

Tywi Catchment
Management Plan
Consultation
Report Summary

N.R.A - Welsh Region

REGIONAL TECHNICAL (PLANNING)

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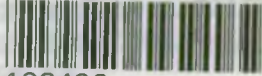
NRA

*National Rivers Authority
Welsh Region*

**Guardians of
the Water Environment**

April 1994

ENVIRONMENT AGENCY



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NRA Wales 36



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INTRODUCTION

The rivers, lakes, estuaries and coastal waters of Wales are subject to 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) was created in 1989 as an independent environmental watchdog. Its prime purpose is to maintain and improve the water environment and regulate the use of water by industry, agriculture and the private water and sewerage companies. The NRA's general duties include:

- Maintenance and improvement of water quality by control of pollution in surface and groundwater.
- Protection of people and property from flooding.
- Provision of flood warnings.
- Management of water resources.
- Maintenance and improvement of fisheries.
- Conservation of the natural water environment.
- Promotion of water based recreation.
- Navigation (in some rivers).

In addition, the NRA has a responsibility to reconcile conflicts between water users and plays a key role in the strategic management of the interaction between users of the water and land environments.

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

YOUR VIEWS

The Tywi CMP Consultation Report is our assessment of the catchment and identifies the key issues which need to be resolved. These 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 we propose?

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

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CATCHMENT STATISTICS

GENERAL

Area	1376km ²
Population (1991 Census)	41,900
Population Density	30.4/km ²

TOPOGRAPHY

Ground Levels	Max height	548m AOD
Sea Levels (Ferry-side)	Mean High Water Springs	4.2m AOD
	Mean Low Water Springs	-2.4m AOD

WATER QUALITY

Length of River in 1990 River Quality Survey

Very Good	293.5 km
Good	25.2 km
Fair	9.6 km
Poor	17.4 km
Bad	none

Tywi Estuary

Good	12.6 km
Fair	9.4 km

WATER RESOURCES

Annual Average Rainfall	1550 mm
Primary Gauging Station	Tywi at Nantgaredig

FLOOD PROTECTION

Length of Designated Main River	287.9 km
Length of River on which Flood Alleviation Schemes implemented	3.9 km
of which	
Hard Defences	1.3 km
Soft Defences	2.6 km
Length of River covered by a Flood Warning Scheme	105 km

FISHERIES

	Salmon	Sea Trout
Declared Annual Migratory Fish Catches: Coracle	52	831
(10 year average)		
Scine	132	818
Rods	768	5214

THE NRA'S VISION FOR THE TYWI CATCHMENT

The Tywi is an important rural catchment, the major land use in the middle and lower reaches being dairy/livestock farming. In this stretch, the Tywi has a wide floodplain and flood defences have been provided at several locations, including the market towns of Carmarthen, Llandeilo and Llandovery. In the uplands, sheep farming and coniferous forestry predominate. Following completion of the Llyn Brianne reservoir scheme in 1972, some 75 km of the Tywi, from the dam to the tidal limit, have been regulated under low flows. The river is a major source for drinking water, being used as far east as Cowbridge in Mid Glamorgan. The Tywi supports important salmon and sea trout fisheries, harvested both by anglers and net fishermen - including the traditional coracle fishery. The catchment also has a high environmental value, with special protection being afforded to a large number of Sites of Special Scientific Interest, and land within the Brecon Beacons National Park and Cambrian Mountains Environmentally Sensitive Area.

The challenge of managing the catchment will be addressed by implementing solutions to the existing problems and encouraging imaginative proposals to allow sustainable economic and community development to proceed whilst ensuring protection and improvement of the water environment. The interests of existing water users must also be safeguarded.



The river regulation scheme is one area that needs particular attention during the coming years, in order to achieve the best possible balance between the needs of water supply and the environment. For example, the threat posed to breeding little ringed plovers by reservoir releases must be addressed, whilst ensuring that fish movement into the system is not impaired unduly in low flows. The acidification of surface waters around Llyn Brianne, which is being addressed by the experimental liming project, is an issue which NRA is keen to resolve.

The NRA would wish to see sulphur emissions controlled at source in order to achieve long term improvements. Water quality problems in the estuary must also be addressed, particularly the poor bacteriological quality and low dissolved oxygen levels which occur under certain conditions.

