

THE RIVER DEE CATCHMENT MANAGEMENT PLAN ACTION PLAN: 1996



NRA

*National Rivers Authority
Welsh Region*

CATCHMENT STATISTICS

Area	2088 km ²
Population	427,000 (estimate)
Area at flood risk	10,500 Ha
Average Annual Rainfall	1,130 mm
River Quality	135.1 km Very Good 145.5 km Good 32.5 km Fair 21.7 km Poor 6.8 km Bad
Estuary Quality	63.0 km Good 2.5 km Fair
Designated Fisheries (78/659/EEC)	291 km Salmonid 28.5 km Cyprinid
Designated Bathing Water (76/160/EEC)	West Kirby

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THE AREA MANAGER'S VISION FOR THE DEE CATCHMENTS

The River Dee is of major importance as a source of water supply for domestic and industrial purposes in North East Wales and North West England. As a consequence, it has become one of the most regulated rivers in Europe, with complex systems to manage river flows and to maintain its high quality. The flow management systems also provide measures to reduce the frequency and impact of flooding within the catchment.

Despite the high level of manipulation of river flows, the Dee has important natural features that need protection. The river is prominent nationally for salmon fishing. It has a significant population of sea trout which is largely unexploited and also supports important coarse and estuarine fishing. Llyn Tegid and the Dee estuary are RAMSAR sites, part of the river corridor has recently been identified as an SSSI and the catchment as a whole presents numerous opportunities for those with ornithological and other conservation interests. More active pursuits are catered for at Canolfan Tryweryn, the National White Water Centre, where white water canoeing and rafting is available.

The challenge for the NRA is to protect and develop the potential of the catchment in such a manner that the needs of this wide range of interests are properly balanced. Our vision for the lifetime of this Plan includes the following:

- We will pursue improved security measures for water resources provided by the Dee Regulation Scheme, ensuring that the needs of the abstractors are served whilst protecting the river environment and other uses.

- We will pursue measures to improve protection of water quality by implementing pollution prevention initiatives, key amongst which will be establishment of a Water Protection Zone, if approved by the Secretary of State for Wales.
- In undertaking our own operational activities, particularly in relation to flood defence, we will do so in a manner which is sympathetic to the conservation features of the catchment. Routine maintenance of sections of main river will continue on an annual basis, with non routine operations carried out on an as - needs basis.

It is imperative that we develop good cooperative working arrangements with other organisations and agencies if we are to successfully manage such a complex and important catchment. We particularly hope through this Plan to influence the development plans of Local Authorities.

The delivery of this vision for the catchment and resolution of the issues contained in this Action Plan will therefore require active collaboration from a range of organisations. We have an opportunity to develop a cohesive, integrated management approach and we look forward to receiving the support and active involvement of users of the catchment in order to achieve this vision.



S. J. BROWN
NORTHERN AREA MANAGER -
NRA WELSH REGION



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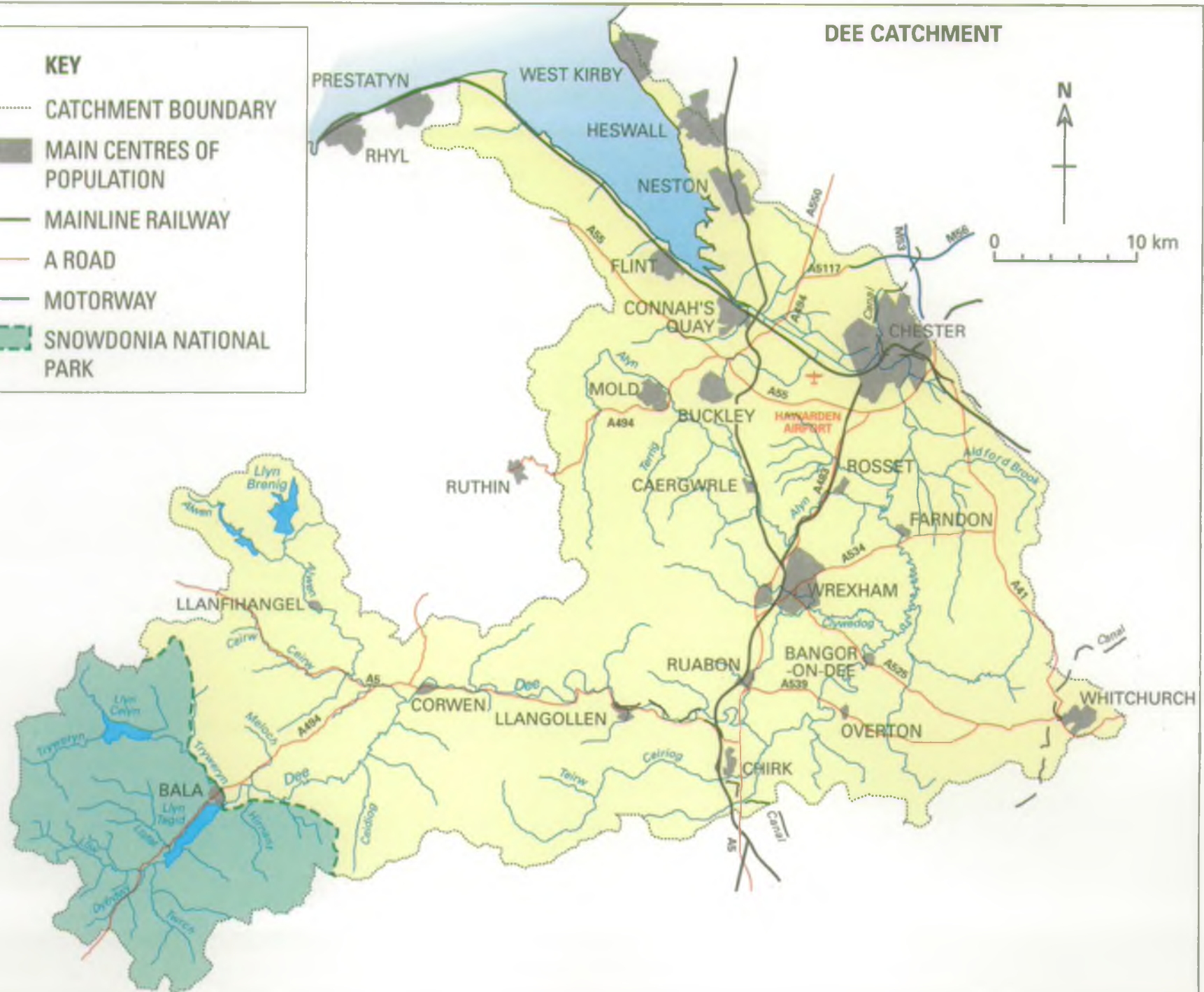


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DEE CATCHMENT

KEY

- CATCHMENT BOUNDARY
- MAIN CENTRES OF POPULATION
- MAINLINE RAILWAY
- A ROAD
- MOTORWAY
- SNOWDONIA NATIONAL PARK



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1.0 INTRODUCTION

THE CONCEPT OF CATCHMENT MANAGEMENT PLANNING

The rivers, lakes, estuaries and coastal waters of England and Wales are subject to large and rapidly increasing demands from the users of water. Many different uses interact or compete for water and will inevitably come into conflict with one another. The National Rivers Authority aims to protect and improve the water environment in England and Wales and to harmonise conflicts between competing water users. Our Mission Statement expresses the following principles:

"We will protect and improve the water environment by the effective management of water resources and by substantial reductions in pollution. We will aim to provide effective defence for people and property against flooding from rivers and the sea. In discharging our duties we will operate openly and balance the interests of all who benefit from and use rivers, groundwaters, estuaries and coastal waters. We

will be businesslike, efficient and caring towards our employees."

We have chosen to use Catchment Management Plans (CMPs) to translate those principles into action. The Action Plan is a strategic policy framework for the management of the catchment and is produced after we have considered the comments received on the Consultation Plan. It includes a statement of action needed to achieve the vision for the Dee Catchment and will form the basis for improvements to the water environment by outlining the areas for work and investment proposed by the NRA and others. The Action Plan primarily covers the five year period from 1996 to 2000, although a number of projects may take longer owing to funding availability and government policy. The Region will formally adopt the proposals in the Action Plan.

CMPs also provide the means of promoting two key aspects of environmental management:-

- land use planning
- water quality objectives.

RELATIONSHIP BETWEEN LAND USE PLANNING AND CATCHMENT MANAGEMENT PLANNING

The broad objective of catchment management planning is to conserve and enhance the total river environment through effective land and resource management. However, whilst the NRA is well placed to influence some of the factors affecting the water environment, particularly in relation to the river corridor itself, we have very little control over the mechanisms which determine land use change on a catchment-wide basis. This is to some degree the responsibility of local planning authorities through the implementation of the Town and Country Planning Acts, whilst agriculture, as a major land use in the catchment, can introduce significant changes.

