USK
CATCHMENT MANAGEMENT PLAN
CONSULTATION REPORT

NRA

National Rivers Authority
Welsh Region

USK CATCHMENT MANAGEMENT PLAN

CONSULTATION REPORT

April, 1995

National Rivers Authority
Welsh Region

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COVER PHOTO: River Usk at Brecon (*Courtesy of Wales Tourist Board*)

THE NRA'S VISION FOR THE USK CATCHMENT

The Usk catchment is one of extraordinary contrasts: the mountainous landscape of the Brecon Beacons to the lowland plains and estuarine area around Newport; the rural character of much of the River Usk valley to the highly populated and industrialised Afon Lwyd Valley; the man-made channel of the Monmouthshire and Brecon Canal to the fast flowing headwaters of the River Usk and the daily changes witnessed by an estuary experiencing the second highest tidal range in the world.

These many and varied features allow the catchment to support a variety of uses such as farming, forestry, water supply, industry and tourism. The rivers and canal provide many opportunities for recreation, including canoeing and angling, walking and bird-watching. The catchment offers a habitat for many rare plants and animals, including otters, little ringed plovers, twaite shad, sea and river lamprey, invertebrates and lichens.

The National Rivers Authority's task is to seek to balance these uses now and in the future. Our main aim is to achieve a sustainable use of the catchment and our key objectives are:

* To maintain and improve the conservation value of the catchment.

* To improve the River Usk's spring salmon and wild brown trout fishery with runs and catches of salmon meeting targets consistent with ideal breeding levels. To sustain healthy coarse fish, eel and the important shad populations.

* To ensure that all those who wish to use the catchment for recreational purposes can enjoy doing so with the mutual respect and consideration of others.

* To maintain and improve, where possible, flood defences in order to protect people and property.

* To maintain the importance of the Usk catchment as a major supplier of water throughout South Wales and to diminish the effect of these abstractions upon the water environment.

* To ensure that by utilising the natural capacity of the river to dispose of treated effluents it does not result in a loss of the river's ecological and fishery potential.

* To seek continued improvements in the water quality of the Usk and its tributaries wherever possible, in particular by encouraging the improvement of combined sewer overflows and encouraging the Government to produce a strategy for the control of minewater from abandoned mines.

* To ensure that any development proposals in the catchment have no detrimental effect on surface water or groundwater resources in either quality or quantity nor on any associated flora and fauna. Close liaison with developers and contractors is essential particularly in the Afon Lwyd catchment.

The Usk catchment is subject to a proposal to construct a barrage across the estuary at Newport. This would significantly alter the existing tidal regime of the estuary, threatening the river's ecology in general and each species of migratory fish in particular.

The views of local people and their representatives will be respected. We will need the help of the local communities and hope to build upon existing relationships and develop new ones in pursuing these goals.

Through close liaison, regular reporting on our progress and our determination to fulfil our role we intend to maintain the impetus for action in the Usk catchment.

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1.0 THE PURPOSE OF CATCHMENT MANAGEMENT PLANS (CMPs)

1.1 THE ROLE OF THE NRA

Never before have the rivers, lakes, estuaries and coastal waters of Wales been subject to such large and rapidly increasing demands from the users of water. Many different uses interact, or compete for water or water space, and will inevitably come into conflict with one another. The National Rivers Authority (NRA) is the major manager of the water environment in England and Wales and aims to harmonise conflicts between competing water users as well as its general duties that include: -

- Maintenance and improvement of water quality by control of pollution in surface and groundwater.
- Flood defence for people and property.
- Flood warning.
- The proper management of water resources by conservation, augmentation and control.
- Maintenance and improvement of fisheries.
- Conservation of the natural water environment.
- Promotion of water based recreation.
- Navigation (in some rivers).

The NRA also plays a key role in the strategic management of the interaction between users of the water and land environments.

We believe that it is important that the interests of all water users are considered in the development and protection of the water environment. Therefore, we have chosen to promote our ***vision*** and management proposals via published Catchment Management Plans (CMPs).

1.2 WHAT THIS PLAN IS DESIGNED TO DO

This consultation document presents a number of issues and options for the future management of the Usk catchment, and is based on a detailed study carried out by the NRA during 1994. A number of proposals are presented for comment and it is intended that, following consultation with you and other river users, a final action plan will be presented which will seek to manage conflicts in river use and optimise the overall benefits to all river users within the catchment.

The Final Action Plan will steer us in developing our own management programme for the catchment and guiding us in the way we respond to any development proposals.

This consultation document is divided into 2 parts:

Part I: Presents the range of management issues, and options to address them, that have been identified by the NRA;

Part II: Provides background information on the approach we took in developing this plan, including information on identified water Uses (including those to be incorporated in the new Water Quality Objective (WQO) scheme) and the statutory and informal targets required to support them. The targets are expressed in terms of water quality, water quantity and physical features.

We hope that you find the information in this consultation document informative and thought provoking. Let us know whether you agree or disagree with our current proposals: remember this is not just our document, it is also yours: without your help we cannot produce a final workable Action Plan that will be of benefit to you and all users of the Usk Catchment.

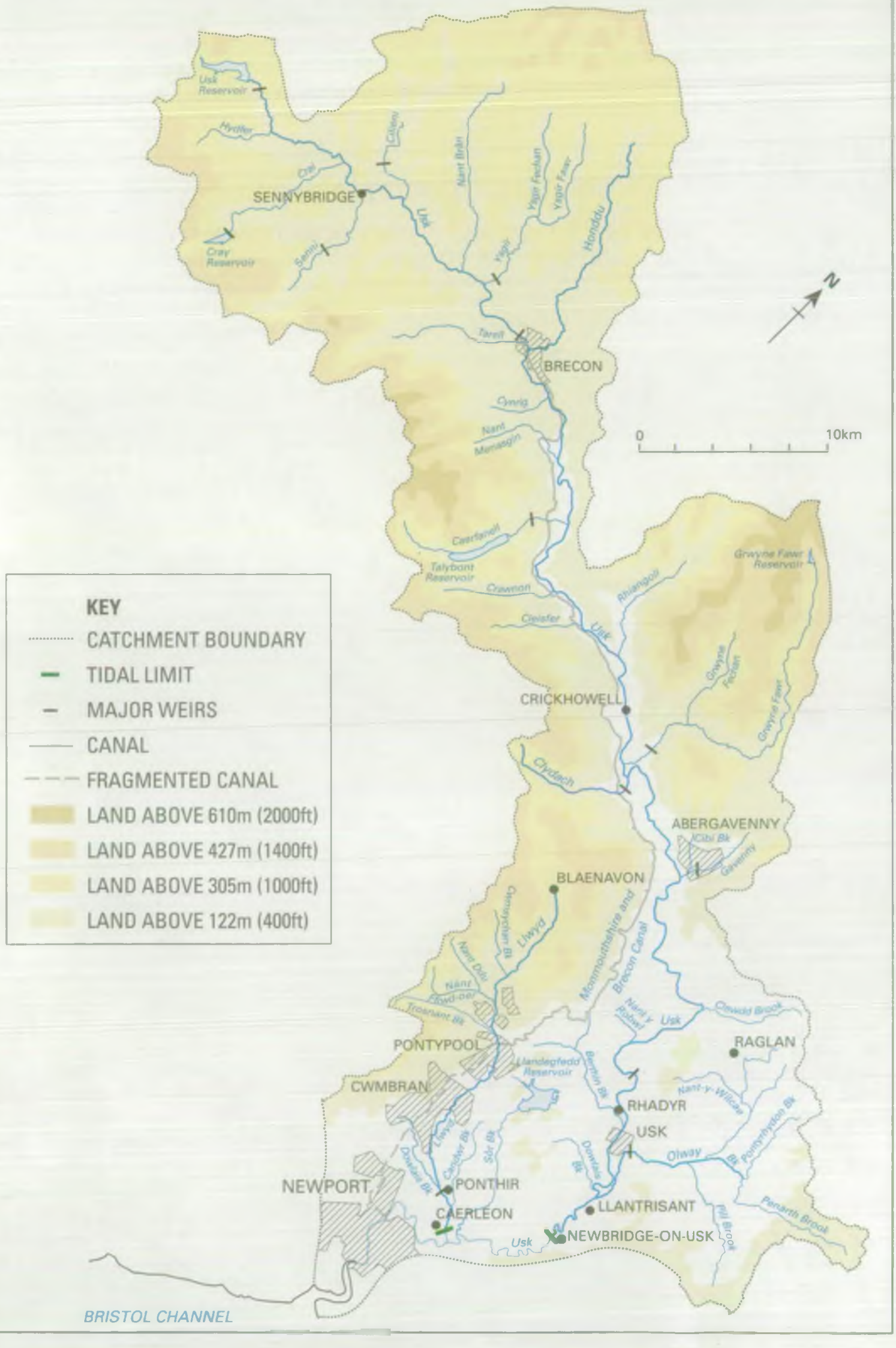
Please send any comments you may have on the Consultation Report to:

The Area Catchment Planner,
National Rivers Authority,
South East Area
Abacus House
St.Mellons Business Park.
St. Mellons
Cardiff CF3 0LT

Telephone: 01222 - 770088

2.0 AN OVERVIEW OF THE USK CATCHMENT

MAP 1. USK CATCHMENT



FOLD OUT TO SEE MAP 1: THE USK CATCHMENT
(TO BE READ IN CONJUNCTION WITH ALL OTHER MAPS)

2.0 AN OVERVIEW OF THE USK CATCHMENT

2.1 Introduction

This plan covers the main River Usk, the Afon Lwyd and the Monmouthshire and Brecon Canal. The River Ebbw and the coastal levels area will be dealt with in separate catchment management plans.

The River Usk rises on the northern slopes of the Black Mountain of Dyfed and flows through the rugged landscape of the highest mountains in South Wales. Its headwaters and those of its tributaries are contained within the Usk, Cray, Talybont and Grwyne Fawr reservoirs. At Brecon, the Monmouthshire and Brecon Canal begins its parallel path alongside the river until the floodplain widens at Abergavenny and the Usk takes a separate course, via the town of Usk, to join the Severn Estuary at Newport. Meanwhile, the canal heads towards Pontypool where it crosses the Afon Lwyd and then fragments into sections. The Afon Lwyd rises above Blaenavon and passes through the highly populated and industrialised areas of Pontypool and Cwmbran before joining the Usk estuary near Caerleon.

2.2 Land Use

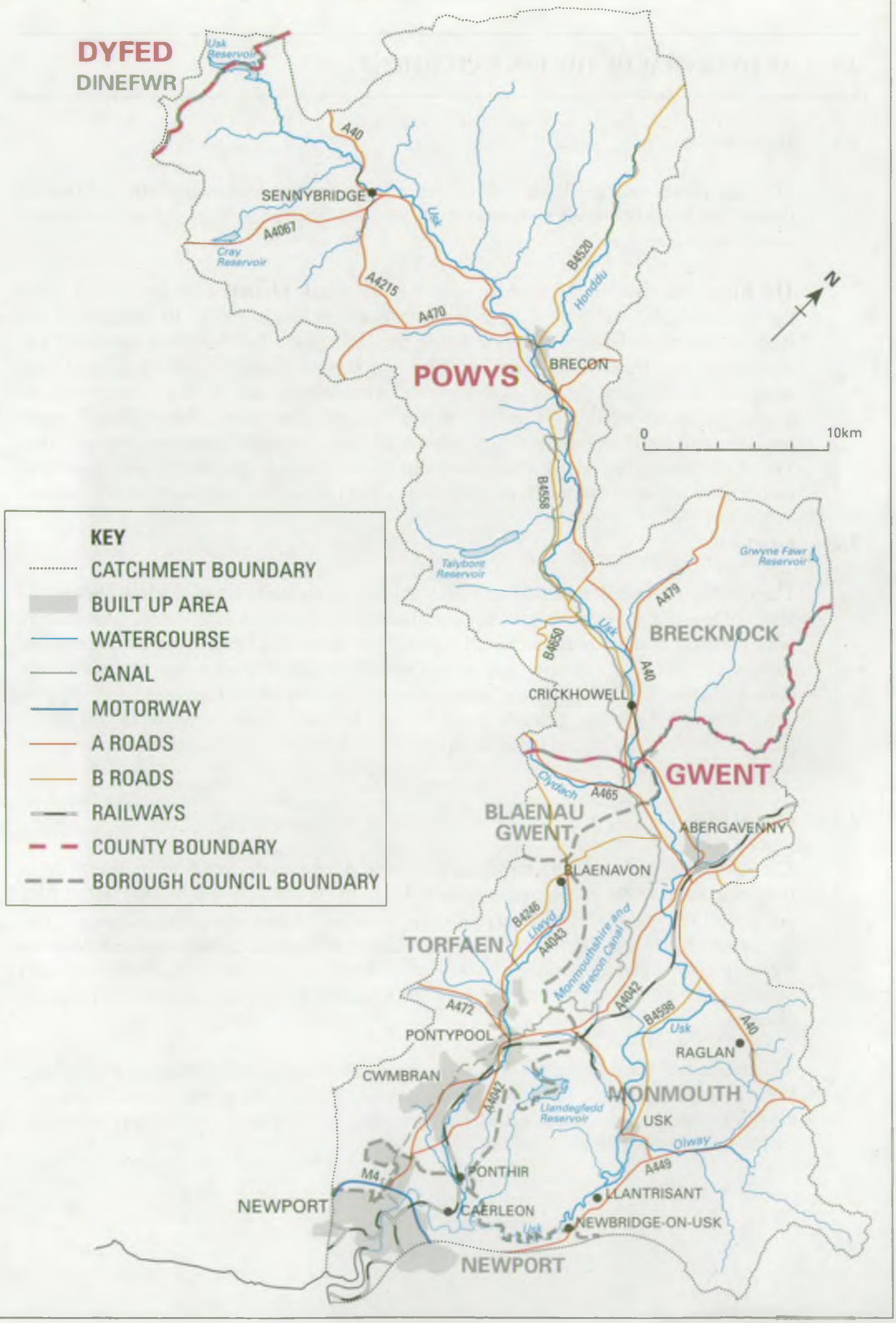
The catchment is predominantly rural and sparsely populated, the exceptions being the towns of Newport, Abergavenny, Pontypool, Blaenavon, Cwmbran and Brecon. Agriculture is the principal land use in the catchment with industry important in the lower catchment and along the Afon Lwyd. Tourism has always been important to the local economy with the historic towns of Usk, Brecon, Abergavenny, Crickhowell, Caerleon and Raglan complemented by other features such as the Brecon Beacons National Park, the Monmouthshire and Brecon Canal itself and the Big Pit Mining Museum in Blaenavon within the catchment.

2.3 Flood Defence

The River Usk flows through low-lying agricultural land along much of its length from Brecon to the tidal limit at Newbridge-on-Usk. In the uplands, much of the rainfall runs rapidly off the Old Red Sandstone rocks, the waterlogged peat and thin soil cover. The catchment is long and narrow, with the Usk running through its centre and the tributaries typically short. During periods of heavy rainfall within the catchment, the flood plain becomes inundated and the total width of the river and flood plain can exceed 1.5km in places.

Downstream of the tidal limit, flooding largely results from tidal influences. This is due to the Severn Estuary tidal range which is the second highest in the world, exceeded only by the Bay of Fundy in Newfoundland. At Newport, the predicted tidal range is approximately 14.1metres (see Section 2.9 for details).

MAP 2. INFRASTRUCTURE



Widespread development has taken place within the flood plain of the river at several locations such as Brecon, Crickhowell, Usk and Ponthir. Major flood alleviation schemes have been carried out at all of these places to protect the settlements from inundation by water. At Newport and Caerleon works have been carried out to protect against tidal flooding with other reaches benefitting from privately-financed defences.

A Water Level Management Plan may be produced for the Gwent Levels which will include parts of the Usk catchment. Sites requiring these documents, which aim to provide a means by which water levels can be balanced for a range of activities, will be agreed with the Countryside Council for Wales by early 1995. There will be a 3 year prioritised programme for the production of these plans.

2.4 Hydrology & Hydrogeology

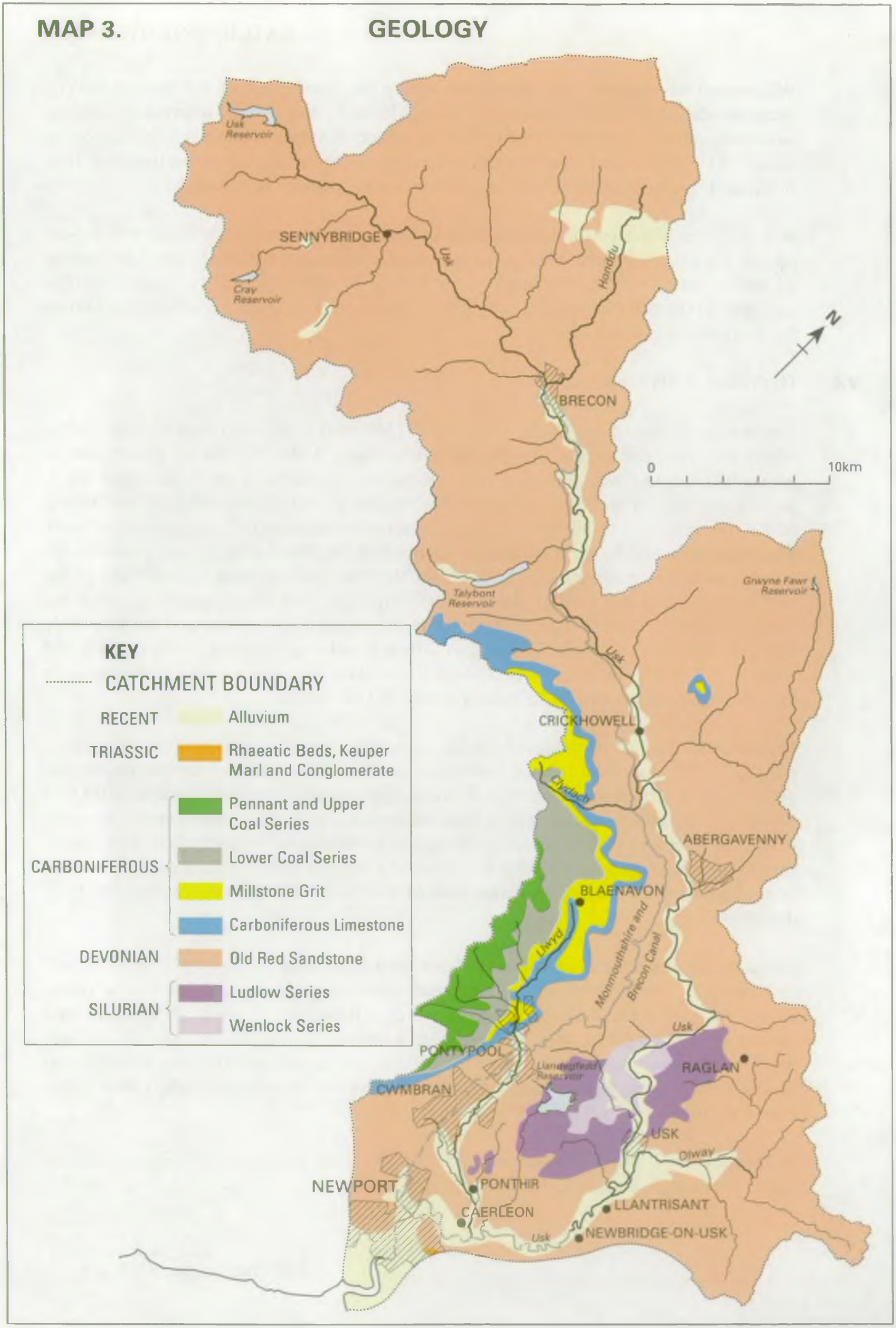
The average annual rainfall for the catchment (1340 mm) is similar to the average for the whole of Wales, and greater than that for England and Wales (912 mm). The climate is generally mild and wet, providing high yields for reservoirs in the Usk. Rainfall is particularly high in the Brecon Beacons, where the altitude approaching 886m (nearly 3000ft) and proximity to the coast, results in an annual average rainfall in excess of 2400mm. The shelter provided by these mountains ensures that the inland areas behind - notably the Gwent lowlands - receive markedly less rainfall. Over the catchment about 40% of the rainfall evaporates or is used by plants. The 800 mm per year which remains is called the effective rainfall. Some of this quickly finds its way to the river systems and the sea, while the remainder is delayed by infiltrating into soils and rocks, or by being stored in lakes and reservoirs. This may then be slowly released to maintain river flows during dry periods, or used to satisfy demands by agriculture, industry and the public.

Under normal conditions, the River Usk has an average daily flow of over 2500 Megalitres per day (Ml/d) at its tidal limit at Newbridge-on-Usk. Over most of the catchment, the groundwater contributions to this flow are modest, emanating from the Devonian (Old Red Sandstone), the coal measures or from sand and gravels along the river channels. Because of this, the river levels fall quite rapidly during dry periods such that the typical dry summer flow of the Usk is reduced to 360 Ml/d - 13% of the average flow. In drier periods, natural flows become even lower. The lowest flow of 140 Ml/d was recorded during the 1976 drought.

Groundwater is a more important contributor on a local scale in the Llwyd and Clydach catchments. The Carboniferous Limestone underlying these tributaries is a major groundwater resource. It also adds many features to these valleys which are characteristic of the rock, including the Llangatwg Cave system and the Clydach Gorge. Springs here are much more numerous than elsewhere in the Usk, and consequently these rivers return relatively high flows in the summer months. The typical dry summer (Q95) flow of the Llwyd at Ponthir is 55 Ml/d and 20% of its average flow.

Water abstracted from the Usk at Brecon flows slowly along the Monmouthshire and Brecon Canal to discharge into the Llwyd at Pontypool.

MAP 3. GEOLOGY



2.5 Fisheries, Conservation & Recreation

The catchment's rural character and good water quality generally support a rich flora and fauna. The area is particularly important for invertebrates and for many bird species including sandmartins, dippers, grey wagtails and little ringed plovers. However, there is a need for and opportunities to improve wildlife habitats throughout the catchment.

The Usk is one of the principal salmon rivers in Wales and is historically famous for its spring salmon run. It is probably the most renowned wild brown trout river in Wales, and coarse fish species, particularly chub and dace, are present in the middle and lower reaches. It is one of the few British rivers where shad are recorded in significant numbers and sea lamprey are found. The twaite shad flourish in the Usk whilst the very rare allis shad is occasionally seen. The salmon and trout fisheries are very important to the local economy as they attract anglers from afar.

The proposed Usk Barrage in Newport is potentially a very serious threat to migratory fish populations, ie salmon, sea trout, eel, sea lamprey and shad. This is the reason why the NRA opposes this scheme.

The scenic Usk Valley attracts many visitors and residents who enjoy their leisure time close to the river, its tributaries and canal. Walkers, anglers, naturalists, canoeists and boaters all use the aquatic environment. Conflicts can occasionally arise where a user is ignorant or disrespectful of the requirements of other users.

2.6 Water Quality

Water quality in the Usk catchment is generally very good. The main river upstream of the tidal limit, and the majority of the tributaries are of high enough quality for potable abstraction and salmonid fisheries. Due to the urban and industrialised nature of the Afon Lwyd sub-catchment, this river is prone to minewater and intermittent polluting discharges of sewage. The oxygen content of the Monmouthshire and Brecon Canal varies significantly during the year due to a combination of sluggish flows and heavy weed and algal growths. The Usk has a highly dynamic estuary which gives rise to extensive re-suspension of mud and a brown colouration. Under certain conditions sudden reductions in dissolved oxygen content occur due to discharges of crude sewage and the oxygen demand of the resuspended mud.

2.7 Monitoring

River Levels, Flows and Rainfall

The NRA operates 8 gauging stations to measure river flows in the Usk and its tributaries. These are used by the NRA to manage the water resources of the catchment and to control and regulate abstraction. Two of the stations at the Usk and Cray Reservoirs are used specifically to monitor the release of water from the reservoirs to maintain flows downstream (known as compensation flow). Some of the gauging stations, and an additional 3 stations which measure river levels, are used for flood warning. River and stream flows are also routinely measured at a number of sites in the catchment by one-off spot gauging. Currently no boreholes exist in the catchment to monitor groundwater levels and quality but this is currently under review.

Rainfall is measured continuously by the NRA at 2 sites in the Usk catchment. A further 24 gauges, which usually measure daily rainfall totals, are read by private observers. Data for many of these sites are collated by the NRA and sent to the Meteorological Office at Bracknell.

Water Quality

Water quality samples are taken regularly at 133 sites covering most of the rivers and streams in the catchment. In addition, 100 significant discharges are sampled and analysed routinely to ensure that they meet standards set for them by the NRA.

Routine planned inspections are carried out at farms, trade premises, industrial sites and sewage installations as part of the NRA pollution prevention programme to assist in catchment management.

The estuary is routinely monitored at 2 sites for List 2 substances as defined by the EC Dangerous Substances Directive.

Biological Monitoring

Routine biological monitoring is undertaken at 76 of the water quality sampling points as part of a rolling programme of biological monitoring throughout the Region. An assessment of the biological quality is made by analysing the types of insects and other small aquatic life that are present. Other surveys are carried out to assess the impact of sewage treatment works, farms and industrial discharges on the river environment.

Habitat Surveys

A strategic River Corridor Survey was undertaken in 1993. This survey provides a description of habitats in the river corridor and covers the main River Usk, the Senni, Honddu, Menasgin, Rhiangoll and Olway. The NRA is currently developing a River Habitat Survey System which will classify and evaluate the physical structure of the river. Log-pile

otter holts built by the NRA are monitored annually for evidence of use, and a programme of bat population monitoring has recently commenced in collaboration with other organisations.

Fish Stocks

Information about adult salmon is collected through rod catch returns submitted by fishery owners and anglers, catch returns submitted by salmon netsmen and anglers, and data from the electronic fish counter at Trostrey Weir near Usk town. Information on Usk rod catches has been recorded since 1871 and the river has possibly the longest record of salmon rod catches of any in England and Wales. The distribution and abundance of juvenile fish has been assessed annually since 1985 using electrofishing techniques at 50 fixed sites throughout the catchment. ~~Additionally,~~ during the salmon spawning season NRA fisheries staff undertake redd counts to give an indication of the level of spawning. Elver catches are also monitored through reported catch returns.

2.9 KEY DETAILS

Catchment Area: 1358 km² **Highest Point:** 886m (Pen y Fan, Brecon Beacons)

Annual Average Rainfall: 1340 mm

River Length: Usk - 137km
Llwyd - 31km

Average Daily Flows: Usk - 2600 Megalitres per day
Llwyd - 270 Megalitres per day

Gross Licensed Abstraction 2103 Megalitres per day
Total Water Loss (not returned to catchment) 29 Megalitres per day

(1 Megalitre is a million litres)

Populations in the Usk Catchment:

County Council	Borough Council	1991	2021 (predicted)
Gwent	Blaenau-Gwent	3732	3809
Gwent	Monmouth	29293	36143
Gwent	Newport	95920	98234
Gwent	Torfaen	88812	95396
Powys	Brecknock	18689	21010
Total Population in Usk Catchment	-	236445	254592

Fisheries:

Average annual declared Salmon rod catch (1982-1993)	560	No. of salmon anglers (approx.)	1000
Average annual fish count at Trostrey Weir (1988-1994)	4604	No. of trout anglers (approx.)	7000
Target salmon run size for optimal egg deposition	6500	No. of coarse anglers (approx.)	3000
Equivalent target declared salmon rod catch	1500		

Fish Species Present in the River: Salmon, Sea Trout, Trout, Sea Lamprey, Brook Lamprey, Allis Shad, Twaite Shad, Chub, Dace, Eel, Roach, Stickleback, Stoneloach, Bullhead, Perch, Minnow, Gudgeon, Barbel, Carp, Pike and River Lamprey.

Water Quality: River Length in General Quality Assessment Class (including Monmouthshire and Brecon Canal) *

Class A (219km) 56.7%
Class B (93km) 24%
Class C (30km) 7.8%
Class D (25km) 6.5%
Class E (19km) 4.9%

* 3 years of data from 1991-1993.

Flood Defence:

Length of Statutory Main River: 252km

Newport Tidal Range:
Mean high water - spring 6.3m AOD
Mean low water - spring -5.6m AOD
Highest high water - spring 7.6m AOD
Mean high water - neap 3.2m AOD
Mean low water - neap -2.9m AOD
Lowest low water - spring -6.5m AOD

3.0 ISSUES AND OPTIONS.

This section of the Plan presents the key issues that the NRA has identified from its analysis of the Usk catchment. One or more suggestions are made for addressing each issue and you are invited to comment on these. This section relates solely to those areas which have been shown not to be able to support certain of the identified Uses; the rest of the catchment should be regarded as being able to support **all** identified Uses.

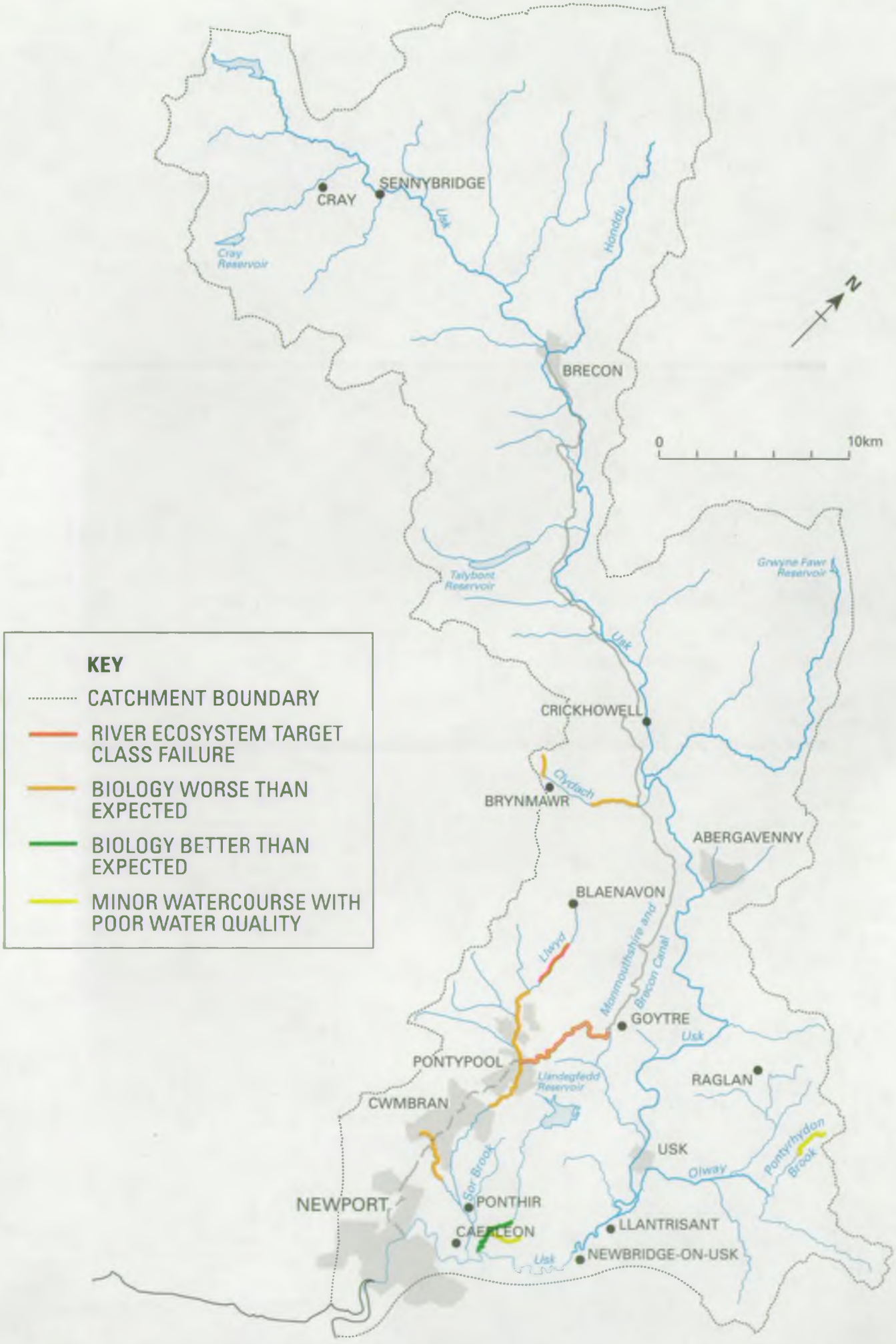
Section 3.1 identifies, in detail, those areas of the catchment which have been identified as failing to meet specific targets to support identified Uses. Significant areas of conflict between Uses are also discussed. Section 3.2 presents these issues along with options to address them, identified by the NRA.