In Carmarthen, flood protection standards must be improved and the NRA will ensure that all new development, including road schemes, does not compromise protection standards within the catchment. In the middle reaches of the river, gravel extraction activities have led to channel instability, and environmental damage, and the NRA will be seeking tighter control through planning and regulatory procedures.

The realisation of the NRA's vision will be achieved through a balanced management approach to all activities so that the optimal potential of the catchment can be obtained and sustained.

We will collaborate actively with all users of the catchment and all those statutory bodies that can assist us in striving to achieve this vision.

GENERAL

The Afon Tywi rises at an altitude of 425m AOD, falling steeply for the first 17 km before reaching the dam at Llyn Brianne. Just above Llandovery the river gradient lessens as the river begins to meander across its flood plain.

Many tributaries join the Tywi on its course to the sea. On the left bank the Brân joins near Llandovery and the Sawdde, which drains one of the wettest areas of the catchment on the edge of the Black Mountains, contributes to the flow further downstream.

The Cothi is the largest tributary and flows into the Tywi not far upstream of the tidal limit. The Gwili joins on the right bank within the tidal reaches. From source to sea the Tywi runs for some 111 km draining a large catchment area of 1376km².

DEVELOPMENT & LAND USE

The catchment is sparsely populated with a large proportion centred around the market towns of Carmarthen, Llandeilo and Llandovery in the middle to lower reaches of the catchment.

The main road in the catchment is the A40, passing through all the major towns before forming part of the Euroroute which connects Fishguard with London. Many 'B' class roads criss-cross the middle and lower parts of the catchment, connecting the larger towns with outlying villages. Road scheme proposals exist to bypass Llandeilo and Carmarthen (East). The highly afforested part of the upper catchment around Llyn Brianne is largely devoid of any infrastructure.

Carmarthen forms part of the important Intercity rail link between London and the port of Fishguard. Llandeilo and Llandovery are served by part of the mid-Wales rail link connecting with Llanelli.

Intensive dairy farming is concentrated in the lowlands, with mixed dairy/livestock rearing being the major feature of the middle reaches. Sheep farming and large tracts of commercial coniferous plantations predominate in the upper reaches and high ground. Forest Enterprise has the largest landholding including Brechfa, Tywi and Crychan Forests. Upland soils in this area are prone to acidification, exacerbated by coniferous afforestation.

Numerous abandoned metal mine workings exist, particularly in the upper catchment. Two of the most productive sites in South Wales were Dolaucothi gold mines and the Nant-y-Mwyn lead and zinc mines at Rhandirmwyn.



WATER QUALITY

Water quality in the Tywi catchment is generally very good. The 1990 River Quality Survey showed that 92% of classified river reaches achieved standards for classes 'good' or 'very good'.

The general lack of mains sewerage in the catchment necessitates effluent disposal to septic tanks and small private works for many communities. The majority of sewage treatment works (STWs) serve discharge into receiving waters with high dilution. The largest works, Parc-y-Splotts, serves a population of over 20,000 and provides only primary settlement of sewage before discharging to the Tywi estuary at Johnstown.

Bacteriological quality within the estuary is poor at certain states of the tide. In summer, when there is a combination of low river flows and spring tides, very low dissolved oxygen concentrations can result.

The upland part of the catchment around and including Llyn Brienne suffers from low pH and associated elevated aluminium concentrations due to surface water acidification. To alleviate the problem of low pH, a direct lake liming operation of Llyn Brienne has been undertaken bi-annually since 1991. Contaminated drainage from abandoned mines also contributes to elevated zinc levels in the upper catchment.

Amexpark Ltd, at Johnstown (Carmarthen), treat domestic sewage from the Llangunnon and Pensarn areas of Carmarthen Town, together with leachates from Nant-y-Caws, Wernddu and Withyhedge domestic waste disposal sites (outside of the Tywi catchment) and cooling water from Alcoa, Swansea.

WATER RESOURCES

Rainfall in the Tywi catchment varies from 2400mm/year on the Black Mountains to less than 1200mm around the estuary, with a catchment average of about 1550mm/year. Flows in the Tywi have been regulated by Llyn Brienne since it first filled in March 1972. This allows a greater rate of abstraction from the river than natural flows could support. Most of the water abstracted from surface water sources in the catchment is for potable supply (drinking water) purposes.



