need for strategic management of biodiversity across the SEP area

There has been a net loss of wildlife habitats and diversity of wildlife in the SEP area. Causes include urban development, the need for coastal defence, changing agricultural practices and pollution. Local Authorities within the SEP area are producing individual Local Biodiversity Action Plans (LBAPs). Management of biodiversity on the Estuary could be greatly assisted by the development of an Estuary-wide Biodiversity Action Plan. The implementation of such a Plan (including monitoring and review) would require co-ordination of existing Biodiversity actions of Local Authorities and other statutory and voluntary organisations in the SEP area. Any such plan for the enhancement and conservation of biodiversity must be in keeping with the framework of the emerging statutory Scheme of Management for the SPA and the pSAC.

Policy N1a

Support and encourage the establishment of the statutory scheme of management for the Severn Estuary SPA and a shadow scheme of management for the pSAC.

Policy N1b

Promote Estuary-wide co-ordination to develop mechanisms for the enhancement of biodiversity and to prevent the deterioration of estuarine habitats.

Policy N1c

Encourage initiatives to raise awareness and increase understanding of the range of existing statutory regulations and non-statutory initiatives affecting nature conservation.

Proposals for Action	Who could be involved	Benefits
N1a (i) Support the Relevant Authorities in preparation of the Scheme of Management for the Severn Estuary SPA, particularly with respect to involvement of non-relevant authority interests.	ASERA, SEP, Owners, occupiers, rightholders, local interest groups, local user groups, conservation groups WWT	<ul style="list-style-type: none">• Co-ordinated approach to the protection of bird species noted in the Severn Estuary SPA designation.• Co-ordinated scheme of management of non-relevant authority input.
N1a (ii) Support the Relevant Authorities in developing a shadow management scheme for the pSAC, congruent with the Scheme of Management for the SPA, particularly with respect to involvement of non-relevant authority interests.	ASERA, SEP, Owners, occupiers, rightholders, local interest groups, local user groups, conservation groups, WWT	<ul style="list-style-type: none">• Co-ordinated approach to the protection of interests noted in the Severn Estuary pSAC designation.• Co-ordinated scheme of management of non-relevant authority input.
N1b (i) Develop further mechanisms and schemes to protect and enhance biodiversity in the Estuary area, including BAPs, HAPs, and SAPs.	ASERA, Environment Agency, LAs, CW/EN, Wildlife Trusts, SECG, Local Records Centres, NAW, DTLR, SEP, WWT	<ul style="list-style-type: none">• Protection and enhancement of wildlife habitats and the diversity of the Estuary's wildlife.
N1b (ii) Co-ordinate contribution to and implementation of Estuary related aspects of sub-regional Biodiversity Action Group initiatives such as the BAP for the South West.	All organisations involved in specific plans, WWT, SEP	<ul style="list-style-type: none">• Protection and enhancement of wildlife habitats and the diversity of wildlife in those areas.
N1b (iii) Develop an Estuary-wide BAP to provide a co-ordinated set of plans on the Severn Estuary	SEP, EN, LAs, LA21 partners, SECG, DTLR and Welsh Biodiversity Group co-ordinators, WWT	<ul style="list-style-type: none">• Overview of BAPs, HAPs, and SAPs relating to the Estuary.• Increased co-ordination between LBAPs on Estuary HAPs and SAPs.

Proposals for Action	Who could be involved	Benefits
N1c (i) Increase public involvement in nature conservation, in Greater Gwent and Glamorgan Biodiversity Action Groups, LBAPs and through the LA21 process and local interest groups.	LAs, CCW, EN, Wildlife Trusts, SEP WDA, Clevedon Civic Society, WWT	<ul style="list-style-type: none"> • Raising the general level of awareness of the importance of the Estuary for wildlife, estuarine environmental issues, and the use of the Estuary as an educational resource.
N1c (ii) Promote dissemination of nature conservation/biodiversity information in relation to the SEP area.	SEP, SECG, Wildlife Trusts, WWT	<ul style="list-style-type: none"> • Raised awareness and understanding of biodiversity values.
N1c (iii) Raise awareness of public consultation aspects of statutory regulatory processes involving nature conservation issues, particularly where issues have cross local authority/national boundary implications	SEP, regulatory bodies, WWT, LAs	<ul style="list-style-type: none"> • Raised understanding of and public involvement in statutory consultations on nature conservation matters. • Increased co-ordination of cross border consultations.
N1c (iv) Disseminate existing research and help co-ordinate further research into species and habitats, including the impacts of plans and projects, and operations on them.	SEP, ASERA, EN, CCW, Environment Agency, LAs, research institutions, WWT	<ul style="list-style-type: none"> • Raised awareness of existing information. • Co-ordinated approach to future research.
N1c (v) Raise awareness of the role of natural processes in the maintenance of important habitats for wildlife, coastal protection, and the scientific value of geomorphology	SEP, EN, WWT	<ul style="list-style-type: none"> • Raising general understanding of the natural changes that occur in the Estuary and their relationship with the wildlife interests

Issue reference N2

Concern about the implications of the SPA and possible Special Area of Conservation (pSAC) for estuarine activities

The agreed scheme of management produced by ASERA will set the framework within which estuarine activities will be managed, either voluntarily or through regulation so as to achieve the conservation objectives for the site.

Policy N2

Raise awareness of international designations and the proposed statutory management scheme for the SPA and pSAC.

Proposals for Action	Who could be involved	Benefits
N2 (i) Encourage collaboration between Relevant Authorities, Competent Authorities, interest groups and others to contribute to and raise awareness of the Authorities' roles in relation to Estuary management.	ASERA, SEP, Interest groups and Estuary organisations, Competent Authorities, WWT	<ul style="list-style-type: none"> • Raised awareness and understanding and ownership of the SPA/SAC Management Scheme.
N2 (ii) Make full use of existing groups and fora in order to consult with the wider interests on the Estuary about SPA/pSAC nature conservation issues.	ASERA, SEP, Interest groups and Estuary organisations, WWT	<ul style="list-style-type: none"> • Appropriate consultation when required by ASERA.

Issue reference N3

The impact of development on nature conservation interests

Development can have an impact on nature conservation interests of local, national or international importance. While the national and international interests are given some protection through legislation, responsibility rests with the Local Authorities to develop their own mechanisms, such as Countryside Strategies and LBAPs to protect local interests. Where surveying and monitoring is undertaken, codes of good practice, such as those used by English Nature, should be considered.

Policy N3a

Identify and record wildlife resources in a format that is accessible for planners, developers and other interests.

Policy N3b

Protect and monitor wildlife resources through the planning process and other management initiatives.

Policy N3c

Encourage an appropriate impact assessment of effects of development proposals on sites, habitats or species of nature conservation importance.

Proposals for Action	Who could be involved	Benefits
N3a (i) Carry out species and habitat audits, and compile and maintain records at regional centres.	LAs, Local Records Centres, CCW, EN, Wildlife organisations, WWT, Environment Agency	<ul style="list-style-type: none">• Good data management and assessment of species and habitat status.
N3a (ii) Encourage species and habitat audits and records to be made accessible to developers, planners and other decision makers.	LAs, Local Records Centres, CCW, EN, Wildlife organisations, WWT	<ul style="list-style-type: none">• Development proposals better informed by understanding of habitats and species.
N3a (iii) Monitor SSSI features.	CCW, EN, WWT, owners, Wildlife organisations	<ul style="list-style-type: none">• Protection of wildlife and nature conservation interests.
N3a (iv) Identify and monitor SINC, LNRs, HAPs and SAPs	CCW, EN, LAs, WWT, Environment Agency	<ul style="list-style-type: none">• Protection of wildlife and nature conservation interests.
N3a (v) Raise awareness of biodiversity issues through dissemination of information and best practice.	CCW, EN, LAs, SEP, WWT, Environment Agency	<ul style="list-style-type: none">• Better understanding of the value of nature conservation interests and biodiversity.
N3c Assist in the provision of information on Biodiversity to developers, Local Authorities and others with respect to developments	SEP, CCW, EN, LAs	<ul style="list-style-type: none">• Environmental impact assessments informed by existing knowledge of habitats and species potentially affected by development proposals .

Issue reference N4

The effects of recreational use on wildlife.

Recreation on the waters and shores of the Estuary may have an adverse effect on its wildlife, e.g. disturbance to wildlife by public access, boating, wildfowling or development of new facilities. However, well-planned, sustainable leisure pursuits can minimise the adverse impact on wildlife whilst increasing people's appreciation of nature conservation.

Policy N4a

Seek to avoid disturbance to wildlife from existing recreation and tourism.

Policy N4b

Encourage the development and operation of recreation and tourism activities and facilities which avoid and decrease adverse impact on wildlife.

Proposals for Action	Who could be involved	Benefits
N4a&b (i) Raise awareness of the value of wildlife with tourism and recreation interests, developers and operators, local communities, individuals and visitors.	SEP, LAs, CA, CCW, EN, NFU/NFUW, CLA, BASC, Local communities, and interest groups, WWT, Environment Agency	<ul style="list-style-type: none">• Greater understanding of the potential impacts of activities on wildlife.• Appreciation and improved understanding and enjoyment of the Estuary without causing harm to wildlife habitats or the diversity of wildlife.
N4a&b (ii) Promote sustainable use and enjoyment of the natural resources of the Estuary for environmental education, recreation and green tourism.	CCW/EN, Recreational groups, Tourist Boards, LAs, SECG, Wildlife Trusts, Access officers, BASC, Heritage Coast, WWT, Environment Agency	<ul style="list-style-type: none">• Appreciation and improved understanding and enjoyment of the Estuary without causing harm to wildlife habitats or the diversity of wildlife.
N4a&b (iii) Promote research which will further the understanding of the impacts of human activity on the Estuary.	SEP, WWT, Environment Agency	<ul style="list-style-type: none">• Appreciation and improved understanding and enjoyment of the Estuary without causing harm to wildlife habitats or the diversity of wildlife.

Issue reference N5

Public concern about the effects of pollution on wildlife

Many substances enter the Estuary and its environs as a result of human activities. Sewerage, industrial effluents, agricultural run off (fertilisers and pesticides), radioactive discharges, thermal pollution, noise and light can all have an effect on the ecology of the Estuary. Policies and actions to deal with pollutants can be found in Chapter 8.

Policy N5

Support and promote the development and implementation of mechanisms for providing better public information about pollutants released into the Estuary and their impacts; support and promote existing and emerging pollution controls.

Proposals for Action	Who could be involved	Benefits
N5 (i) Collate existing information on impacts of pollutants on nature conservation interests.	Environment Agency, EN, CCW, ASERA, DEFRA, DTLR, NAW, Crown Estate, Competent Authorities	<ul style="list-style-type: none">• Greater understanding of the impacts of pollutants on wildlife
N5 (ii) Conduct research into the impacts of pollutants on nature conservation interests.	Environment Agency, EN, CCW, ASERA, DEFRA, DTLR, NAW, Crown Estate, Competent Authorities	<ul style="list-style-type: none">• As N5 (i)
N5 (iii) Raise awareness of mechanisms (including the press and other media) that provide information for the public on pollutants released into the Estuary, and the likely effects on wildlife (to include industrial and sewage effluents, and pollution incidents).	Environment Agency, EN, CCW, SEP, Industry	<ul style="list-style-type: none">• Greater understanding of pollutants and their effects• Incentive to reduce pollutants released into the Estuary.
N5 (iv) Raise awareness of existing regulatory mechanisms controlling pollutants released into the Estuary.	Environment Agency, (including LEAP actions), EN, CCW, SEP, Industry	<ul style="list-style-type: none">• As N5 (i)

Issue reference N6

Agricultural management of important habitats including grazing of saltmarsh

Sensitive agricultural management, including appropriate grazing and cutting of grassland, watercourse and hedge management can benefit a number of different habitats and species. For example, saltmarsh forms an important part of the Estuary's nature conservation resource and contributes to coastal defence as a natural buffer. Appropriate grazing levels are an important element in maintaining the nature conservation value of saltmarsh. (See Chapter 5 for other factors that can affect saltmarsh and details on the contribution of saltmarsh to sea defences).

Policy N6

Encourage and promote management initiatives and regimes that maintain and enhance habitats and species in a way that benefits the character of the Estuary as a whole.

Proposals for Action	Who could be involved	Benefits
N6 Develop and promote appropriate initiatives and schemes to manage habitats and species in keeping with conservation interests and with national and international designations, e.g. intertidal habitat options of Countryside Stewardship, Tir Gofal on Gwent Levels SSSIs.	ASERA, CCW, EN, DEFRA, Farmers and landowners, NFU/NFUW, FFWAG, Environment Agency	<ul style="list-style-type: none">• Conservation of habitats.• Conservation of important plant species.• Improved resources for birds.• Contribution to coastal defence.• Contribution to conserving character of the Estuary.

Issue reference N7

The need for recognition of the value of geological sites

Geological and geomorphological features are an important element of the Estuary's character. There is a need to ensure that they are suitably valued and protected in the SEP area.

Policy N7

Support and encourage the protection, identification, notification, and promotion of geological and geomorphological features including GCR (Geological Conservation Review) sites and RIGS (Regionally Important Geological/Geomorphological Sites).

Proposals for Action	Who could be involved	Benefits
N7 Identify and notify sites of geological and geomorphological interest.	CCW/EN, Local Geology Groups, SECG, Local Records Centres, LAs	<ul style="list-style-type: none">• Improved protection of sites, allowing education of students and amateurs, and improved understanding of the geology and geomorphology of the Estuary.