The policies in statutory development plans are important in this regard, in that they set out the framework for land use change and provide the key reference in determining development applications. The NRA encourages the inclusion of policies which reflect its concerns and responsibilities. As guidance for local authorities, the NRA has prepared a set of statements relating to water quality and water resources, flood defence, fisheries, conservation, recreation and navigation in the river corridor, and mineral workings and waste disposal. These statements are summarised in our "Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans".

This CMP Action Plan sets out issues and actions specific to the Dee catchment which have been determined within the framework of these Guidance Notes. Section 4 outlines how consideration of the concerns of the water environment should influence the location and nature of development and land use change within the catchment.

WATER QUALITY OBJECTIVES

The Statutory Water Quality Objectives (SWQOs) scheme, introduced under the Water Resources Act 1991, is a new system for water quality planning which will place quality targets on a statutory footing. The scheme is based upon the recognised uses to which a river stretch may be put and is consistent with the principles of CMPs. These uses will include River Ecosystem, Special Ecosystem, Abstraction for Potable Supply, Agricultural/Industrial Abstraction and Water Sports.

At present, only the standards for the River Ecosystem Use have been developed on a formal basis and, as a result, this is the first SWQO Use to be introduced by the Government through the Surface Waters (River Ecosystem) (Classification) Regulations 1994. This replaces the Fisheries Ecosystem Scheme used in the Consultation Report (see The Surface Waters (River Ecosystem) (Classification) Regulations 1994) and is the first of the five uses to be formally introduced. The new scheme contains water quality standards which are statistically more robust than those in the earlier proposal. Consequently, the data used for the CMP Consultation Report have been re-examined to reflect the new scheme and some of the actions proposed may have changed as a result. The benefit of this more rigorous examination is that the NRA can be even more confident that the money we spend, or ask others to spend, is targeted to resolve those issues that will lead to the most significant improvements in water quality. For each classified stretch within the Dee catchment, a River Ecosystem class target has been proposed and this CMP Action Plan identifies, where appropriate, the actions required to achieve these targets. At present, these targets will only be applied informally although it is hoped that, in the near future, these may be established as Statutory WQOs by the Secretaries of State for the Environment and for Wales.



2.0 REVIEW OF THE CONSULTATION PROCESS

The Dee Catchment Management Plan consultation report was distributed to 405 organisations and individuals, including statutory and non-statutory bodies, to seek their views on the NRA's proposals. This was distributed a week in advance of the formal public launch of the Plan at the Rossett Hall Hotel, Rossett on the 21st July, 1994. In addition to the comments received at the launch, all consultees were invited to submit their detailed views by 31st October, 1994.

There were 67 respondents, the support of which we found most encouraging. A small number were of the view that the NRA's proposals were not sufficiently exacting. Others questioned some of the factual information and provided corrections/amendments. All respondents were sent an acknowledgement for their valued contributions which were considered in the preparation of this Action Plan.

The consultation report identified 67 issues within the catchment. The public consultation identified a further 15 potential issues of which 5 were adopted as new issues. The changes since the consultation report are as follows:-

- Issues 68, 69, 70 and 71 - new issues following public consultation
- Issues 26 and 35 - withdrawn (for reasons see Tables in Section 5.0)
- Issues 4, 10, 41, 44 and 48 - actions completed
- Issue 12 - integrated into Issue 2
- Issues 15, 17, 18, 20, 21, 22, 24, 27 and 29 - integrated into Issue 5

- Issues 14, 25 and 61 - now included in Issue 13
- Issues 30, 31 and 32 - now included in Issue 28
- Issue 43 - incorporated into Issue 6
- Issue 62 - incorporated into Issue 36
- Issue 38 - incorporated into Issue 37
- Issue 40 - incorporated into Issue 39

This then gives the total number of discrete issues within the catchment that still require action as 44.

The new issues are:

- 68 Improvements to Bagillt East sewage treatment works
- 69 Appraisal of the navigational priorities of the Dee estuary
- 70 Flood defence improvement scheme for Sealand area of Chester
- 71 Long term improvements to standards of service and security of the Dee Regulation System during periods of drought
- 72 The inclusion of the Dee Estuary in the "Montreux Record" of Ramsar sites which have been ecologically damaged

The consultation process is a very important and integral part of our development of a Catchment Management Plan, and in particular, the preparation of the Action Plan. The consultation on this Plan has revealed that many share the NRA's vision for the Dee and are supportive of the proposed actions to achieve the objectives set by the Authority.

3.0 OVERVIEW OF THE CATCHMENT

GENERAL

The Dee is one of the most important rivers in the United Kingdom. Its source lies within the Snowdonia National Park and the catchment through which it flows contains a wide range of landscape types from high mountains around Bala, rugged peaks near Llangollen, steep sided wooded valleys, the plains of Cheshire and North Shropshire and finally the vast

mudflats of the estuary. It is steeped in history (these were the homelands of Owain Glyndwr) and has a wealth of conservation interests. The influence of man from pre-Roman times is very evident throughout the catchment.

The course and topography of the river valley and tributaries were strongly influenced and modified by the glacial activity which ended some 13,000 years

ago. The Lower Dee floodplain is a former lake with a narrow restricted outlet, which explains the difficulty of preventing flooding completely in these parts. The need to maximise the availability and quality of water resources in the catchment for supplying drinking water, to control flooding and to protect important fisheries and conservation interests has led to the Dee becoming one of the most regulated rivers in Europe.

WATER RESOURCES

The framework for the present day management of the river is defined within the Dee and Clwyd River Authority Act 1973. The three lakes used for river regulation are Brenig, Celyn and Tegid. Llyn Tegid is a natural lake, whilst Brenig and Celyn are reservoirs owned by Dŷ Cymru Welsh Water (DCWW). In order to secure the proper operation and management of these reservoirs, the NRA has entered into an "operating agreement" with DCWW under Section 20 of the Water Resources Act 1991.

The regulated Dee provides drinking water to over 2 million people, distributed by four Water Companies, as well as water for agricultural and industrial uses. In addition, provisions are made within the system to store nearly 10,300 million litres for special release purposes each year. These purposes include fishery, recreation and water quality management. Hydrometric data are collected at 29 sites for river flows and levels, at 36 sites for groundwater levels and at 26 sites for rainfall. Flows and levels are also recorded at the regulating reservoirs and at the Alwen direct supply reservoir. Annual average rainfall varies from 2500mm in the mountains above Bala to 600mm in the Chester area, typical annual evaporation being around 450 mm.

The natural average run-off to Chester weir is 36.8 cubic metres per second (cumecs). Licensed abstractions from the Dee catchment amount to over 1 million Ml/a, which includes abstraction from surface and groundwaters for drinking, industrial use, spray irrigation, electricity generation, fish farms and transfer purposes. The water abstracted by fish farms and for hydro electric power generation is all returned to the river. In total over 600 thousand Ml/a is licensed for transfer within the catchment, of which 99% is associated with the regulation of the Dee. The abstraction of water into the Shropshire Union Canal represents a transfer of water out of the catchment. The lower reach between Farndon and Chester weir experiences flow reversals of up to 100 cumecs as a



result of high tides, which regularly exceed the Chester weir crest level. Accompanying these flow reversals there are temporary variations in river levels of a metre or more over 12 hours. These unsteady hydraulic conditions cause problems for hydrometric measurement, real time control of regulation releases and prediction of times of travel within the reach.

FLOOD DEFENCE

The provision and maintenance of effective flood defence is necessary to protect people and property against flooding from rivers and the sea. There are some 10,500 hectares at risk within the catchment and the powers to maintain or improve defences are shared by a mixture of maritime District Councils and the NRA. The extensive development within the coastal plain has generated a commitment to the provision of adequate sea defences by the District Councils. In addition there are major defences in private ownership, predominantly by British Rail. The types of sea defences vary between natural dune systems and more traditional sea walls. The NRA owns short lengths of sea defence (at Llanasa, Heswall and Broken Bank) which are maintained annually, but we are more extensively involved with the maintenance of the Hawarden and Northern Embankments along the canalised length of the Dee. These defences provide protection to industrial development within the estuarial flood plain.

The fluvial (non-tidal) flood plain of the Dee is principally in the agricultural middle reach between Chester and Bangor-on-Dee, for which fluvial defences give limited protection from inundation. Further fluvial defences within the catchment are concentrated

mainly in urban situations, e.g. the River Alyn at Mold and the Dee at Bangor-on-Dee.

The extensive areas of coastal and river flood plains present drainage difficulties due to the low-lying nature of the land. Pumping stations are used in many urban and rural situations to facilitate drainage. Elsewhere in the catchment, Flood Defence work consists mainly of shoal removal and river management schemes. Regulation of the upper catchment of the Dee at Bala provides the opportunity to exercise a degree of flood control and operate a flood warning scheme. The scheme, specifically designed for the benefit of urban developments at Bala, Corwen and Bangor-on-Dee, also provides a service to landowners for agricultural/stock protection purposes in the Dee flood plain. There have been reports of minor flooding incidents on non-main (ordinary) watercourses, but there are no known flooding problems for property within the area covered by the Plan. There is a small storage area within the catchment at Knoll's Bridge designed to reduce peak flows. However, progressive development of the Finchetts Gutter catchment in Chester has highlighted the need for a Flood Protection Improvement Scheme, and that is currently programmed for construction during the period 1996-1998.

