

NRA-Wales 14

Taff Catchment  
Management Plan  
Consultation  
Report Summary

N.R.A. - Welsh Region  
REGIONAL TECHNICAL (PLANNING)  
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**NRA**

*National Rivers Authority  
Welsh Region*

**Guardians of  
the Water Environment**

April 1995



*18th Century River Taff in Cardiff - John Ibbotson (courtesy of Aberdeen Museum and Art Gallery)*

ENVIRONMENT AGENCY



128765

*COVER PHOTO: Aerial view of the River Taff in Cardiff*

## THE NRA'S VISION FOR THE TAFF CATCHMENT

The River Taff is one of the best known rivers in Wales, especially as it flows through Cardiff, the capital city. The fast flowing valley rivers in this catchment have experienced major changes over the last 200 years. Before the industrial revolution the rivers were noted for their rural tranquillity, remoteness and quality of salmon fishing; they were described by B H Malkin in 1803 as having:

*"perfect clearness, uncontaminated, unless in heavy floods, by the least tinge of muddy soil or any other fortuitous discolouring"*

They then suffered a severe degradation due to industrialisation and huge population growth within the catchment. Effluents from the iron and steel works, coal mines, power stations, coke ovens and sewers, poured into the rivers. Rapid improvements have been occurring since the 1970's due to pollution control legislation and the decline in heavy industry. Wildlife, including migratory fish and otters, is now returning to the river; the Taff Trail attracts many visitors who enjoy the many features of the catchment; anglers, canoeists and rowers use its waters for recreation.

The NRA's vision is to manage the uses of the catchment so as to continue this improvement in a sustainable way. Our key objectives are:

- to reinstate significant and self sustaining runs of salmon and sea trout.
- to sustain and, where possible, improve stocks of brown trout and coarse fish.
- to ensure that all those who wish to use the catchment for recreational purposes can enjoy doing so with the mutual respect and consideration.
- to maintain all flood defences in order to protect people and property.
- to maintain and improve the conservation value of the catchment.
- to ensure that any development proposals have no detrimental effect on the water environment. Early discussions with developers and contractors are essential.
- the continued improvement in water quality by effective regulation of industry and investment in sewage and sewerage infrastructure.
- to reduce the amount of litter and sewage-derived debris along the river banks.
- to manage the water resources so as to ensure to support the supply of potable water to South East Wales.

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 Taff catchment.

## INTRODUCTION

Never before has there been such a pressing need to conserve our rivers, lakes and coastal waters to support the rapidly increasing recreational, domestic, agricultural and industrial demands placed upon them. On the other hand, the need to protect life and property from flooding has never been greater. The NRA has a wide range of responsibilities for the control of the water environment, and seeks to reconcile the conflicts raised by the competing needs for water. In particular, the NRA is responsible for:

- conservation of water resources
- pollution control
- flood defence and flood warning
- maintenance and improvement of fisheries
- conservation of water related habitats and species
- promotion of water based recreation
- control of navigation in some areas.

The NRA believes that it can only carry out its work by adopting the concept of integrated catchment management. This means that a river catchment is considered as a whole and the actions in each of the NRA areas of responsibility must take account of the possible impact on other areas.

*River Taff at Taffs Well (showing Castell Coch)*





The NRA has decided to formally present its catchment management policies to the public via Catchment Management Plans which will be produced for all the rivers in Wales by 1998. The Plans are intended to provide a link between the NRA and the users of water in each catchment so that the Authority can better reflect their interests whilst carrying out its duties. For this reason each Plan includes a Consultation Phase during which the general public are invited to comment on the NRA's proposals for the future management of the catchment.

## **YOUR VIEWS**

The Taff Catchment Management Consultation Report is our assessment of the state of the catchment and identifies the key issues which need to be resolved. The most important are outlined in the tables at the end of this summary report. We need your views:

- what do you think about the Plan in general?
- have we identified all the uses?
- have we identified all the issues?
- what do you think about the options proposed?
- do you have any other information about the catchment or any comments about its future management?

If you would like to comment on the Consultation Report or receive a copy of the full document, please write to:

**THE AREA CATCHMENT PLANNER  
NATIONAL RIVERS AUTHORITY  
SOUTH EAST AREA - WELSH REGION  
PLAS -YR -AFON  
ST.MELLONS BUSINESS PARK, ST. MELLONS  
CARDIFF CF3 0LT  
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## THE TAFF CATCHMENT

This plan covers the catchment of the River Taff, including the rivers Cynon, Rhondda, Clydach and Tāf Bargoed. It is one of the most well known river systems in South Wales.

The River Taff rises on the Old Red Sandstone escarpment of the Brecon Beacons and flows in an approximately south easterly direction to join the Severn Estuary at Cardiff. The river falls an average 11 metres for every kilometre in river length which, although steep, is typical of most of the South Wales coalfield rivers. The main river and its major tributaries flow in steep, narrow valleys. The resulting high water velocity it produces makes for a turbulent river which erodes the bed and banks.

The River Cynon joins the Taff at Abercynon, and the River Rhondda, with its two tributaries the Rhondda Fawr and Fâch, joins further downstream at Pontypridd. From here on to the sea, no further major tributaries join the Taff, and after passing through the deep gorge cut through limestone near Taffs Well, the river flows through the Cardiff plain to Cardiff Bay.