Further reading:

- 1 The Conservation (Natural Habitats &c.) Regulations Statutory Instrument No.2716 HMSO1994.
- 2 Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. European Community1992.
- 3 European Sites in England and Wales. A guide to the Conservation (Natural Habitats &c.) Regulations 1994 and to the preparation and application of management schemes (contains the articles of the Habitats Directive (92/43/EEC), DETR, 1998.
- 4 Guidelines for the Selection of Biological SSSI, NCC, 1989
- 5 Planning Policy Guidance Note 9: Nature Conservation, Department of the Environment, 1994
- 6 Sites of Special Scientific Interest, Countryside Council for Wales,1997.
- 7 SSSI Guidance, English Nature, 1999.
- 8 Planning Guidance (Wales) Technical Advice Note 5: Nature Conservation and Planning, Welsh Office, 1996.
- 9 Habitats regulations guidance notes 1, 2 & 3, English Nature, 1999.
- 10 Local Environment Agency Plan - Taff Area, Environment Agency, 1998.
- 11 Local Environment Agency Plan - Eastern Valleys Area, Environment Agency, 1998.
- 12 Local Environment Agency Plan -Wye Area, Environment Agency, 1998.
- 13 Severn Vale LEAP Action Plan - 2000,
- 14 Local Environment Agency Plan -Neath Port Talbot and Bridgend Area, Environment Agency, 2000
- 15 Wye Area LEAP Action Plan - April 2000
- 16 Eastern Valleys LEAP Action Plan - April 2000,
- 17 Taff Area LEAP Action Plan - April 2000,
- 18 Ely & Vale of Glamorgan LEAP Action Plan - April 2000,
- 19 North Somerset Rivers LEAP Action Plan - November 1998,
- 20 Brue & Axe LEAP Action Plan - March 1998,
- 21 River Tone LEAP Action Plan - December 2000,
- 22 West Somerset Rivers LEAP Action plan - February 1999,
- 23 Bristol Avon LEAP Action Plan - March 2000,
- 24 Severn Estuary Natural Area Profile, English Nature, 1997,
- 25 Geological Conservation Review,
- 26 RIGS Handbook, Royal Society for Nature Conservation,
- 27 Code of practice for collecting fossils, English Nature, 1996.

14. Archaeology and the historic environment

Aim:

To conserve and enhance the Estuary's archaeological and cultural heritage, and to secure its sensitive management and promotion.

Government aims

14.1. The Government aim is to identify and protect nationally significant aspects of the historic environment, on land and sea, and to improve access to them.

Background

14.2. Archaeological remains in and around the Estuary are a finite resource, an irreplaceable record that contributes to our understanding of the past and present. However, there is a lack of awareness of the Estuary's historical heritage. The Severn Estuary has a wealth of features of archaeological importance and historic interest. Its archaeological potential is not fully understood or represented by the number of nationally designated Scheduled Ancient Monuments or sites recorded in the region's Sites and Monuments Records. Many sites survive in a way that is rare elsewhere, sealed within the accumulation of marine sediments and peats which make up the Severn Levels and areas of alluvium around the Estuary, still awaiting discovery. The Severn Levels are an area where historic landscapes and alluvial deposits still survive in a way which is rare elsewhere, and the historic landscape is far better preserved than on most other UK reclaimed coastal wetlands. In the permanently waterlogged conditions that lead to an excellent preservation of archaeological remains, there are also well-preserved remains of the natural flora and fauna. Scheduled Ancient Monuments are shown in Map 15 (see Appendix 8).

14.3. The area below the intertidal zone also contains significant archaeological remains relating to the early prehistoric landscape that once covered the whole of the present Estuary, before later becoming submerged by rising sea level. Many historic wrecks are known in the subtidal zone, as well as an uncertain number of earlier unrecorded wrecks. The area demonstrates the greatest concentration of coastal archaeology in Britain and this great archaeological potential, and the threats to it, are summarised in the document produced by English Heritage, 'England's Coastal Heritage', and research reports grant-aided by Cadw. The *Bristol Channel Marine Aggregates (August 2000)* mapped limited existing data for the subtidal archaeological resource in the Bristol Channel and Severn Estuary. The study indicated the likely archaeological and heritage importance and susceptibility of specific areas.

14.4. The Estuary is particularly important for our archaeological heritage because many of the deposits are waterlogged, preserving organic evidence such as wood and evidence of past environments. Palaeolithic hand axes, Mesolithic footprints and stone tool scatters recovered from the foreshore, indicate the presence of hunter-gatherer groups before the introduction of farming. Later prehistoric sites include the Bronze Age settlement at Brean Down, roundhouses recorded on intertidal peats of the Gwent Levels and a concentration of rectangular buildings connected by a system of trackways in the intertidal area near Goldcliff, dating back to the Iron Age. Settlement during the Romano-British period saw the construction of drainage systems and sea defences though during the centuries after the collapse of that administration the sea defences broke down. Most of the Estuary's remaining seabanks are currently unrecorded and unscheduled. Much of the present landscape owes its origins to the ecclesiastical and secular landowners and tenants of the medieval period, and reflects the efforts of successive generations of farmers to manage and exploit the coastal margins of the Estuary. The Estuary also has an industrial history closely linked to navigation that began in prehistoric times. This is partly expressed in the wide geographical distribution of a range of artefacts to be found at archaeological sites in the area.

Development pressures

14.5. Due to development pressures in the coastal area, including brownfield sites, the archaeological resource is under threat and features are being fragmented or lost. As it is likely that many sites of archaeological importance and historic interest remain undiscovered, the potential for loss and disturbance caused by all kinds of development is great. Increasing development pressure makes the loss of substantial areas of this landscape a certainty. However, Planning Policy Guidance Notes 15 and 16, and Planning Guidance (Wales) Technical Advice Notes 6, together provide support for the assessment of the impact on the historic environment including the wider historic landscape. Development plan policies can be developed which give explicit support to such assessment.

14.6. Preserving an ancient monument and its setting is a material consideration in determining planning applications, whether or not the monument is ‘scheduled’ under *the Ancient Monuments and Archaeological Areas Act (1979)*. Planning authorities, via development plans, face the task of reconciling the need for development with the interests of conservation.

14.7. Most development plans already require appraisal and recording work to be carried out on sites where there is proven archaeological importance. However, they vary in the extent to which they acknowledge the archaeological importance of the Estuary and seek to reduce the conflict between development and conservation in the area.

Overlap of issues

Elements of this chapter overlap with the following issues in other chapters:

- Landscape issues, Chapter 12
- Sea-level change and coastal defence; Chapter 5
- Planning issues, Chapter 2

Issue reference H1

Inadequate information about, and awareness of, the archaeology and historic features and artefacts of the Estuary

The Estuary contains a wealth of archaeological remains and historic features, but only a relatively small part of it has been properly surveyed. The distribution of sites recorded in Sites and Monuments Records and/or protected as Scheduled Ancient Monuments does not reflect the true density of sites in the Levels and elsewhere. Without a good knowledge of the resource it is difficult to protect it on a strategic rather than a site-by-site basis.

Policy H1a

Promote surveys, research and integration of data to achieve a strategic understanding of the archaeological, palaeo-environmental, industrial heritage and cultural interests of the historic landscape, and intertidal and subtidal areas.

Policy H1b

Encourage effective communication links between all relevant agencies and organisations to improve co-ordination in archaeological issues and promote public understanding of the value of the historical environment around the Severn Estuary.

Policy H1c

In the context of new development, undertake adequate surveys of historic resources to facilitate appropriate assessment of possible impacts.

Proposals for Action	Who could be involved	Benefits
H1a (i) Produce a research and management framework, based on a systematic audit of the archaeological and historic heritage of the Estuary.	RCAHMW, EH, Cadw, Archaeological Trusts, LAs, EN, Universities, SELRC, SEP, NAW, GoSW, Environment Agency, Universities	<ul style="list-style-type: none">• Improved quality and integrity of information on the historic environment.• Improved access to information for decision-makers.• Estuary-wide co-ordination of archaeological research and management.
H1a (ii) Undertake further studies and survey work, especially in the alluvial deposits and low-lying land around the Estuary.	LAs, Archaeological Trusts, EH, Cadw, Universities, SELRC.	<ul style="list-style-type: none">• Improved quality and integrity of information on the historic environment.
H1a (iii) Co-ordinate data to operate within a Geographic Information System framework to allow correlation of archaeological, sedimentological and hydrological data.	LAs, EH, Cadw, Archaeological Trusts, Environment Agency.	<ul style="list-style-type: none">• Single source of spatially related information for decision-makers.
H1a (iv) Facilitate information exchange by encouraging publication, supporting the maintenance and development of the database of the Sites and Monuments Record and improving integration between different types of information.	As H1a (i)	Improved access to data for decision-makers.
H1a(v) Encourage understanding of sea level and coastal change in the Severn Estuary over the last 10,000 years.	Environment Agency, DEFRA, LAs, EH, Cadw, Natural Environment Research Council (NERC)	Improved understanding of environmental influences on human activity over the last 10,000 years. Better predictive modelling of sea level and coastal change for the Estuary.

Proposals for Action	Who could be involved	Benefits
H1b (i) Co-ordinate the provision of archaeological services within Local Authorities to enable a strategic approach to survey, recording and management of sites.	LAs, Archaeological Trusts.	<ul style="list-style-type: none"> Improved management of archaeological sites.
H1b (ii) Promote awareness of the role of the Sites and Monuments Record to Local Authorities.	SEP, Archaeological Trusts, EH, Cadw, LAs	<ul style="list-style-type: none"> Increased understanding among planning authorities.
H1b (iii) Promote the historic resource of the Severn Estuary area via mechanisms such as publications and the internet.	SEP, EH, Cadw, LAs, Archaeological Trusts Universities, SELRC, NAW, GoSW	<ul style="list-style-type: none"> Improved information and awareness of the historic environment.

Issue reference H2

Protecting the historic landscape of the Severn Levels

The present landscape of the Severn Levels reflects centuries of management of the area by successive generations of landowners. In addition to being highly valued as an attractive area, the landscape character and its component features are part of the historic archaeological resource and there is a need for adequate survey and assessment of the historic landscape as a whole.

Policy H2

Conserve and, where appropriate, enhance the historic landscape bordering the Severn Estuary.

Proposals for Action	Who could be involved	Benefits
H2 (i) Implement initiatives that support landowners and occupiers to protect the historic landscape.	CCW, DEFRA, EH, Cadw, LAs, Archaeological Trusts, FFWAG.	Help maintain the character of the Estuary landscape.
H2 (ii) Produce guidelines for developers to minimise adverse impacts on historic landscapes.	Archaeological Trusts, NAW, GoSW, LAs, EH, Cadw	As H2 (i)
H2 (iii) Complete the ongoing programme of historic landscape characterisation for land bordering the Severn Estuary and promote its use in the generation of planning guidance to conserve and enhance the historic landscape.	EH, Cadw, LAs	Help maintain and curate the historic landscape character of the area.

Issue reference H3

Threat to the historic environment from development

Increased development around the Estuary, and particularly on the Levels, is threatening the historic environment resource and industrial heritage of the area. Pressure comes from all types of development, especially tourism, port and other transport related industrial and housing development. The archaeologically rich areas of alluvium around the Estuary are subject to threat from green field development. There is a need to make all interested parties fully aware of archaeological discoveries on development sites. However, information may be inadequate for an appropriate assessment of the impact on archaeology resource to be made. Decision-making is easier if any archaeological aspects can be considered early in the planning process.

Policy H3

Encourage the need for conservation and enhancement of the historic environment to be incorporated into all levels of planning policy in both statutory and non-statutory plans relating to the Estuary.

Proposals for Action	Who could be involved	Benefits
H3 (i) Determine the impacts on historically important sites in development proposals, agricultural uses, dredging, coastal defence and land drainage works.	EH, Cadw, RCAHMW, Archaeological Trusts, Universities, LAs, Environment Agency, IDBs, NFU/NFUW, CLA	<ul style="list-style-type: none">Improved awareness of and protection for historically important sites.
H3 (ii) Exercise development control powers to provide consistent protection to areas of particular archaeological and historical interest.	LAs, NAW, GoSW	<ul style="list-style-type: none">Improved protection for historically important sites.
H3 (iii) Provide guidance to Local Planning Authorities for dealing with matters relating to the historic environment that can be passed on to owners and site managers.	EH, Cadw, DTLR, NAW	<ul style="list-style-type: none">Improved awareness by planning authorities, site owners and managers.

Issue reference H4

Damage to archaeological heritage caused by erosion

Changes in sediment pattern and an increase in erosion are revealing a suite of archaeological sites and other features of historical importance. These sites are subject to active erosion, a problem that may increase with a rise in sea level and increased storminess. Exposed sites are particularly vulnerable to damage from human activities such as development and natural processes such as wave action. It will be necessary to develop a system for recording the most vulnerable sites.

Policy H4

Support the conservation and, where appropriate, the enhancement of the historically important features and/or sites in and bordering the Severn Estuary where damage could be caused by erosion.

Proposals for Action	Who could be involved	Benefits
H4 (i) Observe and record sites as they are exposed.	EH, Cadw, RCAHMW, Archaeological Trusts, Universities, LAs.	<ul style="list-style-type: none">New sites recorded before damage can occur.
H4 (ii) Determine the risks to sites of heritage value from coastal erosion and, where appropriate, take necessary action.	EH, Cadw, RCAHMW, LAs, Archaeological Trusts.	<ul style="list-style-type: none">Improved protection to sites of archaeological value.

Further reading:

1. England's Coastal Heritage. English Heritage 1997.
2. Planning Policy Guidance Note 15, Planning and the Historic Environment. Department of the Environment 1992.
3. Planning Policy Guidance Note 16, Archaeology and Planning. Department of the Environment 1992.
4. Circulars 60/96, 61/96 and 1/98. Welsh Office.
5. Planning Guidance (Wales) Technical Advice Note 6: Archaeology and Planning. First Revision, Welsh Office 1999.
6. Gwent Levels Historic Landscape Study. Rippon Cadw and CCW 1996.
7. Archaeology in the Severn Estuary, the Annual Reports of the Severn Estuary Levels Research Committee, Exeter: Short Run Press Ltd. Bell, M. (Ed) Vols. 1-10, Rippon.
8. Advisory Committee on Historic Wrecks website www.culture.gov.uk/ACHWS.htm
9. Prehistoric Intertidal Archaeology in the Welsh Severn Estuary. M. Bell *et al*, CBA Research Report 2000
10. Register of Landscapes of Outstanding Historic Interest in Wales. CCW, Cadw and ICOMUS, 1998.
11. Gwent Levels: The Evaluation of a Wetland Landscape. S. Rippon, 1996.