The majority of the water abstracted at Nantgaredig is transferred to Lower Lliw Reservoir and Felindre WTW to supply Swansea and the surrounding area as far east as Cowbridge. The quantity of water released from Llyn Brianne is increased to match the quantity abstracted at Nantgaredig, when the natural flow in the Tywi at Nantgaredig falls below 682 Ml/d. During very dry summers this quantity is further increased so as to maintain a minimum flow in the Tywi downstream of Nantgaredig. In addition there is a reserve of water in Llyn Brianne for use, at the discretion of the NRA, to supplement river flows as necessary.

The majority of agricultural abstractions are small and, as such, do not require a licence. As agricultural land is used mainly for dairying and livestock production, and rainfall is normally plentiful, there are only two spray irrigation licences in force.

Other abstractors of water include on fish farm at Llanllawddog and a small amount of light industry, the needs of which are met from sources within the catchment.

FLOOD DEFENCE

Flood defence interest in the catchment relates primarily to the provision and maintenance of flood alleviation schemes. These schemes provide protection to centres of population located on the flood plain of the Tywi and its main tributaries.

In times of high river flow the extensive Tywi flood plain provides natural storage for flood waters, without which the peak flow in the downstream channel would be significantly greater. Loss of this natural flood plain, either by landfill or by development, could increase flood peaks in the downstream channel and reduce flood protection standards accordingly.

Property at Carmarthen, Abergwili, Bronwydd, Llanpumsaint, Whitemill, Pont-ar-gothi, Llandeilo, Llangadog, Llanwrda, Llandovery and Cynghordy has been flooded in the past. Consequently, flood defence works have been constructed at many of these locations and these are regularly inspected and maintained.



The presence of Llyn Brienne reduces the magnitude of peak flood flows, particularly in the Autumn refill period. This reduction can be significant in the upper reaches of the Tywi but is less so in the lower reaches, particularly once the reservoir is full.

Two recent proposals to cross the Tywi flood plain at Carmarthen and at Llandeilo provide examples of development which can have an adverse effect on existing flood protection standards. At the NRA's request the developer has assessed the impact of these proposals on flood protection standards and has agreed to undertake works to offset these impacts.

The NRA operates a flood warning system on the Tywi. This involves continuously monitoring weather and potential flooding conditions and issuing warnings via the police as appropriate.

FISHERIES

The Tywi catchment supports an internationally renowned sea trout (sewin) fishery which has provided higher declared annual rod catches than any river in England and Wales in recent years. The numbers of reported rod caught salmon are also high and place the Tywi amongst the top Welsh fisheries for this species. The estuary supports a licensed seine and coracle net fishery for salmon and sea trout, the latter fishery having a particular heritage value. Reported catches of salmon and seatrout by both anglers and netmen have declined since peak catches in the late 1980's.

There is no shortage in the amount of usable spawning gravel available both on the tributaries and on the main river and, although some obstructions to fish passage exist (on 16 of the 65 tributaries), these are not believed to have a significant impact on the productivity of the catchment as a whole.

Mitigation for the loss of production of salmonids from the area inundated during the creation of Llyn Brienne was provided by a Fisheries Protection Scheme (FPS), subsequently modified because of surface water acidification of the headwaters above Llyn Brienne.

Brown trout are found throughout the catchment. A few pike are taken from the river system each year and these are believed to originate from Talley Lakes in the Cothi catchment which, together with the Bishop's Pond near Carmarthen, are notable for their coarse fish populations.



PHOTOGRAPH BY GUY LAWRENCE FOR THE NRA

Two commercial fisheries for salmon and sea trout exist on the Tywi estuary. Twelve licences are issued annually for coracles with a further nine for seine nets. Shellfish, predominantly cockles and mussels, are harvested commercially in the lower estuary.

Following the introduction of the MAFF Bass Conservation Area Regulations and South Wales Sea Fisheries Committee Byelaws virtually no commercial fishing for sea fish is now carried out in the estuary with the exception of a small number of stake nets on the foreshore which catch predominantly flatfish and mullet.

CONSERVATION

The environmental value of the catchment is very high in terms of both its conservation and landscape features, containing 56 Sites of Special Scientific Interest (SSSIs), a single National Nature Reserve, and two RSPB reserves. Parts of the upper catchment lie within the Cambrian Mountains Environmentally Sensitive Area and the Brecon Beacons National Park. Amongst the many rare or notable species to be found in the catchment are otters, which appear to be increasing their range, red kites and little ringed plovers. The latter species is protected and breeds in greater numbers on the Tywi gravel shoals than anywhere else in Wales.