*Pack Horse Bridge in Pontypridd*

## MAP OF THE TAFF CATCHMENT AREA



## CATCHMENT STATISTICS

Catchment Area: 526 km<sup>2</sup>  
 Highest Point: 886m (Pen-y-fan on the Brecon Beacons)

### Populations: (solely in the Taff Catchment)

County Councils	Borough/ City Councils	1991	2001 (Predicted)	2011 (Predicted)	2021 (Predicted)
Mid Glamorgan	Cynon Valley	62,927	64,202	63,306	62,529
	Merthyr Tydfil	58,553	60,245	59,837	59,104
	Rhymney Valley	5,879	5,868	5,844	5,773
	Rhondda	77,029	73,276	72,116	71,232
	Taff Ely	38,703	41,205	40,817	40,318
South Glamorgan	Cardiff	94,200	105,333	109,095	113,135
<b>TOTALS</b>		<b>337,291</b>	<b>350,129</b>	<b>351,015</b>	<b>352,091</b>

### Flood Defence

Length of Statutory Main River: 143 km  
 Length of Flood Defences: 34 km

### Water Resources

Average Daily Flow: Taff: 1610 megalitres per day  
 Cynon: 370 megalitres per day  
 Rhondda: 470 megalitres per day

Gross licensed abstraction: 335 megalitres per day

Estimated volume of water abstracted  
 and not returned: 33 megalitres per day

*(1 megalitre is 1 million litres or 1000 cubic metres)*

### Fisheries

Average annual declared salmon rod catch 1988-1994	57
Average annual declared sea trout rod catches 1988-1994	139
Average annual salmon run size (minimum estimate) 1992-1994	422
Average annual sea trout run size (minimum estimate) 1992-1994	696
No. salmon/sea trout anglers (approx.)	100
No. trout anglers (approx.)	5000
No. coarse anglers (approx.)	5000



## DEVELOPMENTS AND LAND USE

The main communication links, such as railways and main roads all occupy the narrow valley floors and main sewer lines run down many of the river channels in the catchment. The towns of Merthyr Tydfil, Pontypridd, Aberdare and the city of Cardiff all lie on the banks of the Taff or its tributaries. Housing and industry have extended in ribbon development along the river frontages.

This catchment was dominated by the heavy industries of coal, iron and steel. The decline of these in the 20th century has led to an overall improvement in the state of the whole catchment, the water quality has improved and the ecology is becoming richer. Merthyr Tydfil and Cardiff are the main industrial bases remaining, but many sizeable industrial estates are dispersed throughout the catchment. There are 3 major landfill sites and several quarries and opencast sites operating. Other land uses include hill farming and forestry and more and more emphasis is now being put on tourism in the valley. The Rhondda Heritage Park, Castell Coch, Cardiff Castle, Brecon Mountain railway and the Taff Trail are amongst some of the attractions.

The pattern of development in the Taff catchment has also changed with the demise of the mining industry, the development of new light industrial and business parks, the expansion of existing industrial sites and a number of road improvements and by-pass schemes either being proposed or under construction.

The Cardiff Bay Barrage will have a major impact on development during the next 10 years, by encouraging the regeneration of the docklands area by Cardiff Bay Development Corporation.

The legacy of industrial scars is gradually being removed by land reclamation schemes. This was given considerable impetus following the Aberfan disaster in 1966. Land reclamation schemes have generally been carried out on old colliery tips, steelworks and allied industrial sites. Many of these sites are close to the river and the necessary disturbance of



*Cardiff Bay*

them during reclamation can cause serious water pollution by suspended solids and mobilisation of leachable materials from contaminated land.

Although only one major site at East Merthyr is currently underway there are several major schemes in the planning design stage which will be undertaken in the next 5 years. These are at Merthyr Vale, Albion and Abercynon, Deep Navigation, Blaenrhondda (Fernhill), Phurnacite (Abercwmboi), Maerdy and Taff Merthyr.

## WATER QUALITY

The chemical water quality of the whole Taff catchment is generally good but there are substantial lengths of river where intermittent pollution is occurring. This is mainly caused by sewage inputs from combined sewer overflows (CSOs) and leaking sewer pipes. Many of the CSOs are unscreened so discharges also result in the introduction of a significant amount of non- biodegradable litter which can accumulate on the river banks, causing a considerable aesthetic impact and affecting wildlife. Sporadic inputs of contaminated run-off or spillages from the many industrial areas can occur and minewater discharges from abandoned mines cause discoloration and deposition of iron hydroxide on the river bed in some places.

Despite these problems, the main rivers Taff, Rhondda and Cynon and most of their tributaries are of sufficiently high quality to support a salmonid fishery.