Appendix 1. Summary of issues

Strategy chapter number	Strategy issue reference number	SDA rank
2 Planning and management	M1 Complexity of the organisational framework, especially the planning framework, and the need for co-ordination between organisations, management initiatives and plans.	3
	M2 Inadequacy of coastal policy.	3
	M3 Definition of an Estuary management zone.	3
	M4 Extent and enforcement of legislation.	6
	M5 Public participation in management of the Estuary.	4
	M6 Variations in the regional guidance around the Estuary.	2
	M7 Co-ordination of information and research and the need for sound science for Estuary management.	3
	M8 The provision of public information and awareness raising.	3
	M9 The need for Strategic Environmental Assessment.	3
3 Sustainable land use, development and transport	D1 Concern about the amount of development in coastal areas.	1
	D2 Impact of development on areas of natural, cultural, built, archaeological or scientific interest.	1
	D3 The impact of new roads and transport infrastructure.	3
	D4 The impact of one-way bridge tolls on traffic in west Gloucestershire.	3
	D5 Concern about new development in areas at risk from flooding or coastal erosion.	2
	D6 Environmental effects of barrages, weirs and renewable energy schemes, and their impact on economic regeneration.	3
4 Agriculture	R1 Representation of farming interests in land use planning and management.	2
	R2 Participation of farmers in diversification schemes.	2
	R3 Participation of farmers in conservation initiatives.	2
	R4 Concern about the effects of intensive farming practices.	3
5 Coastal protection and flood defence	C1 The need for strategic planning of coastal defences - Shoreline Management Plans	1
	C2 The implications of raised sea levels resulting from global warming for coastal defence.	1
	C3 The need for new and improved coastal defences.	1
	C4 Reduced drainage from coastal land because of sea level rise.	1
	C5 Concern about the loss of saltmarsh and other intertidal and beach habitats because of coastal squeeze.	2
	C6 The impact of coastal protection and flood defences on other interests.	1
	C7 The need to improve tidal flood warning systems.	5

6 Tourism, recreation and access	T1 Promoting sustainable tourism.	3
	T2 The regeneration of existing resorts.	3
	T3 Provision of water-based tourism facilities.	3
	T4 Provision of Public Rights of Way around the Estuary and impacts from recreational use.	5
	T5 Access to the shore.	5
	T6 The impact of recreation and tourism on farming and the rural environment.	5
	T7 Provision of facilities for recreational boat users.	3
	T8 Marinas.	3
	T9 Accommodating motorised watersports in the Estuary.	3
	T10 Reducing perceived conflicts between recreational users.	5
	T11 Public understanding of recreation management	3
7 Ports, shipping and navigation	P1 Future port development	
	P2 Impacts of maintenance dredging.	6
	P3 Adequacy of aids to navigation and advice to sea operators.	6
	P4 Untrained recreational users affecting navigational safety.	6
	P5 Adequacy of search and rescue in the Estuary.	6
	P6 Safety of canal craft using the Estuary below Sharpness.	7
8 Waste management and pollution	W1 Coastal litter.	4
	W2 Fly-tipping.	4
	W3 Visual effects of untreated and partially treated sewage discharges.	3
	W4 Oil pollution from contaminated surface water run-off.	4
	W5 EC Directive failures at designated bathing waters.	3
	W6 Monitoring of other bathing waters.	4
	W7 Pollution risk to Gloucester - Sharpness Canal drinking water supply to Bristol.	4
	W8 Radioactive discharges from nuclear licensed sites.	4
	W9 Air quality.	4
	W10 Nutrient levels.	2
	W11 Thermal pollution.	2
	W12 Heavy metals.	2
	W13 Organic chemicals, polychlorinated biphenyls (PCBs).	2
	W14 Pollution from land that is contaminated.	2
	W15 Pollution from land based waste disposal.	2
	W16 Public concern at the level of Environmental Quality Standards.	5
	W17 Public concern over levels of substances in consented discharges.	5
	W18 Concern about pollution from major marine accidents.	2
	W19 Accidents from nuclear installations.	2
	W20 Accidents at major industrial sites.	2
	W21 Achievement of waste strategy targets.	4
	W22 Achievement of Energy Strategy	
9 Aggregates and other minerals	A1 Meeting society's need for minerals.	4
	A2 Use of alternative materials.	4
	A3 Minerals dredging and relationships with coastal erosion, sediment transport and beach levels.	4
	A4 Effect of marine aggregate extraction on fisheries and wildlife.	4
	A5 Effects of minerals dredging on archaeology.	4
	A6 Visual and other impacts of onshore mineral working.	4
	A7 Local accountability of minerals dredging control.	6
	A8 Regulation of minerals dredging.	6

10 Water resources	X1 Establishing environmentally acceptable flow regimes.	3
	X2 Balancing the needs of abstractors with other users.	5
	X3 Managing demand for water.	5
11 Fisheries	F1 Decline of salmon catches.	3
	F2 Phasing out of mixed stock salmon fisheries.	3
	F3 Future of heritage fisheries.	3
	F4 Access to the shore for anglers and the effects of fishing activities on other users of the Estuary.	5
	F5 Complexity of fishing regulations.	3
	F6 Eel and elver fishery management.	3
12 Landscape and seascape	L1 Impact of development on landscape and seascape character.	4
	L2 The need to conserve and enhance the landscape and seascape character of the Estuary.	4
	L3 The adverse impact of flood defences and coast and river-bank protection on the landscape and seascape of the Estuary.	5
	L4 Effect of farming on the landscape and seascape.	4
13 Nature conservation and wildlife	N1 The need for strategic management of biodiversity across the SEP area.	2
	N2 Concern about the implications of the SPA and the possible Special Area of Conservation (pSAC) for estuarine activities.	3
	N3 The impact of development on nature conservation interests.	2
	N4 The effects of recreational use on wildlife.	2
	N5 Public concern about the effects of pollution on wildlife.	2
	N6 Agricultural management of important habitats including grazing of saltmarsh.	3
	N7 The need for recognition of the value of geological sites.	3
14 Archaeology and the historic environment	H1 Inadequate information about, and awareness of, the archaeology and historic features and artefacts of the Estuary.	5
	H2 Protecting the historic landscape of the Severn Levels.	5
	H3 Threat to the historic environment from development.	5
	H4 Damage to archaeological heritage caused by erosion.	5

Appendix 2. Stakeholder Decision Analysis Ranking

RANK	ISSUE GROUP
1	THE FUTURE OF COASTAL DEFENCE
	EFFECTS OF DEVELOPMENT AND GROWTH ON COASTAL AREAS
2	RURAL MANAGEMENT
	POLLUTION FROM MAJOR ACCIDENTS
	POLLUTION AND ITS EFFECTS ON ENVIRONMENTAL QUALITY
	THE IMPACTS OF COASTAL EROSION AND FLOODING
	THE EFFECTS OF OTHER USERS ON NATURE CONSERVATION AND WILDLIFE
	DEVELOPMENT POLICY AND PLANNING GUIDANCE
3	EFFECTS OF INCREASING TRAFFIC AND PLANNED TRANSPORT FACILITIES
	THE EFFECTS OF FARMING ON THE RURAL ENVIRONMENT AND LANDSCAPE
	EFFECTS OF BARRAGE AND WEIR PROPOSALS
	INFORMATION AND ENVIRONMENTAL EDUCATION FOR ALL
	THE EFFECTS OF SEWAGE EFFLUENT
	MAINTENANCE OF ENVIRONMENTALLY ACCEPTABLE FLOWS TO THE ESTUARY
	MANAGEMENT OF FISHERIES
	INFORMATION AND SCIENTIFIC DATA REQUIREMENTS FOR ESTUARY MANAGEMENT
	DECLINE OF FISH STOCKS
	MANAGEMENT OF WILDLIFE HABITATS AND AREAS OF GEOLOGICAL VALUE
	PROVISION FOR RECREATION
	WIDER ASPECTS OF ESTUARY MANAGEMENT
	THE IMPACT OF NATURE CONSERVATION DESIGNATIONS ON OTHER USERS
4	POLLUTION AND ITS EFFECTS ON PUBLIC HEALTH AND HUMAN ACTIVITIES
	SOCIETY'S NEED FOR MINERALS FROM THE SEVERN ESTUARY
	ENVIRONMENTAL IMPACT OF AGGREGATE DREDGING
	ESTUARY LANDSCAPE MANAGEMENT
	IMPLEMENTATION OF WASTE REDUCTION INITIATIVES
	WIDER PUBLIC PARTICIPATION IN ESTUARY MANAGEMENT PLANNING
	POLLUTION AND ITS VISUAL EFFECTS
5	IMPACTS ON, AND AWARENESS OF, ARCHAEOLOGY AND THE HISTORIC ENVIRONMENT
	IMPACTS OF TOURISM AND RECREATION
	WATER USE IN THE COASTAL ZONE
	THE NEED FOR TIDAL FLOOD WARNING
	ACCESS FOR TOURISM AND RECREATION
	POLLUTION MANAGEMENT
6	THE LEGAL FRAMEWORK FOR PROVIDING EFFECTIVE ESTUARY MANAGEMENT
	NAVIGATIONAL SAFETY
	REGULATION OF MINERALS DREDGING
7	THE EFFECTS OF PORTS AND SHIPPING ON OTHER USERS

The issues as indicated in Appendix 1 were grouped into the above headings for the purpose of the Stakeholder Decision Analysis process.

Appendix 3. Summary of the SES process

Date	Stage	Documents produced
1995	Strategy established Local authorities, Government agencies and others	<ul style="list-style-type: none"> • Business Plan • SES 'Flier' – information brochure
1996-97	Collection of information on issues Public meetings & consultation with key organisations. Seminars with key stakeholders, including industry	<ul style="list-style-type: none"> • Statements of interest collected • Progress Reports • Report on Public Meetings • Joint Issues Report (1997)
1997-98	Consultation on issues Public consultation (1997), industry seminar and LA21 Workshop Detailed discussion of issues and way forward by Steering and Working Groups (1997-98)	<ul style="list-style-type: none"> • Joint Issues Report Responses (1998) • Newsletter
1998	Prioritisation of issues using Stakeholder Decision Analysis (SDA) Involvement of key stakeholders in a series of facilitated workshops	<ul style="list-style-type: none"> • Recommendations reported • SDA Report to Steering Group • Newsletter
1999-2000	Development of the Draft Strategy for the Severn Estuary Wide involvement of stakeholders (largely drawn from participants of SDA process and Steering Group) in drafting and design.	<ul style="list-style-type: none"> • Consultation Draft, <i>A Strategy for the Severn Estuary</i>
2000-01	Consultation Stakeholder presentations & consultation with key organisations and public. Partner organisations formed chapter groups and considered all responses to the Consultation draft.	<ul style="list-style-type: none"> • <i>A Strategy for the Severn Estuary</i>

Appendix 4. SES Steering Group members

Associated British Ports
Bristol City Council
British Waterways, Gloucester
Cardiff County Council
Cardiff University
Confederation of British Industries
Coastal Cell Group (Severn Estuary)
Country Land and Business Association
Countryside Council for Wales
Department for the Environment, Food and Rural Affairs
English Nature
Environment Agency
Forest of Dean District Council
Glamorgan/Gwent Archaeological Trust
Gloucester City Council
Gloucester Harbour Trustees
Gloucestershire County Council
Government Office for the South West
Monmouthshire County Council
National Assembly for Wales
National Farmers Union
Newport County Borough Council
North Somerset Council
RSPB Cymru
Sedgemoor District Council
Severn Estuary Levels Research Committee
Somerset County Council
South Gloucestershire Council
Sports Council for Wales
Stroud District Council
Tewkesbury Borough Council
The Bristol Port Company
The Institution of Civil Engineers
The Vale of Glamorgan Council
Wales Tourist Board
Welsh Water (Dwr Cymru)

Appendix 5. Who does what on the Estuary

Organisations with statutory/regulatory powers and/or responsibilities on the Severn Estuary

	Planning and management	Sustainable land use, development and transport	Agriculture	Coastal protection and flood defence	Tourism, recreation and access	Ports, shipping and navigation	Waste management and pollution	Aggregates and other minerals	Water resources	Fisheries	Landscape and seascape	Nature conservation and wildlife	Archaeology and the historic environment
British Waterways	✓	✓			✓	✓			✓				✓
Cadw: Welsh Historic Monuments													✓
Coastal Cell Groups	✓			✓									
Countryside Agency	✓	✓	✓	✓	✓						✓		
Countryside Council for Wales	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Crown Estate								✓					
DEFRA			✓	✓	✓					✓			
DTLR					✓						✓		
English Heritage	✓												✓
English Nature	✓		✓	✓	✓					✓	✓	✓	✓
Environment Agency	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Farming and Rural Conservancy Agency	✓		✓		✓		✓	✓					
Internal Drainage Boards	✓	✓	✓						✓			✓	
Joint Nature Conservation Council												✓	
Local Authorities	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Maritime and Coastguard Agency						✓	✓						
Port and Harbour Authorities	✓				✓	✓	✓	✓				✓	
South Wales Sea Fisheries Committee										✓		✓	
South West Tourism	✓		✓		✓								
Sports Council for Wales	✓	✓	✓		✓								
Sport England	✓	✓	✓		✓								
The RC on Ancient and Historic Monuments													✓
Wales Tourist Board					✓								
Water Companies	✓	✓	✓		✓		✓		✓			✓	✓
Welsh Development Agency		✓											

Responsibilities of relevant organisations

The following list identifies some of the responsibilities of the various bodies listed above. It is not a complete account of what they do, but notes issues most likely to be relevant to the *Strategy for the Severn Estuary*.

British Waterways

Website: www.britishwaterways.co.uk

- Advise local and central government as a statutory consultee on development and other issues which could affect waterways;
- Operate 2000 miles of canal nationally with varied recreational uses;
- Act as Port Authority for one commercial port within the SEP area;
- Manage and have statutory powers relating to water resources;
- Have fishery licensing powers on their property;
- Have responsibility for maintenance of the waterways system including many listed structures.

Cadw: Welsh Historic Monuments

Website: www.cadw.wales.gov.uk/

- Protect, conserve and promote an appreciation of the built heritage of Wales.
- Secure the preservation of ancient monuments and historic buildings;
- Grant aid for the repair of ancient monuments and historic buildings;
- Manage some monuments in Wales that are in direct state care.

Coastal Cell Groups

Contacts:

- Severn Estuary Coastal Group (Severn Estuary SMP) – Steve Sands Steve.Sands@n-somerset.gov.uk
- Swansea Bay Coastal Group – Mr Allan James allan.james@Swansea.gov.uk
- North Devon and Somerset Coastal Group (Bridgwater Bay to Bideford Bay SMP) – Kelvin Rufus wsdckr@netcomuk.co.uk
- Non-statutory groups providing co-ordination on coastal defence issues;
- The coastal cell groups produce and undertake ongoing reviews of their respective SMPs.

Countryside Agency

Website: www.countryside.gov.uk

The Countryside Agency is the statutory body working:

- To conserve and enhance England's countryside;
- To spread social and economic opportunity for the people who live there;
- To help everyone, wherever they live and whatever their background, to enjoy the countryside and share in this priceless national asset.