The information that has been used to identify these issues is provided in **Part II** of this report which lists the known Uses of the catchment and sets targets to support them. You should note that the issues and options do not constitute NRA policy but have been considered within the NRA's policy framework and that no priority should be inferred form the order in which they appear.

3.1 THE STATE OF THE CATCHMENT.

The following section examines the ability of the catchment to support the Uses identified in Section 4, **Part II**, by assessing compliance with the targets set out in Section 5, **Part II**. In this way the key issues in the catchment are identified. The potential solutions to these issues are discussed in Section 3.2 .

MAP 4. STATE OF THE CATCHMENT–WATER QUALITY



3.1.1 WATER QUALITY

General

The current state of the water quality of the Usk catchment has been assessed against the Use-related targets set in Section 5. This has been achieved largely by the use of data collected from routine sampling points for the past 3 years. In many of the smaller and headwater streams there is no requirement for the NRA to collect routine water quality data and in these reaches data from other sources has been used. These sources are often 'one-off' special surveys and the data cannot carry the same statistical certainty as those from routine points.

Since aquatic animals and plants have to endure the whole range of water quality at each site, biological data can be very useful in supporting the water chemistry data that only represent a series of 'snapshots' of the water quality. This is especially true in the smaller streams that are not routinely sampled. The Welsh Region of the NRA has developed a series of 'biological keys' based upon the presence and absence of certain indicator species, which can be used to detect intermittent or background problems such as acidification (acid rain) or farm pollution. Biological data is also used to qualify the results of much of the water chemistry data assessment. The Authority also routinely samples fish stocks at many sites. All these sources of data are used to assess the state of the catchment and identify areas where the targets set in Section 5 are not met.

The following sections and maps illustrate the results of this analysis: unless it is specifically stated otherwise, the catchment achieves its identified targets.

Local Perspective

Map 4 identifies river stretches where water quality fails to meet the River Ecosystem Class targets (see Maps 10 and 23). It also shows where the biological monitoring has shown discrepancies with the chemical data. This indicates either intermittent pollution or the effect of a chemical that is not routinely measured. There is a localised impact on the biology of the Nant Ddu, downstream of Cray Sewage Treatment Works, but this is not considered to be a significant issue at present. It should be noted that the stretches of river formally designated under the EC Freshwater Fish Directive (78/569/EEC), and the points monitored under the EC Dangerous Substances Directive (76/464/EEC) all comply with their water quality targets.

Issues Identified

Issue 1

Water Quality Target Failure in the Monmouthshire and Brecon Canal between Goytre and Pontypool

A 7 km stretch of the Monmouthshire and Brecon Canal between Goytre and Pontypool fails to meet the River Ecosystem (RE) targets. Comparison with Map 10 shows that the canal deteriorates in quality from its source at Brecon to Newport. This is due to low levels of dissolved oxygen caused by the physical characteristics of the canal.

Issue 2

Water Quality Failure in the Afon Lwyd

There is also one stretch of the Afon Lwyd between Blaenavon and its confluence with the Nant Ffrwd which fails to meet its long term quality target of RE2. This is due to high biochemical oxygen demand (BOD) on some occasions which may be caused by discharges of sewage from combined sewer overflows (CSOs) in the Blaenavon area. Investigative work will be carried out to determine the extent of the impact and to ascertain whether or not other discharges may be contributing to the problem. Any remedial work required in respect of the CSOs will be carried out in the priority determined by the NRAs CSO strategy and Dŵr Cymru-Welsh Water's (DCWW) second Asset Management Plan (AMP2) which identifies their capital investment over the period 1995-2005.

Issue 3

Poor Water Quality in Minor Tributaries due to Agricultural Activities: Nant Wilcae, Wecha Brook, Brynich Brook , Llangybi Tributaries and Dowlais Brook

There are a number of stretches of the minor unclassified tributaries where poorer water quality has been identified which are likely to be due to diffuse agricultural inputs. Investigations are needed in each of the sub catchments in order to identify the sources.

Issue 4,5

Poor Water Quality below Cheshire Home STW and Raglan STW

A tributary of the Sor Brook downstream of the Cheshire Home at Llanhennock and the Pontyrhydon Brook downstream of Raglan Services are minor watercourses which have poor water quality as a result of discharges from small sewage treatment works (STW).

Issue 6

Poor Biological Quality of Clydach

In the upper stretches of the Afon Clydach the quality of the biology is worse than expected. This is most likely to be caused by the operation of the combined sewer overflow at the Heads of the Valley roundabout at Brynmawr. This has been identified in the NRA's priority list for consideration in DCWW's AMP2. The poorer biological quality in the lower stretches may be due to intermittent sewage discharges which need further investigation, as well as to the impact of the high volume of treated effluent from Brynmawr Sewage Treatment Works.

Issue 7 **Poor Biological Quality in Afon Lwyd due to Discharges from Abandoned Mines**

Mining, for both coal and iron ore, commenced in the area about 200 years ago. The closure and abandonment of mines has led to discharges of iron-rich minewater and the deposit of orange coloured iron hydroxide solids on the beds of watercourses. Under current legislation, these discharges are exempt from regulatory control .

There are currently several significant minewater discharges to the Afon Lwyd. These discharge into the Cwm Sychan Brook at Abersychan, the Trosnant Brook at Pontypool and the Llwyd at Blaenavon. The quality of these discharges is currently stable and they have a limited impact on water chemistry within the Afon Lwyd. However, the biological scores in the stretches (see Map 4) receiving these discharges indicate that they are having a detrimental effect on the aquatic life. There are also poor trout populations in these stretches of water.

An additional threat to the water environment can result from the collapse of old mine workings. These can adversely affect the quality of a minewater discharge through diversion of underground water flows and elevation of the water table.

Issue 8 **Removal of Animal Carcasses from Watercourses and Riverbanks**

Aesthetic and very localised water quality problems can arise as a result of the disposal of animal carcasses in water courses, or onto river banks, either deliberately or accidentally. The NRA receives numerous complaints about carcasses and has to arrange for their collection and disposal at significant cost to the Authority.

Issue 9 **Contamination of Groundwater below Anacomp Magnetics, Brynmawr**

Historic losses of solvent (Cyclohexanone) from the site now occupied by Anacomp Magnetics, Brynmawr have resulted in local contamination of groundwater. Seepages of this contaminated water from the ground below the site also cause strong odours and under certain circumstances can affect the water quality of the Afon Clydach. Investigations have been undertaken by both the NRA and Anacomp Magnetics to establish the extent of the contamination, and to identify any remedial actions.

Issue 10 **The Impact of Untreated Sewage Discharges to the Usk Estuary**

There are 14 untreated sewage discharges into the Usk estuary in Newport. These contribute to the oxygen demand of the sediment and, at low summer tides, the ammonia levels in the river can become significant. Free passage of migratory fish is thought to be adversely affected by these water quality conditions. Additionally, these discharges create an aesthetic problem in the estuary which runs through the centre of Newport. All these discharges must be given secondary treatment by the end of the year 2000 in order to complywith the terms of the Urban Waste Water Treatment Directive.

Issue 32 **Usk Barrage Proposal**

The docklands at Newport have a history of industrial activities with its associated potential for groundwater contamination. This is of concern in relation to mobilisation of pollutants if any elevation of the groundwater table occurs as a consequence of the proposed construction of the Usk Barrage.

3.1.2 WATER QUANTITY

General

A catchment would fail its targets for water resources if abstraction was causing rivers and streams to dry up or flows to become unacceptably low, or if groundwater levels were declining or groundwater quality deteriorating.

Licences of right had to be granted in 1965 without regard to the ability of the resource to sustain the abstraction in the long term without detriment. Over the years, the actual rates of abstraction have, in some cases, increased to the volumes specified in the licences. As this occurs, the potential arises for low flows or declining groundwater levels.

The NRA has considered carefully the available surface and groundwater resources within the Usk catchment and their degree of utilisation. The following Section and Map summarise the results of this analysis. It must be stressed that where no problems or areas for further investigation have been identified, the NRA is satisfied that resources are adequate. As more information becomes available, for example about the actual flow requirements of the aquatic ecosystem, the NRA will review its resources management in each catchment.

Assessment of the catchment assumes that existing licence conditions are complied with. The NRA has a policy of active inspection and enforcement of licence conditions.

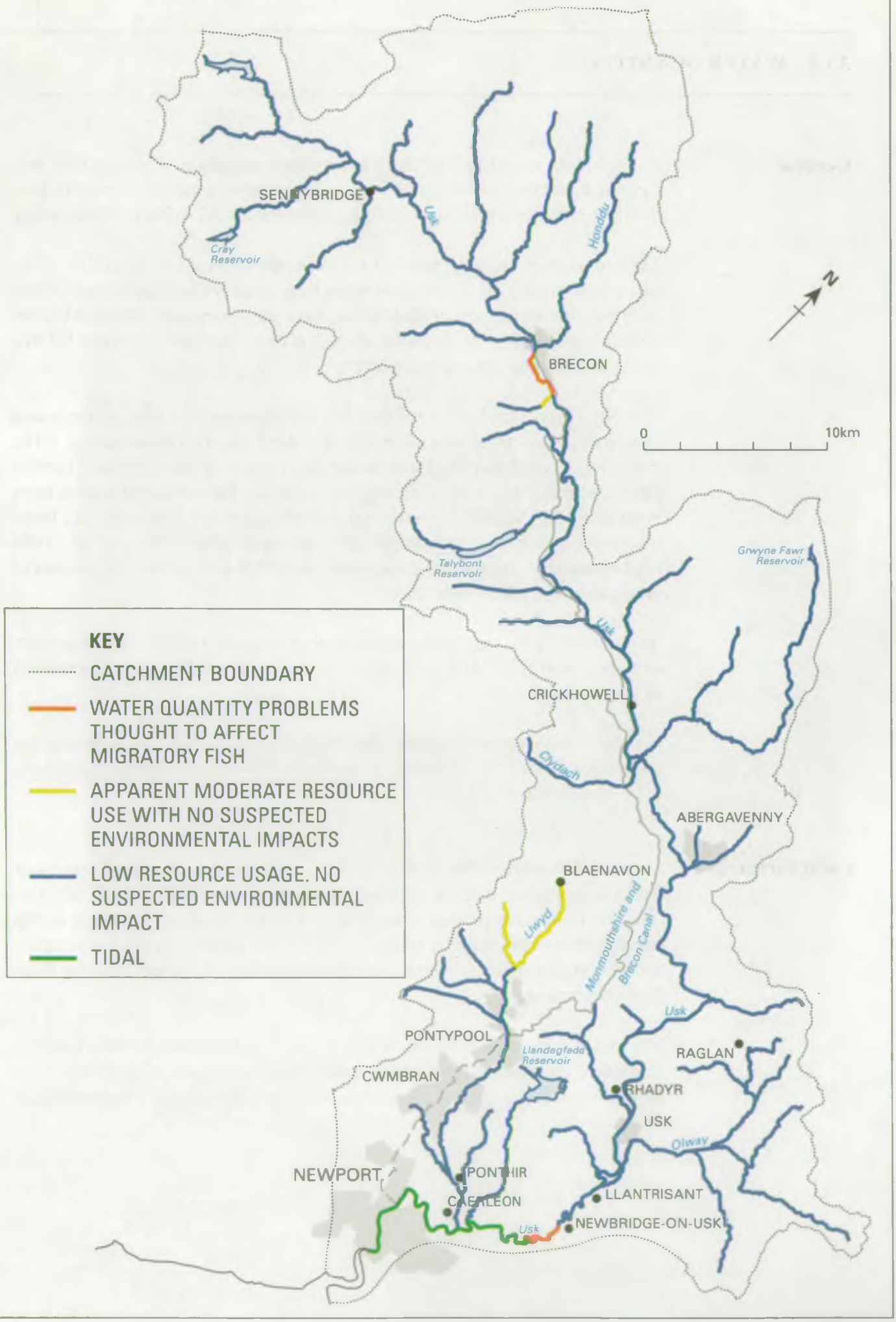
No allowance has been made for climatic change because future scenarios are uncertain and within the lifespan of this Plan (5 years) any change is unlikely to be significant.

Local Perspective

This initial assessment has been made by comparing the amount of water lost through abstraction with the typical natural river flow during a dry summer (the Q95). The estimate of water loss is a worst case, as explained in the Uses Section of this plan. A definitive state of the catchment cannot be made until a licensing policy has been implemented or the ecological need for river flows determined.

The loss of water within the catchment is very small relative to the available resource. Throughout most of the catchment, reductions in river flows or groundwater levels are not thought to cause any significant environmental degradation.

MAP 5. STATE OF THE CATCHMENT–WATER QUANTITY



Map 5 shows the locations in red where reductions in river flows are thought to cause environmental problems and are discussed in the issues identified section below. There are also areas where licensed abstractions allow quite large proportions of the resource to be used but which in practice are not thought to affect the river environment; these areas are shown in yellow.

The first of these areas is the upper Afon Lwyd and Clydach where rocks give rise to numerous springs, above which several public water supply licences are congregated. These are licensed to abstract a significant proportion of the available summer resource, presenting an apparent resource usage which seems exacerbated in Pontypool by industrial abstractions. In reality, however, most of the abstraction capacity in the upper Afon Lwyd is not used, as it has been replaced by water transferred from elsewhere. The major abstraction that is still used is at Ffynon Gisfaen (upper Clydach) which must leave half the spring flow untouched. As might be expected, the aquatic environment of the Afon Lwyd is not significantly affected by abstraction, and any environmental impacts would be confined to the vicinity of those springs that are still used.

Secondly, a short stretch of around 100 m of the River Cynrig is denied around half its natural Q95 flow by the NRA's fish farm. The abstracted water is all returned downstream. Under Q95 conditions a residual flow in excess of 2 Ml/d is maintained along the stretch. The site is routinely monitored to detect any degradation in habitat, and results suggest that the abstraction has had no adverse impact upon the aquatic environment.

Thirdly, a substantial proportion of the Berthin Brook is licensed for abstraction for public water supply, industrial supply and spray irrigation use. However, most of this licensed quantity is not used. The Royal Ordnance factory near Usk returns all the water it uses at the point of abstraction. The only times this plant could substantially affect the flows in the Berthin Brook are during reservoir refilling when flows are not returned. However, this is done infrequently, and in the past has been carried out at less than the licensed rate in order to minimise the impact. Environmental monitoring suggests no impact on the Berthin Brook from abstractions.

Issues Identified

Issue 11 **Impact of DCWW Abstractions at Rhadyr and Llantrisant**

The DCWW public water supply abstractions at Rhadyr and Llantrisant are only a few miles upstream of the tidal limit. Under low flow conditions, the combined abstraction has to be balanced by releases of water from the Usk and Cray reservoirs. Under certain circumstances, the flow below the

abstractions equates to the natural flow of the river when averaged over a day. However, pumping constraints mean that the abstraction takes place over less than 24 hours so that there can be a significant variation in the flow to the estuary over a day. This can affect fish migration.

Small floods, or spates, in late spring and summer stimulate and encourage the migration of salmon from the estuary upstream. However, tnese spates can be abstracted under the current licence conditions and fish migration will consequently be reduced.

These impacts could be lessened by varying the licences to maintain a steady abstraction over several days and limiting the abstraction of late spring and summer spates. This would improve the chances of fish migration, would be advantageous to the ecological productivity of the river and may improve the appearance of the river when abstraction takes place during periods of low flow.

Issue 12

Impact on River of Water Supply to Canal at Brecon Weir

The Monmouthshire and Brecon Canal transfer is not controlled as strictly as licensed abstractions because it is not licensable under water resources law. Licensed abstractions have to be measured, and the NRA informed of the quantities taken. The amount diverted to the canal is not known, but gaugings suggest that in periods of low flow, between 40 and 60 Ml/d can be diverted to the canal. This depletes the river of a significant flow, which can amount to over a third of the river's typical summer flow (Q95) at Brecon.

Fish passage is not possible at lower flows over the weir, and the abstraction of water causes these conditions to occur more often than they would do naturally. At present, the abstraction is operated by a manual sluice, which is thought to allow unnecessary water waste. Better water management of this major catchment feature would assist passage over the weir for migrating fish.

Further investigation into the effect of the canal upon small watercourses along its length need to be carried out. These effects are at present unknown. In places, these may be beneficial, as the canal overspills, or water seeps from it into the neighbouring watercourses. In other places, it may cause localised problems by preventing drainage from parts of the catchment reaching very minor streams. More sizeable tributaries are usually culverted under the canal and no known problems have been caused. Reduced flows in the canal caused by better control over abstraction could exacerbate the water quality problems in the canal. The dissolved oxygen content could become critical. This needs further investigation before flows are altered.

Issue 13

Insufficient Information on Groundwater Levels to Fully Protect Water Resources and the Environment

To manage and protect water resources, the NRA must assess the amount and quality of the water resource throughout the catchment and during different times of the year. This knowledge enables the NRA to:

* understand how much water can be abstracted without adversely affecting existing abstractors or the aquatic environment;

* implement groundwater protection policies to prevent pollution.

At present the NRA has no monitoring network to measure the quality and quantity of groundwater flows. As a result, the NRA has plans to construct a number of observation boreholes to extend the measuring network. This will enhance the water resource management of the catchment.

3.1.3 PHYSICAL FEATURES

General

Since Physical Features targets are the most subjective (Section 5.3) it follows that much of the assessment of the state of the catchment must be similarly subjective. Data from many sources including routine fisheries, biological and habitat surveys and special investigations are used to identify areas that are apparently deficient in certain essential or desirable features such as spawning gravels, riparian tree cover or in-river habitats.

Flood risk has been assessed by studying the flood history over the past 25 years and the known distribution of flooding.

The following section and map illustrate the current state of the catchment and identify areas where there are felt to be deficiencies.

Issues Identified

Issue 14 **Areas Subject to Tidal and Fluvial Flooding**

The following table lists those locations where the most significant Main River Usk flooding of property occurs.

Place	No. of Properties at Risk from Major Floods	Statistical Return Period	Flood Source	Unresolved Issues
Crindau	1269	1 in 20 years	Tidal	Financial viability/ practicality.
Newbridge -on-Usk	4	1 in 50 years.	River/ Tidal	Financial viability/ practicality
Usk	8 (plus additional properties from minor watercourses)	1 in 50 years	River	Financial viability
Chainbridge	5	1 in 25 years	River	Financial viability
Gobion	8	1 in 10 years	River	Financial viability
Llanover	3	1 in 10 years	River	Financial viability
Abergavenny	2	1 in 10 years	River	Financial viability
Llanwenarth	10	1 in 10 years	River	Financial viability
Glangrwyney	20	1 in 20 years	River	Financial viability
Crickhowell	32	1 in 50 years	River	Financial viability
Llangynidr	1	1 in 50 years	River	Financial viability
Talybont	3	1 in 30 years	River	Financial viability
Llanhamlach	1	1 in 50 years	River	Financial viability/ practicality

Flooding also occurs from minor watercourses. Elsewhere, nature conservation interests are improved by occasional flooding.

Issue 15

Floodplain and Riverside Development

Although, in comparison with some other catchments, the Usk Valley is relatively rural, there are many areas attractive to developers, particularly near towns and villages. Flood plains are an integral part of the overall river system, and the NRA considers it essential that they are kept free from development for flood defence reasons. In addition, the NRA recognises the importance of protecting the existing aquatic environment and heritage features associated with them. Thus, the NRA objects to the development of flood plains.

Over the next 5 years, the NRA will be conducting a national survey of flood risk areas (in accordance with Section 105 of the Water Resources Act 1991) to further assist the Local Authorities in their consideration of planning proposals and the need for flood alleviation works.

Issue 16

Loss of Wetland Habitat in Catchment

The Usk catchment is generally rural in character and scenically attractive. Despite the presence of a range of aquatic invertebrates, flowering plants, bryophytes and lichens, improved drainage, agricultural changes and urban development in recent years has led to the loss of many wetland habitats. While large areas of open water are provided by reservoirs, lowland wet grasslands suitable for breeding waders, upland bogs, small ponds and marshes are much more limited in extent. The existence of the Welsh Office Agricultural Department (WOAD) Wetland Habitat Enhancement Scheme may provide encouragement for the creation of new wildlife habitats and the restoration of degraded sites.

Issue 17

Lack of Natural regeneration of Riparian Trees and Shrubs in Some Areas

Although many of the riverbanks of the Usk and its tributaries are tree-lined, surveys suggest that regeneration is lacking in some areas . This has long-term implications for wildlife, landscape and riverbank erosion. Overgrazing, lack of fence maintenance and the spread of alien plants may be contributing to this potential problem. In the lower catchment there are more extensive lengths of open riverbank and little sign of replacement of large trees or groups of trees which could be significant landscape features in the flood plain.

Issue 18

Control of Alien weeds, particularly Giant Hogweed

In recent years 3 alien plant species have colonised the catchment, particularly the lower part of the system. Giant Hogweed, Japanese Knotweed and Himalayan Balsam all pose a threat to the native flora and

fauna. Other problems are the difficulty of and increased need for flood defence scheme maintenance and the health hazard posed by Giant Hogweed to those working on or enjoying the river.

Issue 19

Lack of Conservation Strategies for Riverine Animals

The majority of animal species normally associated with a river such as the Usk are found within the catchment but many are potentially threatened by human activities. At present there are no strategies in place for the conservation of these species, neither rare nor protected species such as water voles and little ringed plovers, or more widespread species such as dippers and sandmartins. A regional otter conservation strategy is currently being prepared which should identify the needs of otters in the Usk catchment.

Issue 20

No Standards of Service Agreed with CCW for NRA Operations affecting Sites of Special Scientific Interest (SSSIs)

Many NRA operations (eg flood defence maintenance works, issuing of abstraction licences) can directly or indirectly affect wetland SSSIs. There is therefore a need to identify sites which are sensitive to such operations and agree standards to be applied when dealing with the sites, eg working only at certain times of the year, maintaining a certain groundwater level.

Issues 12,21-26

Barriers to Fish Migration

There are a number of natural and man-made obstructions to the migration of salmon in the River Usk and its tributaries. The following man-made sites have been identified as requiring improved fish passage facilities or measures to reduce exploitation of fish.

Site Name	Tributary	Partial or Total Obstruction	Over-exploitation Problem?
Crickhowell Bridge	Usk	Partial	Yes
Llanfoist Bridge	Usk	Partial	Yes
Brecon Weir	Usk	Partial	Yes
Ponthenhafod Gauging Station	Senni	Partial	No
Talybont Gauging Station	Caerfanell	Partial	No
Llangenny Leaps	Grwyne	Partial	Yes
Pantymoel Aqueduct	Llwyd	Total	Yes

One is a total obstruction, i.e. fish passage is impossible under all flow conditions whilst the remainder are partial obstructions - allowing fish to pass only under certain flow conditions (usually medium flows). In some cases, this can lead to over-exploitation of fish and reduced success in

accessing spawning areas. Implementation of legislative measures to reduce exploitation may also be required at some obstructions, or as an alternative if fish passage cannot be improved. Only man-made obstructions are targeted for improvement as there are likely to be genetic differences in populations above natural obstructions. Improvement of fish passage is therefore likely to interfere with the genetic integrity of local fish stocks.

Issue 27

Decline in Salmon Stocks, especially Large Spring Fish

As one of the principal salmon rivers in Wales, the River Usk has historically had a reputation for the quantity and quality of fish caught in the spring. Apart from the wet years of 1988 and 1993, the salmon rod catch has been below the long term average on the Usk every year for the past 20 years. The decline in the number of spring salmon caught has been the most dramatic. The most notable likely causes of the decline in salmon stocks include legal and illegal over-exploitation in the river, estuary and high seas and droughts in recent years. Changes in the marine environment may also have contributed. Many of the recommendations of the report "Usk Salmon - Recommendations for Action" (G W Mawle, 1992) have been implemented, whilst a number have yet to be instigated.

The review of the 1985 Net Limitation Order, due to be implemented in 1996 identified that:

- the Usk drift net Fishery exploits mixed stocks of salmon in the Severn Estuary;

- there are insufficient salmon spawning in the rivers (including the Usk) for which the exploited salmon are destined, to meet identified spawning targets.

The review therefore concluded that the commercial fishery be phased out under a "Reducing Net Limitation Order".

Discussions are underway between angling interests and the netsmen for a "buyout" of the fishery so that the fishery may be phased out more quickly. Prior to 1992 a large number of salmon destined for the River Usk were taken illegally in the Severn Estuary by fishermen under the guise of sea fishing. This was virtually eliminated with the introduction of new Sea Fisheries Byelaws in September 1992, though bailiffing effort had reduced it considerably between 1987 and 1992. Illegal fishing by organised gangs with nets takes place on the lower River Usk from late spring to early autumn, and with prohibited instruments such as spears and gaffs in the spawning tributaries in late autumn by small groups and individuals. Salmon are also vulnerable to illegal fishing in the Usk and Severn estuaries. Illegally taken salmon are sometimes sold to outlets such as hotels, fishmongers and restaurants.

Fish eating birds, principally goosanders and cormorants, have increased in numbers on the Usk in recent years. There is widespread concern amongst fishery interests that these birds are having a significant impact on salmon and trout stocks. The NRA is seeking, through research, to obtain further evidence of the impact of fish-eating birds on fish stocks. In the meantime, it will comment on applications to cull, referred to it by the Welsh Office, on a case-by-case basis, within the current legislative framework.

Issue 28

Decline in Brown Trout Stocks

Historically the Usk was recognised as possibly the premier brown trout fishery in Wales. The river is designated a wild brown trout fishery and introductions of non-Usk origin fish were prohibited in summer 1994. However, there is a perceived decline in the catches and stocks of brown trout. Poor trout populations have been noticed in the upper Llwyd, Olway Brook, Berthin Brook, Gavenny and Clydach. There are a number of reasons for this which may include water quality problems and siltation of spawning gravels. An investigation into the status of trout stocks on the Usk has commenced and the recommendations of a Brown Trout Strategy are being implemented. Avian predation applies to trout aswell as salmon (see Issue 27).

Issue 29

Improvement in Coarse Fishing Facilities

There are significant stocks of coarse fish in the River Usk but coarse anglers have limited opportunities of access to fish for them. More fishery owners may be encouraged to make their water available to coarse anglers, particularly during the close season for game fishing (18 October - 2 March). Enhancement of coarse fish stocks in the Monmouthshire and Brecon Canal may encourage more coarse anglers to use this facility.

Issue 30

Degraded River Habitat

River engineering schemes and some agricultural practices can lead to the reduction of bankside and instream habitat and cover, resulting in reduced fish populations and wildlife habitat diversity. Similarly, unconsented erosion protection works cause loss of naturalness and biological diversity and impact on the landscape. The use of the WOAD Waterside Habitat Enhancement Scheme may provide landowners with alternatives to such practices.

3.1.4 CONFLICTS BETWEEN USES

Issues Identified

Issue 31 **Conflict Between Different Recreational User Groups and their Impact on Wildlife Conservation**

The principal conflict amongst recreational water users in the catchment is between canoeists and anglers. There is an Informal Access Agreement between the United Usk Fishermen's Association, which represent the majority of fishing interests on the river, and the Welsh Canoeing Association, with support and input from the NRA. This agreement outlines permitted access points and times and conditions for canoeing. Unfortunately, some canoeists are not aware of, or do not abide by the terms of the agreement. In the summer, when the access agreement does not apply, canoeing takes place along stretches without permission of the landowner. Consequently, angling is sometimes disturbed by canoeists and this may lead to conflict.

Occasionally there is concern over the impact of recreational activities such as angling, canoeing, general public access and river engineering works on wildlife conservation in the catchment's watercourse.

Issue 32 **Usk Barrage Proposal**

The NRA has been involved in lengthy technical discussions with the promoters of the Usk Barrage scheme, Newport Borough Council and Gwent County Council, over a number of years which has culminated in its formal objection heard at the Public Inquiry which ended in April 1994.

The main thrust of the objection concerned the unacceptable impact upon the fish stocks and fisheries, especially with regard to the passage of migratory fish.

At the time of publication, the outcome of the inquiry has not been announced.

3.2 A SUMMARY OF THE ISSUES, AND OPTIONS FOR THEIR RESOLUTION

ABBREVIATIONS USED IN TABLES

AMP2 - Asset Management Plan
BCU - British Canoe Union
CCW - Countryside Council for Wales
CSO - Combined Sewer Overflow
DCWW-Dŵr Cymru Welsh Water
FUW - Farmers Union of Wales
LA - Local Authority
LPA - Local Planning Authority
NFU - National Farmers Union
NRA - National Rivers Authority
OPW - Otter Project Wales
SSSI - Site of Special Scientific Interest
STW - Sewage Treatment Works
UUFA - United Usk Fishermens Assoc.
WCA - Welsh Canoeing Assoc.
WOAD -Welsh Office Agriculture Dept.

Issue No.1:	***WATER QUALITY TARGET FAILURE IN THE MONMOUTHSHIRE AND BRECON CANAL BETWEEN GOYTRE AND PONTYPOOL***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Increase monitoring to more accurately determine extent of water quality failure.	NRA	Quantify extent of water quality failure.	Costs to NRA

Issue No.2:	***WATER QUALITY FAILURE IN THE AFON LWYD***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Undertake investigation into cause and extent of Biochemical Oxygen Demand failure, particularly CSOs.	NRA	Identifies sources.	Costs to NRA.
2. Assign appropriate priority for remedial action in the Regional CSO Strategy and undertake remedial action.	NRA/ DCWW	Improvement to water environment.	

Issue No.3:	***POOR WATER QUALITY IN MINOR TRIBUTARIES DUE TO AGRICULTURAL ACTIVITIES: NANT-Y-WILCAE, WECHA BROOK, BRYNICH BROOK TRIBUTARIES, LLANGYBI TRIBUTARY, DOWLAIS BROOK.***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Target catchment control work in these catchments.	NRA	Identification of sources of problem.	Costs to NRA
2. Identify farms for improved farm waste handling to comply with the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991.	NRA, Farmers.	Improvements to water quality in long term.	Unknown costs to farmers. Costs to NRA. Short term improvements unlikely to be achieved.

Issue No.4:	***POOR WATER QUALITY IN SOR TRIBUTARY BELOW LLANHENNOCK CHESHIRE HOME SEWAGE TREATMENT WORKS***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Improvements to Llanhennock Cheshire Home STW.	Cheshire Home	Improvement to water quality of Sor Brook tributary	Costs to Cheshire Home.
2. Removal of discharge from watercourse to soakaway.	Cheshire Home	Improvement to water quality of Sor Brook tributary	Costs to Cheshire Home. Practicality of establishing a soakaway.