FISHERIES

The fisheries of the Dee are of national importance, with a commercial salmon fishery, sea fisheries of economic significance in the estuary and a wide range of species present elsewhere in the catchment. Salmonids (salmon, sea trout and brown trout) are widespread whilst cyprinids (coarse fish) are abundant in the lower river. The Dee is noted for the good

numbers and large size of its grayling. Much of the sea fishing is undertaken by local operators in small craft, but occasionally large fishing vessels enter the outer estuary. Illegal netting of salmonids was a serious problem in the estuary. The problem still continues but new legislation introduced by the NRA in August 1992 has significantly reduced this activity. Licensed salmon and sea trout netting is currently restricted under a Net Limitation Order (under the 1975 Salmon and Freshwater Fisheries Act) to 30 draft (Seine) and 4 trammel nets each year, downstream of Chester. Concern over the decline of spring running salmon has resulted in the development of byelaws aimed at reducing net and rod catches, implemented during 1995. Cockling has recently become a major commercial interest and this shellfishery will continue to provide beneficial local employment, provided it is properly managed. Prawns and shrimps have been the source of a thriving local industry for generations and are found in abundance in the outer estuary at certain times of the year. Mussels are also to be found in a few locations around the outer estuary, particularly off West Kirby, Thurstaston and Greenfield.

Llyn Tegid, the largest natural lake in Wales, contains 14 species including the gwyniad (*Coregonus clupeoides pannantii*) a relic from the last ice age and unique to the UK. Since 1991 the NRA has operated a purpose built salmon trap at Chester weir, providing the most intensive monitoring station in Wales and England. The trap monitoring and associated studies (the Dee Stock Assessment Programme) aim to provide scientific measures of both the numbers of fish entering the river and the factors influencing them. Not surprisingly, angling is a major interest in the catchment. In economic terms the salmon fishery is of great importance but coarse fishing is also popular. Salmon catches vary according to the time of year and to movement of fish into the freshwater river from the estuary. The 10 year annual mean declared rod catch to 1991 was 538, with the majority of fish being taken in the period between August and October.

Several reservoirs in the headwaters provide good quality trout fishing. Llyn Brenig in particular caters for large match events, both for bank and boat fishing. In recent years a multitude of smaller trout lakes have been developed as put-and-take fisheries.

Acidification problems on some of the Llyn Tegid tributaries and the River Alwen result in poor populations of salmonids with non-migratory fish being better adapted to the conditions.



CONSERVATION

The Dee Catchment has 46 sites of conservation importance. Rising in uplands within the Snowdonia National Park and designated Areas of Outstanding Natural Beauty, the Dee travels through wooded river valleys and lowland river meander systems of geomorphological importance. The large inter-tidal areas of the estuary provide rich feeding grounds for up to 120,000 birds. It is an area of international importance, being one of the five top sites in Britain (over 10% of wintering waders) and is in the top ten most important in Europe (over 1% of NW European wildfowl). This importance is recognised in its designation as a RAMSAR site (wetland of international importance) and a SPA (Special Protection Area). The extensive saltmarshes are of considerable botanical interest, whilst the outer estuary is important for grey seals, with about 15% of the Welsh population. Llyn Tegid is the largest natural lake in Wales and is a Ramsar site and SSSI, containing the rare snail *Myxas glutinosa* and the *gwyniad* referred to above.

RECREATION

The Migneint, in the upper reaches, is a proposed RAMSAR site and one of the largest areas of blanket bog in Wales, whilst the Berwyn is a proposed ESA (Environmentally Sensitive Area) and SPA (Special Protection Area), nationally notable for its blanket mire vegetation and bird populations. Otters appear to be on the increase, particularly on the Rivers Ceiriog and Alyn, whilst dippers occur on most upland tributaries. Sandmartins, kingfishers, sawbills and wagtails are common.

There are 218 Scheduled Ancient Monuments which lie within the catchment, but these represent less than



10% of all currently known sites. The sites include prehistoric forts (e.g. the Caer Eini ridge), crop marks such as those at Llanfor, bridges (e.g. Pont Fawr, Llandderfel), the Walls, tower gates, and posterns of the City of Chester, and part of Offa's Dyke.

RECREATION

The water environment is a key attraction for the important tourist industry in the area. Frequently visited areas of high amenity value include the estuary, Chester, Llangollen, Snowdonia National Park (including Llyn Tegid), Llyn Brenig and several lowland country parks. Outside of these centres, facilities for car-based visitors (picnic sites, interpretative facilities) are poor. However, riverside access is particularly good with almost continuous footpaths on one or both banks from Connah's Quay to Overton. The estuary is internationally recognised for its bird populations and bird watching is popular, with formal events organised by the RSPB on Wirral foreshores and at Point-of-Ayr. However, bird watching facilities on inland reserves are non-existent, with the exception of a hide at Brenig. Near the headwaters, the larger lakes and reservoirs are popular for sailing, wind surfing and sub-aqua activity, whilst the Alwen Reservoir is one of the few inland sites in Wales used for water skiing. At Bala, the regulated Afon Tryweryn is the base for the National White Water Centre (Canolfan Tryweryn) and the river is internationally renowned for wild water and slalom canoeing. In 1994 the wild water racing World Cup was staged on this river, and it hosted the 1995 World Championships. The Dee at the historical town of Chester is popular for a variety of boating activities, as is the Shropshire Union Canal. Tidal constraints limit activity in the canalised section of the estuary but further seawards this is well used by sailing dinghies and small fishing boats, whilst parts of the estuary salt



marsh are used for wildfowling. At West Kirby, the bathing water has been identified under the EC Directive (76/160/EEC) and considerable recreational activity takes place along this north shore of the estuary.

NAVIGATION

The NRA, as successor to the Dee Conservancy Board which was established under the Dee Conservancy Act 1889, is responsible for navigation on the estuary. It is also the Harbour Authority for the greater part of the estuary. Due to the shallow channel, commercial shipping is restricted to entering the upper estuary on a limited number of tides per year. The only port of any size is that at Mostyn Docks near the mouth of the estuary, which can accommodate commercial shipping throughout the year. From Chester weir upstream to Farndon Bridge, navigation is the responsibility of Chester City Council. Upstream of Farndon Bridge, there are no public rights of navigation. The navigation authority for the Shropshire Union Canal is British Waterways.

WATER QUALITY

The Dee is generally of very good water quality throughout its length although a number of tributaries are adversely affected by sewage or agricultural pollution. Very low summer flows in some tributaries can contribute to adverse effects on quality. Occasional pollution incidents in the main river or the tributaries can have severe impacts on some uses, especially potable water abstraction. The river is intensively monitored, including automated bank-side monitoring

stations and twice daily sampling at nine key locations to detect any incidents that may threaten the quality of water abstracted from the river. This programme is designed to give warning to water undertakers so that abstractions may be shut down or treatment processes altered to deal with any problems. To minimise the frequency and impact of such incidents, the NRA is seeking further controls on the way potentially polluting substances are stored and is seeking an Order under S.93 of the Water Resources Act 1991 to establish a water protection zone. Following a Public Inquiry, the NRA is awaiting the decision of the Secretary of State for Wales. If granted, the Dee Water Protection Zone would be the first of its kind in the UK.

Most of the 141 significant sewage discharges and some of the 29 major industrial discharges are made directly to the freshwater river, generally on the fringes of urbanised areas. The regulated nature of the river ensures high dilution for these main river discharges and for most pollution incidents, except in severe droughts or when major incidents occur. Agriculture may however exert substantial impacts on quality in the lowland areas especially in Cheshire, whilst forestry and sheep rearing can exert lesser impacts in upland areas. Some upland sub-catchments suffer from the effects of acidification.

Most industrial discharges are made to the estuary and a phased programme of improvements has been agreed with many industries around the estuary. Historical industrial activities in this part of the catchment have left a legacy of contaminated land and the NRA liaises closely with local authorities to ensure that redevelopment of contaminated sites proceeds in a manner which does not adversely affect surface or ground waters. A number of large discharges of sewage are made to the estuary, some of which cause water quality problems. The NRA is also concerned that the identified bathing water at West Kirby fails to meet the standards of the EC Bathing Waters Directive. Negotiations with both Dŵr Cymru Welsh Water and North West Water Ltd. has ensured that much of the finance has now been allocated to improvement schemes where they are required.