The Countryside Agency will work to achieve the very best for the English Countryside, its people and places, by:

- Influencing those whose decisions affect the countryside through our expertise, our research and by spreading good practice by showing what works;
- Implementing specific work programmes reflecting priorities set by Parliament, the Government and the Agency Board.

Countryside Council for Wales

Website: www.ccw.gov.uk

The Countryside Council for Wales is the statutory adviser to Government on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment throughout Wales and its inshore waters. With English Nature and Scottish Natural Heritage, CCW delivers its statutory responsibilities for Great Britain as a whole, and internationally, through the Joint Nature Conservation Committee. CCW directly (through regulatory powers) or indirectly (as a statutory consultee or through its countryside remit) can have significant influence over almost all the issues covered by the *Strategy for the Severn Estuary*.

The CCW has both an executive and advisory role in the planning system, for instance it:

- Designates and /or advises government (central and local) on the creation of statutory protected areas of national and international importance (e.g. Special Areas of Conservation, Sites of Special Scientific Interest);
- Is a statutory consultee for development plans;
- Has to be statutorily notified of all environmental impact assessments produced in Wales and its offshore waters;
- Is a statutory adviser to Government on any matters relating to the countryside;
- Is a statutory consultee for certain types of development (e.g. near SAC, SSSI);
- Has statutory duties under the Habitats Regulations 1994 to advise prospective developers exercising permitted development rights in/near/affecting Natura 2000 sites (e.g. SACs and SPAs);
- Has a statutory duty to keep under review all matters relating to:
 - The provision of facilities for the enjoyment of the countryside
 - The conservation and enhancement of the natural beauty and amenity of the countryside;
 - The need to secure public access to the countryside for the purposes of open-air recreation.

Crown Estate

Website: www.crownestate.co.uk

- License the extraction of marine aggregates subject to permission from the National Assembly for Wales and/or the Department of Transport, Local Government and the Regions.
- Owns much of the seabed in the lower part of the Estuary.

Department for Environment, Food and Rural Affairs

Website: www.defra.gov.uk

The Ministry has wide ranging and diverse responsibilities as well as some regulatory controls that cross the boundaries of topics outlined in the Strategy document.

- To secure a more economically rational Common Agricultural Policy which gives a better deal to consumers and tax payers and pays due regard to the needs of the environment;
- To assist the development of efficient markets in which internationally competitive food, fish and agricultural industries can thrive;
- To enhance economic opportunity and social development in rural and coastal communities in a manner consistent with public enjoyment of the amenities they offer;
- To safeguard the continuing availability to the consumer of adequate supplies of wholesome, varied and reasonably priced food and drink.
- To reduce the risks to people and the developed and natural environment from flooding and coastal erosion.
- To sustain and enhance the rural and marine environment and public enjoyment of the amenities they provide.
- To conserve fish stocks for future generations and secure a sustainable future for the sea fishing industry.

Department of Transport, Local Government and the Regions

Website: www.dtlr.gov.uk/

- Provide policy on countryside recreation, including bye-laws, traffic management and rights of way ;
- Provide policy on all land use and transportation matters.

English Heritage

Website: www.english-heritage.org.uk

- Advisory role for scheduled monuments, listed buildings and registered parks and gardens.

English Nature

Website: www.english-nature.org.uk/

English Nature is the Government agency that champions the conservation of wildlife and geology throughout England. It wants to ensure that future generations can enjoy a wealth of wildlife as a major part of their quality of life. It achieves this by both its own actions and by enabling others. English Nature:

- Is the Government's advisor on nature conservation;
- Provides advice and information on nature conservation to other organisations and individuals;
- Designates the most important areas for wildlife and natural features as Sites of Special Scientific Interest (SSSI) and secures sustainable management of these sites;
- Issues licences which permit people to work with protected animals and plants;
- Establishes and manages National Nature Reserves (NNRs) and Marine Nature Reserves (MNRs);
- Supports and carries out research;
- Implements, on behalf of Government, international conventions and EC Directives on nature conservation including the *Conservation (Natural Habitats etc) Regulations 1994*;
- Implements English Nature's share of the UK Biodiversity Action Plan in England and assists in the practical application of sustainable development;
- Helps people to experience and care for wildlife and natural features;
- Offers grants to help others carry out nature conservation.

Environment Agency

Websites: www.environment-agency.gov.uk,
www.environment-agency.wales.gov.uk

- Advise local and central government on environmental issues as a statutory consultee on planning policy, development plans and certain planning applications;
- Provide a flood warning service;
- Maintain, operate and improve flood defences where appropriate;
- Supervise, regulate and influence other organisations with flood defence responsibilities;
- Promote recreational use of all inland and coastal waters and associated land;
- Maintain and improve navigation;
- Enforce navigation legislation;
- Regulate the management of waste, including the treatment, storage, transport and disposal of controlled waste, to prevent pollution of the environment, harm to public health or detriment to local amenities;
- Develop an integrated approach to the prevention and control of land contamination ensuring that remediation is proportionate to risks and cost-effective in terms of the economy and environment;
- Regulate the use of radioactive materials and the disposal of radioactive waste;
- Monitor, protect, manage and where possible, enhance the quality of all controlled waters including rivers, groundwaters, lakes, canals, estuaries and coastal waters through the prevention and control of pollution;
- Conserve, redistribute, augment and secure the proper use of water resources;
- Maintain, improve and develop salmon, trout, freshwater and eel fisheries;
- Further landscape conservation and enhancement when carrying out water management and pollution control functions and promote the conservation and enhancement of the natural beauty of rivers and associated land;
- Further conservation, wherever possible, when carrying out water management and pollution control functions and promote the conservation of flora and fauna which are dependent on an aquatic environment;
- Consider the impact of all its regulatory, operational and advising activities upon archaeology and heritage, and implement mitigation and enhancement measures where appropriate.

Farming and Rural Conservancy Agency (FRCA)

Contact: 020 7238 5588

The FRCA are an executive agency of the Department for Environment, Food and Rural Affairs and the National Assembly for Wales. They provide advice on a range of issues related to the topic chapters in *the Strategy for the Severn Estuary*. They are a statutory consultee on issues relating to:

- Agriculture;
- Tourism, recreation and access;
- Waste management and pollution;
- Land use planning including minerals planning.

Internal Drainage Boards (IDBs)

Various IDBs around the Severn Estuary.

- License land drainage;
- Maintain ditches and other flood prevention works;
- Distribute all water available in the area;
- Have due regard for nature conservation interests in all works;
- Advise local and central government as a statutory consultee in the planning process.

Joint Nature Conservation Council

Website: www.jncc.gov.uk

JNCC is the forum through which the three country nature conservation agencies deliver their statutory responsibilities for Great Britain as a whole and internationally. These responsibilities contribute to sustaining and enriching biological diversity, enhancing geological features and sustaining natural systems.

- Provide advice to government on nature conservation issues.

Local Authorities

Website: Vale of Glamorgan Council: www.valeofglamorgan.gov.uk

Cardiff County Council: www.cardiff-info.com

Newport County Borough Council: www.newport.gov.uk

Monmouthshire County Council: www.monmouthshire.gov.uk

Forest of Dean District Council: www.fweb.org.uk

Gloucestershire County Council: www.gloscc.gov.uk

South Gloucestershire County Council: www.southglos.gov.uk

Gloucester City Council: www.glos-city.gov.uk

Bristol City Council: www.bristol-city.gov.uk

North Somerset County Council: www.n-somerset.gov.uk

Somerset County Council: www.somerset.gov.uk

Sedgemoor District Council: www.sedgemoor.gov.uk

- Implement government policy and legislation at the local level;
- Produce development plans and other land use strategies;
- Decide on planning applications;
- Deal with tree preservation matters;
- Control mineral working and waste management facilities;
- Provide a collection and disposal service for municipal waste.;
- Identify the location of future municipal waste disposal sites, incinerators or other waste management facilities;
- Provide local municipal waste recycling and minimisation schemes;
- Control litter;
- Regulate smaller industrial processes;
- Produce Air Quality Management Plans;
- Compile and maintain contaminated land registers (likely to be a future responsibility);
- Deal with health and safety aspects of surface water;
- Ensure private water supply quality;
- Act as Harbour Authorities in some areas;
- Can construct and maintain flood defences in non-main rivers and along the coast. However, these powers are permissive;
- Generally maintain roads, footpaths and cycleways;
- Manage AONBs;
- Manage historical structures and conservation areas;
- Provide countryside services/prepare local biodiversity action plans;
- Prepare Local Agenda 21 (Local Sustainability) Strategies;
- Produce Local Transport Plans;
- Prepare Community Plans.

Maritime and Coastguard Agency

Website: www.mcagency.org.uk/

MRCC Swansea (01792 366534) is the contact for the Severn Estuary.

- Co-ordinate all Civil Maritime Search and Rescue activities around the UK coastline;
- MRCC Swansea monitor the International Maritime Frequencies and respond to 999 calls and broadcast marine safety information.
- Provide assistance and advice on behalf of the Government to local port and harbour authorities in the response to, and handling of, oil and chemical spills.
- Provide advice on contingency plans and the training of shoreline clean-up management techniques;
- Maintain a large inventory of response equipment;
- Use MCA expertise to ensure aspects of ships safety (e.g. navigation, communications, construction).

Port and Harbour Authorities

Website: The Bristol Port Company: www.bristolport.co.uk

Associated British Ports: www.abports.co.uk

Gloucester Harbour Trustees: www.fweb.org.uk/ght/

Port of Bridgwater: www.sedgemoor.gov.uk

Newport Harbour Commissioners

Cardiff Bay Harbour Authority: www.cardiff.gov.uk/government/english/cardiff_harbour

A wide variety of statutory and non-statutory Acts, Regulations and guidance documents provide the framework for port and harbour activities. Not all ports have activities in the items marked*.

- Make and enforce byelaws;
- Act as competent Harbour Authority (for pilotage)
- Act as Conservancy Authority within harbour limits (maintain a safe harbour);
- Act as local Lighthouse Authority within harbour limits;
- Issue directions to individual vessels;
- Issue general directions*;
- Regulate moorings*;
- License recreational craft*;
- License works within harbour limits*;
- License dredging within harbour limits*;
- Act as competent Authority under the Habitats Regulations*;
- Advise government as a consultee on navigational implications under the Coast Protection Act;
- Advise government as a consultee on navigational implications under the Government View Procedure;
- Prepare statutory port emergency plan;
- Prepare statutory counter-pollution plan;
- Prepare statutory waste management plan, providing and regulating the use of reception facilities for ships' waste*;
- Act as a relevant Authority under the Habitats Regulations;
- Regulate access to the port estate*;
- Carry out monitoring of dredge and deposit sites if required by DEFRA.

South Wales Sea Fisheries Committee

Website: swsfc@aol.com

- Manage and where possible develop stocks of shellfish and fin-fish through the enforcement of local byelaws, national and European legislation;
- Have regard for the conservation of the marine environment and endeavour to achieve a reasonable balance between fisheries and environmental function;
- Act as a relevant Authority under the Habitats Regulations.

South West Tourism

Website: www.swtourism.co.uk

- Manage ‘revitalising farm tourism’ grant scheme;
- Match tourism products to markets, guide product development and promote quality;
- Advise local and central government as a consultee on planning guidance, policy and individual planning applications.

Sports Council for Wales

Website: www.sports-council-wales.co.uk

- Ensure that urban development does not encroach on sport and recreational areas;
- Advise on conflict of sport and recreational use on rural land;
- Ensure that access is available for recreational and sporting uses;
- Promote recreational use;
- Advise on conflict between use and sustainability to recreational users;
- Advise local and central government as a consultee on planning applications.

Sport England

Website: Sport England www.english.sport.gov.uk

- Target resources to schemes which support youth sports through partnerships between schools and sports bodies or with youth agencies;
- Work to develop performance and excellence in sport, through support to governing bodies of sport;
- Distribute grants from the Lottery fund and provide advice to applicants on sports facility planning, design and management.

The Royal Commission on Ancient and Historic Monuments of Wales

Website: www.roahmw.org.uk

- Survey, interpret and record the man-made environment of Wales;
- Compile, maintain and curate the National Monuments Records of Wales;
- Promote an understanding of this information by all appropriate means.

Wales Tourist Board

Website: www.visitwales.com

Wales Tourist Board is the lead public agency for tourism in Wales and its essential role is to bring strategic direction to a fragmented industry.

- Encourage provision and improvement of tourist amenities and facilities in Wales;
- Prepare a strategic framework for marketing Wales as a tourist destination in the UK and overseas;
- Provide a strategic framework for developing the tourism product in Wales and provide financial assistance to encourage capital investment in new and improved tourism facilities;
- Undertake research to evaluate performance, monitor market trends and help the industry plan accordingly;
- Provide advice and information to the Government on the performance of the industry and on tourism matters affecting Wales;
- Develop a tourist information strategy for Wales and co-ordinate standards for the Tourism Information network in Wales.

Water companies

Website: Wessex Water : www.wessexwater.co.uk

Severn Trent Water: www.stwater.co.uk

Bristol Water: www.bristolwater.co.uk

Welsh Water: www.dwrcymru.com

- Advise local and central government as a consultee in the planning process
- Manage company land holding;
- Ensure safe recycling of sewage;
- Promote recreational use of inland surface water reservoirs and land owned by the company;
- Provide treatment and disposal of waste water from domestic and industrial properties;
- Monitor effluent properties;
- Provide mains water supply;
- Monitor quality of public water supply;
- Exercise a duty of care under the Water Act for consideration of conservation and archaeological sites.

Welsh Development Agency

Website: www.wda.co.uk/

- Promote economic development and work with Local Authorities on urban development in Wales;
- Monitor housing land supply and facilitate appropriate development;
- Tackle derelict land issues and administer appropriate grants.