Issue No.5:	***POOR WATER QUALITY IN PONTYRHYDON BROOK BELOW RAGLAN SERVICES STW***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Continued operational improvements to Raglan Services STW.	Granada Services	Improvement to water quality in Pontyrhydon Brook.	Costs to Granada services.
2. Re-assess quality conditions of consent to discharge.	NRA	Confirm environmentally protective consent.	Improvement to water quality not met without option 1.

Issue No.6:	***POOR BIOLOGICAL QUALITY OF CLYDACH IN UPPER AND LOWER STRETCHES***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Improvements to CSO at Brynmawr roundabout.	DCWW	Improve biological quality in upper reaches of Clydach.	Costs to DCWW. Impact on CSO improvements planned elsewhere within the AMP2 capital investment programme.
2. Investigate lower stretches for sewage inputs.	NRA	Identify inputs. Enable targeting for remedial work.	Costs to NRA
3. Increase number of water quality monitoring points in lower stretches to identify causes of poor water quality.	NRA	Quantify extent of poor water quality.	Costs to NRA. May not identify water quality problems.
4. Undertake more detailed biological survey in lower stretches.	NRA	Quantify extent of poor biological quality.	
5. Re-assess quality conditions of Brynmawr STW consent and its impact on the Clydach.	NRA/ DCWW	Confirm effectiveness of existing consent to protect water quality objective of Clydach.	Costs to NRA. Possible cost to DCWW. Impact on AMP2 capital investment programme.

Issue No.7:	***POOR BIOLOGICAL QUALITY IN THE AFON LWYD CATCHMENT DUE TO DISCHARGES FROM ABANDONED MINES***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Investigate the possibility of treatment of these discharges.	NRA/ Welsh Office	Identifies treatment options.	Costs to NRA
2. Seek changes in legislation to ensure effective control of existing and future abandoned minewater discharges.	NRA/ Government	Provides effective control of discharges and improves water environment.	Costs to relevant authorities.

Issue No.8:	***REMOVAL OF ANIMAL CARCASSES FROM WATERCOURSES AND RIVER BANKS***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Liaise with relevant bodies to confirm responsibility.	NRA, District & Borough Councils. NFU/FUW, Police Authorities	Carcasses removed.	Costs to relevant authorities.
2. Place onus on farming community for proper disposal of carcasses.	Farmers	Disposal costs referred to source of problem.	Regulation by relevant Authority still needed. Costs to regulating authority.

Issue No.9:	***CONTAMINATION OF GROUNDWATER WITH SOLVENTS AND ASSOCIATED CONTAMINATED SEEPAGES FROM EMBANKMENT BELOW ANACOMP MAGNETICS, BRYNMAWR.***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Continued investigations into extent of contamination of groundwater.	Anacomp Magnetics	Identification of extent of problem.	Costs to Anacomp. Does not remove existing contamination.
2. Continued monitoring of embankment seepages.	NRA/ Anacomp Magnetics	Identification of any impact on surface water quality	Costs to NRA. Does not remove existing contamination.
3. Relocation of underground solvent storage tanks to above ground.	Anacomp Magnetics	Enable Anacomp to more closely control solvent handling. Prevent further contamination.	Costs to Anacomp. Health and Safety implications to Anacomp. Does not remove existing contamination.
4. Consider options for removing contamination.	Anacomp Magnetics.	Improvement in ground water quality. Improvement to appearance and odour effects on embankment above Clydach. Remove risk of contamination of Clydach.	Costs to Anacomp.

Issue No.10: THE IMPACT OF UNTREATED SEWAGE DISCHARGES TO USK ESTUARY			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Treat discharges individually.	DCWW	Spreads laod of sewage on estuary. Improves water quality.	Higher costs to DCWW than 2).
2. Convey all discharges to one sewage treatment works (Nash).	DCWW	Minimises costs to DCWW. Improves water environment.	Concentrates all effluent discharge in one place in estuary.

Issue No.11: IMPACT OF DWR CYMRU - WELSH WATER ABSTRACTIONS AT RHADYR AND LLANTRISANT			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Agree amendments to the abstraction to consider the pattern of flow.	NRA/DCWW	Improved fish migration from and survival through estuary. Reduced visual effect on river. Improved ecological health of river below Rhadyr. Increased dilution of effluents.	Reduced benefit if Usk Barrage built. Potential reduction in yield of resource system. Costs to DCWW.
2. Reduce abstraction of small floods during spring and summer.	NRA/DCWW	Attract salmon into river for rod fisheries and access to spawning grounds.	Complexity. Potential reduction in yield of resource system.
3. Compensate for summer spates with reservoir releases.	NRA/DCWW	Increases stimulus to fish movement.	Reduced stored water. Less 'natural'. Unable to release sufficient water from Usk reservoir. Reduction in yield of resource system.

Issue No.12: IMPACT ON RIVER OF WATER SUPPLY TO CANAL AT BRECON WEIR			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Install flow meter at the canal intake.	NRA/ British Waterways	Increases knowledge of canal water use and Usk water balance. Assimilate with other options.	Costs. Does not allow control over flows.
2. Agree abstraction policy for Monmouthshire & Brecon Canal.	NRA/ British Waterways	Improve migration of salmon and trout. Reduces waste of water. Improve ecological health of river below weir.	Could exacerbate low dissolved oxygen levels in canal.
3. Install automatic sluice at canal intake.	NRA/ British Waterways	Reduce unnecessary diversion of water, increases flows over Brecon Weir for fish.	Costs. Could exacerbate low dissolved oxygen levels in canal.
4. Improve fish passage by upgrading one of the 2 fish passes.	NRA	Fish passage improved. Angling in pool not restricted.	Does not reduce water waste. Will only be effective with sufficient water. Costs.
5. Propose byelaw or rule to ban fishing from the weir.	NRA/Angling Club	Illegal exploitation reduced.	Reduction in angling facitlity.
6. Propose byelaw to ban fishing in weir pool.	NRA	Legal and illegal exploitation of salmon reduced.	Reduction in angling facility.
7. Augment flows with releases from reservoirs.	NRA/ DCWW	Increase flow over weir.	It may not be possible as it reduces reservoir yield. Would not prevent water waste. No requirement on DCWW to do this.
8. Identify if river drainage into the canal affects small water courses.	NRA/British Waterways	Improves knowledge of catchment. May identify whether there are any local artificial reductions in flow.	Costs. Would not solve problems, only identify them.
9. Install flow measurement station in upper Usk.	NRA	Would assist in operating weir abstraction policy.	Costs. Difficult to maintain due to sediment load.

Issue No.13: INSUFFICIENT INFORMATION ON GROUNDWATER LEVELS TO FULLY PROTECT WATER RESOURCES AND THE ENVIRONMENT			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Increase monitoring of groundwater levels within the aquifers of the catchments between 1996 and 1998.	NRA	Protect local aquifers and associated surface waters from over abstraction. Gain better understanding of catchment water resources.	Cost £50k.

Issue No.14: AREAS SUBJECT TO TIDAL AND FLUVIAL FLOODING			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Monitor flooding to identify need for new defences.	NRA/Local Authorities	Improves knowledge.	Does not prevent flooding.
2. Review options for flood defence improvements to standards of service.	NRA/Local Authorities	May lead to development of new schemes.	Costs.
3. Promote flood defence schemes as appropriate to protect people and property.	NRA/ Local Authorities	Standards of Service improved.	Costs. Possible effect on conservation interest.

Issue No.15: *FLOODPLAIN AND RIVERSIDE DEVELOPMENT*			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Restrict development on floodplain and riverside via planning consultation procedure.	NRA/ Local Planning Authorities	Management of flood risk to people and property. Reduction in need for future flood protection. Protects conservation interests.	Restricts development.
2. Production of Section 105 flood risk maps.	NRA/ Local Planning Authorities	Fulfils statutory duty. Allows LPAs to make better informed decisions.	Cost £50k.
3. Use of statutory powers.	NRA	Better control of flood risk.	Statutory powers limited to 7 metres from river bank.

Issue No. 16: LOSS OF WETLAND HABITATS IN CATCHMENT			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Promote improvement and creation of habitats via consenting procedures and planning responses.	NRA/LA's	Can include future management needs.	Not always in priority areas.
2. Determine the distribution of wetland habitats in the catchment.	NRA/CCW/ Conservation Organisations	Identifies priority.	Does not promote new habitats.
3. Provide at least 20 ha of damp grassland in the lower catchment.	NRA/Landowners/ Conservation Organisations	Conservation benefit to breeding waders.	Landowners may not agree. Costs.
4. Create or improve wetland habitats in the upper catchment.	NRA/Landowners/ Conservation Organisations	Conservation benefits to plants, insects, amphibians and birds.	Landowners may not agree. Costs.
5. Investigate the need for and feasibility of restoring upland bog habitat	NRA/Landowners/ Conservation Organisations/ Brecon Beacons National Park	Conservation benefits to plants, invertebrates and birds.	Landowners may not agree. Costs.

Issue No. 17:	***LACK OF NATURAL REGENERATION OF RIPARIAN TREES AND SHRUBS IN SOME AREAS***		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Protect and further the conservation of riparian vegetation during Flood Defence operations.	NRA	Can be incorporated into routine work over a period of time.	Landowners may not agree. Flood damage to works unless sites carefully selected. Not always in priority areas.
2. Promote the creation of riparian buffer zone in consenting procedures and via planning responses.	NRA/Local Authorities/ Landowners	Conservation, landscape and engineering benefits.	Work not always in priority areas. Future maintenance.
3. Assess the need for fencing, coppicing, pollarding and planting and identify suitable locations.	NRA/ Conservation Organisations	Helps address priority areas.	
4. Undertake a programme of fencing/planting, coppicing and pollarding to encourage regeneration of trees and shrubs.	NRA/ Landowners	Conservation, landscape and engineering benefits.	Costs. Landowners may not agree. Future maintenance.
5. Undertake the planting of individual or groups of trees in the Usk floodplain for long-term conservation and landscape benefits.	NRA/Landowners	Conservation and landscape benefits.	Costs. Landowners may not agree. Future maintenance.

Issue No.18: CONTROL OF ALIEN WEEDS, PARTICULARLY GIANT HOGWEED			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Determine the more detailed distribution of alien plants in the catchment in order to assess costs of control.	NRA/LA's	Identify scale of problem and priorities	Delay in implementation of control measures.
2. Produce a catchment strategy for the control of alien plants.	NRA/LA's/Land-owners/Fishing interests	Integrated approach.	Costs.
3. Undertake a control programme.	NRA/LA's/Land-owners/Fishing interests	Conservation and amenities benefit	Potentially high costs and long term commitment.

Issue No. 19:	*LACK OF CONSERVATION STRATEGIES FOR RIVERINE ANIMALS*		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Identify species requiring conservation strategies and draw up appropriate strategies.	NRA/CCW/Cons. Organisations	Identify needs and priorities.	Costs.
2. Co-operate with Otter Project Wales and others in the production of a Priority Catchment Management Plan for otters.	OPW/NRA/CCW/ Cons. Organisations	Identify needs and priorities	Costs.
3. Implement otter habitat enhancement measures where appropriate.	NRA/OPW/Cons. Organisations/ Landowners	Benefit to otter conservation.	Landowners may not agree.

Issue No.20: NO STANDARDS OF SERVICE AGREED WITH CCW FOR NRA OPERATIONS AFFECTING SITES OF SPECIAL SCIENTIFIC INTEREST			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Agree standards of service.	CCW/ NRA	Protect SSSI. Ensures consistent approach.	Costs.

Issue No.21: BARRIER TO FISH MIGRATION - CRICKHOWELL BRIDGE			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Improve fish passage with simple fish pass in bridge weir.	NRA/Highways Authority	Fish passage past bridge improved. Angling not restricted.	Costs.
2. No further dredging of pool to be consented - to be scoured naturally.	NRA/ Angling Clubs	Fish passage past bridge improved. Angling not restricted.	Possible reduction in angling facility.
3. Propose byelaw to ban fishing in weir pool.	NRA	Exploitation of salmon reduced.	Reduction in angling facilities at this location.

Issue No.22: BARRIER TO FISH MIGRATION - LLANFOIST BRIDGE			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Improve fish passage with simple fish pass in bridge invert.	NRA/ Highways Authority	Fish passage past bridge improved. Angling not restricted.	Costs.
2. Propose byelaw to ban fishing in weir pool.	NRA	Exploitation of salmon reduced.	Reduction in angling facilities at this location.

Issue No.23: BARRIER TO FISH MIGRATION - PONTHENHAFOD GAUGING STATION			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Replace crump weir with flat vee weir gauging station.	NRA	Fish passage improved (for trout).	Costs. Disruption to flow records.

Issue No.24: BARRIER TO FISH MIGRATION - TALYBONT GAUGING WEIR			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Install fish pass during upgrade to gauging station.	DCWW	Fish passage improved for trout.	Minor additional cost of refurbishment works.

Issue No.25: BARRIER TO FISH MIGRATION - LLANGENNY LEAPS			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Minor modifications to weir required to improve fish passage.	NRA/ Weir Owner	Fish passage for trout and salmon improved under greater range of flows. Exploitation of fish below weir reduced.	Costs. Weir ownership is unknown. NRA could become liable if modifications made.
2. Propose byelaw or rule to restrict angling in weir pool.	NRA	Exploitation of fish reduced.	Reduction in angling facility.

Issue No.26: BARRIER TO FISH MIGRATION - PANTYMOEL AQUEDUCT (AFON LWYD)			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Install fish passage facilities at weir beneath canal aqueduct.	NRA/ British Waterways	Access for salmon to spawning grounds improved.	Costs.

Issue No.27: DECLINE IN SALMON STOCKS, ESPECIALLY LARGE SPRING FISH			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Enforce new fishery byelaws to control exploitation and to allow greater escapement to spawn.	NRA/ Fishery Owners/ Netsmen	Increased spawning and stocks, particularly spring fish.	Loss of angling opportunity. Reduced rod catches. Reduced commercial viability of net fishery.
2. Encourage catch and release of large salmon.	NRA/ Fishery Owners/ Angling associations	Increased spawning and stocks.	Difficulty in identifying best communication link
3. Conduct feasibility study of a breeding programme to enhance spring salmon stocks.	NRA	Increased stocks.	Costs.
4. Improve fish passage at Brecon weir and other obstructions according to priorities and available resources. (see Issue 12)	NRA/ Weir Owners/ Fishery Owners	Enhancement of stocks by improving use of nursery areas.	Costs.
5. Facilitate discussions between anglers and commercial fishermen for a 'buy-out' of the commercial fisheries.	NRA/ Fishery Owners/ Commercial Fishermen	Increased spawning and stocks.	Costs. Legal complexity.
6. Identify effect of piscivorous birds on fish populations through objective research.	NRA	Allows development of an informal control strategy.	Costs. failure to protect fish stocks over the short term if effect of piscivores is limiting.
7. Issue licences to cull birds.	WOAD	Reduces predation.	Fails to protect brd species.
8. Comment, as requested, on applications to Welsh Office to cull cormorants and goosanders according to NRA Policy.	NRA	Protection of birds and fish stocks.	

Issue No. 28: DECLINE IN BROWN TROUT STOCKS			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Enforce fishery byelaws (increased takeable size limit) to control exploitation and to allow greater escapement to spawn.	NRA/ Fishery Owners	Increased stocks due to greater spawning escapement.	Loss of angling opportunity.
2. Act on the recommendations of the Brown Trout Strategy including controls on stocking, establishment of database, introduction of catch monitoring and effects of predators on stocks.	NRA	Increased stocks of natural brown trout.	Restrictions on stocking.
3. Implementation of Usk Brown Trout Investigation to establish status, cause and solution to perceived decline.	NRA/ Fishery Owners	Identification of river specific problems and solutions.	Costs.
4. Encourage catch and release and bag limits for brown trout.	NRA/ Fishery Owners	Increased spawning and stocks.	
5. Stocking of areas identified as underpopulated with Usk origin trout.	NRA/ Fishery Owners	Regeneration of populations accelerated.	Habitat and water quality may be limiting criteria in some areas.
6. Identify effect of piscivorous birds on fish populations through objective research.	NRA	Allows development of an informal control strategy.	Costs. failure to protect fish stocks over the short term if effect of piscivores is limiting.
7. Issue licences to cull birds.	WOAD	Reduces predation.	Fails to protect brd species.
8. Comment, as requested, on applications to Welsh Office to cull cormorants and goosanders according to NRA Policy	NRA	Protection of birds and fish stocks.	Practicality of controls.

Issue No.29: IMPROVEMENT IN COARSE FISHING FACILITIES			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Encourage Fishery Owners to make river stretches available to coarse anglers.	NRA/ Fishery Owners	Productive resource made available to coarse anglers in an area short of such facilities.	Possible conflict with game anglers. Possible inadvertent exploitation of salmonids.
2. Enhancement of coarse fish stocks in the Monmouthshire & Brecon Canal.	NRA/ British waterways/ Torfaen Borough Council/ Newport Borough Council/ Angling Clubs	More coarse anglers attracted to fish canal.	Depends on Fisheries Policy of British Waterways/ Local Authorities. Possible conflict with boaters. Possible conflict with wildlife interests.

Issue No.30: DEGRADED RIVER HABITAT			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Implement river bank and channel improvements where habitat is identified as degraded.	NRA/ Fishery Owners/ Land Owners	Increases productivity of catchment for fish and habitat diversity for wildlife.	Costs.

Issue No.31: CONFLICT BETWEEN DIFFERENT RECREATIONAL USER GROUPS AND THEIR IMPACT ON WILDLIFE CONSERVATION			
OPTIONS	Responsibility	Advantages	Disadvantages
1. Liaise with angling and canoeing representatives to facilitate the production of a workable canoeing access agreement.	NRA/ WCA/ UUFA	Informal agreement and legal position is clearly specified for canoeists.	Many canoeists do not heed or are not aware of regulations.
2. Improve communications with canoeists so that they are aware of legal situation and potential conflict of canoeing without permission.	NRA/ WCA/ BCU	Canoeists more aware of their obligations.	Costs. Difficulty of communicating to all canoeists.
3. Individual canoeists to be regulated via a licensing or permit system:		Individual, rather than block permission would raise the profile of the obligations and rules to be followed by each canoeist. A visible permit or licence would identify those who are aware of the rules to simplify regulations.	
a) NRA to introduce a licensing system.	NRA	Legal canoeing enforced by an independent and public authority. Income to NRA.	As there is no right of navigation, there can be no navigation authority, so the NRA has no legal authority to introduce a licensing system. Administrative and enforcement costs likely to outweigh income.
b) UUFA/Canoeing organisations to introduce a permit system as an extension to the access agreement.	UUFA/WCA/BCU	Legal canoeing encourages and regulated by those it affects and who have the legal authority. Possible income to respective organisations.	Requires commitment from canoeing and riparian interests to enforce regulations.
4. Provide advice to site owner and each user group to attempt to resolve conflicts and educate in good practice for the protection of the conservation interest.	NRA/ Site Owner/ User Group	Resources used with minimum conflict and greater understanding.	Costs.

Issue No.32:	*USK BARRAGE PROPOSAL*		
OPTIONS	Responsibility	Advantages	Disadvantages
1. Barrage construction approved.	Secretary of State for Wales	As defined by scheme applicants.	Impact on migratory fish stocks and ecology of the catchment. Others as defined by scheme objectors.
a) Fish Pass design and operation approval.	Welsh Office	Ensure optimum design of fish pass.	Risk of impact on vulnerable species.
b)Fishery protection and mitigation scheme derived.	NRA/ Newport Borough Council/ Gwent County Council/ Other statutory consultees	Protection of user interests.	Longterm cost implications. Potential impact on genetic integrity of stocks.
2. Barrage construction not approved.	Secretary of State for Wales	No adverse effect on fishery.	

PART II

SUPPORTING INFORMATION

4.0 THE USES OF THE USK CATCHMENT

The following sections catalogue the legitimate Uses of the Usk catchment which fall under the control of the NRA in one way or another. A general description of the nature of the NRA's responsibility towards each is given, complete with a set of management aims and environmental quality targets. These are designed to protect both the environment and the requirements of other Uses. In Section 5 these specific targets are used to help us set overall targets, for the whole catchment, for water quality, water quantity and physical features, that reflect the NRA's view of the balance of interests between the different users of water.

4.4 URBAN DEVELOPMENT (including road and rail)

General

Development must be considered when planning the management of a river catchment because it can directly and indirectly affect other Uses. This Use is related to existing and predicted residential, commercial and industrial development that is identified in the county structure and district local plans. These plans identify policies against which planning authorities consider development proposals.

While the NRA has statutory powers and responsibilities to protect the water environment, these can be complemented by effective control of land use to prevent anticipated problems at an early stage.

The NRA is a statutory consultee under planning legislation and advises local authorities on development proposals that can have an impact on matters relevant to the NRA. Consequently, a major objective of this Catchment Management Plan is to provide the planning authorities with a clear picture of the NRA's responsibilities and policies towards development of this catchment. The Plan identifies all legitimate users of the catchment so that their interests can be taken fully into account during the planning process. This approach is consistent with the Government's declared objective of "plan led" development.

The NRA seeks to pursue its aims and policies regarding development through the planning consultation process. Although the final decision on planning matters rests with the planning authority, government guidelines advise on the need to consider the NRA's concerns when determining proposals.

The NRA has produced a series of Guidance notes for LPAs that outline methods of protecting the water environment. The NRA proposes that these should be incorporated into the LPAs' own Development Plans, whenever possible.

Local Perspective

The catchment lies within the administrative counties of Powys and Gwent which contains the Borough Councils of Brecknock, Blaenau Gwent, Monmouth, Torfaen, Newport and the Brecon Beacons National Park.

The Northern area of the catchment is predominantly rural with development centred around the main towns of Sennybridge, Brecon and Crickhowell. The Southern area is far more urbanised. The local plans have allocated land for housing and industrial development, throughout the area.

The current status of the Structure and Local Plans covering the catchment is as follows:

Council	Plan Type	Coverage	Status
Powys County	Draft Replacement	1991-2006	Deposit version circulated April 1994.
Gwent County	Replacement	1991-2006	Perceived adoption date April 1995.
Torfaen Borough	Local	1991-2006	Deposit Plan due Feb. 1995.
Brecknock Borough	Local	1991-2006	Deposit Plan due April 1995.
Monmouth Borough	Local	1991-2006	Deposit version Sept.1993. Public Enquiry due late 1994.
Blaenau Gwent	Local	1991-2006	Draft Version Feb.1993.
Usk Riverfront	Local	1993-2003	Adopted 1st Sept. 1993.
Newport Borough	Local	1991-2006	Deposit Plan due 1995.
Brecon Beacons National Park	Local	1991-2006	Consultation Draft May 1994

The Gwent County Structure Plan indicates that significant land development will be located at:

Riverside and Docks area, Newport
Llantarnam Park, Cwmbran
South East Pontypool
North of Blaenavon
Heads of the Valley area at Brynmawr

The first of these developments, which is detailed in the Usk Riverfront Local Plan, is dependent upon the outcome of the public inquiry into the construction of a Barrage across the estuary at Newport. This proposal, by

Newport Borough Council and Gwent County Council, is resolutely objected

to by the NRA mainly for fisheries reasons.

Road schemes currently underway are the M4/A4042 Brynglas Tunnels and Malpas Road relief scheme, A4042 Llantarnam Bypass with a major dualling scheme proposed for the A465 Abergavenny to Hirwaun road west of the A4042.

A major new bridge, crossing the Usk at Newport is envisaged as part of the proposed M4 Relief Road.

Aims

To ensure that development does not adversely impact, and wherever possible, to ensure that it proceeds in a way that benefits, the water environment and its users.

To ensure that development does not impact on the water environment to a degree that threatens life and property.

Environmental Requirements

Water Quality

The water environment should not suffer any detriment due to development.

Adequate pollution prevention methods, that are consistent with the Groundwater Protection Policy and the NRA's Guidance Notes, should be incorporated into developments.

Water Quantity

To protect inland waters (and groundwater which is a locally important source of water supply) from the detrimental effects of development including afforestation and other changes in land use.

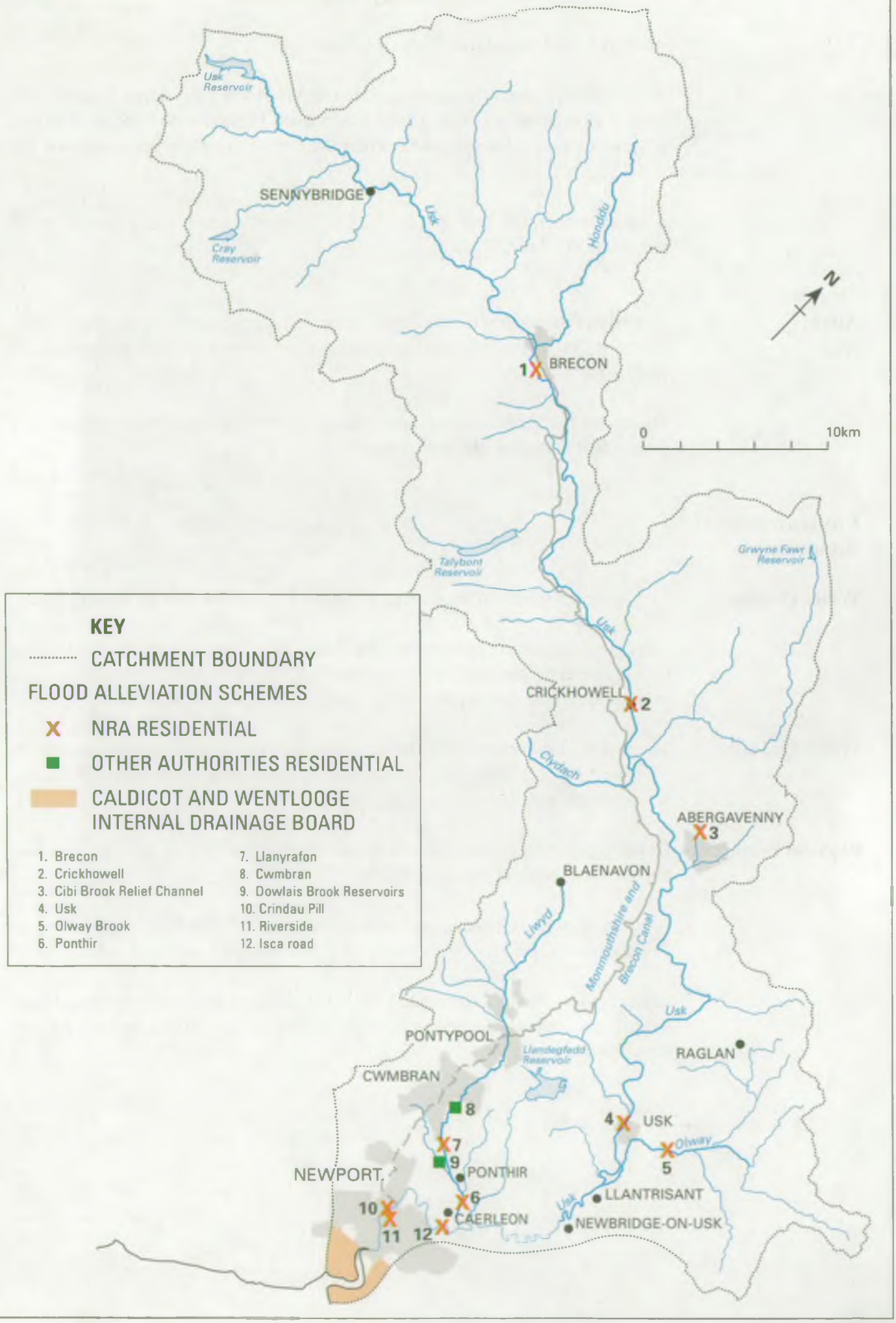
Physical Features

Development should not be at risk from flooding and should neither increase nor put other areas at risk of flooding.

Any work that is needed to reduce the risk of flooding created by a development is paid for by the developer and not from public funds.

Conservation features associated with the water environment should not suffer any detriment, and wherever possible should be enhanced by development.

MAP 6. FLOOD ALLEVIATION SCHEMES



4.2 FLOOD DEFENCE

General

This Use relates to the protection of people and property against flooding from rivers and the sea and the primary role of the river as a drainage system for surface water.

Flooding normally follows from extreme climate conditions such as very heavy rainfall causing high river flows and, in coastal areas, surge and storm generated waves combining with high tides. The severity of an individual flood event is generally described in terms of its frequency of occurrence. This is often expressed as a return period in years, for example, 1 in 50 years (i.e. a flood of this severity would, on average, be expected to occur once in a 50 year period).

Areas of land next to rivers known as flood plain or washlands take the additional flow or naturally store water when the channel capacity is exceeded. If significant areas of flood plain are embanked, tipped or built upon the lost storage volume leads to higher river levels elsewhere.

The coastline of Wales has been divided into a series of Coastal Cells. The boundaries of each cell have been set to reflect the boundaries of the natural physical processes acting on that section of coast. Coastal Groups have been formed containing representatives of each Maritime District Council, the NRA and other bodies with an interest in the management of the coastline.

Recent Government publications such as the PPG on Coastal Planning and Circular 30/92 Development in flood Risk Areas, place a requirement on local planning authorities to take account of coastal processes and flood risk in their determinations. The sources of information to assist these decisions will be the Section 105 Survey (presently under preparation by the NRA) and the Shoreline Management Plans as agreed with the Coastal Group formulated from study work undertaken on the physical influences affecting the coastline. Recent Government guidance will help ensure that Coastal Groups have a consistent approach to Shoreline Management Plans.

Flood alleviation schemes are constructed where necessary and cost-effective. The standard of protection to be provided is determined by an analysis of the options for the most economically and technically advantageous solution. For a scheme to proceed the benefits in financial terms must outweigh the costs.

The Water Resources Act 1991 requires the NRA to exercise general supervision over all matters relating to flood defence.

Powers are also provided for the issue of consents for works on rivers and watercourses designated as "Main River" and for ensuring the maintenance of flow in river channels and the removal of obstructions.

The Land Drainage Act 1994 provides the Local Authority and, where appropriate, Internal Drainage Boards with powers to carry out flood defence works to ensure the proper flow of water. The 1994 Act also provides the NRA with additional consenting powers on ordinary watercourses.

The provision of flood defences including the maintenance of channel capacity, needs to be executed with care if other Uses - notably fisheries and conservation - are not to be affected unduly. Consultations are carried out within and outside the NRA during the formulation and undertaking of schemes. In this way, wherever feasible, and consistent with the original purpose, habitat enhancements form part of the scheme.

Water Level Management Plans will be drawn up for sites where flood defence works influence water levels and there is significant conservation interest. Sites and locations will be agreed with the Countryside Council for Wales or English Nature, and the plans will be developed in accordance with the guidances issued by MAFF/Welsh Office. Such plans will provide a means by which the water level requirements for a range of activities, including agriculture, flood defence and conservation, can be balanced and integrated in a given area.

The NRA provides and operates a flood warning system on designated main rivers and coastal areas at risk from flooding by the sea. The system provides warning to the police who pass the warnings to the general public.

Local Perspective

Defence against flooding is provided in three ways: maintaining river channels and building flood alleviation schemes, warning people of impending floods and controlling development in floodplain areas.

Flood alleviation schemes have been constructed at the locations shown on Map 6. These are regularly monitored and maintained to ensure their effectiveness. The River Usk discharges to the Severn Estuary through the Gwent Levels, the drainage of which is maintained by The Caldicot and Wentlooge Levels Internal Drainage Boards (Map 6). These parts of the Usk catchment have particular drainage problems, which require a very high standard of maintenance.