The landscape is rich and particularly varied, from the rugged mountain scenery around Llyn Brienne through to the wide flood plain dotted with archaeological sites, and from the intimate wooded valleys of the larger tributaries to the sandy expanse of the estuary overlooked by Llanstephan Castle.

The Tywi valley is rich in sites of historic and archaeological interest. Most prominent are the many castles which hold strategic positions, many of them overlooking the river. Notable amongst these are the castles at Llanstephan, Dryslwyn, Dynevor (Llandeilo) and Llandovery.

The Old Quay at Carmarthen is a more recent reminder of the importance of the river as a trading route in the 18th and 19th centuries. Downstream from the Quay, tourists can watch the coracle fishermen plying their ancient skills, which have been passed down through many generations.



PHOTOGRAPH COURTESY OF MALCOLM HUNT

RECREATION

Walking, sightseeing, pony trekking and bird watching are widely practised throughout the catchment, particularly in the area around Llyn Brienne. The catchment is well served by footpaths and bridleways but river bank access is generally

poor and there are few formal facilities for picnicking adjacent to the river. The beauty of the mouth of the estuary, as it broadens into Carmarthen Bay, attracts many visitors.

Angling is popular in the catchment. The Tywi is widely recognised as one of the premier sea trout fisheries in the United Kingdom, with an annual average declared rod catch (1982-1991) of 5,214 fish. Although less well regarded as a salmon river, the Tywi is routinely within the top three salmon rivers in Wales, with an annual average declared rod catch (1982-1991) of 768 fish.

A number of privately owned stillwater trout and coarse fisheries have been established throughout the catchment which offer day ticket fishing for visitors. The lower estuary provides good beach fishing for sea fish, particularly for bass and flatfish.

Windsurfing, water-skiing and jet-skiing are practised in the lower estuary. Boating is confined to the estuary below Carmarthen, as the upstream limit of public navigation rights ends with the tidal limit just above the town. Sailing and power boating are widely practised throughout the estuary.

ISSUES AND OPTIONS

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

- You think that 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.



ISSUE No : 1		SURFACE WATER ACIDIFICATION IN VARIOUS PARTS OF THE CATCHMENT	
OPTIONS	Responsibility	Advantages	Disadvantages
Continued direct liming of Llyn Brienne to regulate pH and water hardness	NRA	Improved water, fishery and biological quality over 17km of river	Open-ended commitment by NRA of £51k per annum
Control new planting and re-planting of conifers	Forestry Authority/NRA/ Forest Owners	Maintenance and recovery of water quality	Limits forestry development on upland areas
Control sulphur emissions nationally and from local sources (e.g. Pembroke)	Government/HMIP/ Power generation companies	Improved water, fishery and biological quality	Cost and environmental impact of control techniques

ISSUE No : 2		ELEVATED ZINC CONCENTRATIONS IN THE TYWI DOWNSTREAM OF NANT-Y-MWYN METAL MINE (DISUSED)	
OPTIONS	Responsibility	Advantages	Disadvantages
Implementation of a site reclamation scheme in whole or in part	Dyfed CC (or successor) / WDA/ NRA	Improvements in water quality, fisheries and possibly environmental value of the site	Estimated cost of surface work alone £1m

ISSUE No : 3		POORER THAN EXPECTED BIOLOGICAL QUALITY IN THE ANNELL, DUNANT AND GWILL	
OPTIONS	Responsibility	Advantages	Disadvantages
Further investigation into cause of problem using biological and chemical monitoring	NRA	Identify cause of problems and effect remedial measures	Investigational costs: £1k Cost/benefit of remedial measures may prove to be unacceptable

ISSUE No : 4 AMMONIA CONCENTRATIONS IN THE YDW CAUSE THIS STREAM TO FAIL TARGETS FOR FE CLASS 1			
OPTIONS	Responsibility	Advantages	Disadvantages
Implementation of a programme of farm inspections during 1994/5	NRA	Identification of point sources of pollution	Cost to NRA of £3k for 30 site inspections
Improvements to farm effluent storage and disposal systems	Farmers	Improvements in water quality	Cannot be quantified but 25% grant aid available