Appendix 6. Acronyms

AA	Automobile Association
ABP	Associated British Ports
ADAS	Agricultural Development Advisory Service
AMP	Asset Management Programme
ASERA	Association of Severn Estuary Relevant Authorities
AQMA	Air Quality Management Area
BASC	British Association of Shooting and Conservation
BAT	Best Available Technique
BCYC	Bristol Channel Yachting Conference
BCMAP	Bristol Channel Marine Aggregates Project
BGS	British Geological Survey
BMAPA	British Marine Aggregates Producers Association
BMIF	British Marine Industries Federation
BPEO	Best Practicable Environmental Option
CA	Countryside Agency
Cadw	The National Assembly for Wales' heritage agency
CCW	Countryside Council for Wales
CEFAS	Centre for Environment Fisheries and Aquaculture Science
CLA	Country Land and Business Association
COMAH	Control of Major Accident Hazards
CROW	Countryside and Right of Way (Act)
CTC	Cyclists' Touring Club
DEFRA	Department of Environment, Food and Rural Affairs
DTLR	Department of Transport, Local Government and the Regions
EH	English Heritage
EN	English Nature
ESA	Environmentally Sensitive Area
EQS	Environmental Quality Standard
EU	European Union
IPPC	Integrated Pollution Prevention and Control
FFWAG	Farming, Forestry & Wildlife Advisory Group
FRCA	Farming & Rural Conservation Agency
FSA	Food Standards Agency
FUW	Farmers Union, Wales
GCR	Geological Conservation Review
GGAT	Glamorgan Gwent Archaeological Trust
GoSW	Government Office for the South West
HSE	Health and Safety Executive
IDBs	Internal Drainage Boards
JAC	Joint Advisory Committee
JNAPC	Joint Nautical Archaeology Policy Committee

LA s	Local Authorities
LA21	Local Agenda 21
LBAP	Local Biodiversity Action Plan
LEAP	Local Environment Agency Plan
MADP	Marine Aggregate Dredging Policy
MAFF	Ministry of Agriculture Fisheries and Food
MCA	Maritime and Coastguard Agency
MCS	Marine Conservation Society
MMG	Marine Mineral Guidance
MPG	Mineral Planning Guidance
MSW	Municipal Solid Waste
NASCO	North Atlantic Salmon Conservation Organisation
NAW	National Assembly for Wales
NAWAD	National Assembly for Wales Agricultural Department
NERC	Natural Environment Research Council
NFU	National Farmers Union
NFUW	National Farmers Union, Wales
NGO	Non-governmental organisation
NRPB	National Radiological Protection Board
OSPAR	Oslo and Paris Conventions
PPC	Pollution Prevention and Control
PPG	Planning Policy Guidance
pSAC	possible Special Area of Conservation
RA	Relevant Authorities
RAC	Royal Automobile Club
RAWP	Regional Aggregates Working Party
RCHME	Royal Commission on Historical Monuments of England
RCAHMW	Royal Commission on the Ancient & Historical Monuments of Wales
RDA	Rural Development Agency
RIGS	Regionally Important Geological/Geomorphological Site
RNLI	Royal National Lifeboat Institution
RPG	Regional Planning Guidance
RSNC	Royal Society for Nature Conservation
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SARA	Severn Area Rescue Association
SCOSLA	Standing Conference of Severnside Local Authorities
SECG	Severn Estuary Conservation Group
SELRC	Severn Estuary Levels Research Committee
SEP	Severn Estuary Partnership
SES	Severn Estuary Strategy
SEWSPG	South East Wales Strategic Planning Group

SINC	Site of Interest for Nature Conservation
SMP	Shoreline Management Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWRA	South West Regional Assembly
SWRDA	South West Regional Development Agency
SWSFC	South Wales Sea Fisheries Committee
TAN	Technical Advice Note (Wales)
TECs	Training Enterprise Councils
TOSG	Technical Officers Steering Group
UDP	Unitary Development Plan
UK CEED	UK Centre for Economic and Environmental Development
UWWTD	EC Urban Wastewater Treatment Directive
WDA	Welsh Development Agency
WWT	Wildfowl and Wetlands Trust
WYA	Welsh Yachting Association
YHA	Youth Hostels Association

Appendix 7. Glossary

Abstraction	To remove water from any source, either permanently or temporarily.
Accretion	The accumulation of sediments, deposited by natural fluid flow processes, usually related to the coastal accumulation of sands, muds or gravels that extend the line of the coast eastwards.
Aggregates	Bulk material used in construction, tarmac or for general fill or ballast (e.g. crushed rock, sand, gravel, etc.).
Aquifer	A geological formation, group of formations or part of a formation that can store and transmit water in significant quantities.
Benthic	Organisms that live on or in the seabed.
Biodiversity Action Plan (UK)	UK Government's programme of actions spanning 59 broad objectives to meet its commitments to conservation and sustainable use of biodiversity arising from the Convention on Biological Diversity.
Biodiversity	The diversity of plant and animal life.
Biological monitoring	Assessment of the environmental quality of rivers and other water bodies, using flora and fauna.
Carrying capacity	The population of a species that its habitat can support without deterioration.
Climate change	Change in patterns of weather over a period of time, the subject of debate in relation to effects of atmospheric pollution on global warming.
Coastal Sediment Cell	A length of coastline and its associated nearshore area within which the movement of coarse sediment (sand and shingle) is largely self-contained.
Coastal defence	Collective term for the protection of the coast against erosion plus sea defence against flooding.
Competent Authorities	The <i>Conservation (Natural Habitats &c.) Regulations 1994</i> require competent authorities to exercise their functions so as to secure compliance with the requirements of the Habitats Directive. The term "competent authority" includes all public bodies and statutory undertakers.
Countryside Stewardship Scheme	Set up by the Countryside Agency in which land-owners are grant-aided to manage their land in an environmentally sensitive way.
Development plan	A public document (or series of documents) required by law to be prepared by all Local Planning Authorities (County, District and Unitary Councils), setting out policies and proposals for development or land use or protection of the environment. They must involve public consultation (usually including a public inquiry) and must be reviewed or replaced at regular intervals.

Dissolved oxygen	The amount of oxygen dissolved in water. Biological and chemical demand for oxygen is a measure of the health of a water body.
Dredging	The process of removing material from the sea bed to aid navigation or to provide minerals such as aggregates.
Ecosystem	A system involving the interactions between plant and animal communities and their non-living environment.
EC Directive	A type of legislation issued by the European Commission which is binding on Member States and sets standards and results to be achieved.
Effluent	Liquid waste from industrial, agricultural or sewage plants and processes.
Environment	When environmental issues are referred to, this term is used to encompass all the facets of our surroundings including: landscape appearance, flora, fauna, geological or geomorphological features, human and other activities, buildings and other structures, sites and structures of archaeological, architectural and historic interest, air quality, water quality, etc.
ESA Scheme	An agri-environment scheme that pays landowners to farm in an environmentally-friendly fashion.
Estuary	A partially enclosed area of water and soft tidal shore and its surroundings, open to saline water from the sea and receiving fresh water from rivers, land run-off or seepage.
Eutrophication	The biological effects of an increase in plant nutrients – nitrates and phosphates – on aquatic systems.
EC Regulation	European Community legislation having legal force in all Member States.
EU Directive	A type of legislation issued by the European Union which is binding on Member States in terms of the results to be achieved but which leaves to Member States the choice of methods.
Favourable conservation status of a natural feature	Achieved when its range (in the area under consideration, e.g. Severn Estuary, or Europe) is stable or increasing.
Flagship	A project or proposal that is well known, regarded highly and innovative.
Floodplain	Flat area bordering a river, composed of sediment deposited during flooding.
Fly-tipping	Illegal tipping of rubbish.
Geographical Information System (GIS)	Geographical database which provides a range of analytical and visual functions to manipulate and display information as maps, reports or graphical charts.
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer).

Habitat	The locality or environment in which a plant or animal species lives.
Habitats Directive	A contribution by the EC to the Biodiversity Convention agreed at the Rio Earth Summit. It gives member states the power to designate areas as SACs where they support rare, endangered or vulnerable habitats and species of plants or animals.
Holistic	Of a doctrine that a system may have properties over and above those of its parts and their organisation.
Hydrography	The study, surveying and mapping of the oceans, seas and rivers.
Internal Drainage Board	Local sovereign authority for drainage.
Intertidal	Between high-water and low-water mark.
Landfill	Site used for waste disposal into voids in the land.
Land Raising	Site used for disposal on the surface of the land.
Local Authority	The elected Council for an area, including Unitary, County and District Councils, as well as Parish, Town or Community Councils. Unitary, County and District Councils have a range of statutory powers, duties and functions in local government, and act as Local Planning Authority (LPA), Highway Authority (LHA), Education Authority (LEA), etc.
Local Environment Agency Plan (LEAP)	Plan developed by the Environment Agency to help identify and manage the uses of the catchment of a river or series of rivers, including issues of soil, air and water quality.
Local Agenda 21	The process of agreeing and implementing local sustainability action plans for the 21 st Century in partnership with local communities.
Local Biodiversity Action Plan	Local plans to secure the conservation of important species and habitats.
Local Nature Reserves	Sites designated by Local Authorities to conserve nature and provide for research, utilised to increase accessibility to and understanding of nature and geology.
Local Record Centres	Compile, manage and deliver records on internationally, nationally and locally important natural features, including species, habitats and geology. They play an important role in assessing the extent and condition of species and habitats listed in National and Local Biodiversity Action Plans.
Local Plan	Public land use planning document forming part of the statutory development plan, setting out detailed policies and proposals for a district (prepared by District Councils) or a specific topic such as minerals or waste (prepared by County Councils).

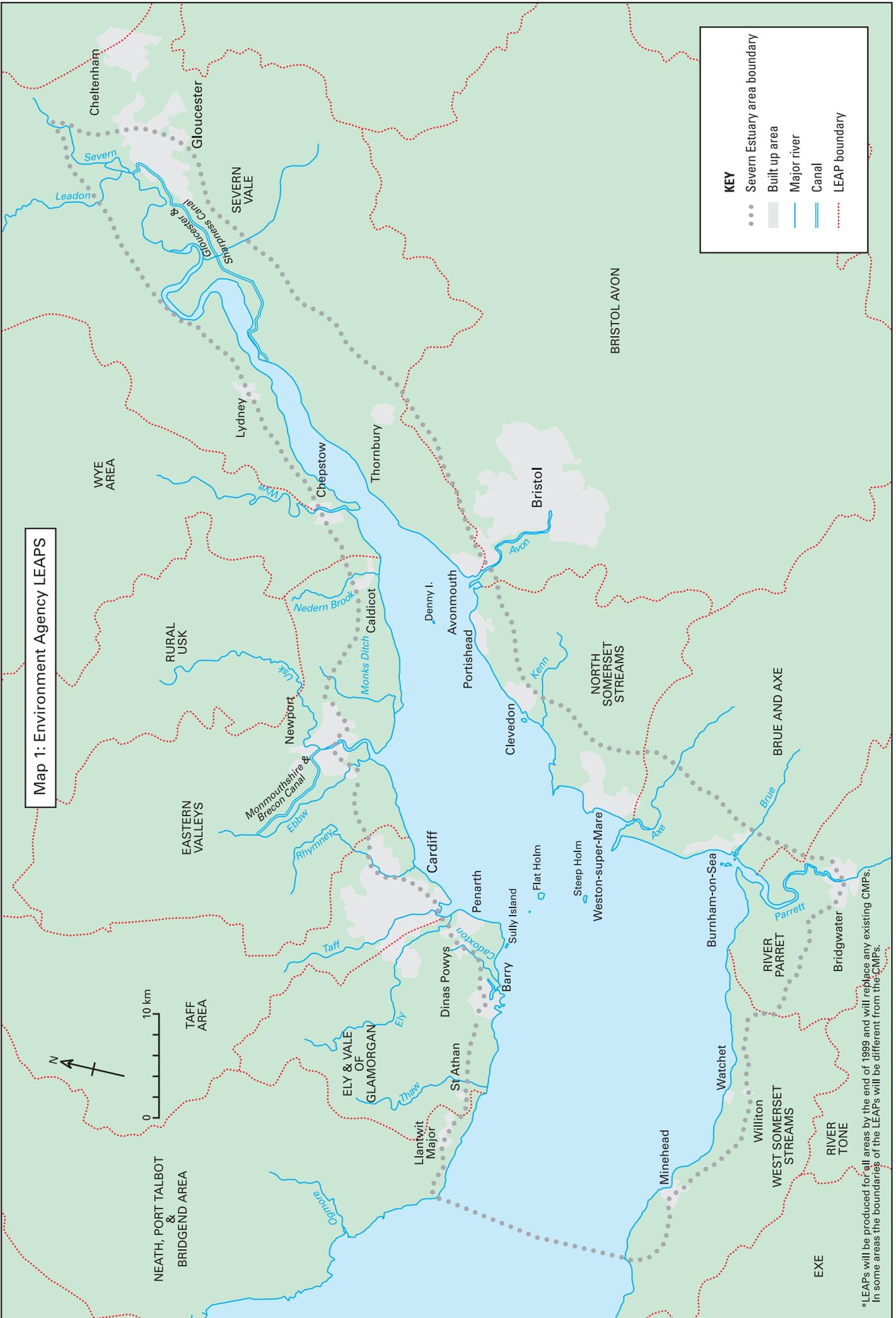
Marine Nature Reserves	Nationally important intertidal and marine areas designated for conservation and research under the <i>Countryside and Wildlife Act 1981</i> , Section 36.
Mean low-water mark	The average height reached at low tide.
Mitigation	Refers to the environmental impact of scheme development or operation, and the actions which may be taken to reduce or ameliorate such impacts.
Mudflat	An area of fine silt, usually exposed at low tide but covered at high tide, occurring in sheltered estuaries or behind shingle bars or sand spits.
National Nature Reserves (NNR)	SSSIs are designated as National Nature Reserves and are the most important areas for wildlife conservation and geology in the country. They are designated under the <i>Wildlife and Countryside Act 1981</i> , Section 35.
Natura 2000	The European network of Special Areas of Conservation and Special Protection Areas under the Wild Birds Directive, provided by Article 3(1) of the Habitats Directive.
Nutrients	A series of chemicals essential for life.
Pathogen	An agent able to cause disease. The term is often restricted to agents that are themselves living organisms.
Pesticides	Substances used to kill pests, weeds, insects, fungi, rodents etc. They can have significant harmful environmental effects.
Planning Policy Guidance	A series of documents on a range of specific topics prepared by the Government, and usually after public consultation, to provide guidance to Local Authorities and others on national land use policies and the operation of the planning system in England. A few still apply in Wales, but are being replaced by Welsh Assembly policy guidance and Technical Advice Notes.
Precautionary Principle	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
Ramsar site	Wetland of international importance especially as a waterfowl habitat.
Recycling	The reprocessing in a production process of waste materials for the original purpose or for other purposes, including organic recycling, but excluding energy recovery.
Relevant Authorities	<i>The Conservation (Natural Habitats &c.) Regulations 1994</i> identify a number of competent authorities as “relevant authorities”, with particular functions in relation to European marine sites. In addition to their duties as competent authorities, the relevant authorities may establish a management scheme for a European marine site under which they shall exercise their relevant functions.