Throughout the length of the main river system, a continuing programme of maintenance is carried out. This involves the removal of insecure and fallen trees or branches as these could impede flow. This work is particularly important at urban locations such as Brecon and Crickhowell where flood

washed debris collects on the piers of arched bridges and can cause flooding problems.

The NRA maintain some short lengths of the tidal defences on the River Usk through Newport with Newport Borough Council being responsible for the remainder. At present, NRA investigations are underway into the adequacy of two sections of the riverside flood defence walls in Newport.

There are large areas of flood plain within the Usk catchment which act as natural water storage areas and reduce the risk of flooding downstream. Development of these could lead to higher flood risk to the urban areas.

Drainage of urban areas, such as Abergavenny and Cwmbran, is also of particular concern. Runoff controls are required on several of the watercourses which receive these discharges to prevent localised flooding during heavy rainfall.

The main area of the Usk catchment likely to require a Water Level Management Plan is the Gwent Levels.

The general public are warned of flooding from the rivers Usk and Llwyd through a flood warning system operated by the NRA in conjunction with the Police and Local Authorities.

Aims

To maintain existing flood defences for people and property against flooding from rivers and the sea, taking account of environmental requirements.

To improve the standard of flood defence where appropriate by promoting and constructing new flood defences.

To maintain effective drainage, taking account of environmental requirements.

To provide warnings of imminent flooding to the public (via the police) where appropriate.

Environmental Requirements

Physical Features

In protected areas, the flood defences/river bank should not be overtopped by a flood flow within a specified return period.

In areas where land use is primarily agricultural, the watercourse should provide effective drainage, taking account of environmental requirements.

No development should be permitted which would impair the effectiveness of any flood defence scheme or prevent access for maintenance of flood defences.

To ensure, where possible, that the effectiveness of the flood plain to store and convey flood waters is not impaired.

Water Level Management Plans will be prepared for all sites agreed with CCW.

Adequate arrangements should be provided for flood warning.

Environmental requirements will be taken into account when designing and undertaking flood defence works.

4.3 SOLID WASTE DISPOSAL (LANDFILL)

General

The disposal of domestic and industrial waste into landfill sites is a common form of waste disposal in England and Wales. All sites that receive material that is not inert have the potential to produce a toxic liquid effluent (leachate) which can pollute surface and groundwater. Consequently the NRA's policy is for all new sites to be designed and operated in a way that contains any liquid effluents. This is monitored by the NRA. Older sites may cause pollution long after tipping has ceased and in these cases, the owner or operator may be required to undertake remedial works.

Waste Regulation Authorities (WRAs) presently issue licences to handle waste or operate a waste disposal site under the Environmental Protection Act 1990. The NRA is a statutory consultee on applications for landfill waste disposal licences.

Local Perspective

There are no active landfill sites receiving domestic, commercial or industrial wastes in the catchment. Wastes generated in the catchment north of Ponthir are disposed of by a waste disposal contractor who takes the waste out of the catchment via a waste transfer station located at New Inn, Pontypool. There is also a Local Authority waste transfer site at Llanfoist and a private site run by Hemmings Waste at Blackrock (shown on Map 7). Wastes arising within Ponthir and Caerleon are disposed of by Newport Borough Council at their Docks Way disposal site in Newport (which is in the Ebbw catchment).

There are also sites at Llanfoist, Ty Coch (Cwmbran) and Tirpentwys (Abersychan) which are now closed.

There are a number of sites in the catchment used for the disposal of inert waste.

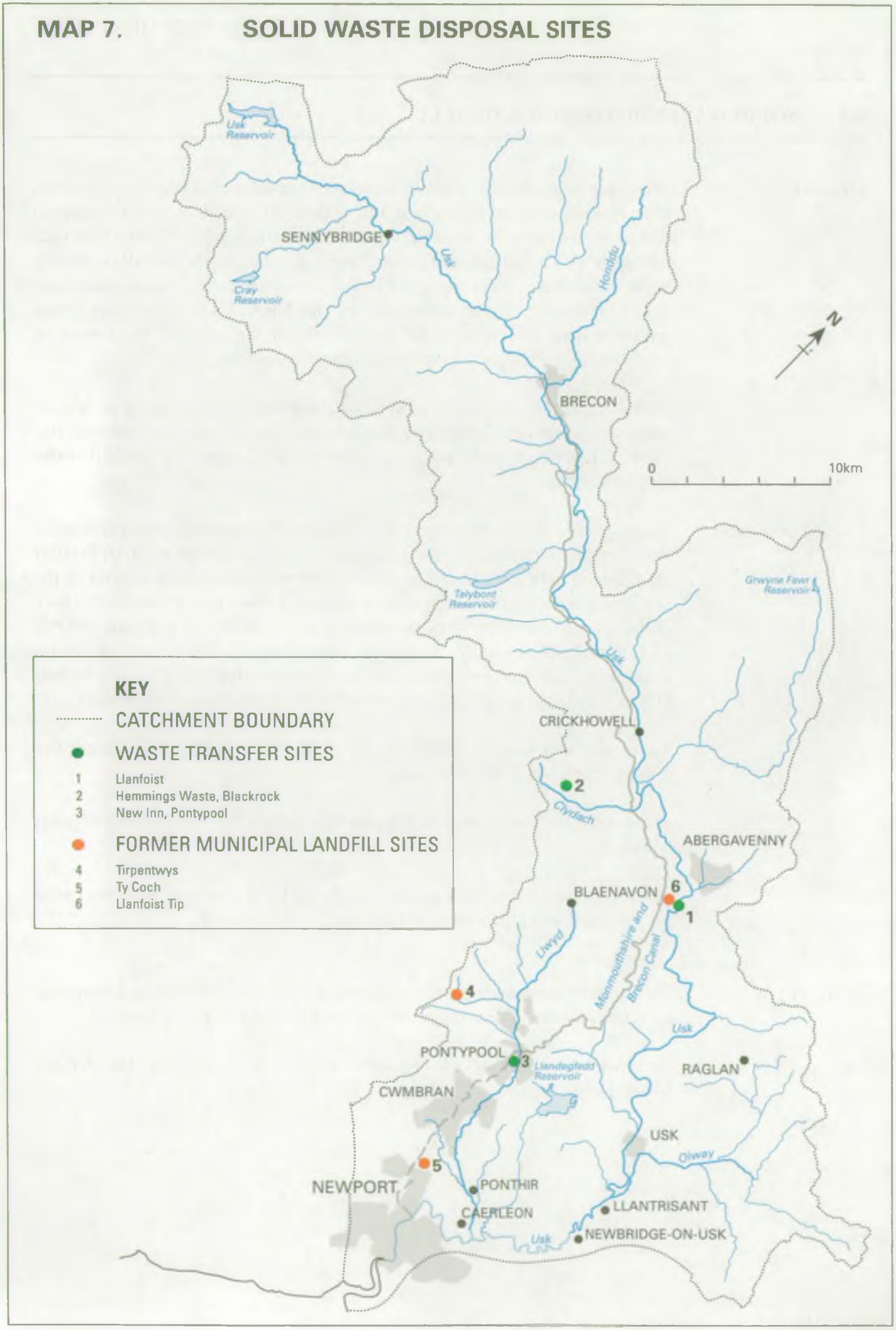
All major sites are periodically inspected by the NRA to ensure that they cause no deterioration of the water environment.

Aims

To ensure that waste disposal sites are designed and operated in a way that does not adversely affect other uses of surface water or groundwater.

To protect the quality of groundwaters by implementing the NRA's Groundwater Protection Policy.

MAP 7. SOLID WASTE DISPOSAL SITES



Environmental Requirements

Water Quality

Waste disposal sites must be designed and managed to prevent liquid effluent from adversely affecting the quality of surface water and groundwaters.

Where appropriate waste disposal sites must comply with prohibition notices or discharge consent conditions. These will be enforced by the NRA and WRAs.

Water Quantity

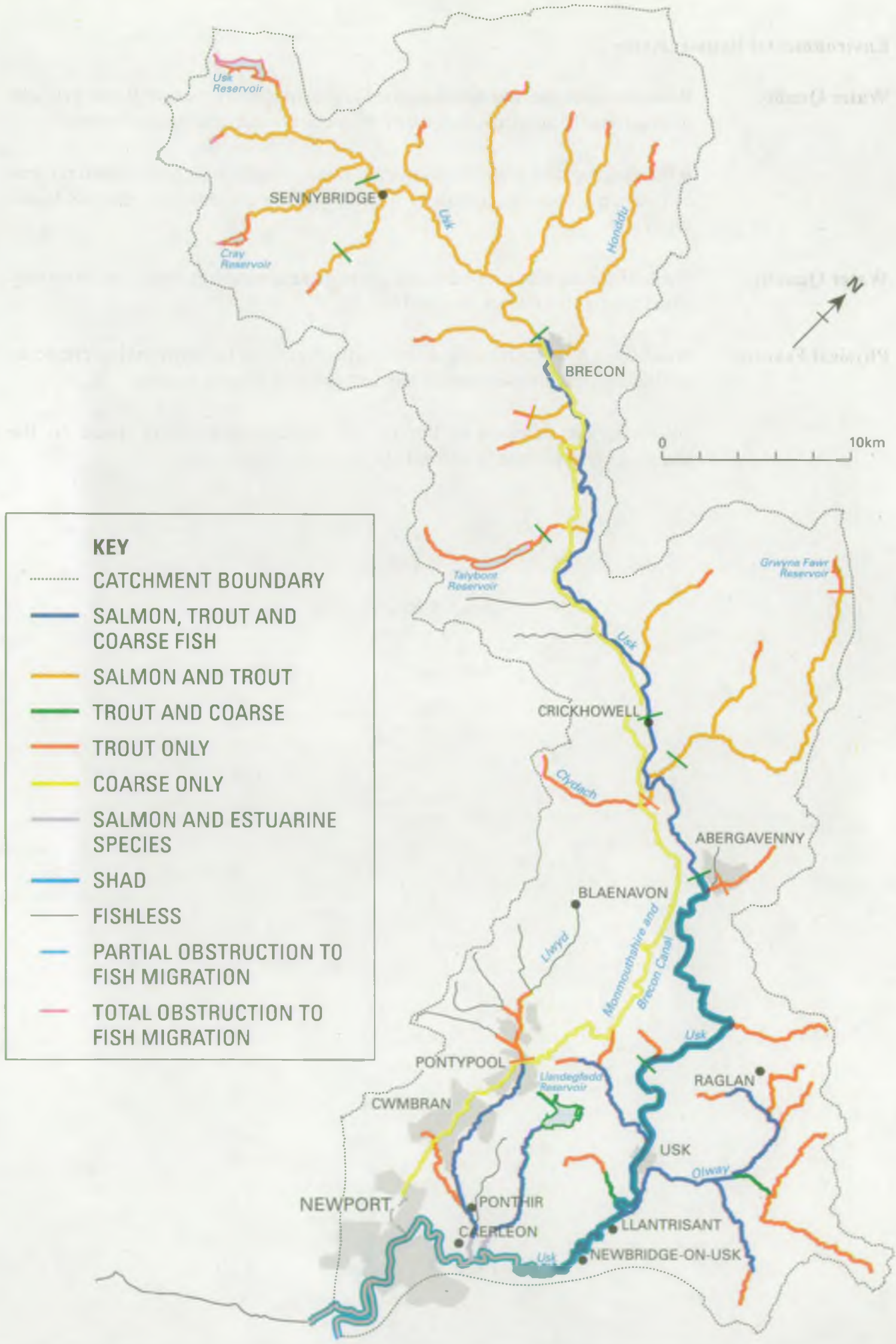
Waste disposal activities must not harm groundwater resources or adversely affect the rights of water abstractors.

Physical Features

Windblown litter from waste disposal sites must not be permitted to create an aesthetic problem in adjacent rivers, estuaries or coastal waters.

Following the cessation of tipping, all aftercare provisions stated on the planning consent must be carried out by those responsible.

MAP 8. FISH DISTRIBUTION



4.4 FISHERIES

General

The Fisheries Use addresses the protection, maintenance and improvement of fish stocks within the catchment: angling is covered in Section 4.13 as a recreational Use.

In order to protect different types of fishery the EC Freshwater Fish Directive (78/659/EEC) provides two levels of protection for water quality to support:-

Salmonid fisheries - eg. salmon and trout.
Cyprinid fisheries - generally referred to as coarse fisheries.

A third category:-

Migratory waters - ie. waters that are only used for the passage of migrating fish such as salmon and sea trout.

is largely protected by the provisions of the EC Dangerous Substances Directive which applies to all controlled waters.

While the Freshwater Fish Directive can only be applied by statute to certain 'designated waters' , the standards it contains will be used informally, for the purposes of CMPs, to assess the whole catchment for this Use.

Water quantity and the physical habitat are also very important factors in the conservation of fish stocks. While these factors do not yet receive the protection from similar formally quantifiable targets, as applied to water quality, the CMP process will help to identify the requirements for their protection in the clearest manner possible.

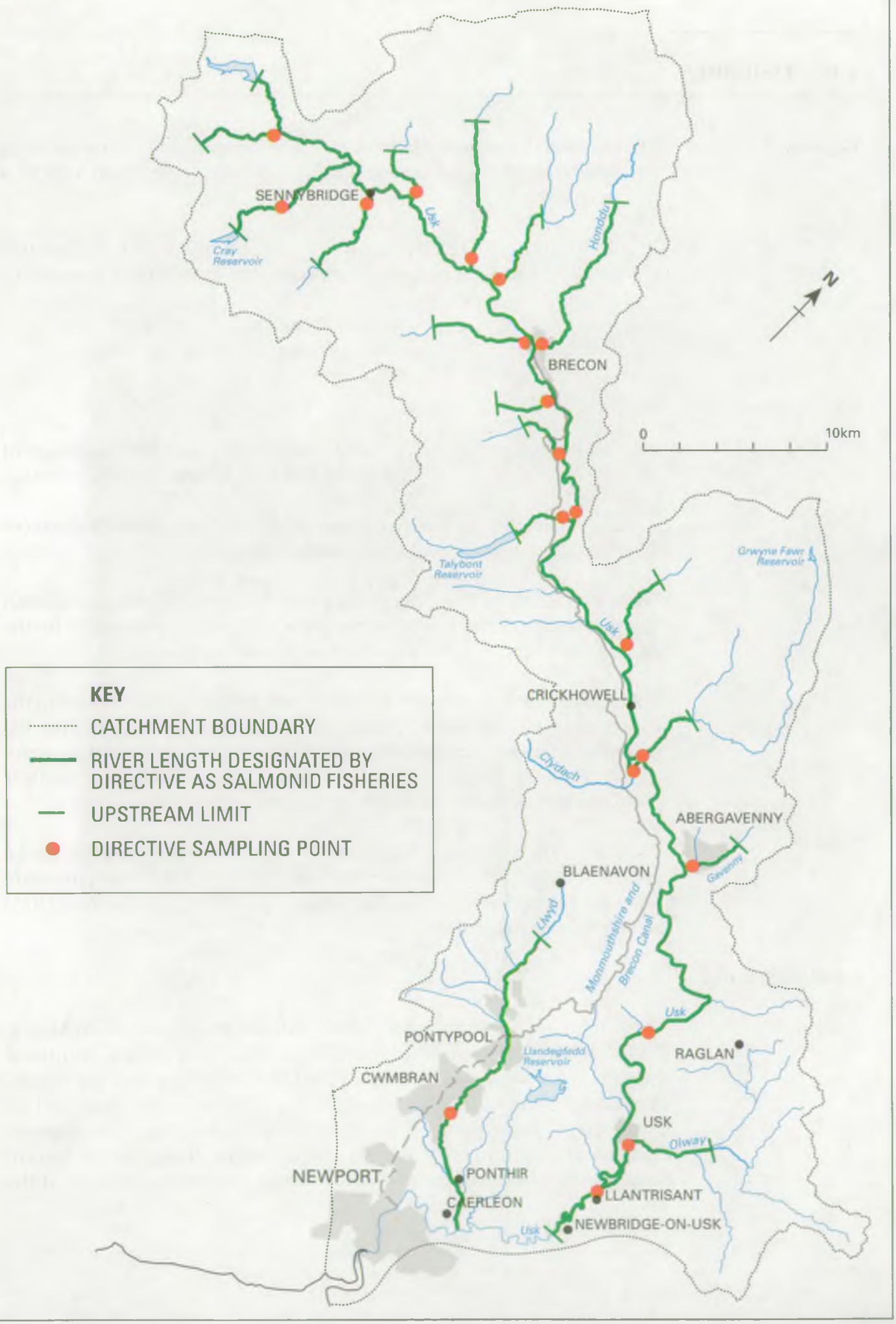
The control of 'poaching' is a vital aspect in the conservation of fish stocks and the NRA employs a sizeable Bailiff force to enforce the legal protection offered to fish stocks by both the Salmon and Freshwater Fisheries Act (1975) and the Salmon Act (1986).

Local Perspective

Salmon

The distribution of salmon, trout, coarse fish and shad is shown on Map 8. The Usk is one of the principal salmon rivers in Wales. Salmon are distributed along the entire River Usk from below the Usk reservoir to the river mouth. They also spawn in most of the tributaries and in the main river down to Usk town. Some illegal fishing for salmon takes place in the river between Crickhowell and Newport. A larger illegal salmon fishery in the Severn Estuary around Uskmouth is now under control. Significant stretches of the

MAP 9. FRESHWATER FISH DIRECTIVE



catchment are designated salmonid waters under the EC Freshwater Fisheries Directive (78/659/EEC). The Usk is designated from the downstream end of the Usk Reservoir to the tidal limit at Newbridge-on Usk, a distance of 103 km. An additional 17 stretches on some of the larger tributaries constitutes a further 132 km. These are indicated on Map 9.

Sea Trout

There is a small but significant run of sea trout in the Usk. They tend to spawn in a few of the tributaries, notably the Hydfer at the top of the catchment, and the Sor Brook and Olway Brook at the bottom.

Brown Trout

The Usk is renowned for its brown trout and is considered by many to be the premier brown trout fishery in Wales. Brown Trout are present throughout the whole catchment apart from the upper tributaries of the Llwyd.

There are a number of stillwater trout fisheries, some of which are supplemented with stocking of brown trout or rainbow trout.

Coarse Fish

Coarse fish species are present in the main river below Brecon, in the lower tributaries, in the Monmouthshire and Brecon Canal, and in a number of lakes and ponds. The Usk is famous for its stocks of dace and other species present include chub, roach, gudgeon and some perch. The illegal stocking of barbel has been confirmed and that of pike is suspected.

Other Migratory Fish

Sea lamprey,river lamprey, Twaite shad and Allis shad are of major conservation importance and migrate into the Usk in May and June each year. Elvers enter the river in the spring and adult eels migrate to the sea principally during the autumn.

Sea Fish

The tidal reach of the lower River Usk is inhabited by a number of saltwater species. Whilst this river is thought to be important for juvenile stages, little scientific evidence exists to quantify its value.

Aims

To sustain the populations of wild fish species at the levels appropriate to a catchment of this type and to protect the passage of migrating fish into and from freshwater.

Environmental Requirements

Water Quality

Rivers - Waters should comply with the appropriate standards of the EC Freshwater Fish Directive (78/659/EEC).

Stillwaters - These waters should comply with the same standards as set for rivers.

Estuaries - These waters should comply with the appropriate standards identified for migratory fisheries element of the Fisheries Use.

Water Quantity

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

An appropriate diversity of natural instream and bankside habitats should be maintained to support the fish typical of the river type.

Appropriate levels of riparian and instream vegetation should be maintained to provide adequate cover for fish.

Artificial barriers should not obstruct passage of migratory fish.

Natural or artificial barriers should not lead to excessive exploitation of fish.

River maintenance and other works should be carried out in a way that causes the least detrimental impact on the fishery.

4.5 RIVER ECOSYSTEM

General.

The River Ecosystem Use addresses the protection, maintenance and improvement of the basic water quality required to support different types of River Ecosystem. The Use has five classes with Class 1 being of the highest water quality. The details of the Use classes are defined in the "Surface Waters (River Ecosystem) (Classification) Regulation 1994". The Use applies to all watercourses in the catchment.

Within the classified stretches, the River Ecosystem Target Class will be used to replace the existing Long Term River Quality Objective (LTRQO) based upon the old National Water Council (NWC) system.

These targets represent the long term aspirations for the catchment and may not, in some instances, be achievable in the short-medium term. Consistent with this, the targets set for this Use, for river stretches covered by this CMP will reflect what can be achieved within its intended life of 5-10 years.

As the River Ecosystem is the first Use introduced under the Water Quality Objectives scheme (See Section 5.1), it is hoped that these "interim" targets will be translated into Statutory Water Quality Objectives during the lifespan of this CMP. Once set as statutory objectives the NRA will have a duty to ensure compliance with them.

Local Perspective

The stretches assessed for river ecosystem use are shown on Map 10 covering the main River Usk and the larger tributaries. The majority of the catchment currently meets the requirements for River Ecosystem Class 1 (RE1).

The Olway Brook, Pill Brook, the upper end of the Clydach, and lower end of the Berthin Brook are all RE Class 2. The Monmouthshire and Brecon Canal meets RE Class 1 near Brecon changing to RE4 near Crickhowell and then RE5 before reaching Newport.

Aims

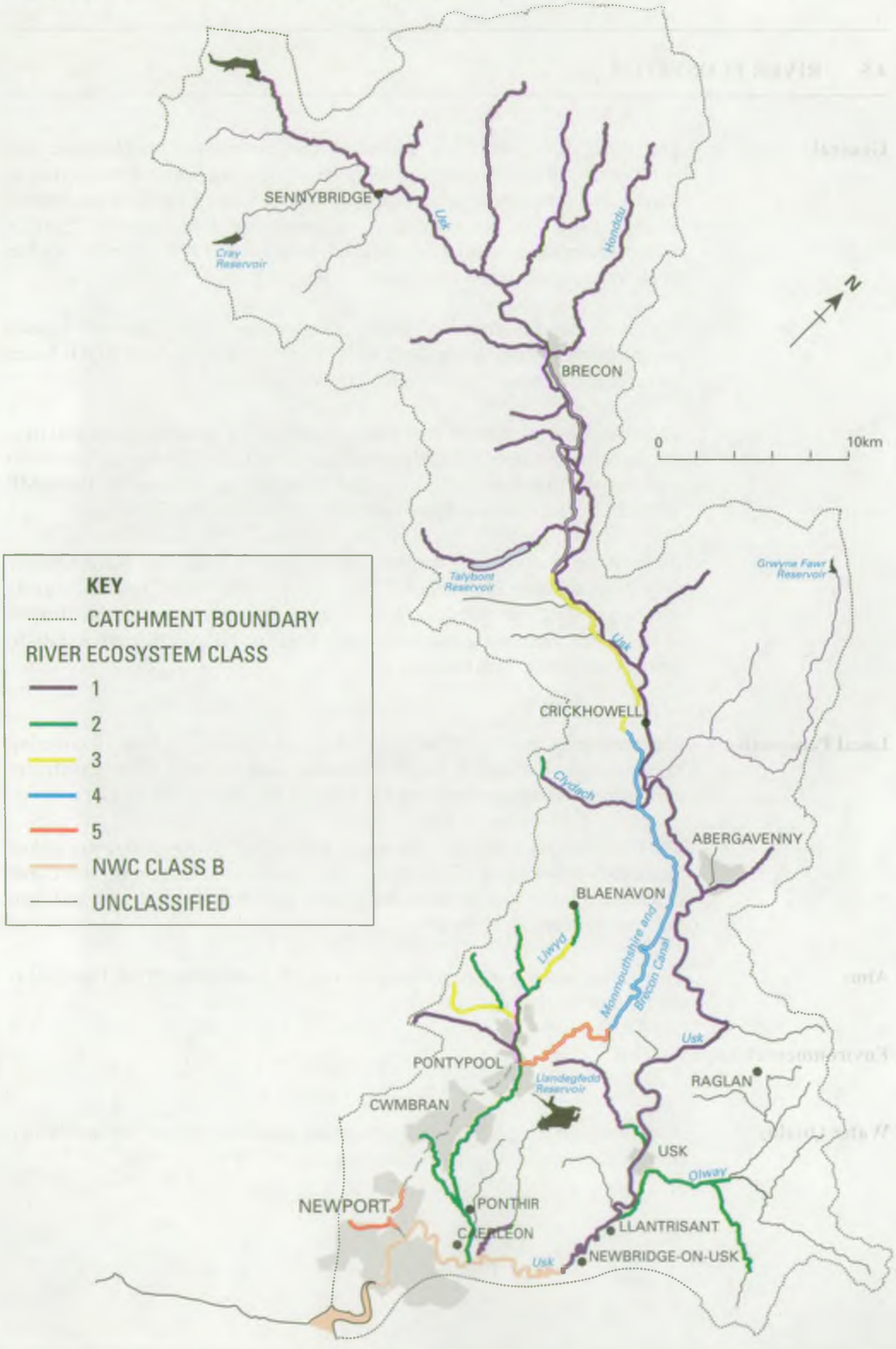
To provide water quality suitable to support a healthy River Ecosystem appropriate to this type of river.

Environmental Requirements

Water Quality

Waters should comply with the appropriate standards of the Surface Waters (Rivers Ecosystem) (Classification) Regulations 1994.

MAP 10. RIVER ECOSYSTEM ASSESSMENT



Water Quantity	To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.
Physical Features	An appropriate diversity of natural instream and bankside habitat should be maintained to support the Ecosystem typical of this river type.

4.6 GENERAL ECOSYSTEM

General.

This Use relates to the protection of all aquatic flora and fauna along with dependent organisms in the river corridor. In this context, dependent organisms are those which rely, at some stage in their life cycle, on the aquatic and bankside environment.

Thus this is the basic Use that is applied to **all** controlled waters within the catchment and provides protection to the aquatic environment from substances identified as "Dangerous to aquatic life" under the EC Dangerous Substances Directive. However, there is also a requirement to protect physical features and water quantity at appropriate levels.

Where areas of the catchment are important for more specific ecological reasons, their protection/development is dealt with in the specific Use related chapters that follow and suitably rigorous water quality targets will be applied.

Local Perspective

The Usk and the majority of its tributaries are typical, upland gravel-bed rivers providing a range of aquatic and marginal habitats. Many of the watercourses are tree and shrub-lined, though less so in the lower catchment. The upper part of the catchment supports a relatively rich flora, nationally rare lichen species associated with emergent and flood-zone boulders, and some rare bryophytes, associated with boulders and riparian trees.

The catchment is important for its bird populations with large colonies of sandmartins, breeding sandpipers and little ringed plovers in its middle reaches and some of the highest densities of dippers and grey wagtails in Wales on its tributaries. The lower valley supports overwintering wildfowl and the low-lying pastures are sometimes used by Bewick swans and breeding redshank and lapwing.

The otter population has recently shown evidence of expansion from its stronghold in the upper half of the river and the majority of the catchment, including the lower reaches of the Afon Lwyd, is now used by them. Water voles (currently under threat in the U.K.), are restricted to a small population on the Monmouthshire and Brecon Canal but mink are widespread. The river has also been identified as being important for its specialised invertebrate fauna of beetles, flies and craneflies, including several very rare species.

In addition to its important population of salmon and trout, the Usk supports nationally and internationally important populations of Twaite shad, sea lamprey and river lamprey. Historically, the river is known to have supported the rare Allis shad.

In general, the Afon Lwyd has been more affected by development than other parts of the catchment.

The River Usk at Chain Bridge is monitored for List 1, List 2 and Red List substances, and those selected pollutants identified by the Paris Commission.

The major sewage treatment works at Ponthir and the receiving esturial waters are monitored for the presence of List 1 and List 2 substances. These substances occur in varying concentrations in the sewage entering the works. They are derived from a number of industrial effluent discharges to the public foul sewerage system including treated effluent and all site drainage from the special waste incinerator at Pontypool. DCWW completed an extensive modernisation of the works in 1993 at a cost of £14 million, which has resulted in a very significant improvement in the quality of effluent discharged to the Usk estuary.

Aims To protect the basic general ecosystem associated with the aquatic environment and its associated corridor.

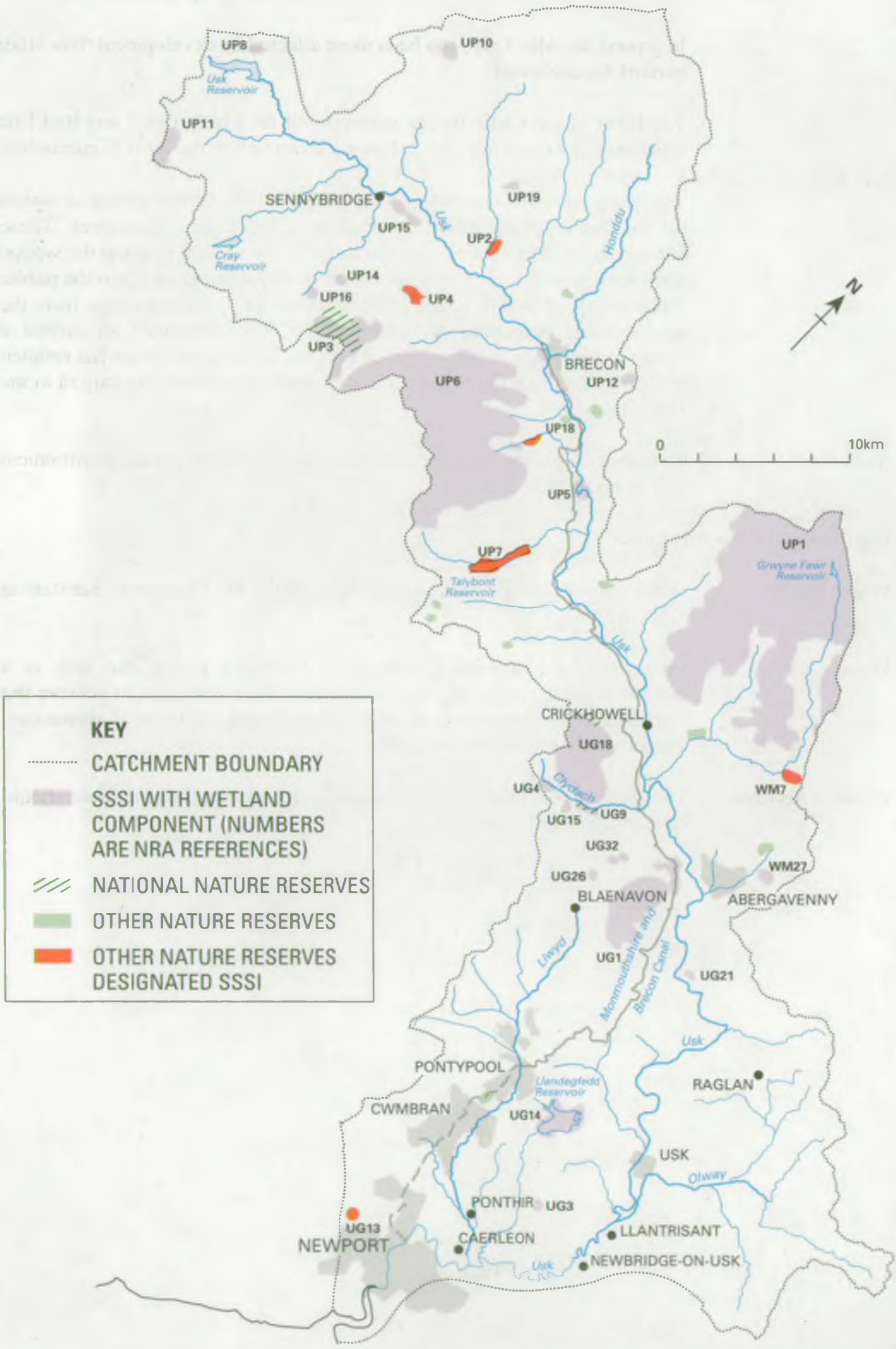
Environmental Requirements

Water Quality Waters should comply with requirements of the EC Dangerous Substances Directive.