There are 2 major Sewage Treatment Works serving the upper catchment located almost opposite each other on the banks of the Taff at Cilfynydd. These discharge treated sewage to the Taff. The rest of the catchment is served by a trunk sewerage system which discharges to the Severn estuary in Cardiff. There are several water treatment works which discharge filter backwash water to the water environment. The Taff estuary currently receives crude sewage discharges but maintains a good chemical quality because of the vast volumes of diluting seawater. The

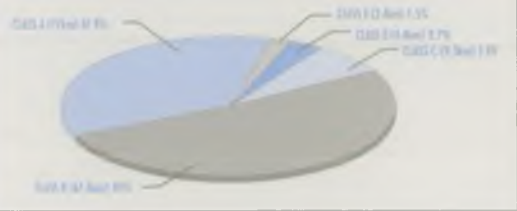


*Broken CSO on the River Taff in Pontypridd*

crude sewage discharges will be removed prior to closure of the Cardiff Bay barrage. Diffuse and intermittent polluting inputs to the catchment upstream will, however, continue to be significant factors likely to affect overall water quality in the impoundment.

### TAFF WATER QUALITY DATA

% length of river in General Quality Assessment class (1991-1993 data)



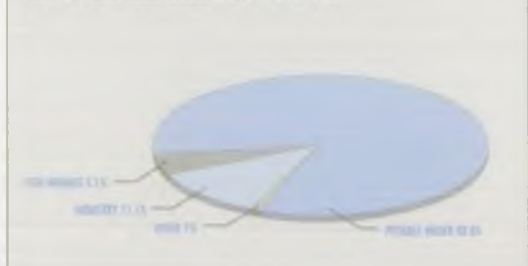
## WATER RESOURCES

The Taff receives very high rainfall, from 950mm per annum in Cardiff to 2400mm on the Brecon Beacons. This rainfall, combined with the mountainous catchment and steep river channels, contribute to high and rapid flows down the rivers. In drier periods, flows can recede quite rapidly as there is limited water storage in the soils and rocks.

The Taff flows over the South Wales synclinal basin and, because of this folding of the rocks, the relatively young coal measures are exposed. Consequently, the area is renowned for coal mining, and a complex pattern of groundwater flow has evolved along the shafts and adits of the old mineworkings. The coal measures constitute a locally important groundwater resource of variable yield and quality.

The main use of water in the catchment is for public water supply. Nearly three-quarters of this comes from the reservoirs in the Tâf Fawr and Tâf Fechan valleys. These are important contributors to the South East Wales Conjunctive Use Scheme, which allows water from a number of sources, including the Usk and Wye catchments, to be re-directed to where it is needed. For example, water from the Tâf Fawr reservoirs (which normally feed Cardiff), can be transferred eastwards to supplement the Tâf Fechan reservoirs which in turn support a number of small, high level reservoirs under drought conditions. Water from the Wye can then be pumped to support Cardiff. Other water uses include fish farms, spray irrigation for golf courses, domestic, agricultural and industrial. Industry is an

### AUTHORISED ABSTRACTIONS



important use although abstractions have decreased markedly since the 1970s, reflecting the decline of the traditional heavy industries of South Wales. The low flows from the aquifer storage are not sufficient and reliable enough for large industrial plants, so they prefer to use the piped public water supply.

## FLOOD DEFENCE

The high rainfall, steep contours and heavily urbanised valley floors (which prevent water soaking into the soil) make the Taff catchment prone to flooding. Most of the major centres of population of the Taff catchment which have had flooding problems in the past are now protected against all but extreme floods. Flood prone areas, which are still undefended at the present time, are usually fairly small and are areas where costs of protective measures exceed the value of the benefits of the works.

The most recent severe flood events were in December 1992, December 1979 and December 1960. The highest tide level this century occurred in February 1990, reaching a level of 7.95 metres above ordnance datum. Consequently, the NRA currently recommends that even in areas sheltered from the open sea, future residential and commercial developments should be protected to 8.6 metres above ordnance datum. This also allows for the predicted effects of global warming.

The Cardiff Bay Barrage will reduce the risk of tidal flooding. The removal of



*Flood defences on the River Taff in Pontypridd*



accumulations of river borne sediments within the bay area will be the responsibility of Cardiff Bay Development Corporation.

It is a popular misconception that high tides affect flood levels in upland areas of the catchment. In fact, even the highest tides will not affect flood levels upstream of Blackweir in Cardiff.

## FISHERIES

A diverse and healthy coarse fish population exists in the lower River Taff, and there are productive brown trout stocks in the middle and upper reaches. Estuarine species, such as mullet, are very much in evidence and the twaite shad (present in only a few rivers in the UK) is thought to be present. Salmon and sea trout populations are rapidly increasing in the Taff following many decades of industrial pollution. Juvenile salmon are stocked to many tributaries. Providing the fish pass in the Cardiff Bay Barrage is effective, the Taff catchment has the potential to be a very productive salmon and sea trout fishery. The main remaining obstacle to migratory fish is Treforest weir.



*Salmon jumping at Blackweir, River Taff*

## CONSERVATION/ECOLOGY

Although the Taff and many of its tributaries have been substantially modified and are very urbanised, they are surprisingly scenic in many parts and home to much wildlife such as otters. There is also a good range of riverine birds including kingfishers, dippers, grey wagtails, heron and moorhen. The reservoirs in the upper catchment have significant marginal habitats. Development elsewhere along the banks has not allowed a very extensive or diverse vegetation to grow. As a consequence the flora of the main river corridors is dominated by plant communities often associated with waste ground and Japanese Knotweed is prevalent.