Renewable energy	Energy produced from resources that are unlimited or can be rapidly replenished e.g. wind, water, sunlight, wave power or waste.
Saltmarsh	A coastal marsh found along low-lying shores, colonised by plant species capable of withstanding frequent and often prolonged immersion in salt water.
Secondary treatment	Biological degradation of effluent which has already received primary treatment.
Sediment	Deposited particles of grains of rocks.
Sewage	Liquid waste from homes, businesses etc which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.
Shoreline Management Plan	Plans through which local authorities and others can provide a framework for sustainable coastal defence policies within a sediment cell or sub-cell.
Special Protection Area	Sites of international importance for rare or vulnerable birds species listed in Annex 1 (Article 4.1) and for regularly occurring migratory species (Article 4.2) and for the protection of internationally important wetlands. Designated under <i>The Conservation (Natural Habitats &c.) Regulations 1994</i> .
Special Area of Conservation	Sites of international importance which contain habitat types and/or species which are rare or threatened within a European context. Designated under <i>The Conservation (Natural Habitats &c.) Regulations 1994</i> .
Sites of Special Scientific Interest	Sites of national importance for their flora, fauna, geological or physio-geographical features. Sites are notified under the <i>Wildlife and Countryside Act 1981</i> , Section 28, as incorporated by the <i>Countryside and Rights of Way Act 2000</i> .
Statutory powers	Powers conferred by statute (an Act of Parliament or related Orders and Regulations) on a public or other body.
Structure Plan	Set out by the County Council with general policies for the development throughout the County.
Sustainable Use	Use of a resource at a level which does not exceed the capacity of that resource to renew or replace itself.
Sustainable Development	Development that meets the needs of present generations without compromising its potential to meet the needs and aspirations of future generations.
Technical Advice Note	Supplement to 'Planning Guidance (Wales): Planning Policy'.
Tir Gofal	An all-Wales agri-environment scheme.
Unitary Development Plan	The development plan in Wales that substitutes for the English Structure Plan and Local Plan.

Waste minimisation	The reduction of waste at source, by understanding and changing processes to prevent and reduce waste.
Water table	Top surface of the saturated zone within the aquifer.
Wetland	An area of low-lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.

Appendix 8. Maps

Map 1:	Environment Agency LEAPs
Map 2:	Major developments proposed in development plans
Map 3:	Coastal processes and topography
Map 4:	Coastal defences
Map 5:	Tourist attractions and recreational areas
Map 6:	Ports and Harbour Authorities and other features of interest
Map 7:	Major sewage discharges and planned improvements
Map 8:	Major industrial discharges
Map 9:	Estuary water quality and statutory monitoring sites
Map 10:	Major atmospheric discharges and nuclear licensed site discharges regulated by the Environment Agency
Map 11:	Licensed dredging sites
Map 12:	Fisheries and angling
Map 13:	Landscape
Map 14:	Designated conservation areas
Map 15:	Scheduled Ancient Monuments



Map 1: Environment Agency LEAPs

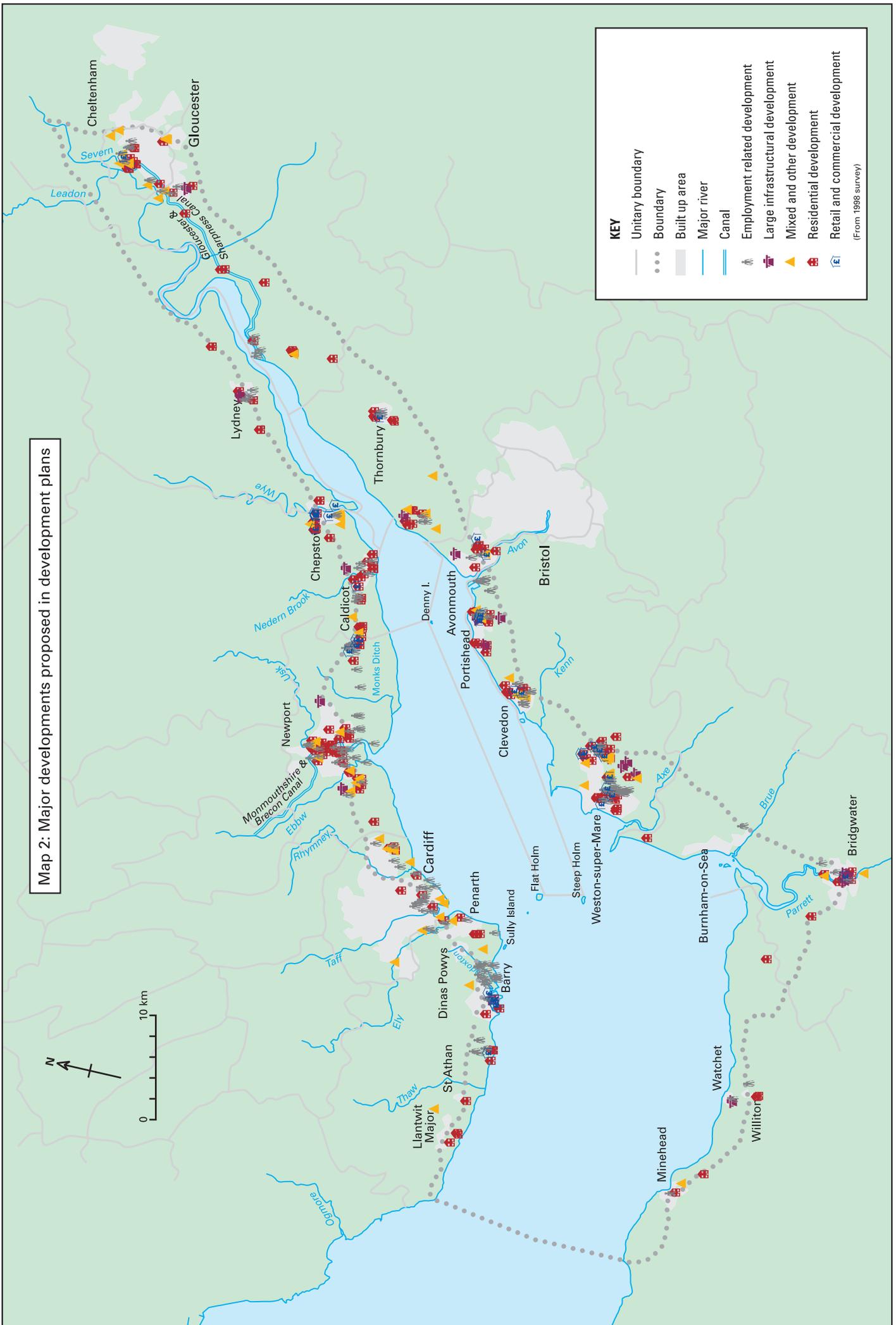
KEY

- Severn Estuary area boundary
- Built up area
- Major river
- Canal
- ⋯ LEAP boundary



*LEAPs will be produced for all areas by the end of 1999 and will replace any existing CMPs. In some areas the boundaries of the LEAPs will be different from the CMPs.

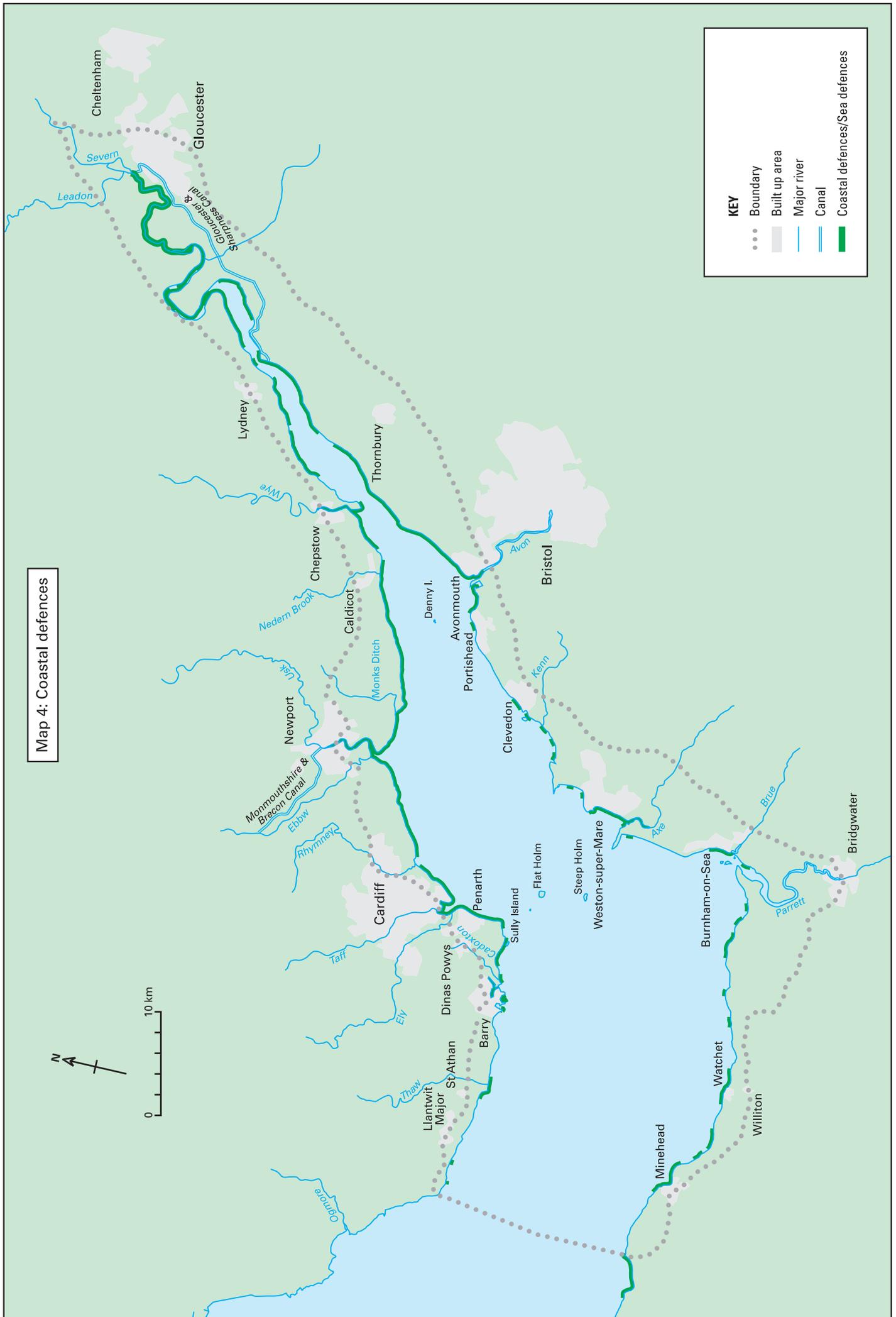
Map 2: Major developments proposed in development plans



KEY

- Unitary boundary
- Boundary
- Built up area
- Major river
- Canal
- Employment related development
- Large infrastructural development
- Mixed and other development
- Residential development
- Retail and commercial development

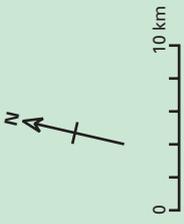
(From 1998 survey)