Water Quantity To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features The diversity of natural instream features and river plants and animals should be maintained and enhanced.

MAP 11. SPECIAL ECOSYSTEMS - NATURE CONSERVATION



4.7 SPECIAL ECOSYSTEMS

General

Special ecosystems are regarded as those areas that are formally designated for their high conservation value. Such areas include National Parks, National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation and Special Protection Areas designated under the EC Habitats and Birds Directives.

This Use is extended to sites that are valuable in conservation terms but are not formally protected eg. Nature Reserves and County Trust Sites and other non-statutory nature reserves.

It is possible that a WQO for the Special Ecosystems Use will be introduced by the DoE during the lifespan of this Plan. Proposals by the NRA and English Nature are being considered and will be the subject of separate public consultation.

Local Perspective

Of the 38 designated SSSIs in the catchment, 31 have some wetland component (see Map 11). These include small ponds, streams and wet grasslands as well as parts of extensive moorlands such as the Brecon Beacons and the Black Mountain. The largest designated waterbodies are Llandegfedd and Talybont reservoirs, both primarily notified for their overwintering wildfowl. The Usk discharges into the Severn Estuary SSSI and proposed Special Protection Area and Ramsar Site. Although the River Usk itself is of nature conservation interest, only one short length is actually within a SSSI, partly for geomorphological reasons.

There are 17 County Trust Nature Reserves, 8 of which are designated SSSIs. There are 2 National Nature Reserves, though neither of them are principally of aquatic interest (see map 11) and a large part of the catchment lies within the Brecon Beacons National Park (See Map 12).

Aim

To protect the special features of interest, for which the site has been designated for their ecological or landscape importance.

Environmental Requirements

Special Conservation Areas are likely to have their own specific environmental requirements for water quality, water quantity or physical features. Currently no designatory agency has identified environmental targets for any sites and, inevitably, consultation would be required before such standards could be implemented.

At sites where water quality is a key factor in the creation of a special ecosystem, the most stringent standards for water quality (i.e. River Ecosystem Class 1) will be applied, in addition to any other known water quality standards.

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

4.8 CONSERVATION OF NATURE, LANDSCAPE AND HERITAGE

General

The protection of the aquatic ecosystem and designated sites for nature conservation are covered in the General Ecosystem and Special Ecosystems sections respectively. This section deals with the broader aspects of the conservation of wildlife, landscape and heritage features associated with inland waters but which may be away from the river corridor.

The landscape and features of conservation or archaeological interest are of great importance in many catchments and may attract large numbers of visitors.

The NRA has a duty to promote and further conservation of flora and fauna while it carries out its business. This includes the protection of water based or associated plants and animals that are so vital to the water environment. It also has to pay regard to any features of natural beauty or interest and must also consider the desirability of improving access to these features.

Exceptionally beautiful landscapes may be protected by being designated as Areas of Outstanding Natural Beauty (AONBs), for which the NRA is an informal consultee, or as National Parks.

Sites of historic or heritage interest may be classed as Scheduled Ancient Monuments (SAMs) or as 'listed buildings' but can be any feature of interest.

Local Perspective

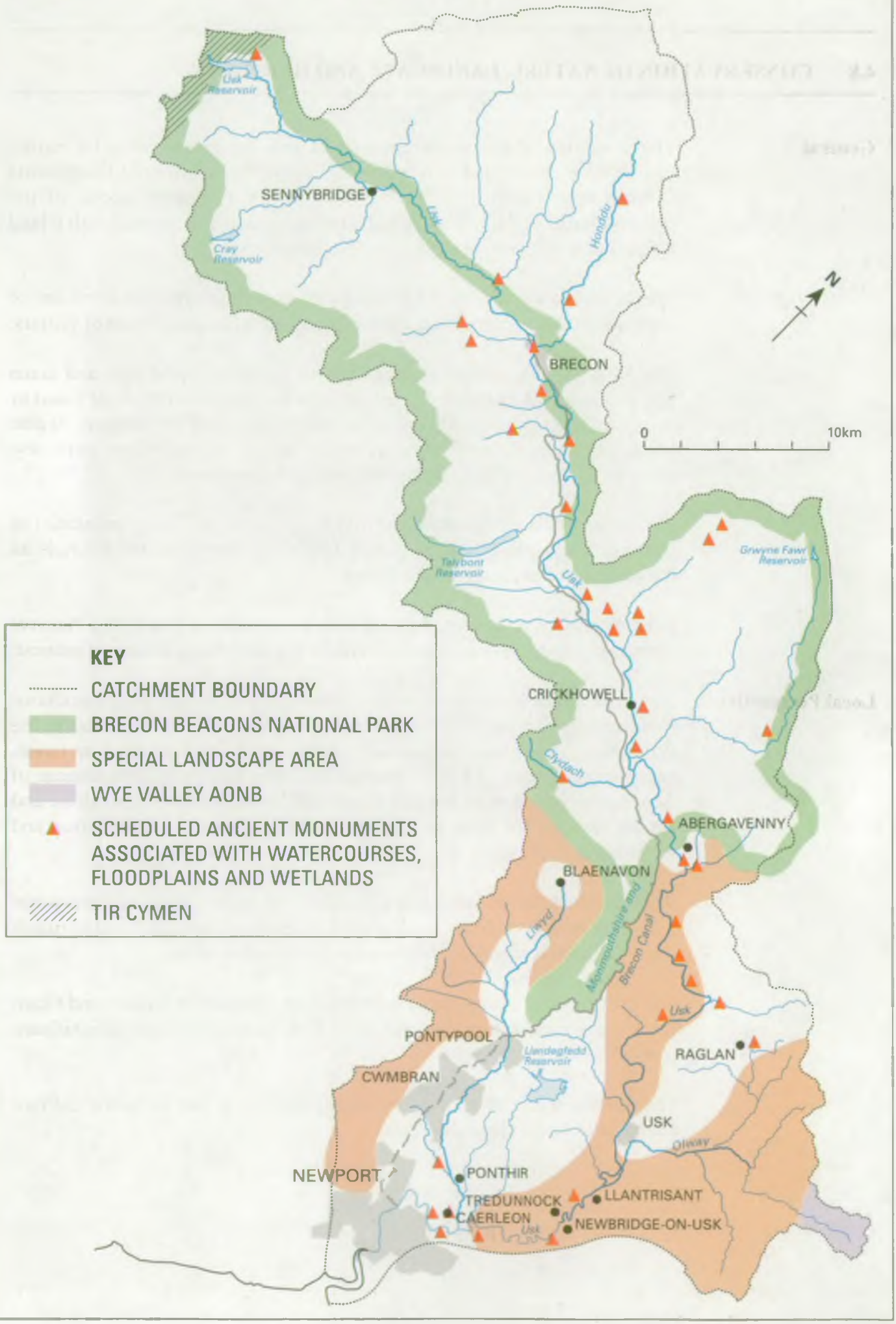
The upper tributaries rise on moorland and often pass through small deciduous woodlands before reaching improved or semi-improved grasslands on the valley floors. Some tributaries, notably the Grwyne Fawr and the Caerfanell, have extensive areas of conifer plantations. The catchment downstream of Abergavenny is of a more lowland nature with more intensive agriculture and gentler streams. The Afon Lwyd flows through a much more urbanised and industrialised valley.

With the exception of the River Usk itself, the largest areas of open-water habitat are reservoirs. There are few areas of extensive wet grassland or marsh and significant reedbeds are restricted to the estuarine zone.

The invasive alien plants, Japanese Knotweed, Himalayan Balsam and Giant Hogweed are present in the catchment with Giant Hogweed a significant problem in the lower catchment.

The catchment also supports excellent populations of bats including the rare Lesser and Greater Horseshoe bats.

MAP 12. LANDSCAPE AND HERITAGE



The majority of the upper catchment is within the Brecon Beacons National Park and a considerable part of the lower catchment, including the main Usk valley between Abergavenny and Caerleon, is a Special Landscape Area in the Gwent County Structure Plan. A small pocket at the extreme eastern edge of the Olway catchment extends into the Wye Valley Area of Outstanding Natural Beauty (Map 12).

While there are several Scheduled Ancient Monuments recorded, the majority, particularly the pre-Roman ones, are not associated with watercourses and flood plains and are not likely to be affected by NRA operations. Those which may be in some way associated with water are indicated on Map 12. Similarly, there are a large number of listed buildings, some of which are located close to watercourses or on flood plains. A number of sites and structures linked with the start of the industrial revolution and exploitation of the South Wales coalfields (particularly in the Blaenavon/Clydach Gorge area) have been proposed as World Heritage sites. These include features closely associated with watercourses in the Usk catchment such as Clydach Ironworks and the Monmouthshire and Brecon Canal.

Parts of Brecon, Crickhowell, Abergavenny, Usk and Caerleon are Conservation Areas and Tredunnock to Newbridge-on-Usk is a proposed Conservation Area. In addition to scheduled historic sites there are a significant number of unprotected sites which may be as valuable and are more vulnerable.

The small area on Map 12 marked as Tir Cymen represents a part of a pilot study area run by CCW to assist farmers in managing their land in an environmentally sensitive manner.

Aim

To ensure that wildlife, landscape and heritage features of interest (particularly designated sites) are protected and, where appropriate, accessible.

Environmental Requirements

Water Quality

Generally there will not be any specific water quality requirements to protect landscape or heritage sites although water around such public places should at least conform with the informal standards for Aesthetic Standards criteria.

Where water quality is a key factor, it should comply with the appropriate River Ecosystem class, while esturial and coastal waters should conform with standards for the Protection of Sensitive Aquatic Life.

Water Quantity

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

Physical features that give rise to natural beauty should be protected.

Sites and buildings of interest should, where cost-effective, be protected from damage by flooding and/or drought.

4.9 ABSTRACTION

General

The removal of water from streams, rivers or groundwater by man is termed **abstraction.** The various uses to which the water is put are all grouped under this general heading. Abstractions are controlled by licences granted under the Water Resources Act 1991. The abstraction licensing process ensures that the NRA can manage water resources so as to ensure that the right balance is struck between the needs of abstractors and the environment.

Exemptions from the requirement for a licence include most types of water supplies to a single household, and small (not more than 20 cubic metres a day) general agricultural uses from surface water (excluding spray irrigation). Also, large areas of North and West Wales are exempt from the licensing requirement for abstractions from groundwater (wells and boreholes), regardless of use. There are a number of other specific types of abstraction (eg. firefighting) which are exempt from the need for a licence(see Appendix 1b).

All abstraction licences specify maximum volumes that the licence holder may take, and many contain conditions to protect the environment and other abstractors. The exceptions are licences granted as Licences of Right in 1965, or "Licences of Entitlement" in 1990 where the legislation did not permit the NRA and its predecessors to restrict pre-existing abstractions.

In considering applications for new licences, the NRA must ensure that there is no derogation of existing abstractors without their agreement, and that the aquatic environment and associated habitats are properly safeguarded. The NRA does not guarantee that the authorised volume will be available, nor that the water will be fit for the purpose for which it will be used.

Certain types of abstraction have specific issues associated with them, as follows:

Public Water Supply

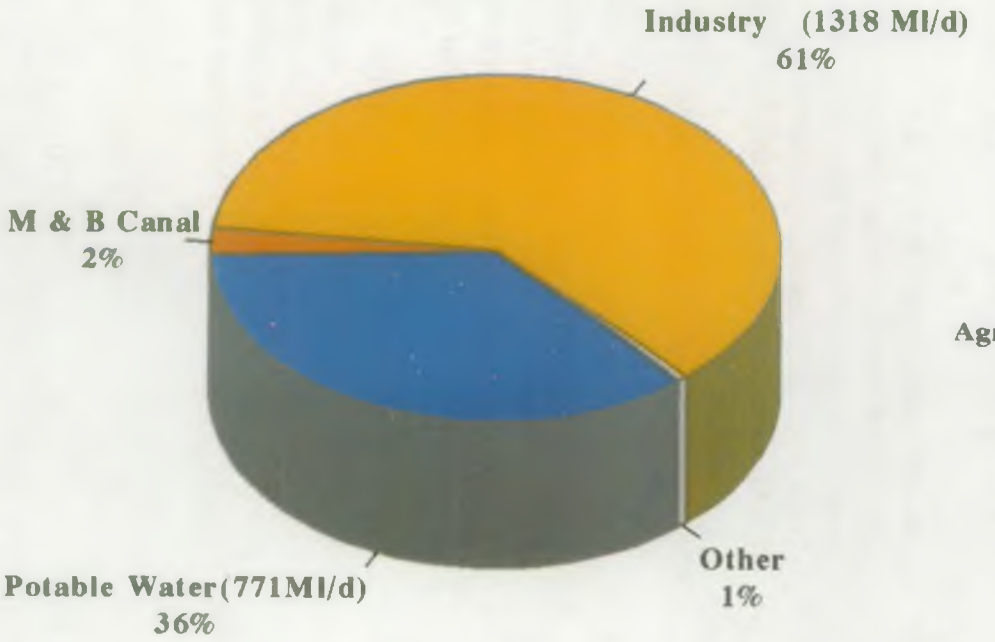
Public water supplies are mainly taken from surface waters - rivers, streams and reservoirs - but groundwater sources can be important on a local scale. Private supplies are generally derived from springs and boreholes and their quality is monitored by the Local Environmental Health Officer.

The NRA is not responsible for the quality of the raw water, nor of the delivered, treated water. However, it does have a duty to protect water quality and will specify protection zones around groundwater sources that seek to control certain potentially polluting activities. The Groundwater Protection Policy (Appendix 1A) forms the basis for the NRA's activities in this area.

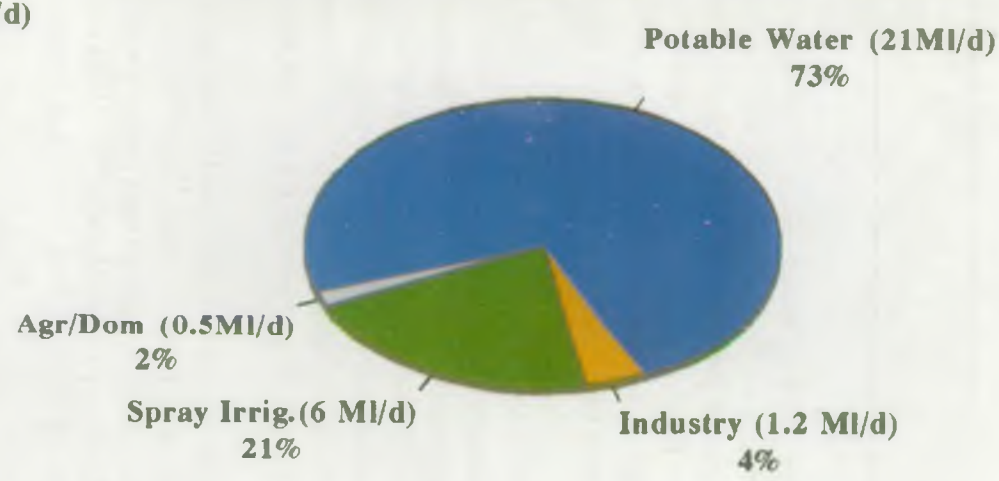
Fig 1: Summer Abstraction

Usk Catchment

Authorised Abstraction



Estimated Summer Water Loss



'Other' includes fish farms, recreation, agriculture, domestic and spray irrigation
Ml/d means Megalitres per day

Water Transfer

Water is not always used in the same place as it is abstracted from. It may be transferred elsewhere, within or outside, the catchment. Transfers clearly represent a nett loss of water to the immediate area and so their impact is generally mitigated by the release of regulation or compensation water during periods of low flow. All transfers are subject to abstraction licences.

Spray Irrigation

Spray irrigation is a high impact use of a water resource and as such is more strictly controlled than other types of abstraction. This is because it takes place during the driest times of year when flows are lowest, and little or no water is returned to the river after use. It is, therefore, potentially damaging to the water environment. The NRA encourages winter abstraction into storage and sets winter abstraction charges at only one-tenth of those for summer abstraction.

Fish Farming

A fish farm is usually a series of off-stream reservoirs in which fish are reared. This can severely affect a watercourse by diverting a large proportion of the flow through the farm. Although all the water is returned downstream, this does mean that a length of the river is reduced in flow. The requirement for an adequate residual flow to protect the river can restrict the viability of a fish farm.

Amenity

There is an increasing demand for water to supply a wide range of amenity ponds and lakes to meet needs as diverse as nature conservation and water sports. Water for these ponds and lakes can be taken from ground or surface water supplies and is subject to the normal abstraction licensing procedure.

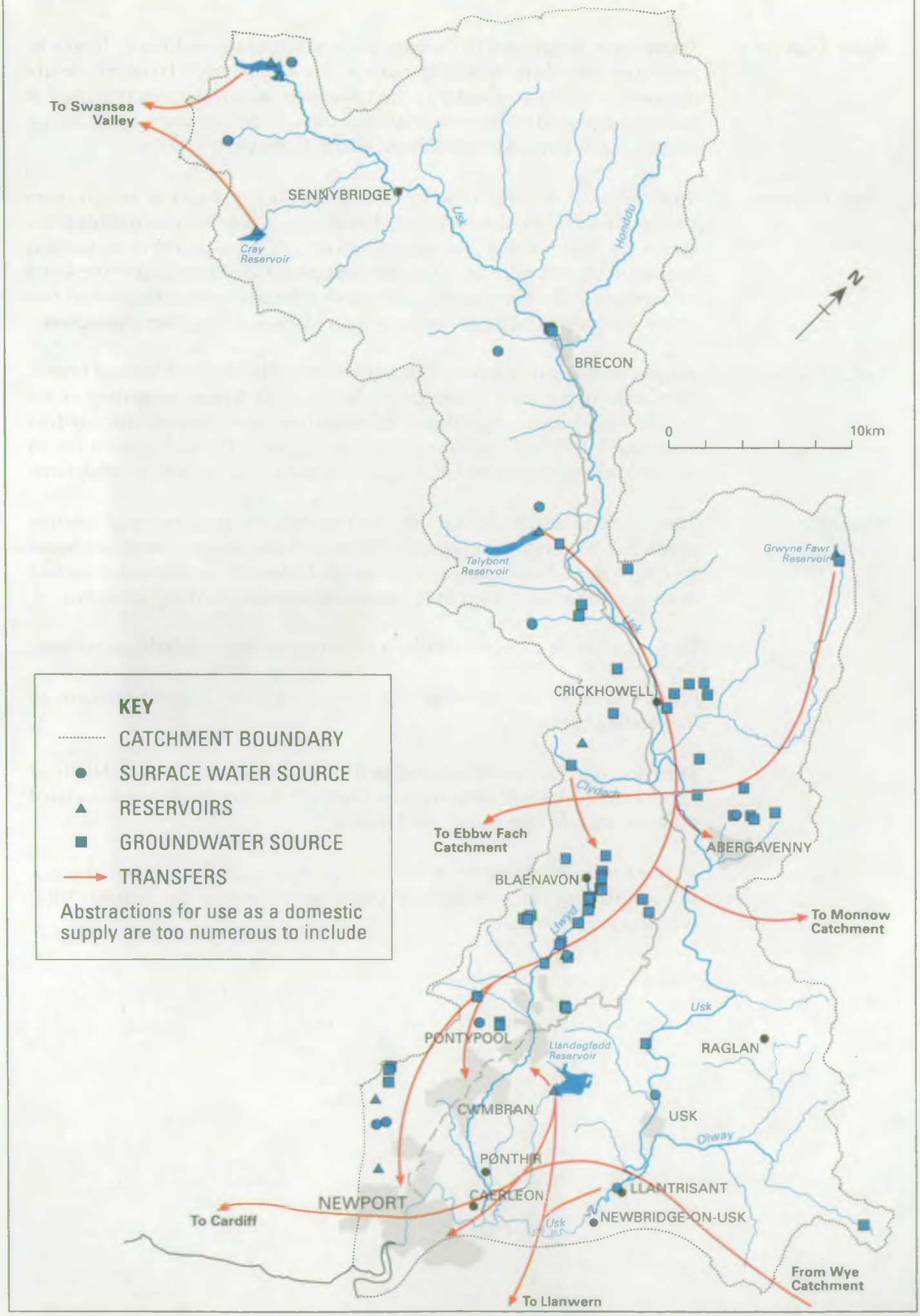
There may also be a requirement for a discharge and/or land drainage consent.

Ponds created by the damming of a watercourse will generally require an impounding licence.

Many amenity ponds are constructed in flood plain areas and are potentially of concern. The NRA will seek to ensure that such developments and associated works do not affect the natural river regime.

To stop the indiscriminate spread of alien fish species and the spread of disease, all stocking of fish into amenity ponds is subject to the normal NRA authorisation procedures.

MAP 13. ABSTRACTIONS AND TRANSFERS FOR PUBLIC WATER SUPPLY



Local Perspective

Water Use

Abstractions of water in the catchment supply a range of needs from public and domestic water supply to agriculture, industry and amenity use. The pattern of abstraction is illustrated by Maps 13 to 15. This pattern is not solely a response to our immediate needs, it is in some measure a relic of recent historical requirements, and, in part, what it is thought will be needed in the near future.

An important symptom of this is that there are quite large disparities between the quantities of water earmarked for use (the licensed quantity), and the actual amounts used: many industrial users, for example, have licensed quantities which fulfilled the needs of previous manufacturing processes and which are not required by the more efficient methods of modern production. Other users hold some of their water rights in anticipation of a dry summer, or for coping with the expected increases in public water needs in the coming years. Still other licences are no longer needed at all. Because of these disparities, the actual daily water use is much lower than that suggested by the licensed quantities.

Water Loss

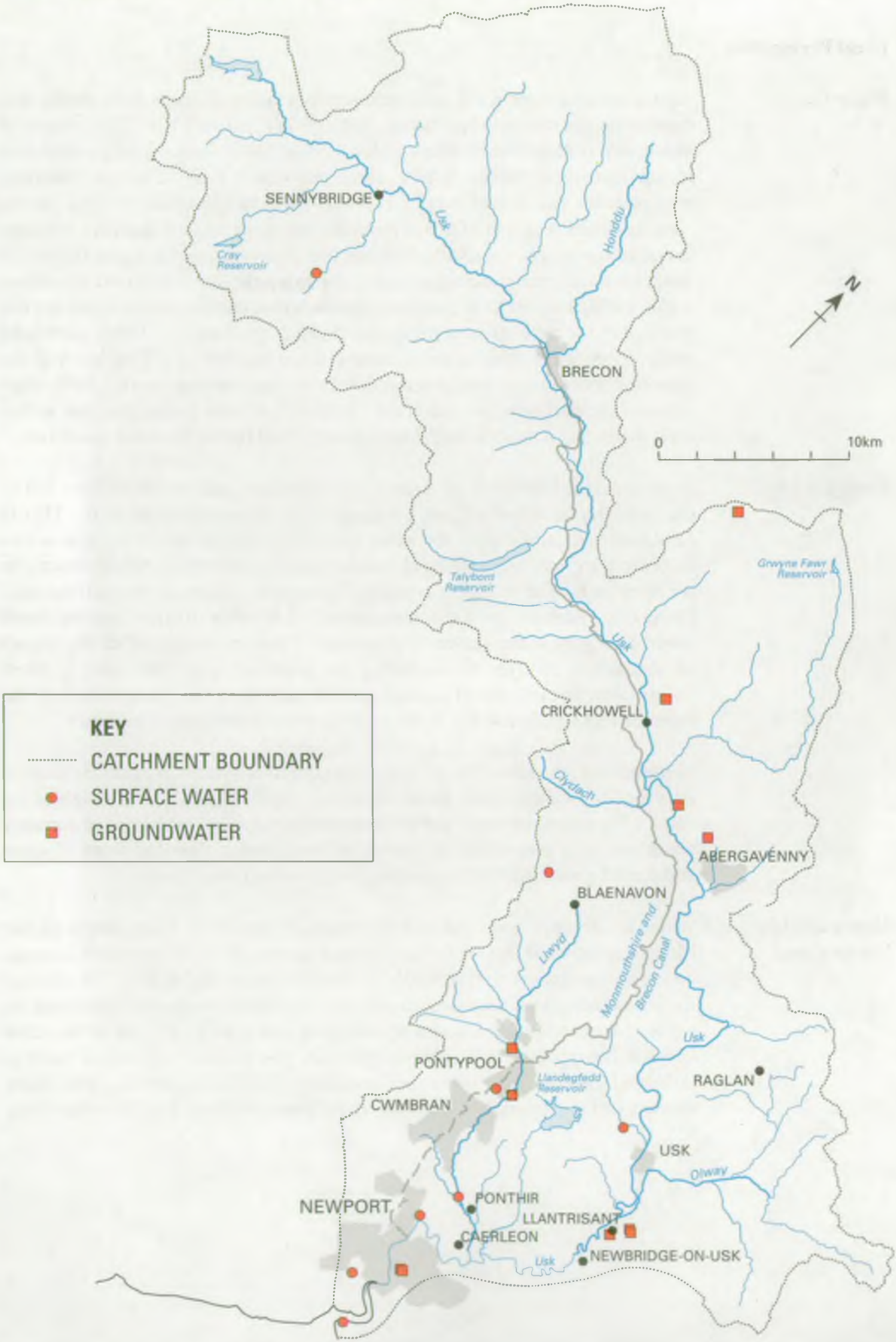
In protecting the health of the river, it is the quantity and pattern of flow left in the river that is important, not the quantity of water taken out of it. This is important because not all of the water taken from the catchment by abstractors is lost to the river. Most of the abstracted water is returned - either directly to the river (at the site or via the sewerage system) or indirectly through the soil. Many other licences have a 'compensation' or a 'hands-off flow', or use water stored during the winter season of abundance. These measures reduce the impact of abstraction on river flows during the summer, when the river is most vulnerable. The impacts of licences which take from the tidal reaches of the river are less significant due to the vastly greater quantities of seawater.

Consequently, the actual loss of water from the river system is often far smaller than the licensed use or the actual water use. The difference is highlighted by Fig.1. The quantities used in the figure are 'worst case' estimates of summer water loss: they assume that all licence holders abstract their full share of water and that all groundwater abstractions directly affect river flows.

Monmouthshire and Brecon Canal

Water is diverted from the Usk at Brecon to maintain water levels in the Monmouthshire and Brecon Canal. The abstraction does not require a licence, owing to special exemption under Water Resources legislation. It causes significant water loss, because although the canal does eventually discharge its water, it does so through a series of overflows along its length and to the Afon Lwyd at Pontypool. It is unknown just how much water is diverted, but it is estimated that the canal takes approximately 50 Ml/d at Brecon, with some smaller surface waters also draining into it along the length of its route (Map 13).

MAP 14. ABSTRACTIONS FOR INDUSTRY



Public Water Supply /Water Transfers

The principal cause of water loss from the river is the abstraction for public water supply which mostly occurs in the cleaner headwaters and tributaries in the catchment (Map 13). They range from local catchpits and collections of springs (taking as little as 0.01 Ml/d) to the large combined abstractions from the reservoirs at Talybont (73 Ml/d), Usk (43 Ml/d), Cray (43 Ml/d) and Grwyne Fawr (9.6 Ml/d). There are also important abstractions from the River Usk itself at Rhadyr (318Ml/d), Llantrisant (77Ml/d) and Brecon (in conjunction with local boreholes, 5.8 Ml/d). These reservoirs represent a water resource of major importance. Combining to give a total storage of over 50 000Ml/d, and a reliable annual yield of 320Ml/d, they are an essential link in a network of water supply designed to serve the whole of South East Wales.

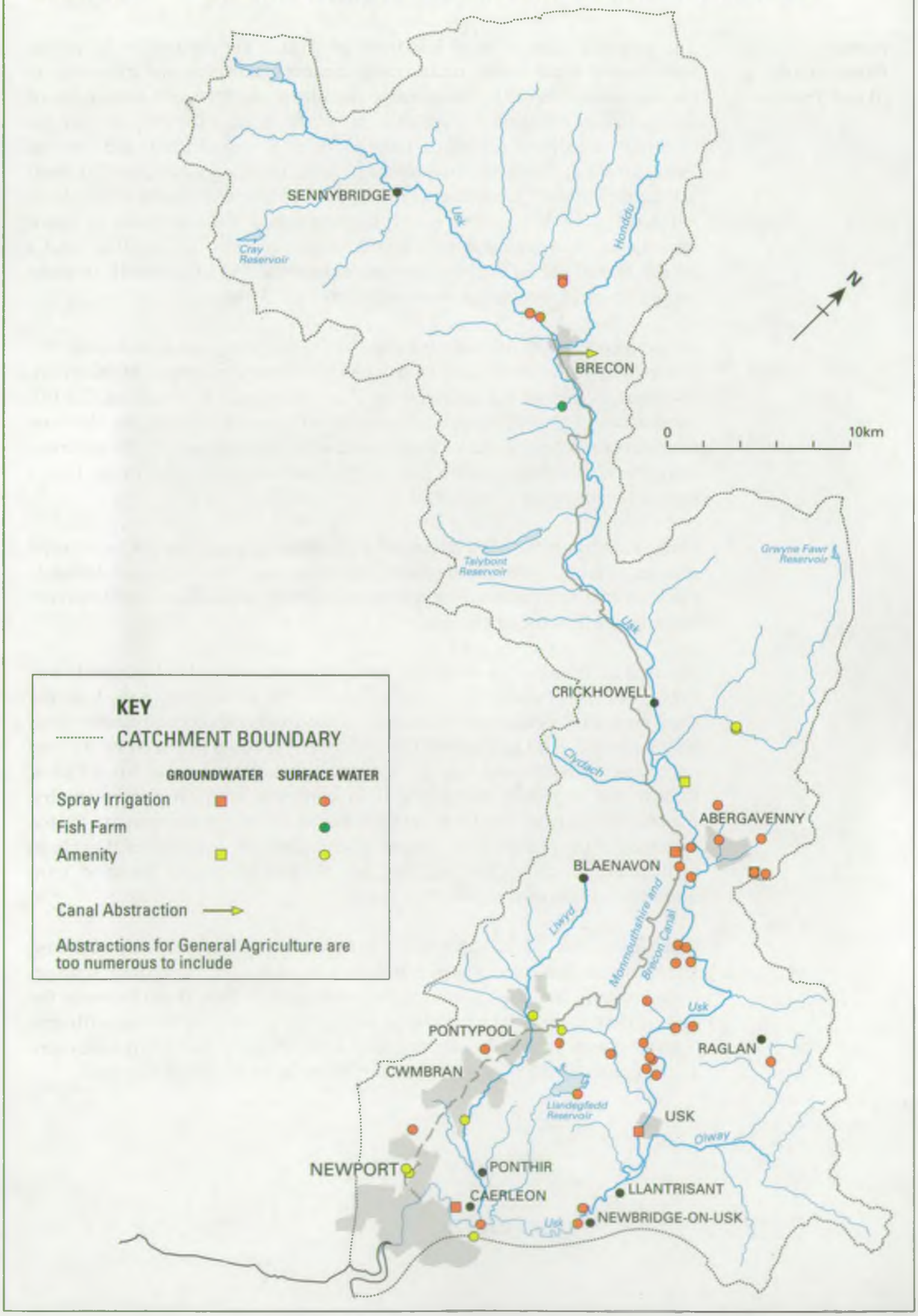
An extensive system of water transfers has been developed to distribute this water (Map13). These sustain the Usk catchment's towns of Newport, Cwmbran, Pontypool and Abergavenny. They also assist in supplying Cardiff, Swansea and Ebbw valleys, and a minor transfer is also made to the Monnow catchment from Abergavenny. Water can also be imported to the Usk catchment from the Wye at Monmouth. This supplements water supply to the Usk 's coastal periphery and Cardiff.