ISSUE No : 5 FAILURE TO ACHIEVE GUIDELINE SUSPENDED SOLIDS STANDARDS ON THE CLOIDACH			
OPTIONS	Responsibility	Advantages	Disadvantages
Continued monitoring of problematic farms in the catchment	NRA/Farmers	Improvements in farm effluent storage/disposal	Cost to farmers unknown but 25% grant available
Continue liaison with Forestry Authority on felling /replanting	NRA/ Forestry Authority	Improvements in water quality	May limit forestry development in certain areas

ISSUE No : 6 TAWELAN BROOK AT JOHNSTOWN FAILS TO MEET FE CLASS 1 STANDARDS FOR AMMONIA AND BOD, AND GUIDELINE STANDARDS FOR SUSPENDED SOLIDS			
OPTIONS	Responsibility	Advantages	Disadvantages
Investigate run-off and inputs from agricultural activity as possible source of water quality failure	NRA	Improved water quality	Investigation costs: £1k Cost of solving identified problems may be high and take a considerable time

ISSUE No : 7 THE PIBWR FAILS TO MEET FE CLASS 1 TARGETS FOR BOD			
OPTIONS	Responsibility	Advantages	Disadvantages
Investigate run-off and inputs from agricultural activity as possible source of elevated BOD. Catchment survey is planned for Sept. to Dec.1994.	NRA	Identification of cause of problem Subsequent improvement in water quality	Investigation costs: c. £5k Remedial measures likely to be expensive and take a considerable time before being implemented

ISSUE No : 8 LOW DISSOLVED OXYGEN IN THE TYWI ESTUARY DURING LOW RIVER FLOWS COINCIDING WITH SPRING TIDES			
OPTIONS	Responsibility	Advantages	Disadvantages
Study to monitor problem caused by natural decay of marine algae and re-suspension of sediments	NRA	Improve understanding of problem which may lead to solutions being found	Cost : unknown
Situation may improve when Parc-y-Splotts STW is uprated (currently estimated at 1996)	Dŵr Cymru	Improved effluent and water quality	Cost : £3.8m

ISSUE No : 9 POOR BACTERIOLOGICAL QUALITY IN PARTS OF THE ESTUARY AND AT LLANSTEPHAN BEACH			
OPTIONS	Responsibility	Advantages	Disadvantages
Upgrading of Parc-y- Splotts STW in line with UWWT Directive	Dŵr Cymru	Improved water quality	Cost : £3.8m Will not totally solve problem
Promote 'best practice' by farmers in following MAFF guidelines	Farmers/NRA	Improved agricultural practices and water quality	Will not totally solve problem but may reduce bacteria inputs from freshwater sources
Define tidal states with optimum quality conditions for water based recreational activities	NRA/Carmarthen DC (Env. Health)	Water users can restrict activities to periods of optimum water quality	Uses constrained and no guarantee of water quality conditions

ISSUE No : 10 MAINTAINED FLOW BELOW NANTGAREDIG IS LESS THAN 95 PERCENTILE FLOW			
OPTIONS	Responsibility	Advantages	Disadvantages
Desk study to identify if existing flow conditions create an environmental problem and, if so, initiate a feasibility study of possible solutions	NRA	Increased knowledge of the catchment Protection of the environment and migratory fish stocks	Cannot commence until ongoing Research and Development (R&D) is complete Cost effective solutions may not be apparent Desk study cost : £2k

ISSUE No : 11 PRESCRIBED FLOW BELOW LLYN-Y-FAN FACH IS LESS THAN 95 PERCENTILE FLOW			
OPTIONS	Responsibility	Advantages	Disadvantages
Desk study to identify if existing conditions do create an environmental problem and, if so, feasibility study of possible solutions	NRA	Increased knowledge of the catchment Protection of the environment	Cannot commence until on-going R&D is complete Cost : Desk study £2k

ISSUE No : 12		CURRENT YIELD OF LLYN BRIANNE TO BE QUANTIFIED	
OPTIONS	Responsibility	Advantages	Disadvantages
Study to investigate yield of Llyn Brianne	NRA/Dŵr Cymru	Potential of reservoir to meet future demands whilst protecting environmental needs can be evaluated	Study cannot commence until national methodology agreed (R&D in progress) Cost : £9k

ISSUE No : 13		FLOOD PROTECTION STANDARDS ARE KNOWN TO BE BELOW THE NRA'S TARGET FOR URBAN AREAS AT CARMARTHEN	
OPTIONS	Responsibility	Advantages	Disadvantages
Investigation now complete. Improvement schemes to be carried out	NRA	Increased flood protection to reduce flood damage	Significant capital costs Increased maintenance