CATCHMENT USES

The range of uses and activities within the Dee catchment is extensive and all legitimate uses of the catchment which can impact, or interact, within the water environment have been described under 21 categories of Use in the Catchment Management Plan Consultation Report.



These are:

Urban Development (including road, rail and airport)

Abstraction for Drinking Water (Potable) Supply

Abstraction for Industrial Supply

Abstraction for Agricultural Supply

Sewage Effluent Disposal

Industrial Effluent Disposal

Solid Waste Disposal (Landfill)

Mineral Extraction

Agricultural Activity

Forestry

Fisheries Ecosystem (now River Ecosystem)

Special Ecosystems

Conservation - General Ecology and Landscape

Archaeology and Heritage

Commercial Harvesting of Sea Fish and Shellfish for Human Consumption

Basic Amenity

Angling

Water Sports Activity

Boating

Navigation

Flood Water Storage and Flood Defence

There will inevitably be some interaction and sometimes conflict between different Uses. Among those identified in the Dee catchment are potential conflicts between the desire by the NRA to enhance

and increase the number and diversity of wetland habitats and the resistance of some landowners to the change. Also more extensive access for canoeing may conflict with angling.

4.0 RELATIONSHIP BETWEEN LAND USE AND THE WATER ENVIRONMENT

The policies in local authority statutory development plans are very important, given that they provide the framework for land use change and provide the key reference in determining development applications (Planning and Compensation Act 1991). The NRA therefore welcomes the inclusion of policies in development plans, which reflect the Authority's concerns and responsibilities including the statutory requirement to conserve and enhance the water environment and associated lands. To facilitate this, the NRA has provided all local planning authorities with 'Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans'.

The Dee catchment has a varied and generally high quality environment. Nevertheless, the impacts of different land uses on the water environment are evident. The extensive residential development, particularly in the coastal resort towns, was not historically accompanied by development of environmentally adequate sewage disposal facilities. This has resulted in sewage being discharged into the estuary, causing aesthetic pollution and in particular the failure of the identified bathing water at West Kirby to comply with the EC Bathing Waters Directive standards. However this problem, and others, should be eliminated within the lifetime of the Plan.

The NRA will object to development in areas where existing inadequate sewage disposal facilities cause degradation of the aquatic environment, and where there is no commitment to an improvement scheme within an acceptable timescale. This policy is currently applied to Bagillt East where inadequate sewage treatment facilities are resulting in the pollution of a tributary of the Dee estuary.

Development of low lying land adjacent to the river or in the flood or coastal plain may put itself and existing development at greater risk of flooding. Development in the higher reaches of the catchment may also increase this risk by reducing the time for flows to peak and by increasing the peak flow at critical locations downstream. The NRA is obliged to advise the local planning authorities where any proposed development is at risk from flooding, in accordance with Welsh Office Circular 68/92.

During the lifetime of this Action Plan the NRA will be required to produce Water Level Management Plans for all sites agreed between the NRA and the Countryside Council for Wales. The plans will be produced over a three year prioritised programme. Once finalised, the details of the programme will be built into the Action Plan at the time of its annual review.

Agriculture and afforestation are predominant in this

catchment and their associated activities can, if not properly managed, result in deterioration of river water quality and adversely affect river flows. The Control of Pollution (Silage, Slurry and Agricultural fuel Oil) Regulations 1991 have introduced standards of construction within the agricultural industry which will serve to reduce the incidence of agricultural pollution.

The forestry industry and the NRA have produced the Forests and Water Guidelines which set standards to minimise problems from forestry operations. These guidelines are regularly reviewed. Whilst coniferous afforestation is not the primary cause of acidification it can exacerbate its impact. Acidification is evident in the upper reaches of the catchment and Indicative Forestry Strategies and associated future planting should have proper regard to this. The NRA welcomes the increasing dialogue on planting proposals with the forestry organisations and local planning authorities. Coniferous planting in acid sensitive areas (where buffering capacity provided by the underlying geology is inadequate) must be kept to a minimum and in some cases avoided. Replanting of sensitive areas continues to be a cause for concern.

Despite the mining activity for both coal and metals

that has occurred within the Plan Area since Roman times, there are only minor localised problems resulting from this activity. The most notable problem is elevated zinc levels in the Clywedog.

Any land use which could result in contamination of land or which could mobilise pollutants in land already contaminated will be subject to the requirement of the NRA's Groundwater Protection Policy. Groundwater is available under a large part of the catchment and it is abstracted for public water supply by Dŵr Cymru Welsh Water, Wrexham Water, North West Water Ltd, Chester Waterworks Company and Severn Trent Water. Its importance as a source of drinking water and, in supporting springs and river flows during dry periods, reinforces the need to protect its quality. Therefore, in support of its pollution prevention work, the NRA will look to the planning authorities to regard the protection of groundwater as a material consideration in the determination of planning applications.

Land use and the water environment are thus closely inter-related and the NRA will actively promote with the local planning authorities the need for the protection of the water environment to be clearly evident in policies within their statutory development plans.

5.0 ISSUES AND ACTION

INTRODUCTION

The Dee catchment is generally of very high quality, but issues have been identified that must be resolved to progress our vision for the catchment. This Action Plan is the means by which the vision is progressively turned into reality. It is a clear statement of intent by a range of organisations to carry out operational work in the field that will translate aims and objectives into tangible improvements.

This Action Plan has a 5 year programme initially and, whereas many of the actions required will be in place by the end of this period, there will be some actions outstanding which will remain to be addressed for our vision to be fully realised. Moreover, Catchment Management Planning is dynamic in nature and, more actions may be identified over the ensuing years which will be required to ensure the river environment of the Dee catchment is adequately protected.

First of all, however, there are 44 issues to be resolved

which are presented in tabular form in this section. All the actions identified have been discussed with those parties involved in undertaking the actions. Only where these parties have agreed to the actions, the timescale of implementation and the costs involved has the NRA featured these elements in this Action Plan. In the absence of these agreements or sufficient information, the issues are included but without the details of costs, timescale, and responsibility.

Due to the reassessment of the water quality data using the statistically more robust River Ecosystem system, the perceived problem of catchment - wide failure of zinc and copper has been withdrawn as an Issue. Elevated zinc levels are a problem in the Clywedog and this Issue still features in the Action Plan.



PROGRESS WITH ACTION PLAN/VISION

The baseline from which the Action Plan operates is the 'State of the Catchment' reported in the Consultation document distributed during 1994.

The following abbreviations have been used in the main text and tables:

ADAS	Agricultural Development and Advisory Service	NERC	Natural Environment Research Council
BC	Borough Council	NFU	National Farmers Union
BWB	British Waterways Board	NRA	National Rivers Authority
CC	County Council	NWW	North West Water PLC
CCW	Countryside Council for Wales	NWWT	North Wales Wildlife Trust
CLA	Country Landowners Association	RSPB	Royal Society for the Protection of Birds
CMP	Catchment Management Plan	SAM	Scheduled Ancient Monument
CSOs	Combined Sewer Overflows	SNCI	Site of Nature Conservation Interest
CWC	Chester Waterworks Company	SPA	Special Protection Area
DC	District Council	SSSI	Site of Special Scientific Interest
DCWW	Dŵr Cymru Welsh Water	STW	Sewage Treatment Works
DECG	Dee Estuary Conservation Group	TDUG	Tidal Dee Users Group
DoE	Department of the Environment	UWWTD	Urban Wastewater Treatment Directive
EC	European Community	WCA	Welsh Canoe Association
FUW	Farmers Union of Wales	WQ	Water Quality
MAFF	Ministry of Agriculture Fisheries and Food	WRA	Waste Regulatory Authority
		WW	Wrexham Water

6.0 ISSUES AND ACTIONS

ISSUE 1 The Identified Bathing Water at West Kirby fails to comply with the standards of the EC Bathing Waters Directive (76/160/EEC).											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Identify localised point sources of bacterial contamination and ensure discharge is adequately improved. Point sources have been identified as surface waters and CSOs.											
(1) <u>Surface Water Discharges</u> (a) NRA monitoring of surface water discharges during 1995. Details of remedial measures required reported by NRA to NWW. <u>Completed January 1996.</u>	Management report to determine future action.	Management Report delivered to deadline.	NRA		<0.5K						
(b) NWW to carry out remedial action.	Sources of contamination to be removed from surface water drains.	EC identified bathing water at West Kirby complies with EC Bathing Water Directive.	NWW	NRA	Not known	*	*	*	*	*	*
(c) Replacement of part of West Kirby foul sewer by April 1997.	Deficient part of sewer replaced.	EC identified bathing water at West Kirby complies with EC Bathing Water Directive.	Wirral MBC		20K to date						
(2) <u>CSOs</u> (a) Problem CSOs in Heswall area included in DCWW AMP2 programme.	All Heswall improvements completed to agreed programme.	EC identified bathing water at West Kirby complies with EC Bathing Water Directive.	DCWW	NRA	Not known						
(b) NWW to carry out improvement work to Caldys CSO.	Improvements undertaken to identified CSO.	EC identified bathing water at West Kirby complies with EC Bathing Water Directive.	NWW	NRA	Not known	*	*	*	*	*	*
* Timescale to be determined.											