Using these water transfers has reduced the demand upon smaller local water sources, notably in the Llwyd catchment. Moreover, their very size demands that a variety of environmentally protective measures are used to restrict summer water losses from the catchment.

Abstractions from the Usk at Rhadyr and at Llantrisant (in all but extremely low flows) are compensated for by releasing water in advance from the Usk and Cray reservoirs. The water contained in the reservoirs comes mainly from winter rainfall. For Llandegfedd reservoir, little water is provided by its own catchment, the Sor Brook. As a result, water is abstracted from the River Usk at Rhadyr and stored in Llandegfedd. In common with all the reservoirs, Llandegfedd must release water into the source streams to compensate for the damming of their headwaters. Unfortunately, while these measures do help in maintaining the daily flow quantity, they do less to support the short term quantities and the natural pattern of flows.

Water losses from public water supply abstraction are lessened further because much of the abstracted water is returned to the river as treated sewage. Unfortunately, this does result in some reduction in river flows between the abstraction and the point of discharge back to the river. The sewage effluents from the coastal parts of the catchment, and the whole of the Llwyd valley, are discharged to the tidal waters and do not return to the freshwater system.

MAP 15. ABSTRACTIONS FOR AGRICULTURE AND AMENITY



Spray Irrigation /General Agriculture / Domestic

Spray irrigation to crops or golf courses results in most of the water being lost from the catchment. Fortunately, however, the irrigators have congregated around the most reliable supply of water, and so are mostly confined to the area that can best sustain this use - the Usk river corridor. Typically, these small and medium sized abstractions (averaging 0.25 Ml/d) take water directly from surface watercourses. In a dry summer spray irrigation might be responsible for around 10 % of total water loss.

Away from the river corridor, the catchment's rural landscapes are scattered with hundreds of general agricultural and domestic abstractions. These abstract from numerous springs, farm wells and boreholes in preference to mains supplies. The domestic abstractions are used as personal sources of drinking water. The general agricultural abstractions are put to a variety of uses, including dairying, stockwatering and cleaning. In both types of abstraction over half the water returns to the river system. The very small volumes abstracted pose little threat to the water environment.

Industrial

The Afon Lwyd valley and Newport are home to most of the industrial abstractions (Map 14). These feed the processes of production ranging from small volume servicing of public houses to cooling in power stations and steel plants. As might be imagined, the amount of water returning to the river system depends greatly upon the specific use to which the water is put. Thus, the water loss has been assessed differently for each.

By far the largest abstraction is at Uskmouth Power Station (1309 Ml/d). This takes from the estuary mouth and does not affect the river flows. No other abstraction licensed for industrial use is over 3.2 Ml/d. There are, however, several plants which use the potable water abstracted in the catchment. These include the steel complex at Llanwern (outside the catchment) which receives some of the water extracted by DCWW in the lower Usk.

Fish Farming/ Amenity

Abstractions for fish farming and amenity (Map 15) are non-consumptive (where all the water used is returned to the environment). The only effect upon the quantity of river flows occurs between the abstraction and discharge points. Of the three fish farms in the catchment only the NRA's rearing facility on the Cynrig requires a licence. This abstracts 2.7 Ml/d and provides fish for stocking the rivers of South Wales. All the water is returned a short distance downstream. The licensed amenity abstractions are greater in number (10) and in total take 3.4 Ml/d, again returning it a short distance downstream. The only amenity abstraction which causes significant localised water losses is the Monmouthshire and Brecon Canal.

Aims

To manage the quality and volume of water resources so as to safeguard licensed and exempt abstractions and the environment. This includes the active enforcement of abstractions. The NRA will encourage abstractions to be made as far downstream as possible and discharges to be made as close to the point of abstraction as is practicable.

Agricultural/ Spray Irrigation

To protect the quality and volume of groundwaters by implementing the NRA's Groundwater Protection Policy.

To minimise the impact on summer flows of spray irrigation and other forms of nett abstraction.

Environmental Requirements

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

4.10 SEWAGE EFFLUENT DISPOSAL

General

In Wales most sewage effluent discharged into freshwaters has been treated in a sewage treatment works (STW) or smaller facility such as a septic tank. However, some untreated sewage is occasionally discharged into rivers from overflows on the sewerage system. The overflows act as safety valves to stop the treatment works being overloaded or the sewerage system being damaged and also to prevent flooding of property. They are designed to operate only under storm conditions when river flows are very high. All these types of discharge are regulated by the NRA which issues, and monitors compliance with, consents to discharge. In order to protect the water environment these consents may contain conditions that variously specify the quantity, quality or circumstances of effluent discharge. In Wales, DCWW handles the bulk of sewage effluent discharged to freshwaters, although the greater number of STWs are privately owned.

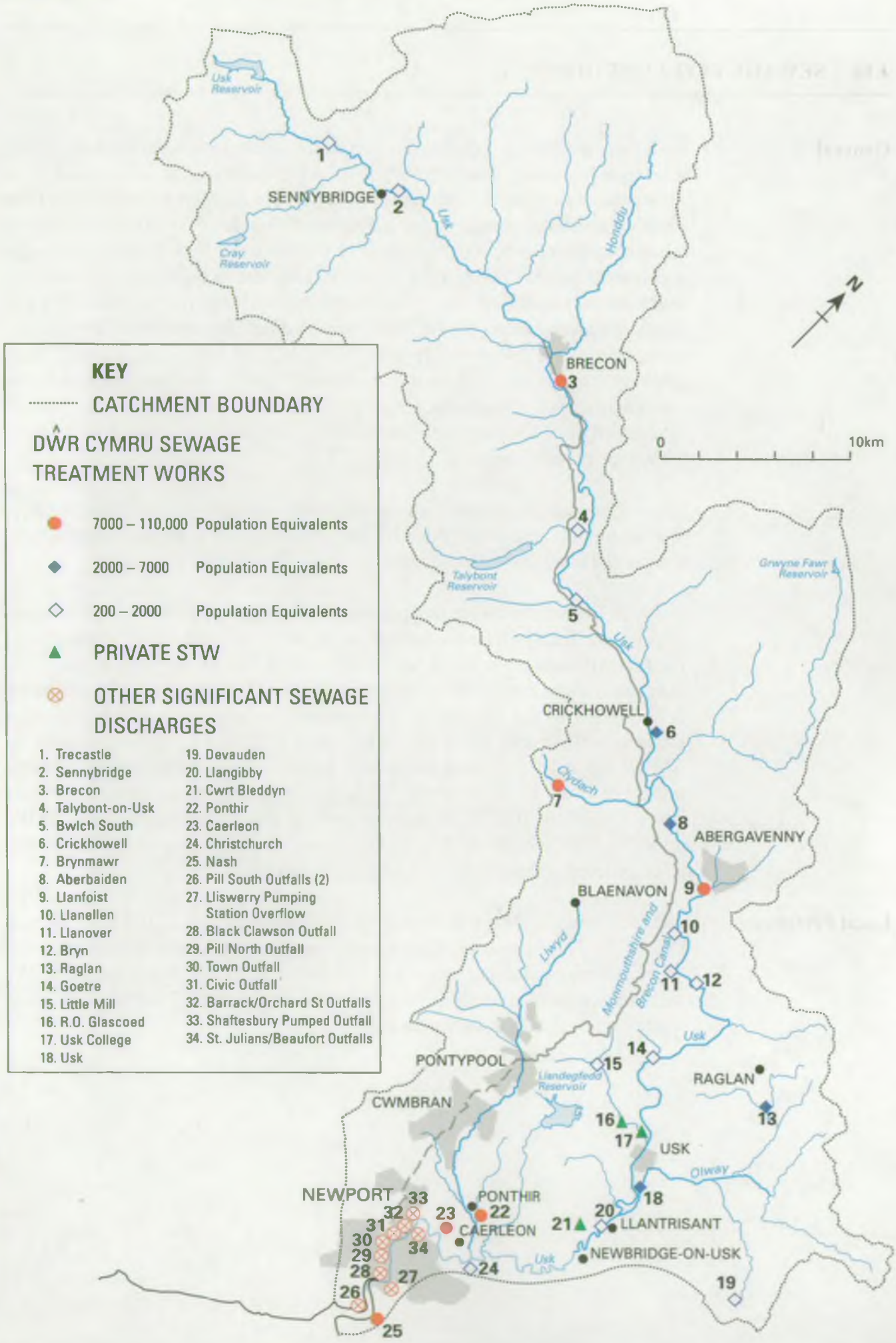
Coastal sewage discharges, which serve the majority of the population of Wales, are also generally owned by DCWW although at present few of them receive the level of treatment associated with freshwater discharges.

In Welsh Region, the continuing improvement in sewage effluent treatment and disposal facilities will be the subject of DCWW's second Asset Management Plan (AMP2), which is being produced in close liaison with the NRA. This plan specifies the capital investment required for DCWW's assets (with regard to the terms of the EC Urban Wastewater Treatment Directive and other statutory obligations) and covers the period 1995-2015. In preparation for AMP2 the NRA has, over the past two years, assessed the environmental impact of every DCWW owned STW discharge and those from Combined Sewer Overflows (CSOs) in order to provide a basis for establishing AMP2 priorities. Any sewage effluent related issues identified within this CMP will be considered within the agreed AMP2 programme.

Local Perspective

The total sewage effluent discharge to the freshwater part of the catchment is 15.7 Ml/d. This represents 5% of the dry weather flow of the River Usk. The majority of consented discharges are from DCWW STWs. There are 51 STWs with discharges of more than 50 population equivalents ($10m^3/d$). The most significant of these are shown on Map 16.

MAP 16. SEWAGE EFFLUENT DISPOSAL



KEY

CATCHMENT BOUNDARY

DWR CYMRU SEWAGE TREATMENT WORKS

- ● 7000 – 110,000 Population Equivalents
- ◆ 2000 – 7000 Population Equivalents
- ◇ 200 – 2000 Population Equivalents
- ▲ PRIVATE STW
- ⊗ OTHER SIGNIFICANT SEWAGE DISCHARGES

1. Trecastle
2. Sennybridge
3. Brecon
4. Talybont-on-Usk
5. Bwlch South
6. Crickhowell
7. Brynmawr
8. Aberbaiden
9. Llanfoist
10. Llanellen
11. Llanover
12. Bryn
13. Raglan
14. Goetre
15. Little Mill
16. R.O. Glascoed
17. Usk College
18. Usk
19. Devauden
20. Llangibby
21. Cwrt Bleddyn
22. Ponthir
23. Caerleon
24. Christchurch
25. Nash
26. Pill South Outfalls (2)
27. Lliswerry Pumping Station Overflow
28. Black Clawson Outfall
29. Pill North Outfall
30. Town Outfall
31. Civic Outfall
32. Barrack/Orchard St Outfalls
33. Shaftesbury Pumped Outfall
34. St. Julians/Beaufort Outfalls

The most significant inputs are shown in the following table:-

Name/Location of STW	Population Equivalent	Receiving Watercourse
Ponthir	110 000	Usk Estuary
Nash	67 600	Usk Estuary
Caerleon	8 700	Usk Estuary
Christchurch	250	Usk Estuary
Llanfoist (Abergavenny)	17 300	River Usk
Brecon	8 080	River Usk
Brynmawr	7 280	River Clydach
Aberbaiden	5 400	River Usk
Crickhowell	3 050	River Usk
Usk	2 100	River Usk
Raglan	2 010	Nant-y-Wilcae

There are many smaller discharges from STWs to watercourses and numerous septic tanks which mostly drain into the ground.

The total sewage effluent discharge to the estuary is approximately 70 Ml/d (in dry weather conditions). There are 14 discharges of crude sewage into the estuary, mainly from the western half of Newport. The 12 significant ones are shown on Map 16. These discharges are controlled under consents which require the provision of full biological treatment by the year 2001 to comply with the Urban Waste Water Treatment Directive requirements. The current proposal for dealing with these entails the construction of an intercept sewer along the west bank of the estuary and connection to the Nash STW by a new pipeline to be constructed beneath the bed of the estuary.

DCWW have recently completed an extensive modernisation to Ponthir STW which has resulted in a very significant improvement in the quality of the effluent discharged to the estuary.

All of the urban areas in the catchment have sewerage systems with combined sewer overflows (CSOs). There are 95 such overflows to the river system in the catchment and a further 36 to the estuary. The majority of these are unscreened and allow the discharge of sewage solids. There are 2 major overflows into the estuary from Lliswerry Pumping Station and Nash STW. In the last 2 years, Torfaen Borough Council and DCWW have made progress

on the replacement of old CSOs in the Pontypool area. Modern separator systems have been installed at various locations which have replaced up to 6 old CSOs at one time and a further scheme is scheduled for the town centre area of Pontypool, where a single separator will replace up to 12 old CSOs.

Aims

To control the disposal of treated and untreated sewage effluent and sewage sludge in a way that protects other water uses.

To protect the quality and volume of groundwaters by implementing the NRA's Groundwater Protection Policy.

The NRA would generally seek to ensure that discharges are made as close as possible to the point of abstraction.

Environmental Requirements

Water Quality

No deterioration in the quality of water above discharges, beyond that assumed when setting the consent for an authorised discharge.

No deterioration in water quality, below the area of mixing for the discharge, which causes detriment to other uses.

Water Quantity

Consent conditions will be derived taking into account the upstream dilution available under average and dry weather flow conditions.

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

No discharge of sewage from overflows should occur at sewer flows less than those specified in consents.

No reduction in the quality of the physical habitat should occur as a result of the discharge of sewage effluent or construction of the outfall works.

4.11 INDUSTRIAL EFFLUENT DISPOSAL

General

In many places it is necessary to dispose of liquid wastes from industry into fresh and coastal waters. However, the material discharged can be highly polluting and close control is therefore vital if the water environment is to be protected.

At most sites the NRA controls pollution from industrial effluents by a system of consents to discharge. However, where a site is subject to Integrated Pollution Control (IPC) any discharges will be authorised by Her Majesty's Inspectorate of Pollution (HMIP), in close consultation with the NRA. Within this framework the NRA will seek to ensure that any authorization issued is consistent with protecting the Uses of the receiving water and also the broader commitment to the reduction of dangerous materials in the environment. Where pollution prevention measures are stated by HMIP these must also be consistent with NRA pollution prevention policy.

Trade effluent is discharged to sewers with the permission of the sewerage undertaker (DCWW in Welsh Region) and is then subject to the sewage effluent treatment and disposal controls outlined in Section 4.12.

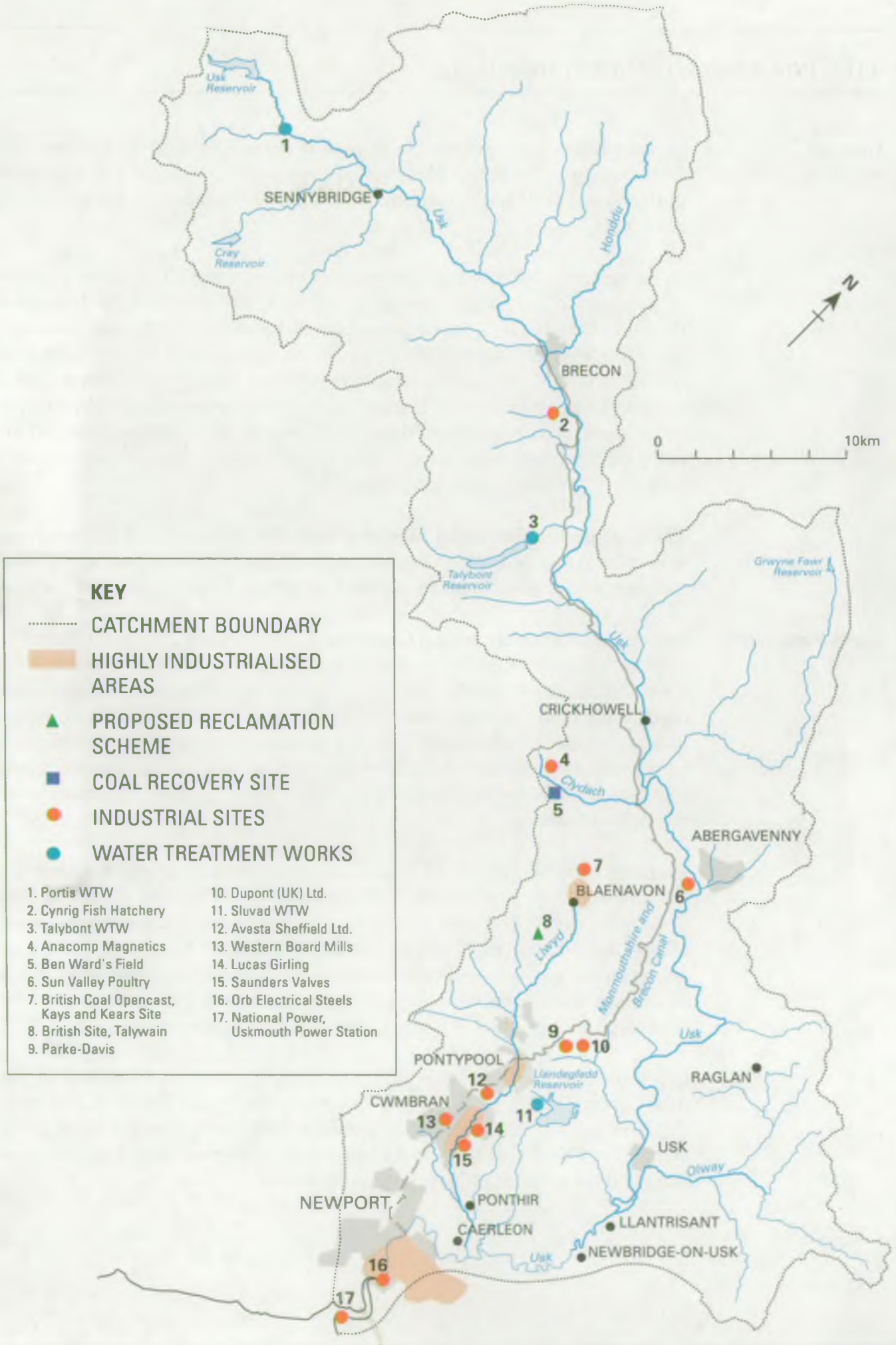
Local Perspective

Industry centres mainly around Cwmbran, Pontypool and Newport (Map 17). Historically, heavy industry, primarily iron, steel and coal has dominated the lower Usk catchment and the dockland areas. The decline of these industries has meant that it is now predominantly lighter industrial manufacturing and service industry based. The industries include power generation, steel producers, turbine blades, cardboard, glass fibre, automotive, engineering and electronic components, foodstuffs, carpets, pipeworks, valve systems, opencast coal mining and cables.

There are very few industrial discharges direct to surface water within the catchment because most of them discharge their trade effluent to the public foul sewerage system. The most significant direct discharges to the estuary are 8 Ml/d of metal contaminated effluent from Orb Electrical Steels Ltd. (where an effluent treatment plant will be installed in 1996) and a maximum of 982Ml/d of cooling water from the National Power Uskmouth Power Station. The discharged cooling water is warmer than the water in the estuary.

Other discharges are from the NRA fish hatchery at Cynrig (3.4Ml/d) to the Afon Cynrig, DCWW's Talybont-on-Usk Water Treatment Works (1.3Ml/d) to the Caerfanell and from Avesta Sheffield in Griffithstown, Pontypool (3.8 Ml/d) to the Afon Lwyd. This last site is a heavy industrial plant producing stainless steels and has a treated effluent containing metals.

MAP 17. TRADE AND MINERAL WORKING SITES



KEY

- CATCHMENT BOUNDARY
- HIGHLY INDUSTRIALISED AREAS
- PROPOSED RECLAMATION SCHEME
- COAL RECOVERY SITE
- INDUSTRIAL SITES
- WATER TREATMENT WORKS

1. Portis WTW
2. Cynrig Fish Hatchery
3. Talybont WTW
4. Anacomp Magnetics
5. Ben Ward's Field
6. Sun Valley Poultry
7. British Coal Opencast, Kays and Kears Site
8. British Site, Talywain
9. Parke-Davis
10. Dupont (UK) Ltd.
11. Sluvad WTW
12. Avesta Sheffield Ltd.
13. Western Board Mills
14. Lucas Girling
15. Saunders Valves
16. Orb Electrical Steels
17. National Power, Uskmouth Power Station

Some trade discharges also arise from site drainage where surface water may become contaminated by spillages on site. The more significant of these sites, such as Anacomp Magnetics, Sun Valley Poultry, Dupont (UK) Ltd. (a fibres factory) and Parke Davis (pharmaceutical manufacturers) are routinely inspected to ensure that appropriate measures are taken to minimise this pollution risk.

Aim

To control the discharge of liquid industrial waste to prevent pollution that would affect other Uses of the water.

To protect the quality and volume of groundwaters by implementing the NRA's Groundwater Protection Policy.

The NRA would generally seek to ensure that discharges are made as close as possible to the point of abstraction.

Environmental Requirements

Water Quality

Discharges should comply with all conditions stated within discharge consents. This will be enforced by the NRA.

There should be no deterioration in water quality above the discharge beyond that assumed when the discharge consent was calculated.

Water Quantity

Consent conditions will be derived taking into account the upstream dilution available under average and dry weather flow conditions.

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

No alterations should be made to the river channel which would reduce the mixing of the effluent and receiving water.

4.12 MINERAL EXTRACTION

General

Mineral extraction can affect surface and groundwaters in a wide variety of ways. Discharges from active quarries and mines can contain toxic and suspended materials that are harmful to aquatic life and are subject to the normal discharge consenting procedure described in Section 4.12. However, discharges from abandoned mines are not adequately controlled by the law and may cause locally severe problems.

The exploitation of minerals can have major impact on water resources by altering groundwater flows and hence affecting stream flows. The removal of material from above the water table reduces the opportunity for natural filtering and attenuation of pollutants, which will consequently enter groundwater more readily. Summer springflows can be reduced as a result of the loss of the water storage capacity of the mineral that has been removed. Reclamation with impermeable materials will increase run-off and reduce the recharge of groundwaters by rainfall.

Open cast mining can be of particular concern to the NRA. These mines can also affect the fishery and conservation value of long lengths of diverted river as well as groundwater quality and quantity.

Gravel extraction may take place from the river channel or floodplains and is controlled by planning law and may also require a land drainage consent from the NRA. If works are not properly managed, the river channel can be seriously damaged by gravel removal.

In some areas land reclamation schemes may cause renewed problems as toxic metals are exposed or fine solids run off into watercourses. Consequently such discharges are licensed and monitored by the NRA.

All mineral workings are subject to general planning control and the NRA is a consultee on such applications and considers each application on a case by case basis.

Local Perspective

Coal mining is still carried out within the catchment. The most significant operation is the British Coal Opencast Kays and Kears site at Blaenavon (Map 17). This is a short term opencast coaling operation, due to finish in 1996 and includes the reclamation of derelict land as part of the scheme. There are several consented discharges of site drainage from this site into the upper reaches of the Afon Lwyd. There are a number of private small mines located between Pontypool and Blaenavon. The discharges of minewater from these mines are consented and have very little impact on receiving water quality.

There is a land reclamation and associated coal recovery site at Ben Ward's Field, Brynmawr and another planned at British,Talywain (Map 17). These sites will eventually be regraded to leave a platform for residential and light industrial development and will require careful control to prevent pollution of the water environment during the process.

Aims

To ensure that mineral extraction and associated activity, including land reclamation, does not adversely affect the water environment.

To protect the quality and volume of groundwaters by implementing the NRA's Groundwater Protection Policy.

Environmental Requirements

Water Quality

All consented discharges must comply with the conditions stated within the consent. This will be enforced by the NRA.

There should be no deterioration in water quality above a consented discharge, beyond that assumed when the discharge consent was calculated.

Measures must be taken to prevent diffuse pollution that may arise from rainfall run-off.

Water Quantity

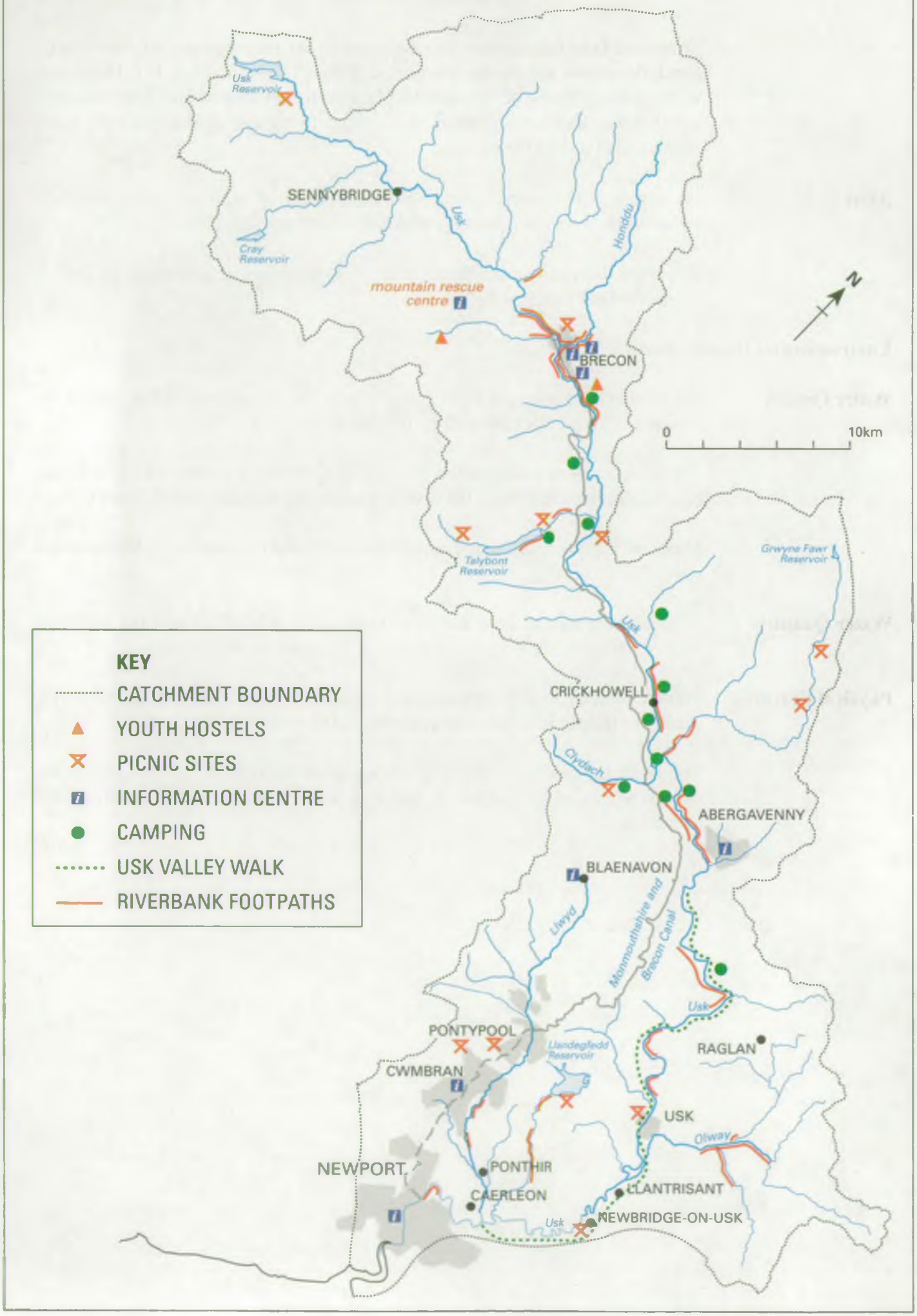
Mineral working and land reclamation should not have an adverse effect on surface and groundwater resources or the rights of water abstractors.

Physical Features

Mineral working, land reclamation and associated activity should not reduce the quality of the physical habitats available in the water environment.

The aesthetic quality of restored landscapes should be in keeping with the overall nature of the catchment and reflect the local needs for amenity and recreation.

MAP 18. BASIC AMENITY



4.13 BASIC AMENITY

General

Basic amenity relates to those activities that are principally land based but could by their nature, attract people to the river environment. Examples include walking, picnicking and bird watching. The main areas of concern are therefore the general aesthetic acceptability of the river corridor, access and public safety.

Local Perspective

The river corridors of the Usk and its tributaries contribute considerably to the amenity value of the area (see map 18). The rural parts of the Usk catchment are particularly popular with holiday makers, campers, outdoor enthusiasts and birdwatchers. Many of the towns along the river provide a base for exploring the Brecon Beacons National Park. The historic towns of Brecon, Crickhowell, Usk, Abergavenny, Caerleon and Raglan are all situated on rivers.

The Usk Valley Walk gives access to the river between Caerleon and Abergavenny and there are other, shorter, riverside footpaths principally associated with Brecon and Crickhowell. Few footpaths exist along tributaries of the Usk but there is access along most of the length of the Monmouthshire and Brecon Canal.

Aims

To maintain the watercourse so that the public enjoyment of bankside environment is not impaired.

To provide safe and easy access to the waterside without unreasonably constraining other Uses.

Environmental Requirements

Water Quality

Water quality should comply with the targets for Aesthetic Criteria which effectively define the minimum water quality acceptable for any water body.

Water Quantity

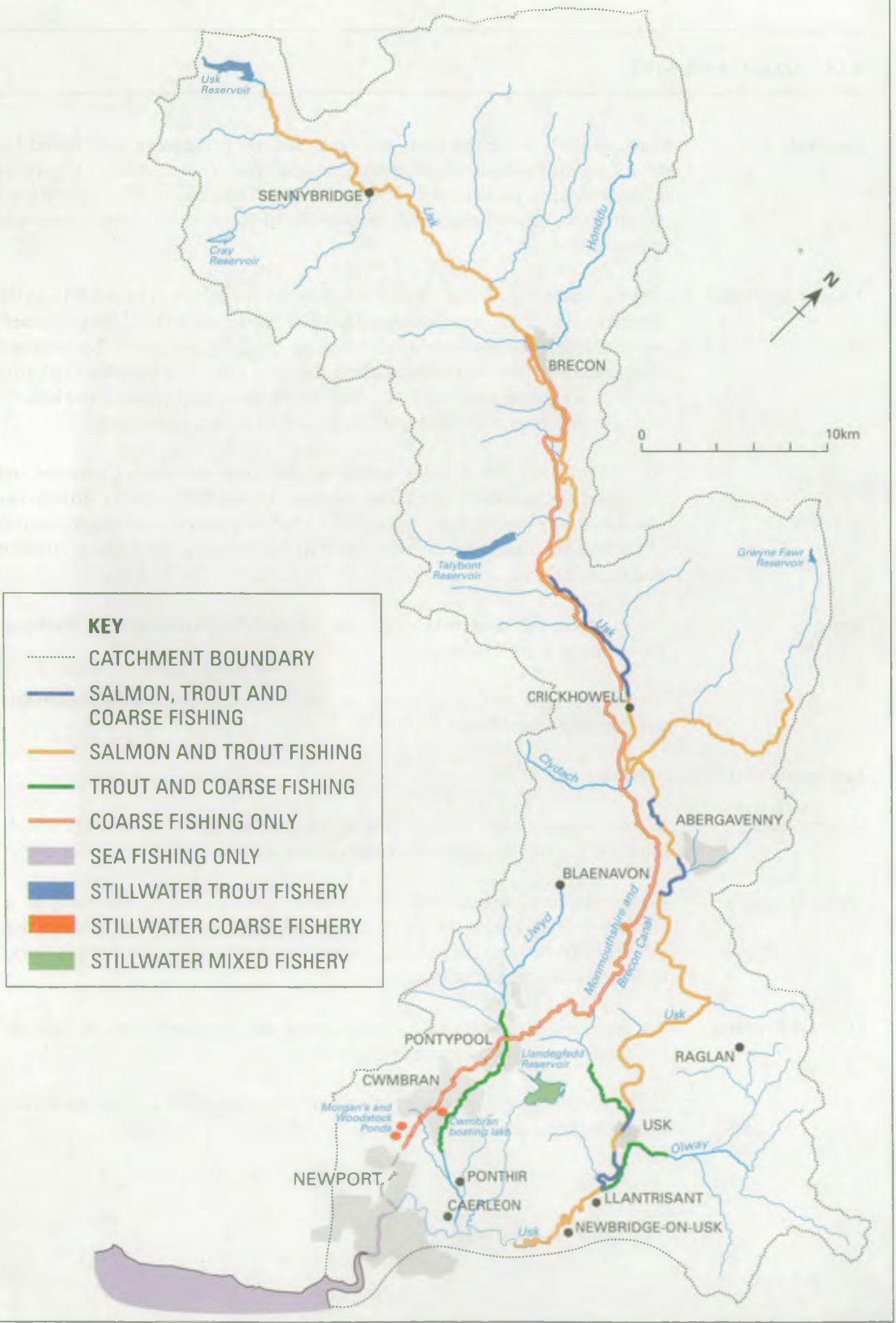
To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

An appropriate network of riverside paths and access points should be maintained and, where appropriate, promoted.