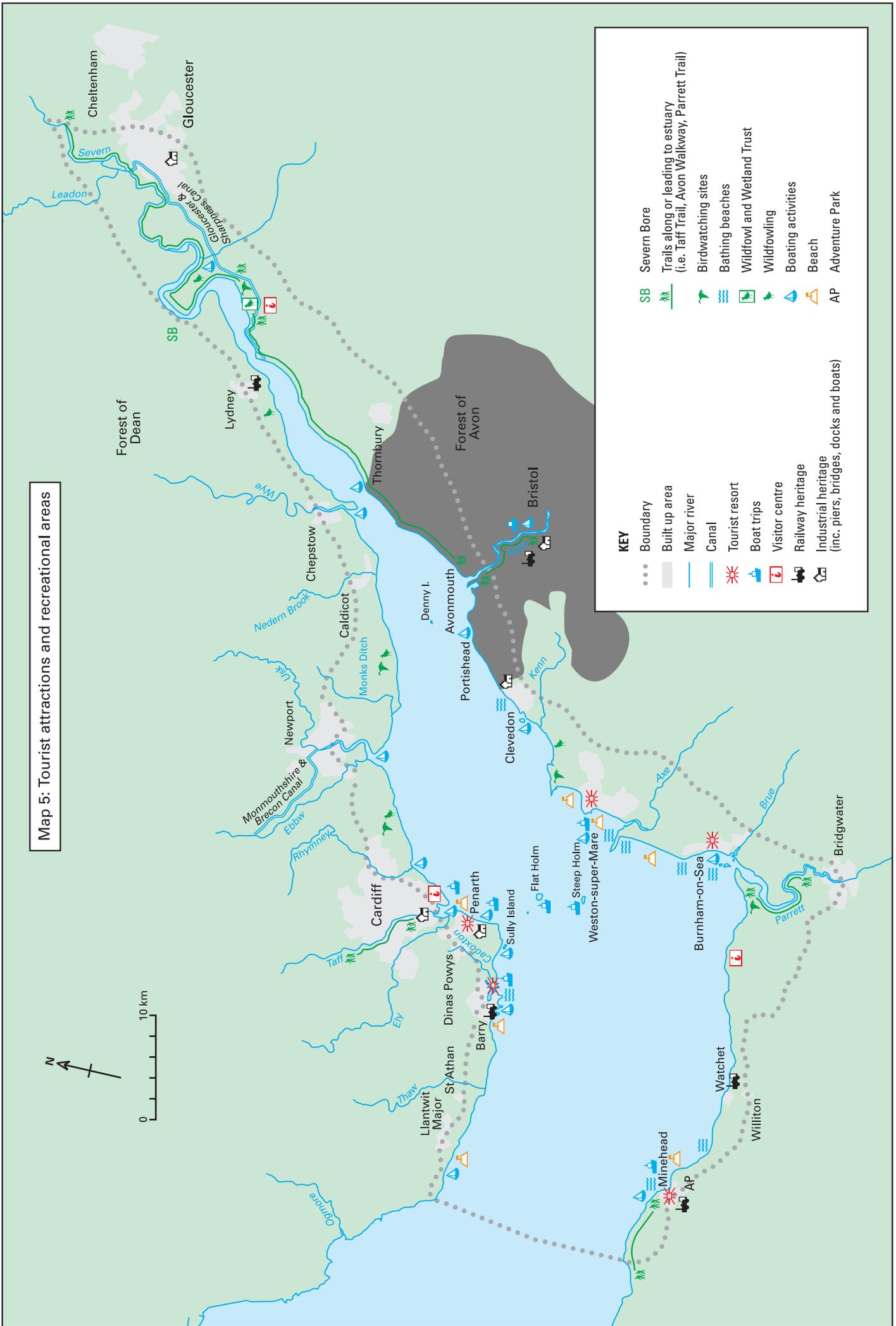
Map 4: Coastal defences

KEY

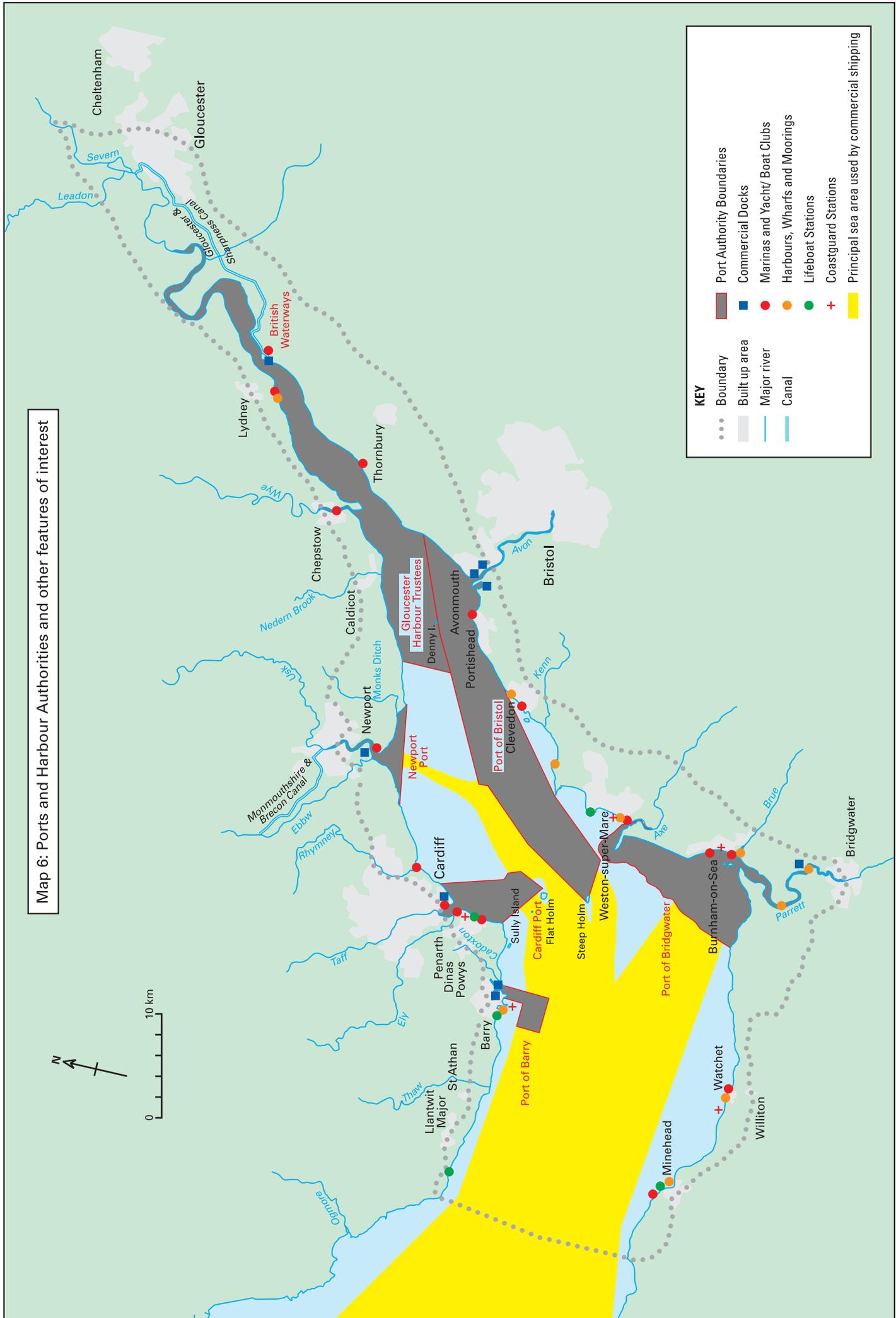
- Boundary
- Built up area
- Major river
- Canal
- █ Coastal defences/Sea defences



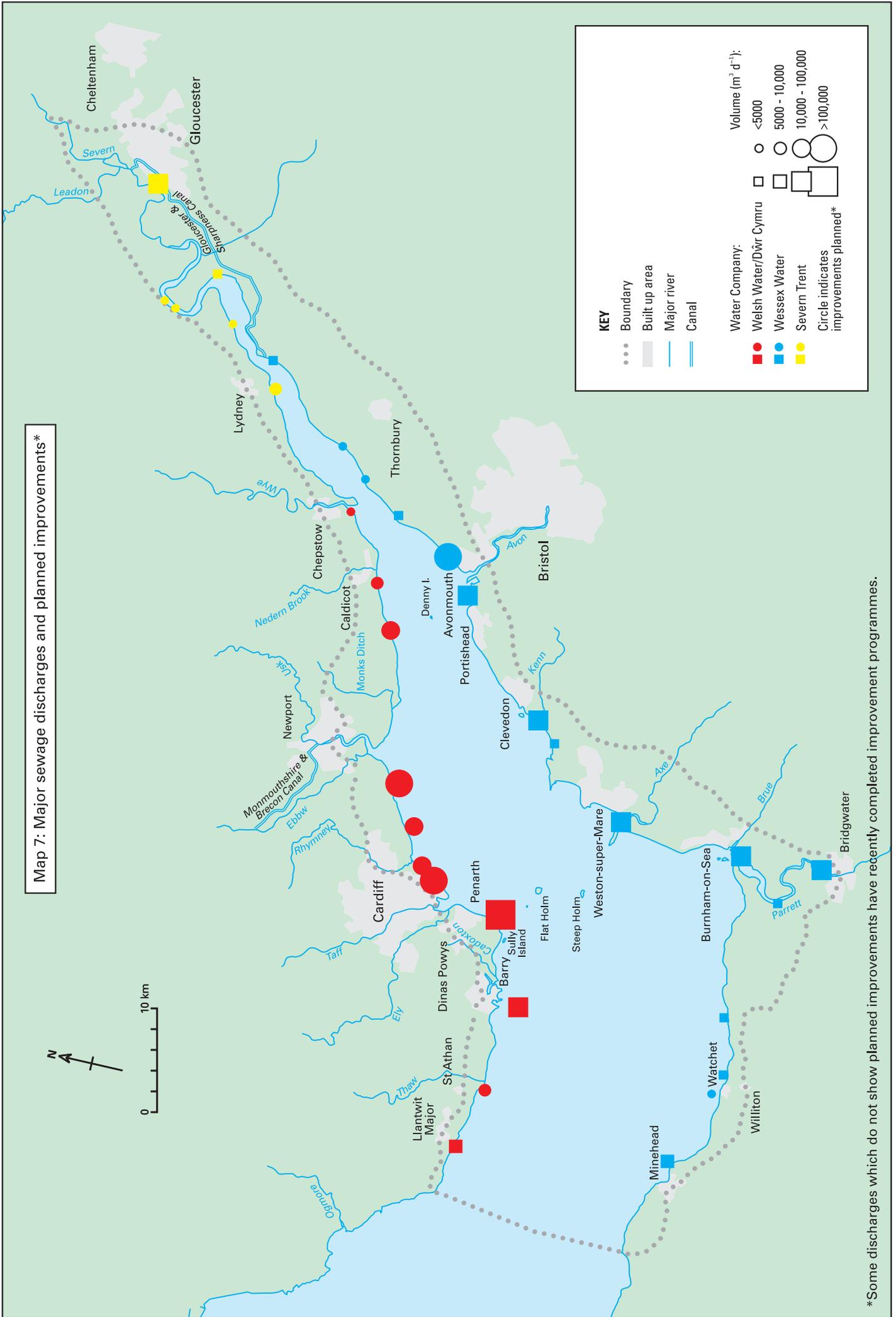
Map 5: Tourist attractions and recreational areas



Map 6: Ports and Harbour Authorities and other features of interest

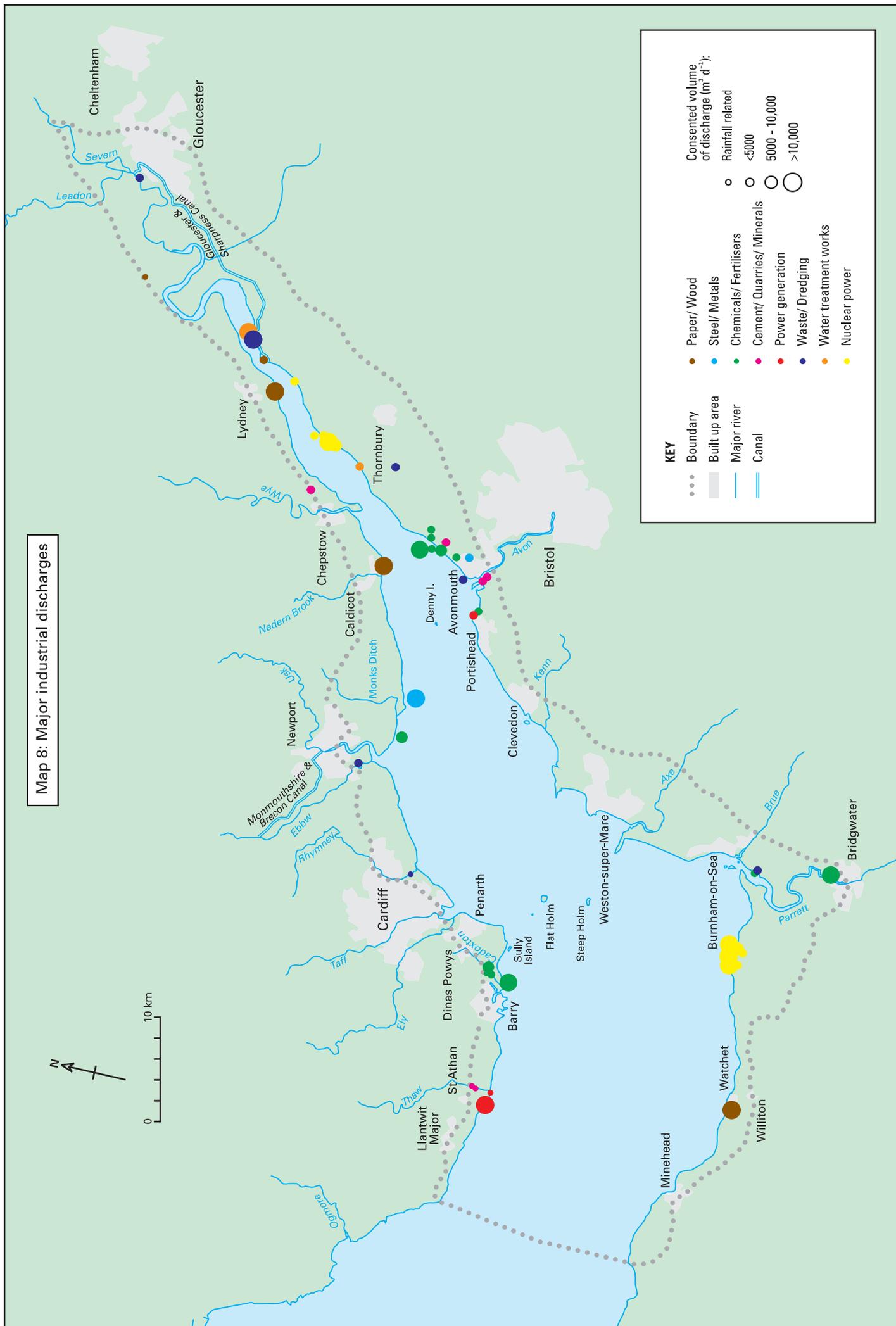


Map 7: Major sewage discharges and planned improvements*

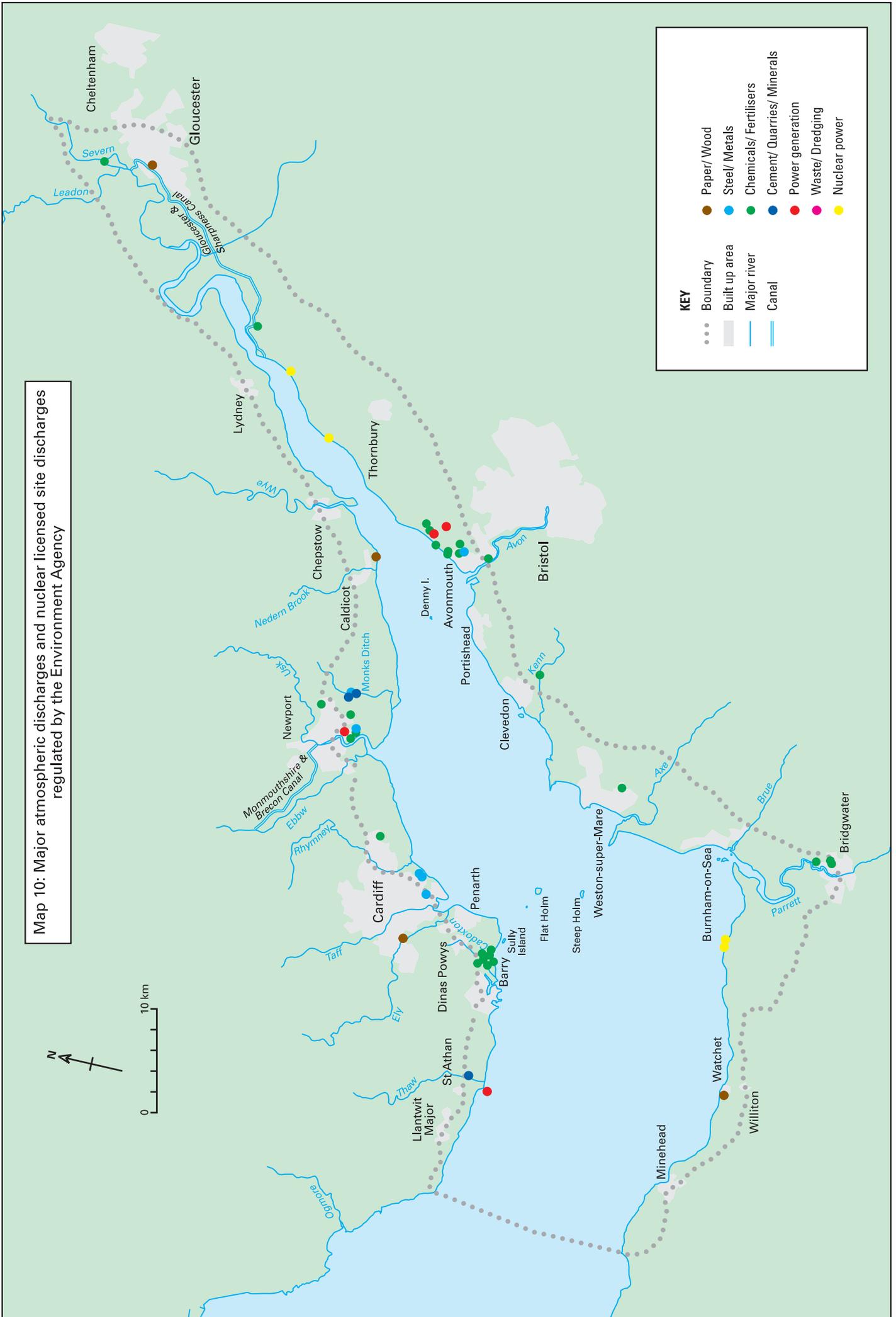


*Some discharges which do not show planned improvements have recently completed improvement programmes.