ISSUE No : 14		FLOOD PROTECTION STANDARDS ARE CONSIDERED TO BE BELOW THE NRA'S TARGET FOR URBAN AREAS AT ABERGWILI AND LLANDEILO	
OPTIONS	Responsibility	Advantages	Disadvantages
Carry out investigation Enhancement of existing defences to offset impact of proposed bypass	Welsh Office in liaison with NRA	Enhanced flood protection	Increased maintenance costs

ISSUE No : 15		FLOOD PROTECTION STANDARDS ARE CONSIDERED TO BE BELOW THE NRA'S TARGET FOR URBAN AREAS AT SITES WITHIN THE CATCHMENT	
OPTIONS	Responsibility	Advantages	Disadvantages
Investigate the problem and possibility of improving flood protection	NRA	Increased flood protection and reduce flood damage	Future maintenance costs

ISSUE No 16 STOS SURVEYS REQUIRED TO IDENTIFY THE EXTENT OF LANDS LIABLE TO FLOOD			
OPTIONS	Responsibility	Advantages	Disadvantages
<p>Undertake surveys</p> <p>National timetable is under consideration</p> <p>Priorities to be set in consultation with Local Authorities</p>	NRA	<p>Flood plain & flood defence problems identified to enable NRA to advise Local Authorities for Local Plans</p>	Cost : unknown

ISSUE No : 17 EFFECTIVENESS OF FISH EXCLUSION SCREENS AT NANTGAREDIG AND MANORAFON INTAKES IS UNKNOWN			
OPTIONS	Responsibility	Advantages	Disadvantages
<p>Investigation into effectiveness of current provisions to be carried out</p> <p>Implementation of any necessary improvements to be carried out</p>	NRA/Dŵr Cymru	<p>Loss of fish from catchment minimised</p> <p>Compliance with legal requirements</p>	<p>Cost and maintenance requirement for Dŵr Cymru</p>

ISSUE No : 18 OBSTRUCTIONS TO THE PASSAGE OF MIGRATORY FISH			
OPTIONS	Responsibility	Advantages	Disadvantages
<p>To review feasibility / desirability of improving access at obstructions and then to define and implement a rolling programme of works (currently underway)</p>	NRA/Angling Associations/ Fishery Owners	<p>To improve the productivity of the catchment and hence enhance rod and net catches</p>	<p>Resource and cost (unknown) implications</p> <p>Possible detriment to local brown trout stocks</p>

ISSUE No : 19

THE LLYN BRIANNE FISHERIES PROTECTION SCHEME HAS NOT BEEN FULLY AND SUCCESSFULLY IMPLEMENTED

OPTIONS	Responsibility	Advantages	Disadvantages
Following advice on water quality trends in the upper catchment, review and, if appropriate, implement stock enhancement measures by reopening adult trap and installing smolt release ponds downstream of the reservoir	NRA/Dŵr Cymru	Improvement of catchment productivity and hence enhancement of net/rod catches	Resource and cost implication unknown, but may be insufficient with anticipated funding

ISSUE No : 20

POACHING OF ADULT SALMON AND SEA TROUT

OPTIONS	Responsibility	Advantages	Disadvantages
Through planning and flexibility, to ensure that resources are effectively targeted on high risk areas, and that staff are highly trained and equipped to maximise effectiveness of enforcement operations	NRA/Fishery Owners	To maximise spawning, escapement and hence productivity of the catchment Compliance with statutory duties	Reduction in resources and time available for dealing with other key threats (e.g. pollution and habitat destruction)

ISSUE No : 21

PERCEIVED THREAT TO CONTINUATION OF CORACLE FISHERY

OPTIONS	Responsibility	Advantages	Disadvantages
Encourage and support funding applications by the Coracle fishermen to grant-aiding and other organisations	Tywi Coracle Netsmen's Association/ Local Authority/ Welsh Authority/ Welsh Tourist Board / NRA	Continuation of 'heritage' fishery Potential tourism implications	Continuation of cropping of returning adult salmonids, thus reducing spawning escapement Cost to other organisations

ISSUE No : 22 REDUCTION IN SALMON AVAILABILITY DURING NETTING/ANGLING SEASONS			
OPTIONS	Responsibility	Advantages	Disadvantages
To investigate the true situation through study of catch data and to consider any appropriate action (e.g. line rearing and stocking of early running salmon, changes in seasons through Byelaw amendments)	NRA/CFF/Fishery Owners	Greater availability for rods and nets	Possible net increase in exploitation and hence reduction in spawning escapement Increased period of enforcement Possible excessive costs