There are numerous Sites of Special Scientific Interest (SSSIs) throughout the catchment. These include significant lengths of river, such as the Taf Fechan and canals, bogs, parts of extensive moorlands and estuary mudflats in Cardiff Bay



which will support notable populations of wading birds until the barrage is completed. The Taff discharges into the Severn Estuary, an area internationally recognised for its conservation value being a Proposed Special Protection Area (SPA) and Ramsar Site. There are 8 County Wildlife Trust and Local Nature Reserves, the majority of which feature the aquatic habitat as a major element.

The River Taff upstream of Merthyr is within the Brecon Beacons National Park and the mix of hill, forest and water is scenically very attractive.

Much of the upland area between the valleys and the broadleaved woodlands around Tongwynlais are also important in landscape terms and are recognised as Special Landscape Areas in County Structure Plans. Ecological surveys indicate that sections of the river corridor of conservation interest are concentrated in the upper Taff, the Quakers Yard area, the upper Cynon and the Clydach above Ynysybwll. The catchment is also important for its industrial landscape.

There are few Scheduled Ancient Monuments which are associated with the aquatic environment. There are a larger number of sites and features of historical interest which are not scheduled but are recorded, and an unknown number of unrecorded sites which may be vulnerable to development.

## RECREATION

The majority of residents live close to the river, which inevitably leads to a high recreational demand. The true value of the river as an amenity is now being realised with the development of the Taff Trail; a long distance cycle and foot path running from Cardiff to Brecon. Parts of the catchment are in the Brecon Beacons National Park which provides an area for walking, birdwatching and other outdoor pursuits. There are also a number of other country parks, nature reserves and other features of recreational and historical interest.



*Taff at Quakers Yard*

Angling is also a popular sport in the catchment. Most salmon and sea trout fishing at present occurs in Cardiff, and river coarse fishing is mainly on the River Taff between Pontypridd and Cardiff. A number of still water fisheries exist including the reservoirs at the top of the catchment.

Rowers use the river at Llandaff and Ponsticill reservoir is used for sailing and windsurfing.

Associated British Ports are the Navigation Authority in Cardiff

Bay but there is no public right of navigation in the freshwater part of the river.



*Rowing at Llandaff*

## ISSUES AND OPTIONS

The following tables list the 36 issues which the NRA has identified within the Taff catchment. We would like to hear from you if:

- you think there are other issues which we have missed
- you think that we have not considered all the options
- you have any views on the options suggested
- you have any other information about the catchment or comment about its future management.

### ABBREVIATIONS USED IN TABLES

NRA	- National Rivers Authority
ABP	- Associated British Ports
CBDC	- Cardiff Bay Development Corporation
LA	- Local Authority
DCWW	- Dŵr Cymru Welsh Water
LPA	- Local Planning Authority
CCW	- Countryside Council for Wales
STW	- Sewage Treatment Works
CSOs	- Combined Sewer Overflows

**ISSUE No.1 :**

**THE IMPACT OF COMBINED SEWER OVERFLOWS AND INADEQUATE SEWERAGE NETWORK ON WATER QUALITY**

OPTIONS	Responsibility	Advantages	Disadvantages
1. Further investigate the Morlais Brook to confirm suspected reasons for water quality failure.	NRA	Identify areas for remedial measures.	Costs.
2. Identify other intermittent or diffuse sources of pollution.	NRA	Further improvements to biological and chemical quality.	Costs.
3. Renewal of substandard sewerage system where appropriate.	DCWW	Improved chemical, biological quality. Reduced sewage derived litter.	Costs to DCWW.

**ISSUE No.2:**

**THE IMPACT OF CANTREF AND PONSTICILL WATER TREATMENT WORKS ON THE TÁF FAWR AND TÁF FECHAN**

OPTIONS	Responsibility	Advantages	Disadvantages
1. Install washwater recovery and sludge treatment plants at water treatment works.	DCWW	Improve discharges to water environment.	Costs to DCWW.

**ISSUE No.3 :**

**THE IMPACT OF MINEWATER FROM ABANDONED COAL MINES**

Options	Responsibility	Advantages	Disadvantages
1. Treat or otherwise remedy minewater discharges	Collaboration between interested parties as opportunities arise	Aesthetic, biological and economic benefits.	No legal power at present. Costs.

ISSUE No. 6: THE IMPACT OF LAND RECLAMATION SCHEMES ON THE WATER ENVIRONMENT			
Options	Responsibility	Advantages	Disadvantages
1. Minimise effects of pollution from land reclamation schemes by planning, design, implementation and control.	Promoting authorities/ developers/NRA	Protect water environment.	Costs to developers and NRA.
2. Encourage the inclusion of enhancement of wildlife, conservation, fisheries and recreation in the reclamation schemes via the planning process on a regular basis.	NRA/Developer/ LPAs	Enhances the river corridor benefitting wildlife and public.	Costs to developer.