Map 8: Major industrial discharges



Map 10: Major atmospheric discharges and nuclear licensed site discharges regulated by the Environment Agency



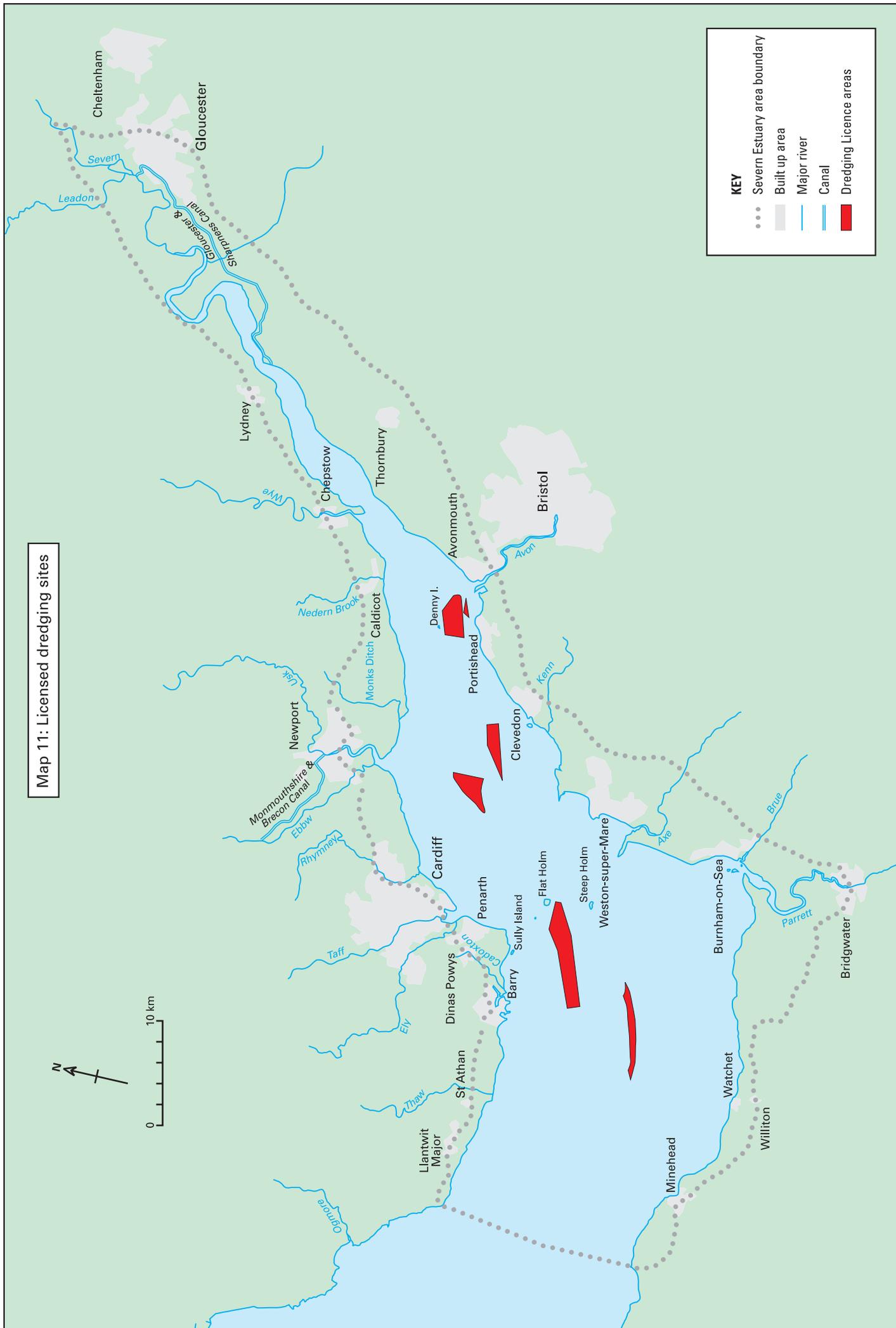
KEY

- Boundary
- Built up area
- Major river
- Canal
- Paper/ Wood
- Steel/ Metals
- Chemicals/ Fertilisers
- Cement/ Quarries/ Minerals
- Power generation
- Waste/ Dredging
- Nuclear power

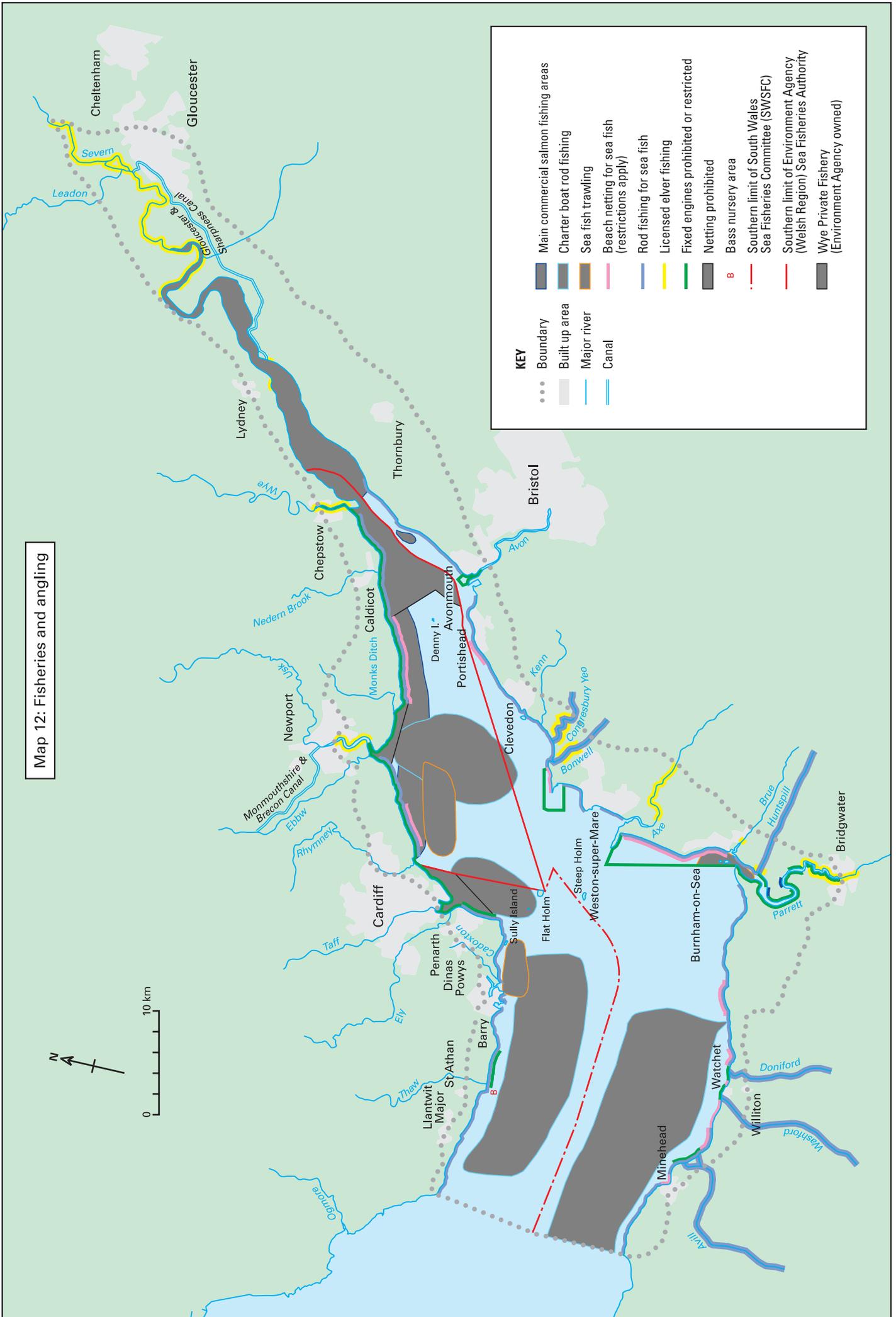
0 10 km



Map 11: Licensed dredging sites

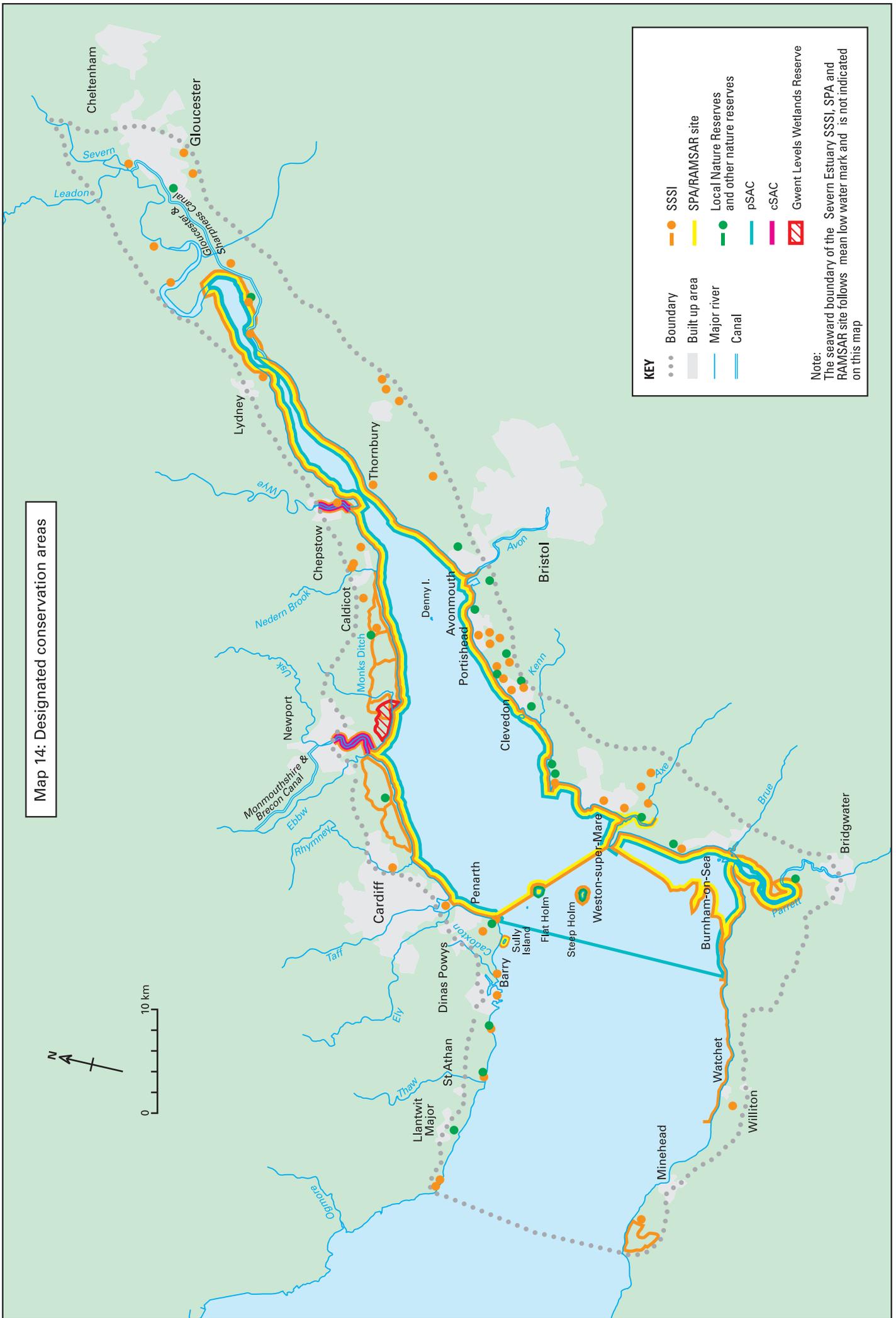


Map 12: Fisheries and angling



KEY	
●●●	Boundary
■	Built up area
—	Major river
—	Canal
■	Main commercial salmon fishing areas
■	Charter boat rod fishing
■	Sea fish trawling
■	Beach netting for sea fish (restrictions apply)
■	Rod fishing for sea fish
■	Licensed elver fishing
■	Fixed engines prohibited or restricted
■	Netting prohibited
B	Bass nursery area
—	Southern limit of South Wales Sea Fisheries Committee (SWSFC)
—	Southern limit of Environment Agency (Welsh Region) Sea Fisheries Authority
■	Wye Private Fishery (Environment Agency owned)

Map 14: Designated conservation areas



KEY

- SSSI
- SPA/RAMSAR site
- Local Nature Reserves and other nature reserves
- pSAC
- cSAC
- Gwent Levels Wetlands Reserve
- Boundary
- Built up area
- Major river
- Canal

Note:
The seaward boundary of the Severn Estuary SSSI, SPA and RAMSAR site follows mean low water mark and is not indicated on this map