The development of recreational sites should be promoted at suitable locations as opportunities arise.

MAP 19. ANGLING



4.14 ANGLING

General

This section deals with the recreational activity of fishing with rod and line, rather than the protection of fish stocks. The latter are dealt with in the Fisheries section.

In many ways the requirements for angling are very similar to those for the basic amenity use. However the NRA has formal responsibility towards angling, and issues rod licences that are a legal requirement for fishing for any freshwater fish. The income generated by licence sales contributes to fisheries management costs.

Traditionally, in Wales, game fishing for salmon and trout has been the predominant form of freshwater angling, although coarse fishing for other freshwater species is locally popular in many areas. Angling for sea fish takes place at many sites covered by Catchment Management Plans. However, the NRA has neither control of, nor responsibility for, sea angling and it is not covered specifically in CMPs.

Local Perspective

Angling takes place throughout the catchment (see Map 19). The River Usk is one of the best salmon and trout fisheries in Wales. Fishing rights on the river and its tributaries are all in private ownership.

Salmon fishing occurs mostly on the main River Usk. Trout fishing also takes place mostly in the main river, on several of the tributaries (such as the Berthin, Olway and Llwyd), and in many stillwaters throughout the catchment. Some fishery owners and angling clubs stock with hatchery reared trout to supplement natural stocks.

River coarse fishing is permitted on the main river only by a limited number of fishery owners and angling clubs and in most of these cases, only during the game fish close season. There is also some coarse fishing on the Llwyd, Olway and Berthin tributaries. There are a number of stillwater coarse fisheries in the catchment but those most intensively fished are Morgans and Woodstocks ponds near Newport and Cwmbran Boating Lake. Llandegfedd reservoir is principally a trout fishery but allows specimen pike angling in the Autumn. Coarse fishing occurs along the length of the Monmouthshire and Brecon Canal, particularly around Pontypool and Cwmbran where stocks are better and the numbers of coarse anglers is greater.

These river and lake fisheries provide recreational fishing for game and coarse anglers, and for pleasure, match and specimen anglers.

Aim To ensure that the water environment can sustain angling at least at its current distribution and quality.

Environmental Requirements

Water Quality The standards relating to Aesthetic Criteria should be maintained so that the enjoyment of the waterside is not diminished. Fish stocks are protected by the provisions in the Fisheries Ecosystem use.

Water Quantity To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features Safe access to and from the waterside should be promoted.

The waterside features required for angling should be maintained and developed.

4.15 WATER SPORTS ACTIVITY

General

Waters used for sports and recreation fall into two broad categories; Identified Bathing waters and Water Contact/Recreational Use waters. Each category is treated separately below.

It is possible that in the future this Use will be included within the proposed scheme of Water Quality Objectives being developed by the DoE.

Identified Bathing Waters:

To be identified by the Department of The Environment (DoE)/Welsh Office (WO) as falling within the terms of the EC Bathing Waters Directive (76/160/EEC), several criteria are taken into consideration including: high numbers of bathers, first aid facilities, life guards and toilets. Identified waters are required to achieve the mandatory total and faecal coliform standards of the EC Directive and are sampled according to the DoE/WO guidelines during the bathing season (May to September inclusive). In Wales, these are exclusively saline waters.

Water Contact/ Recreational Use Waters:

All waters where water sports occur, other than identified bathing waters, fall into this second category. These could include rivers, stillwaters, estuaries and coastal water and may support activities such as canoeing or water skiing where total immersion is likely, or other non-immersion based recreation. Bathing may also take place. It should be noted that the NRA does not recommend bathing in freshwaters.

Local Perspective

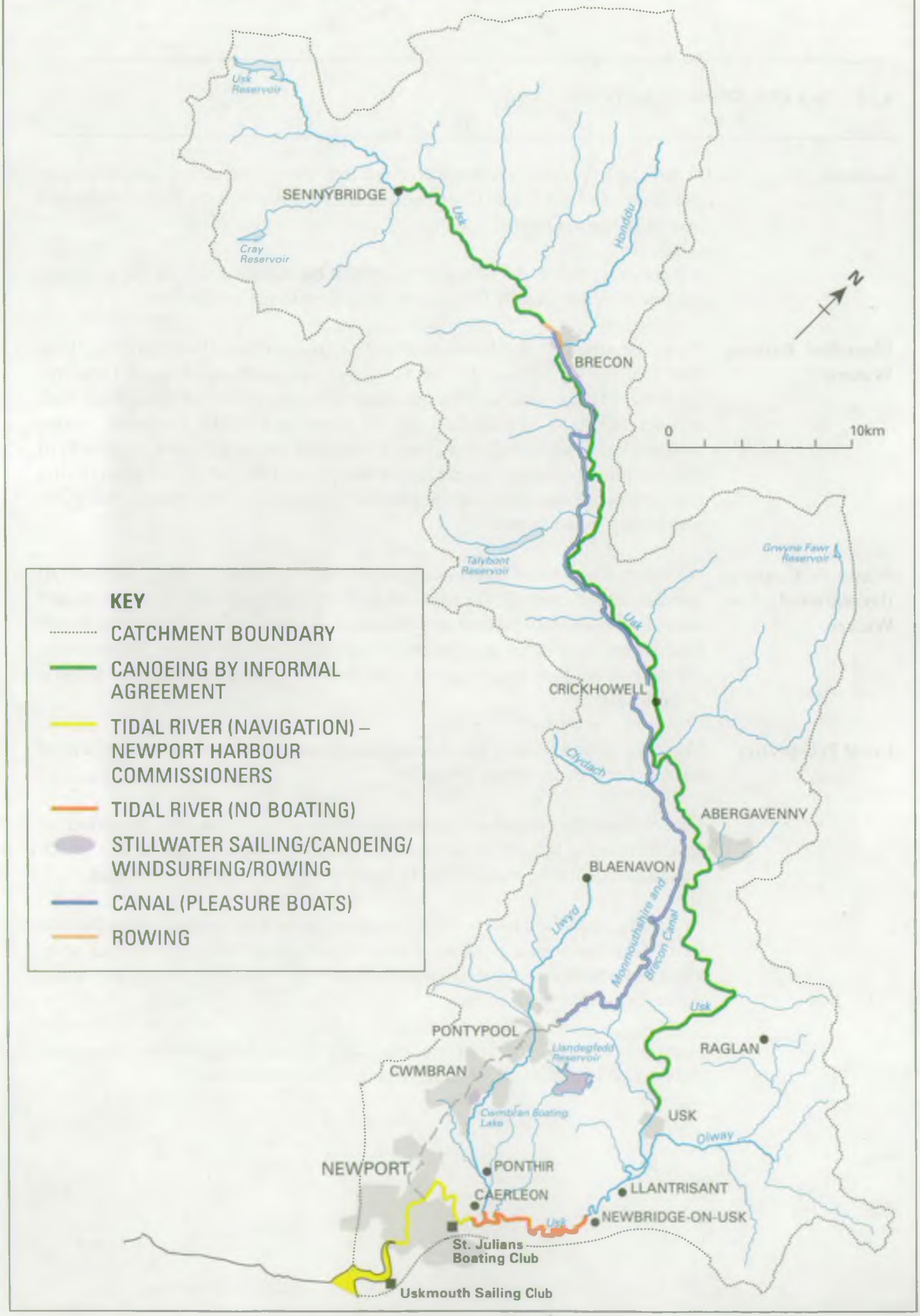
There is a variety of water based recreational activity in the river and on several lakes in the Usk catchment (Map 20).

Canoeists use the river subject to the riparian owners' permission. An informal agreement exists between fishery owners and the canoeing associations which covers access, timing and conditions under which canoeing is permitted.

At Brecon, paddle and row boats are available for hire in the river above Brecon weir. There are similar facilities at Cwmbran boating lake and there is a wide variety of watersports at the Llandegfedd reservoir, including sailing, canoeing, scuba diving and windsurfing.

Local people often swim in rivers, especially during hot summers. However, there are no identified EC Bathing Waters in the catchment.

MAP 20. WATER SPORT ACTIVITY, BOATING AND NAVIGATION



Aim To ensure that the catchment is maintained to an appropriate standard to support bathing in Identified Waters, and other water sports to at least their current levels of use at existing locations.

Environmental Requirements

Bathing in Identified Waters:

Water Quality At Identified Bathing Waters (EC Directive), water quality should conform with the mandatory total and faecal coliform standards contained within the EC Bathing Waters and the mandatory standards in the EC Dangerous Substances Directives and should meet the appropriate standards for Aesthetic Criteria.

Physical Features Promotion of safe and easy access to and from Identified Bathing Waters.

Water Contact/ Recreational Use Waters:

Water Quality Where such marine waters are used for immersion sports, including bathing, the NRA will be guided by the mandatory standards contained within the EC Bathing Waters Directive in assessing water quality requirements for Catchment Plans. The NRA is unable to set bacteriological standards in CMPs for freshwaters where immersion sports or bathing take place but will apply the general Aesthetic Criteria used throughout this report.

Water Quantity To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features To protect and, when possible, improve access to contact/recreation waters.

4.16 NAVIGATION AND BOATING

General

Navigation is considered to be the use of pleasure and commercial craft in waters that fall under the general control of the NRA where a right of navigation exists. This includes the maintenance of navigation aids (such as buoys, perches and marks) which are required for the safe passage of vessels.

In Wales the navigation authority is usually the local port or harbour authority who will liaise with the NRA. However, in the Dee estuary the NRA is the navigation authority. Elsewhere in tidal waters, the NRA neither has control over nor responsibility for navigation.

While the NRA is not the navigation authority for either of the two freshwater rights of navigation that exist in Wales it may under certain circumstances introduce byelaws to control navigational use of a river. The NRA must also pay regard to the needs of those rights of navigation that do exist.

Boating is regarded as the use of boats for pleasure, rather than commercial purposes, and includes rowing, sailing and powered boats where no significant water contact is involved. Where no right of navigation exists, access to and use of the water is by formal or informal agreement of the land/fishery owners and the NRA's concern is principally for the participants' enjoyment of the activity.

Local Perspective

There is no public right of navigation on the freshwater length of the River Usk (see Map 20). However, like most rivers, there is a right of navigation up to the tidal limit, ie. Newbridge- on-Usk. Newport Harbour Commissioners are the Navigation Authority up to Caerleon and administer mooring and navigation aids. The NRA has no jurisdiction over navigation in the Usk.

There is a boating club at St. Julians in Caerleon and a sailing club at Uskmouth. Pleasure craft can currently navigate the Monmouthshire and Brecon Canal, under the jurisdiction of British Waterways, between Brecon and Pontypool. There are plans to renovate and open up the remainder of the canal between Cwmbran and Newport which is currently unnavigable.

Aim

To ensure that waters in the catchment can support boating and related activities to at least their current levels of use at existing places, provided there is no detriment to other uses.

To encourage and support canoe access agreements on the River Usk.

Ensure that works to the river channel do not prejudice these activities as far as is practicable.

Environmental Requirements

Water Quality The provisions for Aesthetic Criteria should be complied with.

Water Quantity To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features Where waters under the control of the NRA are used for navigation no obstruction to the passage of vessels should be created.

Any maintenance of navigation channels or aids to navigation should take into account other uses of the water.

Areas used for boating should be protected from development that would constrain this use.

The encouragement and promotion of safe access points for boating, where appropriate

Features required for navigation or boating should be maintained and enhanced where appropriate. This would include adequate freeboard and freedom from obstructions.

4.17 AGRICULTURAL ACTIVITY

General

The processes and by-products of agriculture are a major potential threat to the water environment, especially in more intensively cultivated areas. Key areas of concern to the NRA include:-

- pollution by animal and other agricultural wastes;
- contamination of groundwater and surface waters by fertilisers and other agro-chemicals;
- the effects of land drainage on water tables and water courses;
- the impact of uncontrolled stock grazing on river banks;

Where there is a specific discharge of effluent from a farm site this will be dealt with via the general discharge consenting process described in the discharge uses sections. However, the highly polluting nature of agricultural waste normally precludes this option and the NRA's approach is aimed at control at source by minimising the volumes of effluent produced and stored. Often it is background pollution caused by large numbers of diffuse discharges that causes the most significant impact and these are of greater concern to the NRA. Consequently the NRA has worked closely with farming organisations to develop waste handling guidelines that seek to control this type of pollution. The Authority can also enforce legal minimum standards for new silage, slurry and agricultural fuel oil installations. In key areas a programme of farm visits by NRA staff helps to alert farmers to potential and existing problems.

The NRA issues codes of practice for the use of fertilisers, herbicides and pesticides to protect the water environment and in certain places (Nitrate Sensitive Areas) may control the application of fertilisers to protect groundwater supplies.

The NRA encourages farmers to fence riverbanks to prevent uncontrolled access by stock. Cattle and sheep can severely damage riverbanks in a way that can lead to channel instability, increased flood risk and a marked reduction in the fisheries and conservation value of the river.

Local Perspective

Agriculture is the major land use in the catchment and consequently there are many thousands of farms. These range from sheep farms in the upland northern and western areas of the catchment to dairy, beef, poultry, mixed and arable farms in the south and east.

The more intensive dairy and beef farms give rise to an increased risk of

pollution from slurry storage and silage production. A programme of farm inspections by the NRA helps to highlight such risks so that pollution can be prevented.

Aim

To protect the water environment from the potential adverse effects of agricultural activity.

To protect the quality and volume of groundwater by implementing the NRA's Groundwater Protection Policy.

Environmental Requirements

Water Quality

All consented discharges should comply with the conditions expressed in the consent. This will be enforced by the NRA.

The codes of practice for the handling and use of Pesticides, Herbicides and Fertilisers should be strictly followed.

Where applicable, the management practices set out for Nitrate Sensitive Areas should be strictly followed.

Agricultural activities must be designed and managed to prevent liquid effluent from adversely affecting the quality of surface and groundwaters.

The Code of Good Agricultural Practice for the Protection of water should be complied with as should the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991.

Water Quantity

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Physical Features

Land drainage activity should not adversely affect the fishery and conservation value of rivers.

Agricultural processes should not lead to a reduction in the quality of physical habitats of fishery and conservation value nor increase river instability or flood risk.

MAP 21. FORESTRY

4.18 FORESTRY

General

The NRA accepts that well managed forestry, in appropriate areas, can make an important contribution to the environment and the economy. Forestry can, however, influence water quality and quantity through alterations to hydrological and chemical processes in water catchments, and by the import or export of chemicals. Adverse impacts include:-

- Increased sediment load and run-off rate to rivers that can increase the flood defence maintenance requirement and may also destroy key conservation features.
- reduced water yield as the trees intercept more rainfall,
- enhanced acidification in sensitive areas as the trees capture more acidic pollutants from the air.
- pollution by fertilisers and pesticides applied to the crop.

These impacts can have implications for water supply, aquatic conservation and fisheries. Following the rapid expansion in afforestation over the past 40 years, further concerns are the increasing rates of clearfelling and replanting which can have similar adverse effects.

Consequently the NRA has worked closely with the Forestry Authority in the production of Forests and Water Guidelines which lay down standards for best practice designed to minimise impact of forest management on the water environment. The NRA is consulted informally on applications for new planting but has requested statutory consultee status on planting grants and felling licenses. While forest development is outside the normal planning process, some local authorities have decided to produce Indicative Forestry Strategies which will identify preferred and sensitive areas for forestry. The NRA will advise on water interests in relation to these strategies.

Local Perspective

There are almost 6000 hectares of woodland in the catchment (see Map 21), which represents 4% of the total land area of the catchment. The forests on headwater catchments are most likely to have significant effects on the water environment. Streams here are highly important as salmonid nursery habitats and for a range of other fauna and flora.

Sensitive areas with existing plantations include the headwaters of the Afon Crawnon and the Nant Cleisfer.

Aim To protect the water environment from the potentially adverse effects of forestry and to maximise the environmental benefits.

Environmental Requirements

Water Quality The provisions of the Forests and Water Guidelines should be complied with in all cases to minimise the impact of forestry on water quality.

Water Quantity To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

Forestry activities, afforestation and deforestation must not result in reduced reservoir yields or adverse effects on surface water flows or groundwater resources.

Physical Features The provisions of the Forests and Water Guidelines should be complied with in all cases to minimise the impact of forestry on the physical environment and to gain the greatest environmental benefit, particularly in riparian areas.

4.19 NET FISHING FOR SALMON, TROUT, AND EELS

General

This Use is principally concerned with the use of nets and other types of gear to catch migrating eels, salmon and trout. Other than sea fish, migrating adult salmon and sea trout are the main quarry for net fisheries in Wales and these are restricted to coastal waters and estuaries. The number of these fisheries is closely controlled by Net Limitation Orders and Byelaws which are designed to maintain stocks. The NRA licenses salmonid net fisheries within the terms of the Orders and enforces Byelaws. In many places the fishing techniques allowed reflect local culture, and consequently in Wales there is a very wide variety of fishing methods employed. These range from coracles and nets to ranks of fixed traps called putchers, which have significant heritage interest.

The capture of eels by nets is also licensed by the NRA. While there is no limit to the number of licences that can be issued, the NRA specifies certain methods that can be employed, and may refuse to issue a licence for a location if it feels that fish stocks could not support the fishery, or that the migration of salmon and trout could be impaired.

Local Perspective

There are currently eight licences available for fishing with drift nets for salmon in the Usk catchment. These nets operate in the Severn estuary. The fishery exploits salmon and sea trout destined for rivers which drain to the Severn estuary, principally the Usk, Wye and Severn.

The salmon and sea trout in the Severn Estuary are also exploited by a privately owned putcher fishery at Goldcliffe, about 2 miles upstream from the mouth of the Usk estuary.

There is also a limited elver fishery which operates in March, April and May in the Usk near the tidal limit.

Aim

To ensure that net fishing takes place in a manner that does not over-exploit fish stocks or interfere with other legitimate uses of the water environment.

Environmental Requirements

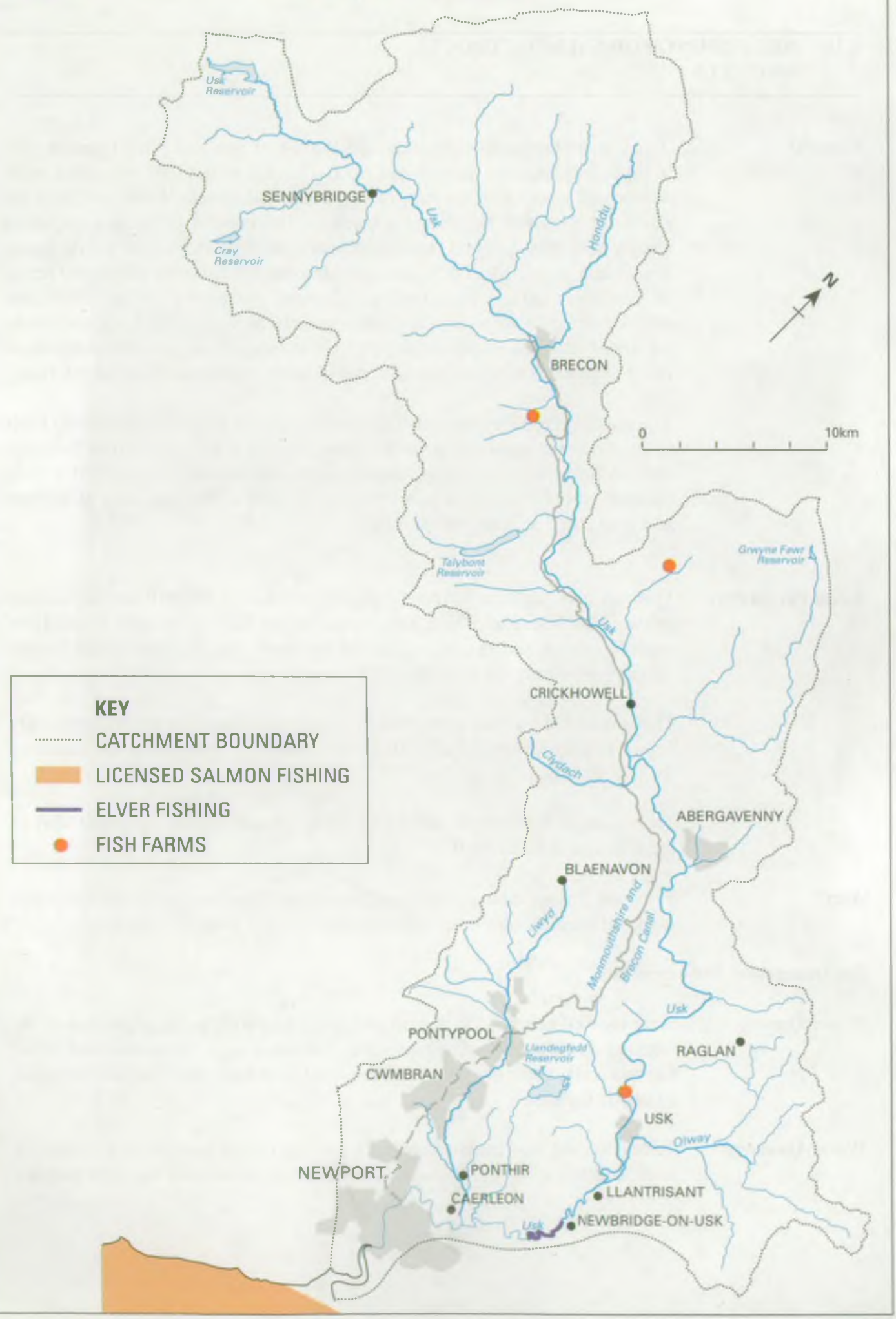
Water Quality

Since the well-being of fish is dealt with in the Fishery Use the protection of the working environment of commercial fishermen will be considered here. Consequently, water quality will be required to comply with the standards for Aesthetic Criteria.

Water Quantity

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance

MAP 22. COMMERCIAL FISHING



between the needs of the environment and those of abstractors: including protection from derogation.

Physical Features

To enforce the provisions of the Net Limitation Orders and Byelaws to ensure that stocks of salmon and sea trout are not endangered by net fishing.

To license and regulate net fishing for eels and non-salmonid freshwater fish to protect stocks.

To minimise conflict between the requirements of different fisheries.

Access points for net fisheries should be protected.

4.20 FISH FARMING

General

Fish farming has especially close links with the water environment and requires large volumes of clean water that are later discharged as effluent. Consequently, there is a large potential for adverse environmental impact. Thus all fish farms must be registered with the Ministry of Agriculture Fisheries and Food (Welsh Office in Wales) and the NRA issues licences to abstract and consents to discharge effluent for freshwater fish farms (marine farms may require a consent to discharge, depending upon circumstances). Careful management of fish farms is required by all involved to control the impact and the NRA is particularly concerned to prevent: the spread of disease, alien species or strains of fish to wild stocks and to maintain free passage for upstream and downstream migrating wild fish.

Fish farming can severely affect a watercourse by diverting a large proportion of the flow through the farm, leaving the river reduced in flow. This requirement for an adequate residual flow can be a factor that restricts the viability of a fish farm at some locations.

Local Perspective

There are three fish farms in the Usk catchment (Map 22). The Cwmdu trout farm on the Nant Rhiangoll produces trout for the table, whilst the Prioress Mill trout farm near Usk produces brown trout and rainbow trout for restocking. The NRA hatchery at Cynrig near Brecon produces salmon, sea trout and brown trout for restocking to rivers in South Wales.

Aims

To control fish farming activity to protect wild fish stocks and other uses of the water environment.

To manage the quality and volume of water resources so as to safeguard licensed and exempt abstractions and the environment. This includes the active enforcement of abstractions. The NRA will encourage abstractions to made as far downstream in a river as possible and discharges to made as close to the point of abstraction as is practicable.

Environmental Requirements

Water Quality

The conditions stated in the discharge consent are complied with. This will be enforced by the NRA.

No deterioration in the quality of water above discharges, beyond that assumed when setting the consent for an authorised discharge.

Water Quantity

To develop and implement a Regional Licensing Policy that will, at a catchment level, enable the NRA to manage water resources to achieve the right balance between the needs of the environment and those of abstractors, including protection from derogation.

That all conditions stated on the abstraction licence are complied with.

This will be enforced by the NRA.

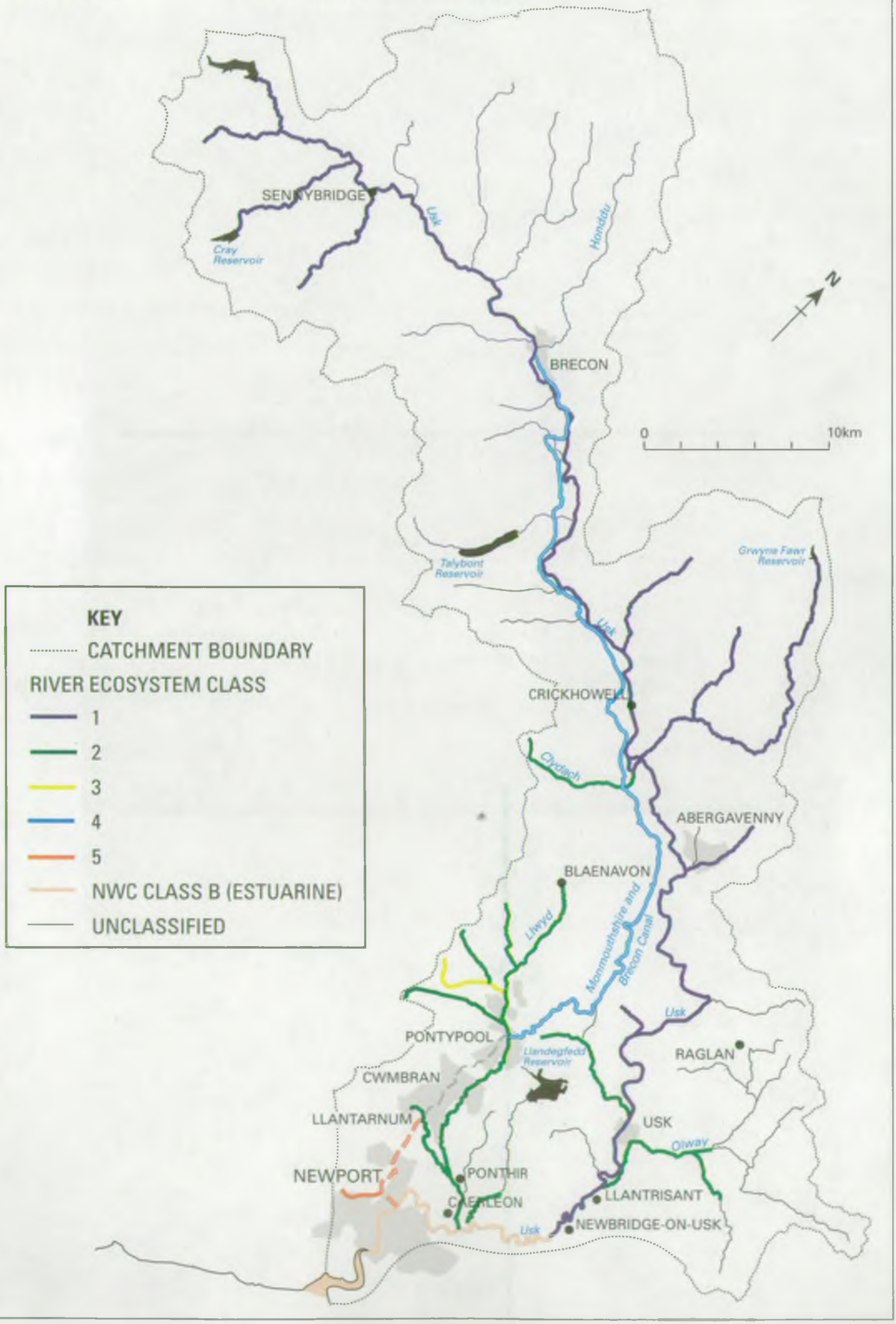
Physical Features

That suitable provision should be made to prevent the escape of stock to the wild and the trapping of wild stock within the farm. Where appropriate this will be enforced by the NRA. Similarly provision should be made to prevent the spread of diseases and alien species.

5.0 CATCHMENT TARGETS

In this section targets are set for Water Quality, Water Quantity and Physical Features, which are designed to protect the most sensitive Use for each part of the catchment. In this manner any other Uses that have less stringent needs are also protected.

MAP 23. WATER QUALITY TARGETS



5.1 WATER QUALITY TARGETS

General

The NRA uses two major schemes for the reporting of river water quality: the General Quality Assessment (GQA) scheme, which is a used to make periodic assessments of the water quality; and the statutory water quality objectives (WQOs) scheme, which is used for the setting of water quality planning targets. These new schemes have replaced the National Water Council (NWC) scheme, upon which previous references to water quality have been based.

The General Quality Assessment (GQA)

The GQA classification provides a means of accurately assessing and reporting on the general state of river water in a nationally consistent manner. It is used to support periodic assessments of the quality of river water in order to report upon geographical and temporal trends in river water quality. The GQA scheme will ultimately comprise four components - general chemistry, nutrients, aesthetics and biology - each providing a discrete 'window' upon the quality of river stretches. At present only the water chemistry element is established.

Statutory Water Quality Objectives (SWQOs)

The SWQO scheme establishes clear quality targets in Controlled Waters, on a statutory basis, to provide a commonly-agreed planning framework for regulatory bodies and dischargers alike. The proposed SWQO scheme is based upon the recognised Uses to which a river stretch may be put. Of the 5 SWQO Uses proposed, only the River Ecosystem Use has been implemented, and so far only informally. However, it is feasible that, at some future date, the River Ecosystem targets proposed for each river stretch in this CMP will be given statutory backing.

Water Quality Targets for CMPs

For Catchment Management Plans the performance of waters is assessed against specific water quality targets. The targets are set to protect specific Uses of the catchment (including those that will ultimately be covered by the SWQO scheme) and call on water quality standards that have been determined for each use. These standards are based on the existing sources of data, especially the River Ecosystem Classification regulations and EC Directives for Bathing Water, Freshwater Fisheries, Dangerous Substances and Urban Wastewater Treatment and are constructed to give a complete coverage of water chemistry.