ISSUE No. 7: LACK OF ADEQUATE LEGISLATION TO CONTROL DIFFUSE /INTERMITTENT POLLUTION FROM INDUSTRY			
Options	Responsibility	Advantages	Disadvantages
1. Target inspection of industrial premises	NRA	Prevention of pollution at source leading to improved water quality.	No regulations available currently to require eg. bunding of storage tanks at industrial premises. Costs to NRA.
2. Implement pollution prevention measures.	Identified industries	Prevention of pollution at source leading to improved water quality.	Costs to industry.

ISSUE No. 8: THE IMPACT OF CYNON VALLEY AND CILFYNYDD SEWAGE TREATMENT WORKS ON THE RIVER TAFF			
Options	Responsibility	Advantages	Disadvantages
1. Improve effluent mixing regime below both works.	DCWW/NRA	Reduced aesthetic impact.	Costs to DCWW.
2. Increase nitrification capacity at Cynon STW.	DCWW	Improvement to water quality.	Costs to DCWW.

## ISSUE No.4:

## THE IMPACT OF ROAD DEVELOPMENTS ON THE WATER ENVIRONMENT

Options	Responsibility	Advantages	Disadvantages
1. Minimise effects of pollution from road developments at the planning consultation phase.	LPAs/Highways Authority	Protect water environment.	Costs to Highway Authority.
2. Monitor and regulate roadwork schemes.	NRA	Protect water environment.	Costs to NRA.
3. Promote the restoration of degraded rivers during road construction.	Highways Authority/NRA	Enhances river corridor.	Costs to Highway Authority.

## ISSUE No. 5 :

## AESTHETIC EFFECTS OF WATERBORNE LITTER

Options	Responsibility	Advantages	Disadvantages
1. Increase public awareness.	NRA/Keep Wales Tidy Campaign/ LAs/ Public	Improvements to water environment. Reduced litter input.	Cost to NRA £40K for 1995/6. Other contributions £400K.
2. Improvements to CSOs.	DCWW	Improvements to chemical, aesthetic and biological quality of receiving watercourse.	Costs to DCWW.
3. Implement 'Friends of the River Taff' voluntary adoption scheme.	Taff Litter Project Steering Group	Improvements to water environment. Reduce litter input.	Relies on continued voluntary support.
4. Target litter fly-tipping blackspots.	Taff Litter Project Steering Group	Reduce litter input.	Costs to group members.



ISSUE No 11 : EFFECT OF ABSTRACTION AT BLACKWEIR			
Options	Responsibility	Advantages	Disadvantages
1. Enact agreement to restrict abstraction during low flows.	NRA/ABP/CBDC	Maintain flow over weir and in estuary, and through Blackweir and Barrage fish passes.	Reduced water in Bute East dock and feeder during low flows.
2. Screening on the Dock Feeder to reduce fish access.	NRA/ABP	Can be done in conjunction with other options.	Costs.
3. Supplement flows in Taff or Dock from alternative source.	CBDC	Maintain water flow in Taff and level in Dock.	May be no suitable source. Costs.
4. Maintain adhoc emergency agreements.	NRA/ABP	No costs.	No guarantee of maintaining flows to the estuary.

ISSUE No 12: FLOODING AT REAR OF CARDIFF ROAD, TAFFS WELL			
Options	Responsibility	Advantages	Disadvantages
1. Identify sources of leakage on surface water culvert and instigate measures to seal them.	NRA	Reduce flood risk.	Costs.
2. Improve surface water and foul sewerage systems.	DCWW/Mid Glamorgan County Council.	Reduced risk of flooding and contamination of water.	Costs.

ISSUE No 13: FLOODING OF HOUSES ALONGSIDE NANT CLYDACH, YNYSYBWL			
Options	Responsibility	Advantages	Disadvantages
1. Regular maintenance of watercourse and walls to ensure optimum capacity is maintained within the river channel.	NRA/Mid Glamorgan County Council	Reduced flood risk.	Continued maintenance commitment.

ISSUE No 9: DEVELOPMENT RESTRICTIONS AT HIRWAUN/PENDERYN			
Options	Responsibility	Advantages	Disadvantages
1. Improve sewerage system in Hirwaun/Penderyn.	DCWW	Improve water quality. Prevent localised flooding.	Costs.

ISSUE No 10 : THE IMPACT OF IMPOUNDMENT ON THE WATER ENVIRONMENT			
Options	Responsibility	Advantages	Disadvantages
1. Negotiate with DCWW to provide compensation water releases.	NRA	Provide flow for environmental benefits	Reduce water available for supply. Supply to the Rhondda in particular is difficult to replace. May prejudice the viability of the treatment works at Neuadd.
2. Reduce water demand	NRA/DCWW	May allow 'spare water' to be used for compensation	May not save sufficient water. Water demand may increase in the future, which makes long term solutions difficult.
3. Do Nothing	NRA/DCWW	Does not permit environmental improvements	Maintains present reservoir yield.

ISSUE No 18: FLOODING AT RHEOLA INDUSTRIAL AREA, PORTH, RHONDDA			
Options	Responsibility	Advantages	Disadvantages
1. Replacement of Railway Bridge.	British Rail	Reduced flood risk.	High cost to British Rail.
2. Continued maintenance of channel to ensure optimum capacity.	NRA	Reduce flood risk.	Continued commitment. Does not resolve problem completely.