6.0 ISSUES AND ACTIONS

ISSUE 2											
Sewage discharges from Heswall STW and CSOs degrade the estuary in the vicinity to Class B.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Improve Heswall STW to ensure effluent is adequately treated. Note, problem CSOs addressed in Issue 1.	Estuary target Class (A) achieved.	NRA monitoring.	DCWW	NRA	£2-3M						
ISSUE 3											
Afon Garth fails to meet the target of RE1 due to diffuse inputs of zinc from abandoned mines.											
Main inputs identified. Monitoring ongoing. Report due April 1996.	Management report to determine future action.	Management report delivered to deadline.	NRA		£7K						
ISSUE 4											
Queensferry Drain fails to achieve RE5 because of sewage effluent from the Queensferry STW and the stream being tide locked.											
Relocate STW outfall direct to the Dee Estuary by mid 1994. <u>Completed October 1995.</u>	No failure of Queensferry Drain to achieve the target class RE5.	NRA monitoring.	DCWW	NRA	£0.5M						

6.0 ISSUES AND ACTIONS

ISSUE 5											High ammonia and BOD and low DO levels within the Plan Area.										
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE										
			LEAD	OTHER																	
(a) Finchetts Gutter (i) Set up and carry out programme of work to determine the inputs leading to the failure to achieve the target of RE4 by end of December 1996.	Report to determine future action.	Report with clear management options delivered to deadline.	NRA		10K																
(ii) Monitor tip leachate and derive contaminated land reclamation scheme to prevent pollution investigation on-going. Consultants report received. Further investigation planned.	Report from consultants to determine future action delivered 1995. NRA internal report delivered by December 1996.	Report with clear management options delivered to deadline.	Countess of Chester Hospital	NRA	28K to date																
(iii) Implementation of remedial actions.	River Ecosystem target class (RE4) achieved.	NRA monitoring.	Countess of Chester Hospital	NRA	Not known		*	*	*	*	*										
(iv) Provide increased treatment for discharges from Chester Zoo. New Treatment Plant installed 1995 (Phase 1). Further improvements proposed.	Improvement and protection of water quality	NRA monitoring.	Chester Zoo		220K to date																
(v) Ensure consents are environmentally protective and enforced.	River Ecosystem target class (RE4) achieved.	NRA monitoring.	NRA		<0.5K																
* Timescale to be determined.																					

6.0 ISSUES AND ACTIONS

ISSUE 5												High ammonia and BOD and low DO levels within the Plan Area (continued)											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE												
			LEAD	OTHER																			
(b) Inner Estuary (formerly Issue 8)																							
(i) Chester STW Improve treatment at Chester STW.	Adequate sewage treatment in place to ensure compliance with environmentally protective consent conditions.	NRA monitoring.	DCWW	NRA	8M																		
(ii) Queensferry STW Outfall relocation. Completed October 1995 Improve STW treatment to achieve UWWTD standards.	Adequate sewage treatment in place to ensure compliance with UWWTD requirements.	NRA monitoring.	DCWW	NRA	4M						2000-2005												
(iii) Broken Bank Reclaim contaminated groundwater in the Broken Bank area of Deeside.	Improvement and protection of water quality.	NRA monitoring.	Clwyd CC	NRA	Not known	*	*	*	*	*	*												
(iv) No increase in discharges of ammonia to the inner estuary until levels are reduced.	Protection of water quality.	NRA monitoring.	NRA		£0.5K annually																		
* Timescale to be determined once Unitary Authority in place.																							

6.0 ISSUES AND ACTIONS

ISSUE 5 High ammonia and BOD and low DO levels within the Plan Area (continued).											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(c) Aldford Brook (formerly Issue 15) (i) Farm inspections completed for most of catchment. Pollution prevention programme to be continued. Improvements carried out at some farms as result of programme.	Improved water quality in Aldford Brook.	NRA monitoring.	NRA	Farmers	2K						
(ii) Tattenhall STW New consent issued. Extra settlement capacity at works. <u>Completed 1995.</u>	Improved water quality in Aldford Brook.	NRA monitoring.	DCWW	NRA	Ongoing NRA costs 2K 30K NRA costs 1K						
(d) Alyn (formerly Issues 17, 20 & 21) (i) Ty Gwyn STW to be improved (design underway).	Improvement of water quality in Black Brook and River Alyn.	NRA monitoring.	DCWW	NRA	500K						
(ii) Investigate low DO upstream of the confluence with the Terrig to determine whether this is a natural occurrence. Report due December 1997.	Report to determine future actions and timescales.	Report delivered to deadline.	NRA		<1K						
(e) Cegidog (formerly Issue 18) Investigate suspected CSOs	Source of contamination identified, rectified and River Ecosystem Target Class RE1 achieved.	NRA monitoring.	DCWW	NRA	To be determined NRA costs <1K						

6.0 ISSUES AND ACTIONS

ISSUE 5											
High ammonia and BOD and low DO levels within the Plan Area (continued).											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(f) Wych Brook (formerly Issue 22)											
(i) Farm inspections within English part of the catchment. <u>Completed 1995.</u>	All farms in catchment visited.	NRA monitoring.	NRA	MAFF	NRA Costs 1K						
(ii) Farm inspections by MAFF within Welsh part of catchment underway. MAFF will inform NRA once visits are completed.	All farms in catchment visited.	MAFF report on completion of visits.	MAFF		Not known						
(iii) Improvements in farm effluent storage.	Improvement in water quality in Wych Brook.	NRA monitoring.	Farmers	NRA	Not known NRA costs 1K						
(iv) Environmental improvements at H H Wardle (Metals) Ltd. Consultants report received January 1996.	Remediation of groundwater pollution.	H H Wardle/NRA confirmation of acceptable situation.	HH Wardle	NRA	Not known						
Implementation of consultants recommendations.	Completion of environmental improvements.	NRA monitoring.	HH Wardle		Not known						

6.0 ISSUES AND ACTIONS

ISSUE 5 High ammonia and BOD and low DO levels within the Plan Area (continued).											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(g) Gwenfro (formerly Issue 24) Reduce input of storm sewage from CSOs. (i) Phase I reduction of storm impact completed. (ii) Phase II Completed. (iii) Phase III due for completion 1996.	Storm sewage discharges reduced in volume and frequency leading to improvement in water quality.	NRA monitoring.	DCWW	NRA	251K 705K 504K						
(h) Morwynion (formerly Issue 27) Investigate local sources causing elevated BOD levels. Due for completion by December 1997.	Local sources of contamination determined.	NRA monitoring.	NRA		3K						
(j) Nug (formerly Issue 29) Carry out investigation into cause of failure to meet RE1. (Significant failure for ammonia, marginal failure for DO).	Sources of contamination identified.	NRA monitoring	NRA		2K						
ISSUE 6 Management of spoil tips at Point-of-Ayr											
Sign lease with British Coal. <u>Completed 1994.</u>	Lease signed.		NRA/ British Coal (RJB Mining)								
Resolve outstanding issue of mitigation package.	Produce a mitigation package acceptable to all parties.	Agreement of all parties.	RJB Mining Clwyd CC	NRA, CCW, RSPB, DECG	70K						
Construct sea defence and pollutant barrier around tip site <u>Completed 1995.</u>	No escape of polluting material from the site.	NRA monitoring.	RJB Mining	NRA,	1.4M						
Install monitoring boreholes. <u>Completed 1995</u>	Boreholes installed at appropriate locations within the site.	Evaluation by RJB Mining staff.	RJB Mining	NRA	39K						
Evaluate results of site investigation from monitoring boreholes (ongoing).	Report to determine any future action to protect groundwater and estuary quality.	Report delivered to time.	RJB Mining	NRA	5k to date						

6.0 ISSUES AND ACTIONS

ISSUE 7											
Past industrial uses and current activities have produced large areas of contaminated land in the estuary, particularly along the Welsh coastline.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Carry out reclamation schemes at identified sites listed below: (i) Flint Castle Moat Scheme <u>Completed 1995.</u>	Environmental improvement and future protection.	NRA monitoring.	Delyn B.C.	NRA	175K						
(ii) Six sites at Halkyn lead works. <u>Completed 1995.</u>	Environmental improvement and future protection.	NRA monitoring.	Delyn B.C.	NRA	375K						
(iii) Gowdal at Holywell <u>Completed 1994.</u>	Environmental improvement and future protection.	NRA monitoring.	Delyn B.C.	NRA	230K						
(iv) Neston Tank Cleaners, Queensferry <u>Completed 1995</u>	Environmental improvement and future protection.	NRA monitoring.	Alyn & Deeside B.C.	NRA	>3M						
ISSUE 9											
The estuary is currently at the limit of environmental quality standards for copper, zinc and organotins, and at times these levels are exceeded.											
Review of consents for point sources. <u>Completed 1995.</u>	All discharge consents are environmentally protective.	Monitoring by NRA staff.	NRA		<5K						
(i) Organotins - To date no source identified. Monitoring to continue, (Report received 1995).	Report identified no continuing issue.	Report delivered to deadline. Monitoring will continue to confirm no environmental issue.	NRA		<0.5K	<div></div>					
(ii) Review of Copper and Zinc inputs. Report by December 1996.	Report to determine future action.	Report delivered to deadline.	NRA		<0.5K	<div></div>					
ISSUE 10											
Many industrial discharges cause significant visual impact upon the receiving water in the estuary area.											
Review of discharge consents. <u>Completed 1995.</u>	All discharge consents are environmentally protective.	Monitoring by NRA staff.	NRA		<5K						
Compliance with environmentally protective discharge consents by September 1996.	No failure to meet revised consent conditions.	NRA monitoring.	Dis-chargers	NRA	Not known	<div></div>					

6.0 ISSUES AND ACTIONS

ISSUE 11

Water quality of many tributaries is affected by diffuse and point source agricultural pollution.