ISSUE No : 23 PROTECTION OF THREATENED SPECIES AND LOCAL GENETIC STRAINS OF FISH			
OPTIONS	Responsibility	Advantages	Disadvantages
Establish status of populations and take appropriate protective action where feasible	NRA/SWSFC/ Fishery Owners/ Angling Clubs	Continued survival of threatened populations	Cost : unknown

ISSUE No : 24 THE INVASIVE PLANT, JAPANESE KNOTWEED, IS PRESENT IN MANY PARTS OF THE CATCHMENT			
OPTIONS	Responsibility	Advantages	Disadvantages
Implement effective and co-ordinated control measures within the catchment where appropriate	NRA/BBNP/ DCC/ CCW/ Local Authorities/ Land Owners	Environmental and access improvements	Resource and cost implication unknown Likely to be a long term commitment

ISSUE No : 25 PUBLIC ACCESS TO RIVERBANKS IS LIMITED			
OPTIONS	Responsibility	Advantages	Disadvantages
Consider the adequacy of the existing footpath network and take appropriate action	Local Authorities/ Land Owners	Improved public access to heighten appreciation of beauty and environmental value of river	Cost : unknown Possible disruption to landowners and other users (e.g. anglers) and wildlife

ISSUE No : 26 "STANDARDS OF SERVICE" FOR SSSIs HAVE NOT BEEN FORMALLY AGREED WITH CCW			
OPTIONS	Responsibility	Advantages	Disadvantages
Agree "standards of service" and implement	NRA/CCW	SSSIs safeguarded	Cost : unknown

ISSUE No : 27 DEVELOPMENT ON FLOOD PLAINS AND THEIR CONFLICT WITH FLOOD DEFENCE REQUIREMENTS			
OPTIONS	Responsibility	Advantages	Disadvantages
Improve liaison between NRA and Local Authorities to ensure protection standards are not compromised	NRA/ Local Authorities	No reduction in existing flood protection. Developer pays for any necessary mitigation works	Cost to developer
Keep river banks free from development		Ensures that existing defences and river can be maintained at reasonable cost and new defences provided in future	Reduction in land available for development

ISSUE No : 28 A NEW BYPASS HAS BEEN IDENTIFIED FOR CARMARTHEN AND LLANDEILO WITHIN THE CATCHMENT			
OPTIONS	Responsibility	Advantages	Disadvantages
Close liaison between the NRA and Welsh Office to ensure NRA interests are protected	NRA/ Welsh Office	NRA interests are taken into account as scheme developed and implemented Environment and property protected	Cost of mitigation works dependent on scheme

ISSUE No : 29 HABITAT DISTURBANCE/DEGRADATION ARISING FROM DEVELOPMENT, RIVER ENGINEERING AND AGRICULTURAL PRACTICES			
OPTIONS	Responsibility	Advantages	Disadvantages
Impacts of various uses need to be assessed and areas/ habitats most at risk need to be identified Tighter planning and regulatory controls to be implemented where appropriate and acceptable working practices agreed and implemented	NRA/ Local Authorities/NFU/ FUW/ Landowners	Compliance with statutory obligations Protection and enhancement of environment and optimization of catchment productivity and conservation value	Constraint on developers operations

ISSUE No : 30 ENVIRONMENTAL DAMAGE AND CHANNEL DESTABILISATION FROM PRIVATE GRAVEL REMOVAL AND UNCONSENTED OPERATIONS			
OPTIONS	Responsibility	Advantages	Disadvantages
Need for tighter planning and regulatory control with increased enforcement. Areas /habitats most at risk to be identified and acceptable methods of working agreed and implemented	NRA/Local Authorities/NFU/ FUW/ Landowners	Compliance with statutory obligations	Constraint on developers operations

ISSUE No : 31		CURRENT LAND USE PRACTICES (E.G. AGRICULTURE AND FORESTRY) CAN RESULT IN RELEASES OF POLLUTANTS TO THE DETRIMENT OF FISHERIES AND CONSERVATION	
OPTIONS	Responsibility	Advantages	Disadvantages
Pollution prevention inspections and control measures to minimise the risk of spillage from stores of farm wastes, pesticides etc.	NRA/FUW/NFU/ Forestry Organisations/ Landowners	Compliance with statutory obligations Improved value and productivity of catchment in fisheries, conservation and amenity terms Protection of legitimate uses	Cost : unknown
Forestry operations to follow Forests and Water Guidelines	Forest Enterprise/ Forest Owners/ Managers/ Contractors	As above	As above