ISSUE No 19: FLOODPLAINS UNDER THREAT FROM DEVELOPMENT			
Options	Responsibility	Advantages	Disadvantages
1. Restrict development on floodplain.	NRA/LPAs	Reduced flood risk to areas downstream. Protect the conservation interest. Less need to restrict run-off from upstream developments.	Reduction in development area.
2. Undertake comprehensive hydraulic analysis at Peace Park and Aberdare to ensure that development will not adversely affect surrounding and downstream area flood risk.	NRA/Developer/LPAs	Reduced flood risk.	High costs.

ISSUE No 20: FLOODING AT MISKIN, MOUNTAIN ASH			
Options	Responsibility	Advantages	Disadvantages
1. Modification/replacement of culvert with possible provision of additional water storage area.	Landowner/LA	Reduced flood risk.	High costs.

ISSUE No 14: FLOODING FROM THE RIVER TAF BARGOED AT QUAKERS YARD			
Options	Responsibility	Advantages	Disadvantages
1. Remove the Bridge.	Landowner	Reduced flood risk.	No access to land on opposite bank.
2. Raise the bridge.	Landowner	Reduced flood risk.	Extensive and expensive road works.
3. Continued maintenance and removal of blockages.	Landowner/NRA	Reduced flood risk.	Continued commitment on a regular basis.

ISSUE No 15: FLOODING AT MERTHYR VALE FROM THE RIVER TAFF			
Options	Responsibility	Advantages	Disadvantages
1. Provide a Flood Alleviation Scheme to protect people and property from flooding.	NRA	Reduced flood risk. Justification on	Cost/Benefit grounds unlikely.

ISSUE No 16: FLOWS RESTRICTED IN RIVER RHONDDA AT PONTYPRIDD			
Options	Responsibility	Advantages	Disadvantages
1. Continued maintenance of channel to ensure optimum capacity.	NRA	Reduced flood risk.	Continued risk of flooding from highest river flows. Continued maintenance commitment needed.

ISSUE No 17: FLOODING FROM THE RIVER RHONDDA AT BRITANNIA, PORTH			
Options	Responsibility	Advantages	Disadvantages
1. Refurbishment and possible raising of walls.	Landowners	Reduced flood risk.	High costs to landowners.

Options	Responsibility	Advantages	Disadvantages
1. Maintain current fish pass and trap.	NRA/CBDC	Fish pass efficiency and trapping facility maintained.	Maintenance costs.
2. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon and sea trout.	Loss of game and coarse angling facility. Enforcement costs.
3. Removal of weir.	NRA	Fish passage unobstructed. Byelaw restricting fishing not required.	Costs. Loss of water to Melingriffith feeder. Possible impact on river bed and railway track above. Loss of deep water for coarse fishing.



Treforest Weir



ISSUE No 21: BARRIER TO FISH MIGRATION - BLACKWEIR			
Options	Responsibility	Advantages	Disadvantages
1. Upgrade current fish pass.	NRA/CBDC	Improved fish pass efficiency.	Costs.
2. Raise weir pool level.	NRA	Improved fish pass efficiency.	Costs.
3. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon and sea trout.	Loss of game and coarse angling facility. Enforcement costs.
4. Fish pass and trap maintenance.	NRA	Fish pass and trap efficiency and maintenance.	Costs.
5. Removal of weir.	NRA/ABP	Fish passage unobstructed. Byelaw restricting fishing not required.	Loss of water to Docks system. Costs. Loss of Dock Feeder facility. Loss of upstream deep water (good for coarse fishing).

ISSUE No 22: BARRIER TO FISH MIGRATION - LLANDAFF WEIR			
Options	Responsibility	Advantages	Disadvantages
1. Upgrade current fish pass.	NRA	Improved fish pass efficiency.	Costs.
2. Provide additional or new fish pass.	NRA	Improved fish passage.	Costs (greater than Option 1.)
3. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon and sea trout.	Loss of game and coarse angling facility. Enforcement costs.
4. Removal of weir.	NRA/Cardiff City Council	Fish passage unobstructed. Byelaw restricting fishing not required.	Costs. Loss of deep water for rowing club. Loss of deep water for coarse fishing.

Options	Responsibility	Advantages	Disadvantages
1. Construct fish pass.	NRA/Others	Improved fish passage. Byelaw restricting fishing may not be required.	Costs. Weir ownership unknown.
2. Improve fish passage with minor modifications to weir to improve fish. passage	NRA	Reduced costs. Improved fish passage. Byelaw restricting fishing may not be required.	State of weir to be investigated. Weir ownership unknown.
3. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon, sea trout and brown trout.	Loss of game angling facility. Enforcement costs.
4. Removal of weir.	NRA	Fish passage unobstructed. Byelaw restricting fishing not required.	Costs. Potential impact on river bed and banks supporting road bridge.

Options	Responsibility	Advantages	Disadvantages
1. Minor modifications to weir to improve fish passage.	NRA/Merthyr Borough Council	Improved fish passage.	Costs.
2. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon, sea trout and brown trout.	Loss of game angling facility.
3. Removal of weir.	NRA	Fish passage unobstructed. Byelaw restricting fishing not required.	Costs. Potential impact on river bed and retaining walls upstream.