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Continue the existing farm pollution prevention inspection programme.	Improvements and protection of water quality.	NRA monitoring.	NRA		15K						
Improve farm effluent management and handling, storage facilities where required. (Also see Issues 5 (c), (f) and (h)).	Existing pollution from farm facilities stopped and/or pollution risk reduced.	NRA monitoring and inspection programme.	Farmers	NRA	Not known (site specific)						

ISSUE 13

Elevated temperatures in sections of the Dee and depressed temperatures in upland storage reservoirs.

Investigate possible causes of temperature variation to determine if it is due to natural causes between:-											
Chester weir to confluence with Caldy Brook (formerly Issue 13). <u>Complete December 1996.</u>	Information to determine future action	Report delivered to deadline.	NRA		1K						
Confluence Aldford Brook to confluence into Worthenbury Brook (formerly Issue 14). <u>Complete December 1996.</u>	Information to determine future action.	Report delivered to deadline.	NRA		1K						
Confluence Shell Brook and confluence with Morwynion (formerly Issue 25). <u>Complete December 1996.</u>	Information to determine future action.	Report delivered to deadline.	NRA		1K						
Examine the role of river regulation on temperature within the system (formerly Issue 61). <u>Complete December 1996.</u>	Information to determine future action.	Report delivered to deadline.	NRA		5K						

6.0 ISSUES AND ACTIONS

ISSUE 23

The Clywedog down to its confluence with the Gwenfro fails to meet River Ecosystem target (RE2) for zinc. There is also a marginal failure of the target for a 2.2km stretch downstream of this confluence.

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Old mine workings identified as a source of contamination March 1995.	Source of contamination identified.	NRA monitoring.	NRA		3K						
Assess fluctuation in water quality. Report by December 1997.	Report to determine future action.	Report delivered to deadline.	NRA		3K						

ISSUE 26

Marginally elevated ammonia levels in the Cyflymen.

Reassessment of WQ data indicates that the stretch meets target of RE1. <u>Withdrawn as an Issue.</u>											
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ISSUE 28

The Alwen Reservoir and its feeder stream the Tryweryn upstream of its confluence with the Mynach and the Glyn, together with the Ceidiog, fail to meet their RE Targets due to low pH.

(a) Alwen (formerly Issue 28) Report on investigation into local causes by December 1997 for Alwen System.	Information to determine future action.	Report delivered to deadline.	NRA		5K						
(b) Ceidiog (formerly Issue 30) Identify local causes of acidification and investigate cost benefit of liming as a remedial measure for the Ceidiog.	Information to determine future action.	Report delivered to deadline.	NRA)						
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(c) Tryweryn (formerly Issue 31) (i) Identify local causes of acidification and investigate cost benefit of liming as a remedial measure for the Tryweryn System.	Information to determine future action.	Report delivered to deadline.	NRA)*3.5K						
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(ii) Reconcile WQ results with Biological assessment.	Information to determine future action.	Report delivered to deadline.	NRA)						
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6.0 ISSUES AND ACTIONS

ISSUE 28

The Alwen Reservoir and its feeder stream the Tryweryn upstream of its confluence with the Mynach and the Glyn, together with the Ceidiog, fail to meet their RE Targets due to low pH. (continued)

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(d) Glyn (formerly Issue 32) Identify local causes of acidification and investigate cost benefit of liming as a remedial measure for the Glyn. * Cost of investigation only.	Report to determine future action.	Report delivered to deadline.	NRA)						

ISSUE 33

The Shropshire Union Canal fails its target (RE3) near Waverton, Chester (BOD, particulate solids) and at Grindley Brook near Whitchurch (marginally elevated particulate solids).

Investigate sources of inputs.	Production of a plan of action acceptable to all parties to address the source of inputs.	Agreement of all parties on the proposed plan of action.	NRA*		2K						
Continue monitoring on Waverton section in 1996.	Information to determine future action.	NRA monitoring and report on results.	NRA		2K						
* Strategy involving three NRA Regions.											

ISSUE 34

The ammonia levels in abstracted water at Brithdir Mawr, Llyn Cyfynwy, Pendinas and Llidiardau need to be reduced to avoid the requirement to provide a higher level of treatment prior to supply.

Carry out investigation to locate inputs to the reservoirs by December 1999.	Information to determine future action.	Report delivered to deadline and inputs identified.	NRA		2K						
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ISSUE 35

Copper and zinc levels throughout catchment are often inexplicably high and inconsistent with biological information.

The more robust River Ecosystem water quality assessment methodology has now resolved the previous inconsistencies between the two sets of data. <u>Withdrawn as an Issue.</u>											
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6.0 ISSUES AND ACTIONS

ISSUE 37

Falling groundwater levels and base flows in the Aldford Brook catchment and the impact of falling groundwater table on Worthenbury Brook catchment.

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(a) Aldford Brook (formerly Issue 37)											
(i) Apply Nationally approved methodology for establishing severity of problem to Aldford Brook Catchment by December 1996.	Report to determine future action.	Suitable report delivered to deadline.	NRA		Not known						
(ii) Investigate catchment groundwater resources. Report due by December 1996.	Management information to determine future action.	Suitable report delivered to deadline.	NRA		100K						
(iii) Implement groundwater model for catchment if appropriate.	Improved management of groundwater resources.	Monitoring of groundwater levels and surface flows by NRA staff.	NRA		Not known						
(b) Worthenbury Brook (formerly Issue 38)											
(i) Low flow survey. Review of data does not indicate a fall in flows to Worthenbury Brook.	No action necessary.		NRA								
(ii) Undertake a feasibility study for flow measuring station <u>Report Completed December 1995.</u>	Report to determine future action.	Report assessing feasibility delivered to deadline.	NRA		3.8K						
(iii) In agreement with landowners design and install flow measuring station if required.											
Design	Design acceptable to all relevant interested parties.	Agreement of all parties to suitability of design.	NRA		10K						
Install	Gauging station constructed.	Data return to NRA Archive.	NRA	Land-Owners	150K						

6.0 ISSUES AND ACTIONS

ISSUE 36

Biological Indicators show acidification to be a problem in many of the upper reaches of the Dee but there is no consistency with currently identified 'Sensitive Areas' or with areas of coniferous afforestation.

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
(a) Sensitive Areas (formerly Issue 36) Through current and possible future R & D projects evaluate the results and accuracy of 'sensitivity' maps and afforestation practices.	Accurate estimation of sensitivity.	Production of more accurate sensitivity maps.	NRA		Not known						
(b) Alwen Reservoir (formerly Issue 62) Investigate impact of flows from the Alwen reservoir on local fish populations. Report by March 1997.	Information to determine future action.	Suitable report delivered to deadline.	NRA		10K						

ISSUE 39

Low flows in the Clywedog and Dolfechas Brook catchments

(a) Clywedog (formerly Issue 39) (i) Identify alternative resource for licensed abstractions Completed.	Existing resource safeguarded.	Monitoring by NRA staff.	NRA								
(ii) Move abstraction to new resource	New licence issued to cover abstraction from new resource and old licence revoked.	Monitoring of abstraction returns and enforcement licence conditions by NRA.	Abstractor	NRA	Abstractors cost 50K and annually 7K						
(b) Dolfechas Brook (formerly Issue 40) (i) Survey completed and vulnerable areas identified. Naturally occurring loss of flow is exacerbated by existing licence of right.	Information to determine future action.	Report delivered to deadline.	NRA		<1K						
(ii) Abstractor to provide for better recirculation of water.	Reduction of volume abstracted.	Monitoring by NRA and reduced level of complaints of low flow.	Abstractor	NRA	Cost not known. NRA costs < 1K annually						
(iii) Abstractor to identify alternative source.	Alternative source used and volume abstracted on existing licence reduced.	Monitoring by NRA and abstractor.	Abstractor	NRA	Not known. NRA costs 2.3K						