ISSUE No : 32		SEALS, CORMORANTS AND SAWBILL DUCKS ARE BELIEVED, BY SOME ANGLERS AND NETSMEN, TO BE SIGNIFICANT THREATS TO FISH STOCKS. SEALS ARE ALSO DISRUPTING ESTUARY NETSMEN AND INVADING FRESHWATER AS FAR AS LLANDEILO	
OPTIONS	Responsibility	Advantages	Disadvantages
To monitor results of national investigations and status of predators within the catchment and then to review NRA policy and advice to Welsh Office/ angling interests if required	NRA/RSPB/CCW WOAD/ Angling and Netting Interests	Proper balance is maintained between predator numbers and fish stocks	None
To periodically review available technology to determine whether seal deterrence equipment is an effective solution to seal incursion into freshwater, and to review national NRA policy if appropriate	NRA/Angling & Netting Interests	Development of deterrence methods can be identified at an early stage	None

ISSUE No : 33 NO ACCESS AGREEMENTS EXIST FOR CANOEISTS WITHIN THE CATCHMENT			
OPTIONS	Responsibility	Advantages	Disadvantages
Encourage and support access agreements between fishery owners and canoeists, with such agreements incorporating the protection of fishery and conservation issues	Welsh Canoeing Association/ Land and Fishery Owners/ NRA	Reduced risk of disturbance to fish, redds and wildlife Reduced conflict between canoeing interests and land/ fishery owners Realisation of canoeing potential	Possible impact on conservation interests and fishery

ISSUE No : 34 DISTURBANCE OF FAUNA IN ESTUARIAL AND COASTAL WATERS AS A RESULT OF POWER BOAT USAGE			
OPTIONS	Responsibility	Advantages	Disadvantages
Determine and monitor situation Implement effective control measures if appropriate	Local Authority/ CCW/ Boat Clubs/ RSPB	Protection of nationally important wintering populations of wildfowl and reduced disturbance to other users	Enforcement difficult Reduced enjoyment by power-boaters

ISSUE No : 35 POSSIBLE IMPACT UPON FISH SURVIVAL AND ANGLING OF LOW TEMPERATURE OF WATER LEAVING LLYN BRIANNE			
OPTIONS	Responsibility	Advantages	Disadvantages
Continue present investigations to determine whether impact is significant	NRA/Dŵr Cymru	Determination of scale of problem	Investigation costs: c.£10k
Should significant impact be proven, investigate possible solutions, which may include multi-level draw-off	NRA/Dŵr Cymru	Improvement to fishery and angling success	Cost : e.g. multi-level draw-off estimated at £500k to £1m

ISSUE No : 36 POSSIBLE IMPACT UPON LITTLE RINGED PLOVER BREEDING SUCCESS FROM FRESHETS RELEASED FROM LLYN BRIANNE			
OPTIONS	Responsibility	Advantages	Disadvantages
Ensure that freshets are not released when the birds are nesting	NRA	Protection of Schedule 1 protected species	Prevents NRA authorising releases for other environmental benefits

ISSUE No : 37 INCOMPLETE TIME OF TRAVEL INFORMATION FOR PROVISION OF ADVICE TO ABSTRACTORS DURING ACUTE POLLUTION INCIDENTS			
OPTIONS	Responsibility	Advantages	Disadvantages
Complete travel time and dispersion studies under a full range of flow conditions for main Tywi downstream of Llandovery and major tributaries	NRA	Comprehensive matrix of flow/ travel time data to assist in management of incidents and protection of abstractors	Cost : c. £10k

ISSUE No : 38 DEVELOPMENT IN SOME SEWERED AREAS MAY LEAD TO FURTHER ENVIRONMENTAL IMPACT			
OPTIONS	Responsibility	Advantages	Disadvantages
Oppose developments in areas where inadequate sewerage systems and/or STWs cause unacceptable environmental impact and for which no remedial schemes are committed	NRA/ Local Authorities/Dŵr Cymru	No increased environmental impacts	Interim arrangements may be promoted Constraints on development in affected areas