Options	Responsibility	Advantages	Disadvantages
1. Incorporate fish pass into hydropower scheme if approved.	Hydropower Co./ NRA	Reduced cost to NRA. Liability for the weir not with the NRA.	Likely to be less effective than NRA fish pass. Affects performance of Hydropower scheme.
2. Proceed with NRA fish pass proposals.	NRA/Other collaborators	Likely to be more effective than hydropower fish pass. Collaborative scheme with other organisations who have agreed to contribute.	Possibly greater cost to NRA. NRA would be liable for the structure. Requires decision to proceed with the hydropower scheme.
3. Implement Byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon, sea trout and brown trout.	Loss of game and coarse angling facility. Enforcement costs.
4. Removal of weir.	NRA Fish passage unobstructed.	Byelaw restricting fishing not required.	Costs. Potential impact on river bed upstream, retaining walls, bridges and roads.

Options	Responsibility	Advantages	Disadvantages
1. Install fish pass at Treforest Weir	NRA/Hydropower Co.	Fish migration to spawning grounds facilitated. Fish available to anglers upstream. Fry stocking no longer necessary. Transport of fish from lower river traps no longer necessary.	Cost of fish pass. Fish vulnerable to illegal exploitation. Cost of protection of stocks (additional enforcement may be required).
2. Continue transporting proportion of fish from Radyr trap to river above Treforest.	NRA	Angling and natural spawning above Treforest possible without a fish pass.	Transport cost. Handling and transport stress to fish. Less natural migratory behaviour for fish.
3. Continue stocking with approx. 50,000 fry per year.	NRA	Adult run maximised whilst spawning habitat is inaccessible.	Cost of broodstock collection, rearing and stocking.
4. Implement byelaws to restrict fishing in weir pools.	NRA	Reduced legal and illegal exploitation of salmon and sea trout.	Enforcement costs. Loss of game and coarse angling facilities.
5. Consider designation of additional stretches under the EC Freshwater Fish Directive.	NRA	Statutory objectives give enhanced protection.	Possible cost implications of complying with standards.

Options	Responsibility	Advantages	Disadvantages
1. Construct fish pass.	NRA	Fish passage to spawning grounds improved.	Costs. Fish may become vulnerable to illegal exploitation upstream.
2. Improve fish passage in conjunction with Local Authority improvements to River Taff.	Merthyr Borough Council, Mid Glamorgan County Council, Welsh Development Agency, Merthyr & Cynon Groundwork Trust, NRA	Fish passage to spawning grounds improved. Amenity and conservation value of the river enhanced. Reduced costs to NRA.	Costs. Fish may become vulnerable to illegal exploitation upstream.
3. Implement byelaw restricting fishing in weir pool.	NRA	Reduced exploitation of salmon, sea trout and brown trout.	Loss of game angling facility.
4. Removal of weir.	As in 2 above.	Fish passage unobstructed. Byelaw restricting fishing not required.	Costs. Pipe crossing exposed. Loss of cascade feature.



ISSUE No 30: BUTE EAST DOCK FISHERY IMPROVEMENT			
Options	Responsibility	Advantages	Disadvantages
1. Assess fish populations more accurately and implement regular monitoring programme.	NRA/Angling Club	Status of fish stocks known more accurately.	Costs. Difficulty in sampling such a large body of water.
2. Supplementary stocking with coarse fish.	NRA/Angling Club	Fish stocks increased.	Costs. Carrying capacity is unknown, so possibility of overstocking.
3. Install fish screen at dock by-pass channel.	NRA/Angling Club/ABP	Reduced loss of coarse fish.	Costs.
4. Provide habitat improvement structures.	NRA/Angling Club	Carrying capacity for fish stocks increased.	Costs.
5. Move dock railings or overcome their proximity to dock edge for international fishing matches.	Angling Club/ABP/South Glamorgan County Council	Venue suitable for high profile international fishing competitions.	Costs.

ISSUE No 31: HABITAT RESTORATION			
Options	Responsibility	Advantages	Disadvantages
1. Promote the restoration of degraded habitats.	NRA/Funding organisation	Habitat actively improved.	Costs.
2. Require riverside developers to improve habitat as part of scheme.	NRA/Developer	Reduced cost to NRA/Funding organisations.	Less strategic and prioritised approach to restorations.

Options	Responsibility	Advantages	Disadvantages
1. Supplementary stocking with coarse fish between Cardiff and Pontypridd (Review Angling Club Practice of transfer from other rivers).	NRA/Angling Clubs	Fish stocks maximised.	Costs. Possibility of overstocking if populations not monitored.
2. Undertake survey of coarse fish populations and implement regular monitoring programme.	NRA	Status of populations known with greater accuracy.	Costs. Accurate sampling is difficult in such a large river.
3. Ensure developments and river engineering works do not degrade and, where possible, seek to enhance fisheries and habitat via the Planning Consultation System.	NRA/Developers/LPAs	Fish stocks and habitat protected and enhanced.	Costs.
4. Implement byelaw to increase takeable size limit for trout.	NRA	Increased spawning and stocks.	Reduced angling catches in the short term.
5. Prohibit stocking with trout not originating from Taff.	NRA/Angling Clubs	Genetics of trout adapted to the Taff catchment protected.	Unnecessary at present, as stocks have a significant proportion and diversity of 'foreign' genetics.
6. Encourage catch and release and bag limits for brown trout.	NRA/Angling Clubs	Increased spawning and stocks.	Difficulty in communication links and changing established practices and attitudes.
7. Use of the Melingriffith feeder as an off-river spawning and nursery area.	NRA	Survival of coarse fish fry increased.	Costs.
8. Provide/seek additional off-river spawning sites upstream	NRA	Survival of coarse fish fry increased.	Costs.