6.0 ISSUES AND ACTIONS

ISSUE 41 Controls to regulate cockle fishery.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Byelaws approved November 1995. Implementation 1996.	Effective control of resource and commercial exploitation.	Monitoring by NRA fisheries staff.	NRA		10K annually						
Review the need for a Restrictive Regulating Order by December 1998	Report to determine future action.	Report delivered to deadline.	NRA		20K						
ISSUE 42 Impact from recreation and cockling on estuarine birds in the Dee Estuary poorly defined.											
Quantify impacts on birds in the Dee Estuary..	Provision of data for effective management proposals.	Agreement of all relevant parties to the management proposals	NRA	RSPB	10K						
ISSUE 44 Management Plan for NRA holdings.											
Management Plan for 3 NRA holdings <u>Completed 1995.</u>	Management Plan produced.	Management Plan delivered to deadline.	NRA		10K						
Implement Management Plan.	Delivery of management proposals to deadline(s).	Evaluation by NRA staff.	NRA		10K						
Complete Management Plans for remaining holdings by December 1998.	Produce Management Plan.	Management Plan delivered to deadline.	NRA		1K						

6.0 ISSUES AND ACTIONS

ISSUE 45 Comprehensive Strategy for Estuarine Management											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Produce and issue strategy document - consultation ongoing.	Agreed strategy for integrated estuary management.	Agreement of all parties to adopt strategy.	EN, CCW, LAs	NRA	90K						
Implement agreed strategy.	Collaborative management of estuary that meets the requirements of all interested parties.	No interested party reports a failure to meet their agreed requirements.	EN, CCW, LAs	NRA	Not known						
For the Dee Estuary SPA prepare a scheme of management for all NRA functions within a timescale agreed with CCW.	Scheme of management for all NRA activities, including regulatory/byelaw making powers; comply with the EC Habitats Directive.	The integrity and conservation status of the site is maintained as required under the EC Habitats Directive.	NRA	CCW, other relevant bodies	To be determined	*	*	*	*	*	*
Review of all NRA consents and authorisations that may affect the SPA within a timescale agreed with CCW.	All NRA authorisations and consents which have a significant effect on the SPA identified, and where appropriate, affirmed, modified or revoked.	The integrity and conservation status of the site is maintained as required under the EC Habitats Directive.	NRA	CCW, other relevant bodies	To be determined	*	*	*	*	*	*
* CCW to advise on timescale.											
ISSUE 46 Fragmented landscape designation for Dee Estuary.											
Review designation. No action pending set up of new unitary authorities.	Agreed policy on landscape.	Assessment of success of implementation of policy, by participating organisations.	New Unitary Authorities	CCW, EN, NRA	Not known (To be determined by agreement)	*	*	*	*	*	*
* Timescale to be determined once Unitary Authorities in place.											
ISSUE 47 Boundary of Dee Estuary SSSI requires review.											
Reassess extent of SSSI. No action to date.	Joint agreement on boundaries.	Successful application for agreed boundaries.	EN, CCW								

6.0 ISSUES AND ACTIONS

ISSUE 48											
Changes to Net Limitation Order and Byelaws for licensed netting of salmonids by 1995.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Review of Net Limitation Order and net byelaws <u>Completed 1995.</u>	Net limitation Order and byelaws reviewed.										
Local inquiry into NRA proposals by December 1996.	Ratification and implementation of NRA proposals.	Target levels for the recruitment of salmonids within the catchment achieved.	NRA		20K						
ISSUE 49											
Interference of salmon migration from the estuary to freshwater under low flows.											
Undertake detailed study of flow requirements for salmonids between the estuary and freshwater. <u>Completed 1995.</u>	Management report to determine future action.	Report with management options delivered to deadline.	NRA		20K						
ISSUE 50											
Numbers of coarse fish in lower Dee below optimum.											
In agreement with riparian owners and angling associations carry out habitat management schemes to improve coarse fisheries in the lower Dee.	Increase in coarse fish population of the lower Dee through collaborative effort.	Confirmation by angling associations of population increases.	NRA, Chester Waterways	Riparian Owners, Chester City Council, Angling Association	NRA costs 50K. Subject to agreement						
ISSUE 51											
Impacts of boating on ecology of Lower Dee.											
Enforce speed limit through formal agreement on management of boat traffic.	Adherence to speed limit.	Minimal or no report of limit exceedence.	Chester City Council	NRA	NRA costs 5K						
Produce guidance leaflet through collaborative effort.	Guidance leaflet available on code of conduct and or byelaws.	Production and distribution of leaflet within deadline.	Chester City Council	NRA	NRA costs 5K						
Use the NRA R&D report on impact of boat traffic/hull design to consider scope for change in design requirements within the river.	Information to determine future management action.	Suitable report produced to deadline.	NRA	Chester City Council	NRA costs 5K						

6.0 ISSUES AND ACTIONS

ISSUE 52 Shortage of low water slipways in the estuary.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Review requirements for new slipways in the Dee estuary by December 1997.	Report to determine future action.	Report delivered to deadline.	NRA	Local Councils	NRA costs 5K						
Provision of new slipways at appropriate locations.	Provision of greater access for river users through collaborative effort.	Installation of agreed slipways.	Local Councils	NRA	Not known						
ISSUE 53 Inaccessibility of some tributaries to migratory salmonids.											
Investigate cost/benefits of removal of barriers and/or installation of fish pass:	Information to determine the most cost effective option.	Cost/benefit analysis by NRA environmental appraisal unit.	NRA		20K						
(i) Llyn Tegid tributaries	Preferred option acceptable to all relevant parties.	Agreement of all parties to suitability of option.	NRA		Not known						
(ii) Abbey Brook	Preferred option acceptable to all relevant parties.	Agreement of all parties to suitability of option.	NRA		Not known						
(iii) Afon Eirha	Preferred option acceptable to all relevant parties.	Agreement of all parties to suitability of option.	NRA		Not known						
(iv) River Alyn	Preferred option acceptable to all relevant parties.	Agreement of all parties to suitability of option.	NRA		Not known						
ISSUE 54 Degraded bankside and instream habitat.											
Produce plan to determine extent of problem (e.g. cattle drainage, tree shading) and determine an agreed strategy.	Strategy produced in agreement with all interested parties.	Strategy agreed by all relevant parties.	NRA, Land-owners, ADAS, Farmers, Fishing Associations		NRA costs 10K Subject to agreement						
Implement phased programme of improvements.	Improved habitat for conservation and fisheries interests through collaborative effort.	Monitoring by NRA conservation and fisheries staff.	NRA, Riparian Owners, Chester City Council		Not known						
ISSUE 55 River bank management conflicts with environmental requirements.											
<u>Resolved 1994.</u> Plan introduced to the satisfaction of all parties.	No conflict between river management and environmental requirements.	No reported conflicts.	NRA		10K						

6.0 ISSUES AND ACTIONS

ISSUE 56

General lack in number and diversity of wetland habitats for fisheries and wildlife.

ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
In consultation with riparian owners produce a plan to manage and enhance habitats, in appropriate locations, when and if the opportunity arises. Create or enhance the following habitats which have been identified as being below acceptable levels for a catchment of the Dee's nature.	Target habitats improved and/or created at sites within the catchment, and a programme of further works agreed for implementation when the opportunity arises.*	Post project appraisal, drawing on NRA, CCW, EN, RSPB survey results to evaluate success of improvement works undertaken.	NRA, CCW, EN, ADAS, Riparian Owners RSPB	NWWT, Otters in Wales	NRA costs 3K						
(i) Wetland habitats (reedbed, damp grassland, open waters).					Average cost 4K per site						
(ii) Through the Water Level Management Plan (WLMP) process, agree with landowners, where possible and practicable, changes in water management that will bring about an increase in the area and conservation of wet grassland.	Water Level Management Plans agreed for all sites on the WLMP list.	Agreement of all parties to the plans.	NRA	Landowners CCW, RSPB	NRA cost <5K						
(iii) Implement agreed changes in water management regimes.	Breeding populations of selected species to increase to a target level agreed with RSPB/CCW for each selected site.	RSPB monitoring programme.	NRA RSPB		Not known 1K per site						
(iv) Other habitats identified from the River Corridor Survey.					Average cost 4K per site						
Seek external project funding.	Sufficient funds obtained from external sources. * actual number of sites can only be determined once the plan is drawn up.	External funds required.	NRA, CCW, RSPB, EN, ADAS, Riparian Owners		1.8M						