Local Perspective

Groundwater

The protection of these resources is effectively undertaken by the implementation of the Policy and Practice for the Protection of Groundwater.

The NRAs' groundwater targets are:

To establish a database of contaminated land sites in the catchment.

To establish a groundwater quality monitoring network for sampling water from boreholes within major, or locally important, aquifer systems.

Surface Water

The whole of the main River Usk from the Usk Reservoir downstream to the tidal limit is of very good quality (suitable for all fish species) and therefore has a River Ecosystem target of 1 (RE1) (Map 23). The majority of the tributaries are also of very good quality and have targets of RE1. The exceptions are the Afon Lwyd,Clydach, Berthin Brook, Olway Brook, Pill Brook and Sor Brook, which are waters of good quality (suitable for all fish species) and are targeted as Class RE2. The Nant Ffrwd-oer is of fair quality (suitable for high class coarse fish populations) and has a target class of RE3. The target for the Monmouthshire and Brecon Canal is RE4 from Brecon down to Pontypool and RE5 between Llantarnam and Newport where large fluctuations in dissolved oxygen concentrations in the water occur. No target class has been applied to the section of canal between Pontypool and Llantarnam as it is fragmented and has been infilled in sections.

Many of the river stretches receive additional statutory protection being designated as salmonid fisheries under the EC Freshwater Fisheries Directive as referred to in Section 4.4. The target for these stretches is to maintain the present status.

Water is abstracted for public potable supply at specific points in the catchment, as indicated on Map 13. The water is then treated at DCWW water treatment works. The EC Directive 75/440/EEC states that the extent of water treatment provided depends on the quality of the abstracted water. More sophisticated treatment must be provided for poorer quality waters. The onus is on the water supply companies to provide the correct treatment. Given the good water quality of the catchment the potable abstractions require normal physical and chemical treatment and disinfection prior to being put into supply.

5.2 WATER QUANTITY TARGETS

General

The implementation of the Water Resources Act 1963 required almost all types of abstraction to be authorised by a licence. Pre-existing abstractions had to be granted a Licence of Right in 1965 that reflected the historical abstraction regime and could not take into account its impact. Subsequently, licences have been granted only if they do not adversely affect existing abstractors and the environment, or if conditions can be imposed which restrict their impact.

The NRA takes a precautionary approach to the granting of new licences, and will only grant them if it is confident that the available resources are able to sustain the proposed abstraction in the long term without harm to the environment or existing abstractors. The NRA also regularly monitors the compliance of abstractors with licence conditions and enforces as necessary.

The NRA currently is developing an abstraction licensing policy that will allow it to consider in a structured way the environmental needs of the river system and to balance these with the needs of abstractors. The policy, when developed, will permit a review of the volume of existing abstractions in the catchment.

A methodology for the assessment and prioritisation of rivers that suffer artificially reduced flows is already in use. In Welsh Region the production of Catchment Management Plans will aid this process.

The NRA will seek to balance the needs of existing and potential abstractors with those of the environment.

The NRA has powers to limit abstraction and take other water conservation measures in periods of drought.

Local Perspective

Until it is possible to make a detailed assessment of the environmental needs of the river or to implement Regional Licensing Policy, the NRA intends to protect the natural 95-percentile flows of the rivers (Q95). In an average year, river flows would be less than the Q95 for only 18 days. These target flows apply when considering new abstractions from surface or groundwater.

Groundwater abstractions are included because, although the groundwater use is limited, abstraction from it can reduce surface water flows. The extent to which this occurs in the catchment is unknown at present, and it is difficult to put restrictions upon a licence based upon groundwater levels. Therefore, it is preferable to base the water quantity targets for groundwater upon the desired surface water flow.

As well as protecting ground and surface waters from over abstraction, the NRA intends to prevent the disruption of groundwater flows by the physical disturbance of aquifers. The flow of water underground is important in maintaining groundwater levels, which may support abstractions or environmental features. Construction, mining or other excavations can interrupt this flow, with potential impacts upon abstractions or the environment. The NRA can influence development proposals through it's role as a planning consultee and, where appropriate, through the NRA's licences and consents. This target has been included in the NRA's "Policy and Practice for the Protection of Groundwater" (PPPG) detailed in Appendix 1a.

5.3 PHYSICAL FEATURES TARGETS

General

Many Uses are affected by the physical characteristics or features of the river and this is especially true of Uses related to wildlife and its conservation. The habitat requirements of the wildlife associated with rivers are too complex to allow simple targets to be set, even if such habitats could be effectively measured. Consequently until such a time as quantitative physical targets can be set, Catchment Plans will adopt the general theme that the abundance and diversity of physical features typical of the type of river, should be maintained and where possible, improved. This requires subjective assessment by trained staff. The NRA is also developing a habitat classification system and use related targets for physical features such as spawning and nursery sites for fish.

In a similar manner the physical features requirements of recreational Uses of waters cannot yet be quantified in order to set firm targets, again professional judgement must be used.

There are many Uses in the catchment which have their own physical features requirements. The following requirements are considered targets for the Usk catchment:

Flood Defence

Maintenance and Improvement

Flood Defence targets nearly all relate to physical features and the requirement for the river channel to contain certain specified flows at different points in its length.

Where economically, technically and environmentally justifiable, the NRA aims to maintain or improve in a cost effective manner, the designated "Main Rivers" to standards of service which accord with the Land Use Bands described in Appendix 3. The Land Use bands for the Usk catchment are shown on Map 24. Water Level Management Plans will be prepared for all sites as agreed with CCW.

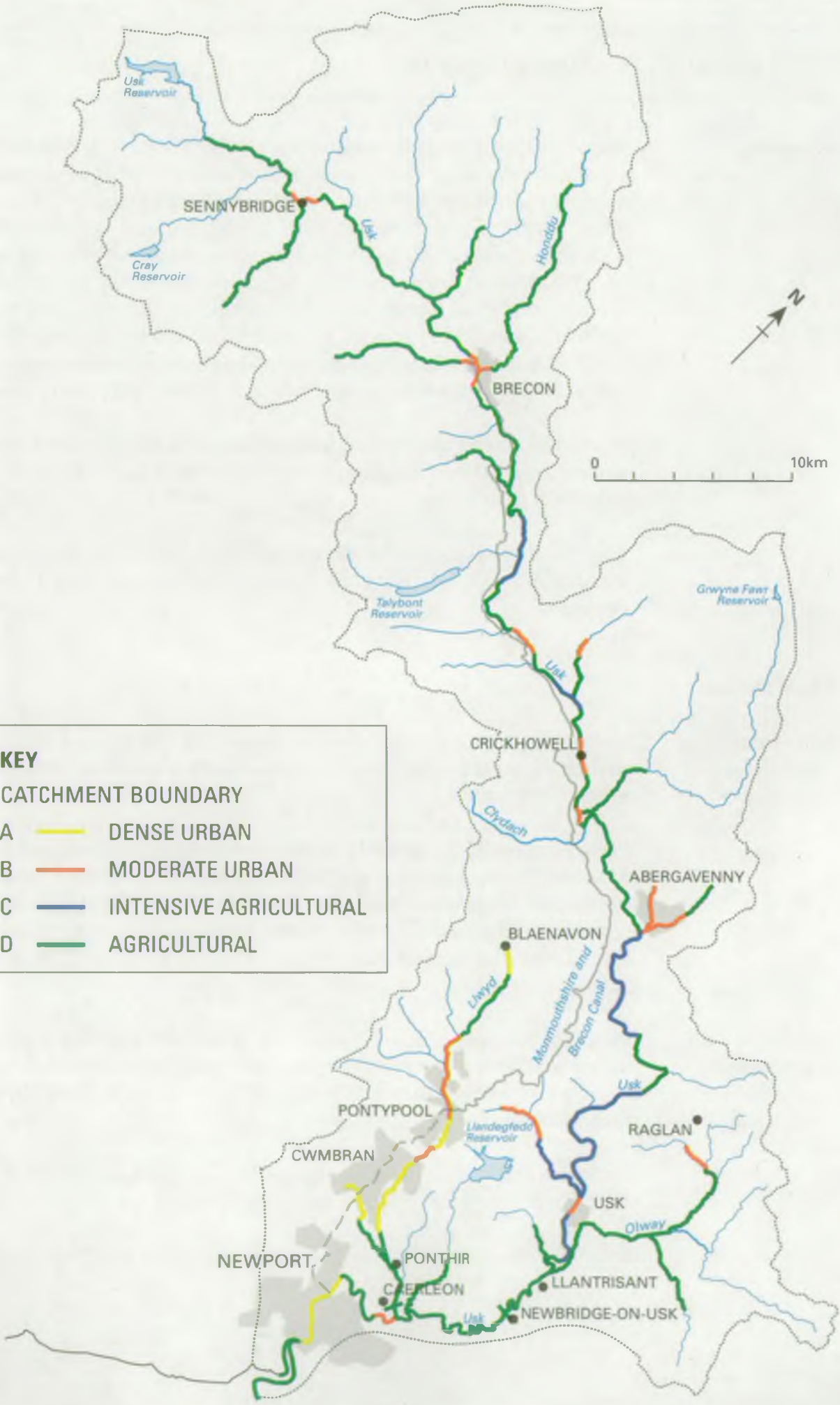
Regulation and Enforcement

Ensure the provision of suitable access for maintenance of river/channel and sea/tidal flood defences and for the construction of new defences by limiting development within 7 metres of the top of the river bank (use of byelaws and planning laws).

Ensure that obstructions to flow do not result in an increased flood risk (consent under Water Resources Act 1991 and Land Drainage Act 1994).

Ensure that development in flood risk areas is identified and encourage planning

MAP 24. FLOOD DEFENCE TARGETS



authorities to use the planning process to guide development away from these areas (Section 105 (2) Survey and Welsh Office Circular 68/92).

Ensure that there is no increase in flood risk to existing properties as a result of development either remote from or adjacent to the existing development (catchment planning to manage flows and/or loss of flood plain storage).

Flood Warning

For the areas covered by the flood warning system, the NRA target is to ensure that the flood warnings are received at least 2 hours before the flood event occurs. The NRA flood warning system aims to provide:

- a 24 hour monitoring service which receives forecasts of adverse weather and heavy rainfall, and warning of high river levels in order to detect and forecast possible main river fluvial and tidal flooding;

- warnings to the police, for dissemination to local authorities, other bodies and the general public. The currently accepted practice for the dissemination of flood warnings is for the NRA to issue warnings to the police who in turn alert local authorities and people at risk.

Conservation Targets

The NRA is currently developing a national river habitat classification scheme. This scheme, and the results for the 1993 River Corridor Surveys and other surveys will assist in setting meaningful and prioritised targets for conservation in the Action Plan.

Through its operational, regulatory and advisory activities, and in its role as a statutory consultee to the Local Planning Authorities, the NRA will endeavour to ensure:

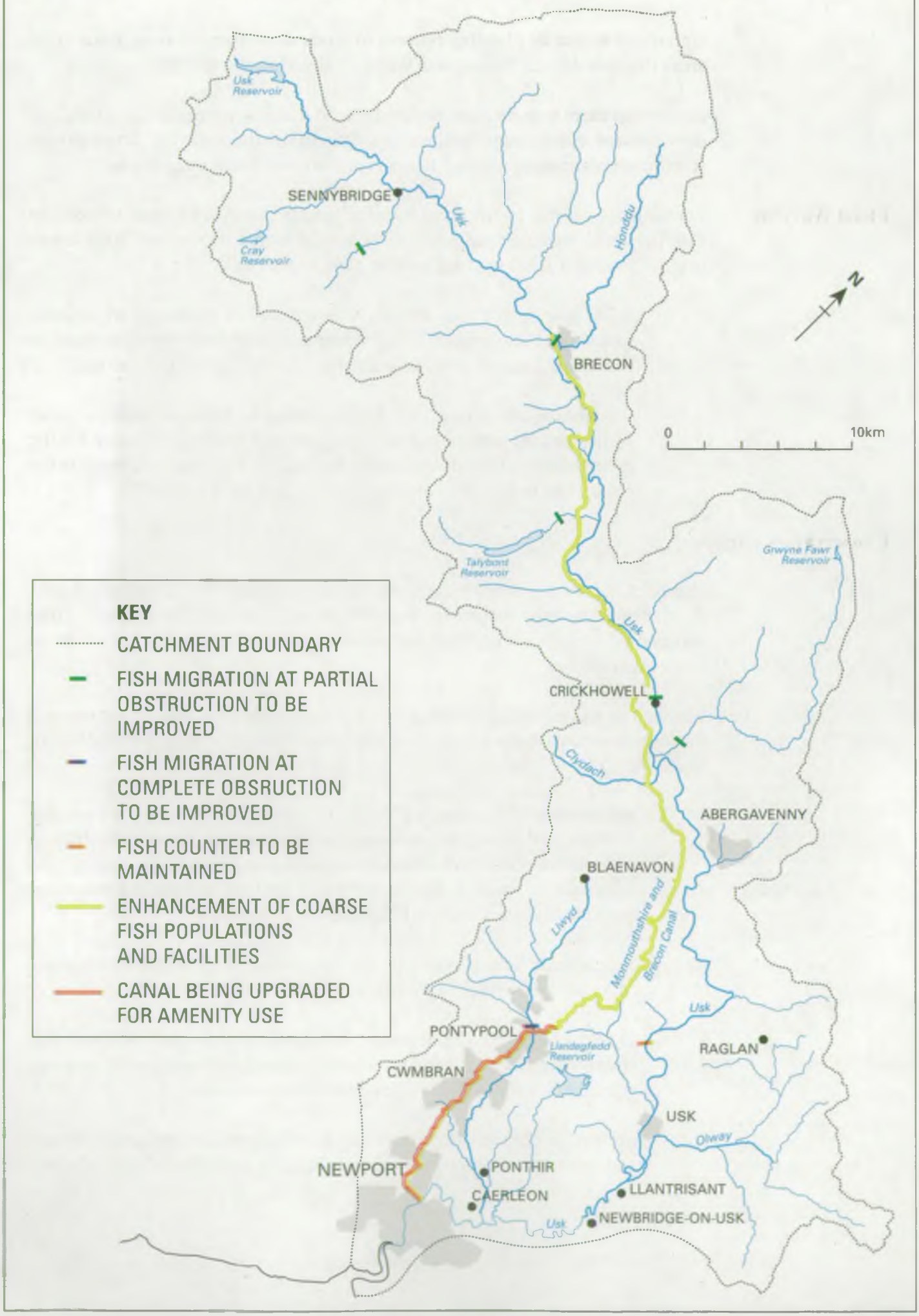
- maintenance of the current diversity of natural features such as bankside features, wetlands, emergent vegetation, meanders, pools and riffles in order to conserve river corridors and safeguard landscape quality. To achieve this, water fringe buffer zones will be encouraged wherever possible to protect waterside habitats from damage.

- maintenance and, if possible, the improvement of SSSIs by meeting "standards of service" agreed with CCW.

- identification and improvement of areas of degraded wetland and riverine habitat to a level at which they support a range of species typical of similar habitats elsewhere in the catchment.

- protect the physical structure of archaeological sites and their settings and, where possible, enhance, recognising the interdependence of many

MAP 25. PHYSICAL FEATURES TARGETS



of the sites and monuments.. Where unavoidable change occurs, the original detail of the site should be carefully recorded.

- the survival and, where necessary, reinstatement of threatened species. This will include not only rare species (e.g. shad), but also specific local strains of more common native species.

- the control of the spread of Japanese Knotweed and other alien weeds as required under the Wildlife & Countryside Act 1981.

To meet these overall objectives the following initial targets have been set:

- ensure the long-term survival of existing tree-lined riverbanks by encouraging natural regeneration of trees and shrubs on such riverbanks.

- ensure the long-term provision of trees as riparian habitat and landscape features in open areas of the catchment.

- ensure that adequate areas of damp grassland habitat exists in the lower catchment for the benefit of breeding waders.

- re-create or improve lost wetland habitats, such as upland bogs, ponds and marshes, for the benefit of birds, amphibians, invertebrates and plants.

- co-operate with Otter Project Wales and other organisations in the production of a Priority Catchment Management Plan for otters and implement habitat enhancement measures where possible.

The above objectives and targets will only be met by the collaboration, co-operation and agreement of other organisations and individuals.

Fisheries Targets

Provision and maintenance of a diversity of natural river features to ensure variety of habitat to maximise production of fish populations. This target can be progressed by taking one or more of the following actions:

- removal of migration barriers where appropriate (Map 25).

- maintenance of fish passes.

- no obstruction to the passage of migratory fish between the marine and freshwater environments.

- maintenance of adequate facilities for stock counting. (Trostrey Weir Fish Counter- see Map 25).

- implementation of appropriate recommendations of the NRA Report "Usk salmon - a Plan for Action" (1992) to maximise the recovery of spring run salmon.

- implementation of appropriate recommendations of the NRA Net Limitation Order Review (1994) to assist in meeting salmon spawning targets fot the Usk. These targets equate to a total target run size of 6500 and a declared rod catch of 1500 salmon per year.

- implementation of appropriate recommendations of the NRA report "Resident Brown Trout - A Management Strategy" (1992) to protect and enhance brown trout populations.

- enhancement of coarse fishing facilities and populations where appropriate (Map 25).

- enhancement of trout populations where and when water quality targets are met.

- enhancement of river habitat to increase carrying capacity of fish populations where appropriate.

- introduction of legislation (byelaws) to minimise over-exploitation of fish stocks.

- implementation of appropriate enforcement strategies to implement legislation designed to protect fish stocks from over- exploitation.

Recreation, Boating and Navigation Targets

The NRA, through its operational, regulatory and advisory activities and particularly in its role as statutory consultee to the Local Planning Authorities, will endeavour to ensure or encourage:

- protection of existing recreational sites, and promotion of new sites at suitable locations, as opportunities arise.

- maintenance of access and associated facilities for boating eg.advice to Torfaen and Newport Borough Councils and British Waterways on their intend upgrade of the Monmouthshire and Brecon Canal from Pontypool to Newport to increase its recreation and amenity value and to permit the passage of pleasure boats along the whole of the canal (Map 25).

- promotion of controlled access and use by contact/recreational users (principally canoeists). This target can be progressed by the following actions:

- liaison with fishery owners and canoeing organisations to encourage the production of informal access agreements.
- liaison with canoeing organisations to educate canoeists in practising their pastime with minimal conflict with other river users.

- maintenance of access and associated facilities for commercial fisheries.
- maintenance of an appropriate network of riverside paths and access points.
- maintenance and promotion of safe access to and from waterside angling facilities for the disabled.
- no obstruction to passage of vessels within the Usk estuary.
- provision is made for both canoe touring and white water canoeing, where appropriate, within the catchment.

APPENDICES

APPENDIX 1a

THE GROUNDWATER PROTECTION POLICY

The preservation of groundwater quality and quantity is a major objective of the NRA. Limiting the risk from pollution and over abstraction must be dealt with in a structured methodical manner.

The NRA has therefore produced a "Policy and Practice for the Protection of Groundwater" which provides advice on the management and protection of groundwater on a sustainable basis. The Welsh Region is implementing this national framework policy for the protection of groundwater which will effectively manage groundwater protection in the Usk Catchment. This new policy deals with the concept of vulnerability and risk to groundwater from a range of human activities. It considers both source and resource protection, together with policy objectives of the NRA with respect to the threat to groundwater from abstraction, physical disturbance of groundwater flows, waste disposal, contaminated land, discharges to underground strata, disposal of sludges to land and diffuse pollution.

The implementation of the policy relies in part on the construction of a series of protection zone maps. Resource protection maps will be produced after consideration of vulnerability of groundwater based on the nature of the strata and type of soil and drift.

The Policy recognises three groundwater source protection zones:

Zone I (Inner Source Protection)

Immediately adjacent to the source area defined by a 50-day travel time from any point below the water table to the source (based on biological contaminant decay).

Zone II (Outer Source Protection)

Area defined by 400-day travel time (based on the delay and attenuation of slowly degrading pollutants).

Zone III (Source Catchment)

The complete catchment area of a groundwater source. The controls to be exerted on a given activity will be more stringent the more vulnerable the resource and the nearer the source.

APPENDIX 1b

The Requirement for an Abstraction Licence

	0 - 5 m^3	**5 - 20 m^3**	**above 20m^3**
One off, any purpose	No restriction	Consent	Licence
	0 - 5 m^3/d	**5 - 20 m^3/d**	**above 20m^3/d**
Domestic, to one household	No restriction in most cases		Licence
Agriculture (from surface water)	No restriction for land adjoining watercourse		Licence
Agriculture (from groundwater)	Licence	Licence	Licence
All other purposes	Licence	Licence	Licence

APPENDIX 2

THE NATIONAL BIOLOGICAL CLASSIFICATION SCHEME (PROPOSED)

A National biological classification scheme is currently being prepared as part of the General Quality Assessment (GQA) scheme (DoE 1992)*. The diversity of the aquatic macroinvertebrate fauna can reflect water quality and is useful in detecting intermittent reductions in quality, and pollution caused by chemical parameters that are not monitored. These events may not be detected by routine water quality monitoring because of their infrequent occurrence and short duration.

The proposed classification scheme would allow rapid comparison between chemical and biological quality for a given river and therefore highlight areas where disparity between the two occurs for further investigation.

The Usk Catchment

Data from biological surveys carried out during 1990, 1991 and 1992 were classified using a prototype classification system. This scheme, called BAPC (BMWP** averages which parallel the chemical grading system), classifies sites according to the ratio of observed and predicted BMWP scores derived from family level identification of invertebrates. A class (a-f) was calculated for each site where biological information existed. This was then compared with the chemical classification for the respective site using the Regional application of an earlier version of the chemical component of the GQA scheme. Descriptions of the biological and water quality classifications used are provided overleaf.

* DoE/WO 1992: River Quality, The Governments Proposals: A Consultation Document.

** BMWP - Biological Monitoring Working Party.

General Quality Assessment Scheme for Rivers

Class	Chemical Classification			Biological Classification EQI (BAPC) (indicative - to be finalised)	Aesthetic Classification Basic Amenity Score (indicative - to be finalised)	Nutrient Status Classification - to be developed
	DO % sat 10%ile	BOD mg/l 90%ile	Ammonia mg N/l 90%ile			
A	80	2.5	0.25	1.0	10	
B	70	4.0	0.6	0.8	8	
C	60	6.0	1.3	0.6	6	
D	50	8.0	2.5	0.4	4	
E	20	15.0	9.0	0.2	2	
F	<20	-	-	<0.2		

RIVER ECOSYSTEM SCHEME CLASSES

Class RE1: Water of very good quality (suitable for all fish species)

Class RE2: Water of good quality (suitable for all fish species)

Class RE3: Water of fair quality (suitable for high class coarse fish populations)

Class RE4: Water of fair quality (suitable for coarse fish populations)

Class RE5: Water of poor quality (which is likely to limit coarse fish populations)

APPENDIX 3

LAND USE BAND SYSTEM

Where economically and environmentally justifiable, the NRA will aim to maintain or improve in a cost effective manner, the designated "Main Rivers" to standards of service which accord with the following Land Use Bands.

Land Use Band	Typical Description of Reach	Target Standard of protection (return period)	
		Fluvial	Tidal
A	Contains residential and non-residential properties distributed over a significant proportion of its length. Amenity uses may be prominent.	1:50 -1:100	1:100-1:200
B	Reaches containing residential and non-residential property over some or all of the reach length but at lower density than band A. Intensive agriculture may be present.	1:20-1:50	1:40-1:100
C	Isolated rural communities at risk with limited numbers of residential and non-residential properties. Agricultural interests will be more apparent than in bands A and B.	1:10-1:50	1:20-1:100
D	Isolated properties at risk. Agricultural use will probably be the main use with arable farming a feature.	1.2-1:5	1:4-1:10
E	Very few properties at risk. Agricultural use will predominate with extensive grassland the main feature.	<3:1-1:1	<1:5
X	No recorded area at risk of flooding.		

Note: The above standards of service table does not imply an entitlement to the provision of this or any standards, but is indicative of the standards considered reasonable for the land use defined.

APPENDIX 4

GLOSSARY OF TERMS, UNITS AND ABBREVIATIONS

ABSTRACTION

When someone takes water from a river, stream, spring, pond, lake or from groundwater they are 'abstracting' the water and they are making an 'abstraction'.

ALGAE

Simple plants which may be floating or attached. They can be microscopic or very large plants but they lack true stems. Like all plants, they are capable of photosynthesis. Algae occur in still and flowing water and are often discussed in the context of Eutrophication (see below).

AMMONIA

A chemical which is often found in water as the result of the discharge of sewage effluents. It is widely used to characterise water quality. High levels of ammonia adversely affect the quality and use of water for fisheries and abstractions for potable water supply.

AOD (ABOVE ORDNANCE DATUM)

Land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as 'Ordnance Datum'. Contours on Ordnance Survey maps of the UK show heights above Ordnance Datum.

AQUATIC ENVIRONMENT

The rivers, streams, lakes, ponds, springs and features that depend on natural waters such as bogs, wetlands and so on.

BIOACCUMULATION

The accumulation, by living organisms, of materials to concentrations higher than those of the surrounding environment. This is particularly important where poisons are accumulated.

BOD

An abbreviation for Biochemical Oxygen Demand. This is an estimate of the rate at which biological and chemical processes use up the available oxygen.

CATCHMENT

The area of land draining to a defined point.

CLASSIFICATION/CLASSES

A way of placing waters in categories (classes) according to assessments of water quality based, for example, on measurements of the amount of particular chemicals in the water (especially BOD, dissolved oxygen and ammonia).

COARSE FISH

Freshwater fish other than salmon and trout, eels and shad.

CONSENT

A Discharge Consent is a statutory document issued by the NRA to indicate any limits and conditions on the discharge of an effluent to a controlled water.

Also a different statutory document issued by the NRA known as a Land Drainage Consent, authorises works to the beds and banks of a river which have been approved by the NRA.

CONTROLLED WATERS

All rivers, lakes, groundwaters, estuaries and costal waters to three nautical miles from the shore.

DANGEROUS SUBSTANCES

Substances defined by the European Commission as in need of special control. This is because they are toxic, accumulate and concentrate in plants and animals, or do not easily break down into less dangerous substances. They are classified as List I or List II.

DETERMINAND

A general name for a characteristic or aspect of water quality. Usually a feature which can be described numerically.

DISSOLVED OXYGEN

The amount of oxygen dissolved in water. Oxygen is vital for life, so this measurement is an important, but highly variable, test of the 'health' of a water. It is used to classify waters.

ECOSYSTEMS

A group of animals and plants which live together within a certain type of surrounding or habitat (e.g. woodland, pond).

EC DIRECTIVE (Control)

A type of legislation issued by the European Community which is binding on Member States and sets standards and results to be achieved.

EUTROPHIC/EUTROPHICATION

Terms which describe water which is rich in nutrients or the process of enrichment. At worst, such waters are sometimes beset with unsightly growths of algae.

FAUNA

Animal life.

FLORA

Plant life.

FRESHET

A naturally or artificially generated increase in river flow after a period of dry weather, having the effect of enhancing water quality and the aquatic environment eg. through improved levels of dissolved oxygen and flushing of accumulated debris and silt.

FRY

Fish which are less than 1 year old.

GAUGING STATION

A site where the flow of a river is measured. Sometimes a weir is used to assist the measurement.

HABITAT

The natural home of plants and animals. Different plants and animals have different needs, and so live in different habitats.

LEACHATE

Liquid containing soluble substances which have been removed by action of water percolating through soil, waste or rock.

LIST I AND LIST II SUBSTANCES

European Community Directive 76/464/EEC aims to reduce pollution in controlled waters by certain dangerous substances. These consist of chemicals selected mainly on the basis of their toxicity, persistence and bioaccumulation. These substances are divided into 2 categories:

- List I substances are considered to be the most harmful. Pollution caused by these must be eliminated.
- List II substances are less harmful and pollution caused by these must be reduced.

m^3/d

Short for cubic metres per day. There are 1000 litres in a cubic metre, and 1000 cubic metres in a megalitre (Ml). In Imperial Units, there are 220 gallons in a cubic metre.

MACROINVERTEBRATE FAUNA

Small aquatic animals, such as insects, snails and worms which live in the river bed.

STATUTORY MAIN RIVER

A legal definition which defines particular rivers and streams on special maps. On the 'Main River', the NRA has permissive powers to construct and maintain defences and to control the actions of others through Byelaws and the issue of Consents. Any proposal that could interfere with the bed or banks or affect the flow of the river requires formal consent from the NRA.

Ml/d

Short for megalitres per day, a standard international unit of measurement. There are a thousand cubic metres in a megalitre and one million litres in a megalitre. In Imperial Units, one megalitre is about 220,000 gallons.

PARAMETER

A general name for a characteristic or aspect of water quality. It is often a feature which can be described numerically.

PARIS COMMISSION (PARCOM)

Formed in 1988 to implement a comprehensive annual study of inputs of selected pollutants to the Convention waters (this includes all the waters around the UK).

PARR

Salmon which are 1 or more years old which have not yet gone to sea.

PERMISSIVE POWER

The NRA is given various powers to do things by a number of Acts of Parliament. Some of these powers are 'permissive', which means the NRA can do these things, but is not under a duty to do them. For example, NRA has permissive powers to construct flood defences, but does not have a duty to do this. In contrast, the NRA has certain statutory duties, i.e. things it must do, e.g. it must authorise abstractions, discharges and works to the bed or banks or main rivers.

POOL

A distinct, deeper area of slow flowing water, often with an eddying flow and often found between fast flowing stretches which are known as 'riffles'.

POPULATION EQUIVALENT

1 population equivalent is the organic biodegradable load having a five-day biochemical oxygen demand of 60g of oxygen per day.

PUTCHER

A line of fishing baskets used to trap salmon in the Severn Estuary.

Q95 (see 95 percentile)

REACH

A length of a river.

REDD

Salmon excavate a depression in river gravels into which they lay their eggs. The eggs are then covered with gravel. This 'nest' is known as a 'redd'.

RED LIST SUBSTANCE

A substance that has been selected for monitoring due to its toxicity, persistence and bioaccumulation.

RIFFLE

Fast flowing shallow water with a distinctly broken or disturbed surface. Riffles are often found between pools.

RIVER CORRIDOR

A term which describes a stretch of river, its banks, and a varying amount of adjacent land that is affected by the presence of the river.

SALMONID FISH

Game fish, e.g. trout and salmon.

SMOLT

At a particular stage of their development, young salmon and sea trout migrate to the sea, and at this stage are known as smolts.

SPRING RUN

Salmon return from the sea to freshwater rivers when adults. They migrate up the rivers to spawn, and this upstream migration is known as the 'run'. There are two main periods of the year when the runs occur which are in spring and autumn. The spring run fish are generally larger than later-run fish, and are often more prized by anglers.

SSSI

Abbreviation for 'Site of Special Scientific Interest'.

SURFACE WATERS

This is a general term used to describe all the water features such as rivers, streams, springs, ponds and lakes.

TELEMETRY

River level stations record the levels every 15-minutes electronically at the gauging station. The telemetry system is a computer system that can contact these stations and ask it to send the level data back to the computer over the public telephone system. The computer then stores the data in its memory. The level data can then be converted to flows automatically by the computer. Some raingauge data is obtained in the same way.

WETLAND

Wet areas of a river catchment where the flora and fauna that live there are dependent on that 'wetness' for their survival.

95-PERCENTILE FLOW (Q95)

The flow which one would expect to be exceeded 95% of the time on average. This is an estimate of the dry weather flow which the river would be at, or below, for 18 days per year on average.