Options	Responsibility	Advantages	Disadvantages
1. Liaise with angling and canoeing representatives to resolve conflicts.	NRA/Angling Clubs/ Fishery Owner/Riparian Owner/Canoeing Orgs.	Relationship between canoeists and anglers improved and conflicts reduced.	Costs.
2. Improve communications with canoeists so that they are aware of legal position and potential conflict of canoeing without permission.	NRA/Welsh Canoeing Association/ British Canoe Union	Improved awareness.	Costs. Difficulty in communicating to all canoeists.
3. Individual canoeists to be regulated via a licensing or permit system:		Individual rather than block regulation 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 regulation.	
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.

ISSUE No.32 : LACK OF INFORMATION ABOUT SITES SUITABLE FOR HABITAT IMPROVEMENTS			
Options	Responsibility	Advantages	Disadvantages
1. Further conservation of riparian and instream habitats during flood defence operations.	NRA	Incorporate into routine work over a period of time.	Not necessarily in priority areas.
2. Undertake River Habitat Survey	NRA	Assists in identifying degraded reaches.	Limited to river corridor.
3. Consultation and detailed site investigations to identify sites for habitat improvements.	NRA/LA/ Conservation Organisations	Identifies feasible opportunities in a systematic way.	Costs.

ISSUE No 33: LACK OF CONSERVATION STRATEGIES FOR RIVERINE WILDLIFE			
Options	Responsibility	Advantages	Disadvantages
1. Identify species requiring conservation strategy and draw up appropriate strategies.	NRA/CCW/ Conservation Organisations	Identifies need and priorities. Benefit to species conservation.	Costs.
2 Assist in the preparation of a priority Otter Catchment Management Plan.	NRA	Identifies need and priorities. Benefit to otter conservation.	Requires landowners agreement.

ISSUE No. 34: INVASIVE ALIEN PLANTS			
Options	Responsibility	Advantages	Disadvantages
1. Determine the current distribution of alien plants in the catchment and assess costs of control.	NRA/LAs	Identify scale of problem and priorities.	Delay in implementation of control measures.
2. Determine control policy for alien plants.	NRA	Consistent approach.	Delay in implementation of control measures.
3. Undertake a control programme.	NRA/LAs/ Landowners/ Fishing interests	Conservation and amenities benefit.	Potentially high costs and long term commitment.

Options	Responsibility	Advantages	Disadvantages
1. Install a fish pass (which is approved by Welsh Office) as part of the barrage construction.	CBDC/Welsh Office	Ensures best designed fish pass.	Risk of impact on vulnerable species. Costs.
2. Continue monitoring the impact of the barrage on the behaviour of migratory fish.	CBDC/NRA	Determines impact of barrage on fisheries.	Costs.
3. Fishery protection and mitigation scheme.	NRA/CBDC	Protection of user interests.	Long term cost implications .
4. Promotion of recreational use of Cardiff Bay.	CBDC/Welsh Tourist Board/ Recreational User Groups	Recreational resource utilised.	Potential conflict between different users. Water quality standards may not be achieved.
5. Eliminate continuous crude sewage discharges and modify CSOs within the bay area to specified standards.	CBDC/DCWW	Improved water quality.	Costs.
6. Remove accumulations of material from the impoundment as needed to prevent flooding of the River Taff.	CBDC	Prevent silting up of lagoon.	Costs.
7. Review status of impoundment as a sensitive water under the Urban Wastewater Treatment Directive.	NRA/CBDC	Reduce algal blooms.	May lead to the need for extra expenditure for CBDC/DCWW for nutrient stripping of upstream sewage effluents.
8. Remove litter, trash, weed and algae accumulations from impoundment.	CBDC	Maintain acceptable aesthetic quality.	Costs. Large amount of river borne trash and litter.
9. Contain leachate from Ferry Road tip and terminate discharges to estuaries.	CBDC	To maintain water quality standard.	Costs. Alternative disposal.



Options	Responsibility	Advantages	Disadvantages
b) Riparian fisheries representatives and canoeing organisations to introduce a permit system.	Fisheries/ Riparian Owners	Legal canoeing encourages and regulated by those it affects and with the legal authority. Possible income to respective organisations.	Requires commitment from canoeing and riparian interests to enforce regulations.
4. Identify and develop a dedicated site for canoeing.	NRA/Welsh Canoe Association/British Canoe Union/Local Authority.	Use restricted to part of the river with minimal impact on other users.	Costs.
5. Provide advice to site owner and each user group to attempt to resolve conflicts.	NRA/Site Owner/ User Group.	Resources used with minimum conflict and greater understanding.	Costs.

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