6.0 ISSUES AND ACTIONS

ISSUE 57											Perceived lack of access and amenity features within the catchment.						
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE						
			LEAD	OTHER													
Review the existing access and amenities and produce a strategy.	Production of strategy acceptable to all relevant parties.	Agreement of all parties on strategy.	Clwyd CC, NRA, CCW, CLA		NRA costs 10K												
Implement a work programme for enhancing the access and amenities where appropriate in agreement with landowners.	Access and amenities that meet public demand.	Access and amenities put in place that meet the target levels identified within the strategy.	Clwyd CC, NRA, CCW, Land-owners	CLA, Angling Clubs, FUW, NFU	NRA costs 50K												
ISSUE 58												Species action plans are required within the catchment.					
Identify priority species requiring action plans.	Prioritised list of species requiring action plans.	Prioritised list agreed by all relevant bodies.	CCW, EN	NRA, RSPB, NWWT	3-5K per species												
Implement the Otter Strategy for Wales.	Secure and, where the opportunity arises, enhance the otter populations within the catchment.	Confirmed by conservation bodies at the time of the 7 year review. (Next review due in 1998-99).	NRA CCW, ADAS	SNP, NWWT	* <20K												
* Collaborative cost mainly NRA.																	
ISSUE 59												Poor facilities for stock assessment and monitoring.					
Improve facilities by:- (i) Repair of Manley Hall fish counter.	More accurate measurement of adult stocks in river.	Monitoring by NRA fisheries staff.	NRA		70K												
(ii) Repair of Pont Barcer fish trap.	Operation of trap brought up to standard.	Efficient operation of salmon trap.	NRA		35K												
ISSUE 60												Localised problems with salmonid recruitment in the Dee and the Alyn.					
(i) Dee - coarse fish Investigate to establish cause.	Following trials produce a report to determine future action by December 1998.	Monitoring by NRA fisheries staff. Report delivered to deadline.	NRA		30K												
(ii) Alyn - trout Investigate methods for reducing compaction of spawning gravels.	Following trials produce a report to determine future action by December 1998.	Monitoring by NRA fisheries staff. Report delivered to deadline.	NRA		30K												

6.0 ISSUES AND ACTIONS

ISSUE 63											
Access for, and regulation of canoeists.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
In conjunction with riparian owners, angling interests and Welsh Canoe Association negotiate the setting up of a long distance canoe touring trail.	Long distance canoe trail set up that is acceptable to all parties.	Agreement of all interested parties to the setting up of the trail.	WCA, Riparian Owners, Angling Associations	NRA	Not known]						
Establish in conjunction with riparian owners and the Welsh Canoe Association a clear code of conduct.	Code of conduct produced that is acceptable to all interested parties.	Agreement of all parties to the code of conduct.	WCA, Riparian Owners, Angling Associations	NRA	Not known]						
Implement code of conduct.	Canoe activities do not adversely affect other legitimate uses.	No confirmed reports of failures to comply with code of conduct.	WCA	NRA	Not known						
In collaboration with the WCA produce a guidance leaflet for the Dee by December 1997.	Guidance leaflet produced to deadline	Leaflet available by deadline.	NRA, WCA		10K						
ISSUE 64											
NRA Management proposals under S93 Water Resources Act 1991.											
Public Inquiry. Completed March 1995.					NRA costs 395K						
Decision with the Secretary of State.	Approval by Secretary of State for the implementation of the River Dee Water Protection Zone.	Implementation of decision. No failure to comply with any Water Protection Zone consent conditions.	Welsh Office	NRA	Not known	*	*	*	*	*	*
* Subject to WO decision and timing											
ISSUE 65											
Loss of young salmon and sea trout at existing fish farms without suitable screens.											
Implement the provisions of the Environment Act 1995 in respect of screening of fish farms (due to come into force in January 1999)	Screening of all intakes and outfalls.	Monitoring by NRA fisheries staff.	Fish Farm Owners	NRA	Not known						

6.0 ISSUES AND ACTIONS

ISSUE 66 Risk of damage to brown trout genetic integrity from stocking.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Identify pristine reaches of rivers in consultation with local angling interest and retain as wild brown trout fisheries. <u>Completed - report presented to RFAC.</u>	Management report identifying reaches where brown trout genetic stock requires protection.	Report delivered to deadline.	NRA, Local Anglers		NRA costs 2K						
Refuse to "consent" further introductions of brown trout unless of Dee parentage.	Genetic integrity of Dee brown trout maintained.	Monitoring by NRA fisheries staff	NRA		1K						
Assist angling interests in provision of Dee broodstock for rearing - on in non NRA units.	Stocking of brown trout of Dee parentage.	Monitoring of increase in stocking of Dee parentage trout through S.30 consents.	NRA		Not known						
ISSUE 67 Decline in 'spring' running salmon.											
Confirm and implement byelaws for rods and nets to protect "spring" fish.			NRA, Welsh Office								
<u>Byelaw approved in 1994.</u>	Implementation of byelaws.	Monitoring by NRA fisheries staff.	NRA	Anglers, Netsmen	10K						
ISSUE 68 Improvements to Bagillt East STW.											
Carry out improvements to Bagillt STW.	STW discharge compliance with consent conditions.	NRA monitoring.	DCWW	NRA	2M						
ISSUE 69 Appraisal of the navigational priorities of the River Dee.											
Assess the priority requirements for managing the navigation function in the Dee estuary by December 1997.	Management report to determine structured programme.	Suitable report delivered to deadline.	NRA	Riparian Owners, Port Authority TDUG	10K						

6.0 ISSUES AND ACTIONS

ISSUE 70 Flood defence improvement scheme for Sealand area of Chester.											
ACTIONS	SUCCESSFUL OUTCOME	HOW WILL IT BE MEASURED	RESPONSIBILITY		COST £	1996	1997	1998	1999	2000	FUTURE
			LEAD	OTHER							
Implement flood defence scheme for Finchetts Gutter to improve the level of protection of property in the Sealand area of Chester.	No exceedence of scheme design criteria.	NRA monitoring of flood events.	NRA		850K						

ISSUE 71 Long term improvement to standards of service of Dee Regulation System during periods of drought											
(i) Temporary over pumping of Llyn Tegid into the Dee to safeguard against droughts > 1:100.	Possible emergency one - off measure to provide limited amount of river regulation water at the end of a dry summer.	Monitoring of system by NRA control staff.	NRA	DCW/W, W/W, NW/W, C/W/C, BWB	0.5M yet to be allocated and agreed						
(ii) Proposal for permanent scheme to aid refill of system by pumping from Llyn Tegid to Llyn Celyn.	Greater drought security and improved standards of service for public water supplies; improved environmental safeguards to the river.	Monitoring of system by NRA staff.	NRA, DCW/W, W/W, NW/W, C/W/C, BWB		20M yet to be allocated and agreed						
(iii) Undertake environmental assessment to safeguard ecological and amenity resource.	Scheme which safeguards the environment and mitigates for any damaging impacts.	Monitoring by NRA conservation staff.	NRA	SNP, CCW	Not known						

ISSUE 72 The inclusion of the Dee Estuary in the 'Montreux Record' of Ramsar sites which have been ecologically damaged.											
Implement the findings of the Ramsar Bureau (June 1995).	Recommendations of Ramsar Bureau implemented, threats removed and damage mitigated.	Estuary removed from the Montreux Record.	CCW, EN, DoE	DECG, NRA RSPB, Industry	Not known						

6.0 FUTURE REVIEW AND MONITORING

The NRA will be jointly responsible, with other identified organisations and individuals, for implementing this Action Plan. Progress will be monitored and normally reported annually. The reviews will examine the need to update the CMP in the light of changes in the catchment and the setting up of the Environment Agency referred to below. The period between major revisions will normally be five years.

At this time it is envisaged that the annual review will take the form of a short progress report, including comparisons of work achieved against that planned, and any changes to the Plan. The annual review will be sent to all those involved in the actions identified for the catchment and to those who demonstrated an interest in the Catchment Management Plan at the consultation stage. These will also be available on request.

The new Environment Agency for England and Wales will, on the 1st April 1996, take over the roles of the NRA, Her Majesty's Inspectorate of Pollution and the Waste Regulatory Authorities. It will be the largest

environmental protection agency in Europe and will be primarily concerned with integrated pollution prevention and control of air, land and water. It will seek to balance the interests of business with those of the environment, the philosophy of sustainable development underpinning its approach to environmental protection and enhancement.

The government recognises the value of integrated river basin management as practised by the NRA through the implementation of its CMPs. It is therefore envisaged that CMPs will continue as the focus for river basin management in the Agency, although they will need to become more extensive management plans to cater for the protection and enhancement of water, land and air.

The implementation of this Action Plan must now be actively pursued and any changes introduced by the new Agency must be smoothly integrated as a positive evolutionary development of the plan.

CONTACTING THE NRA

The national head office of the NRA is in Bristol

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The Welsh Region head office is in Cardiff

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The Area Manager for the Northern Area of the Welsh Region is:

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Enquiries about the Dee Catchment Management Plan should be directed to:

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You should note that the NRA will be merged into the Environment Agency after 1st April 1996. However, responses to this report should be sent to the same address, as above.