

NRA - Wales 74

# National Rivers Authority

*Awdurdod Afonydd Cenedlaethol*

## WELSH REGION

*Rhanbarth Cymru*

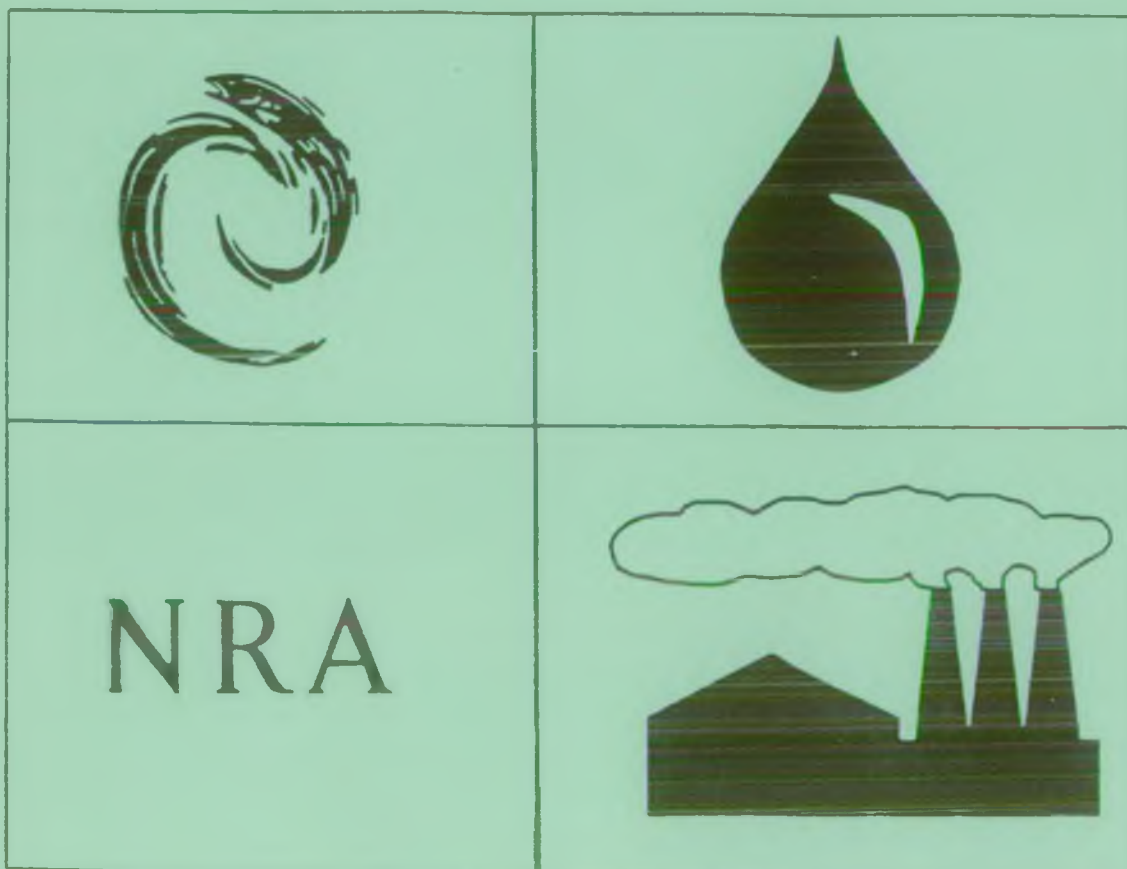
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# EURWG

## Catchment Management Plan

### Phase 2

### Resolution of Catchment Problems



### Guardians of the Water Environment

*Diogelwyr Amgylchedd Dwr*

EURYG CATCHMENT MANAGEMENT PLAN

PHASE 2

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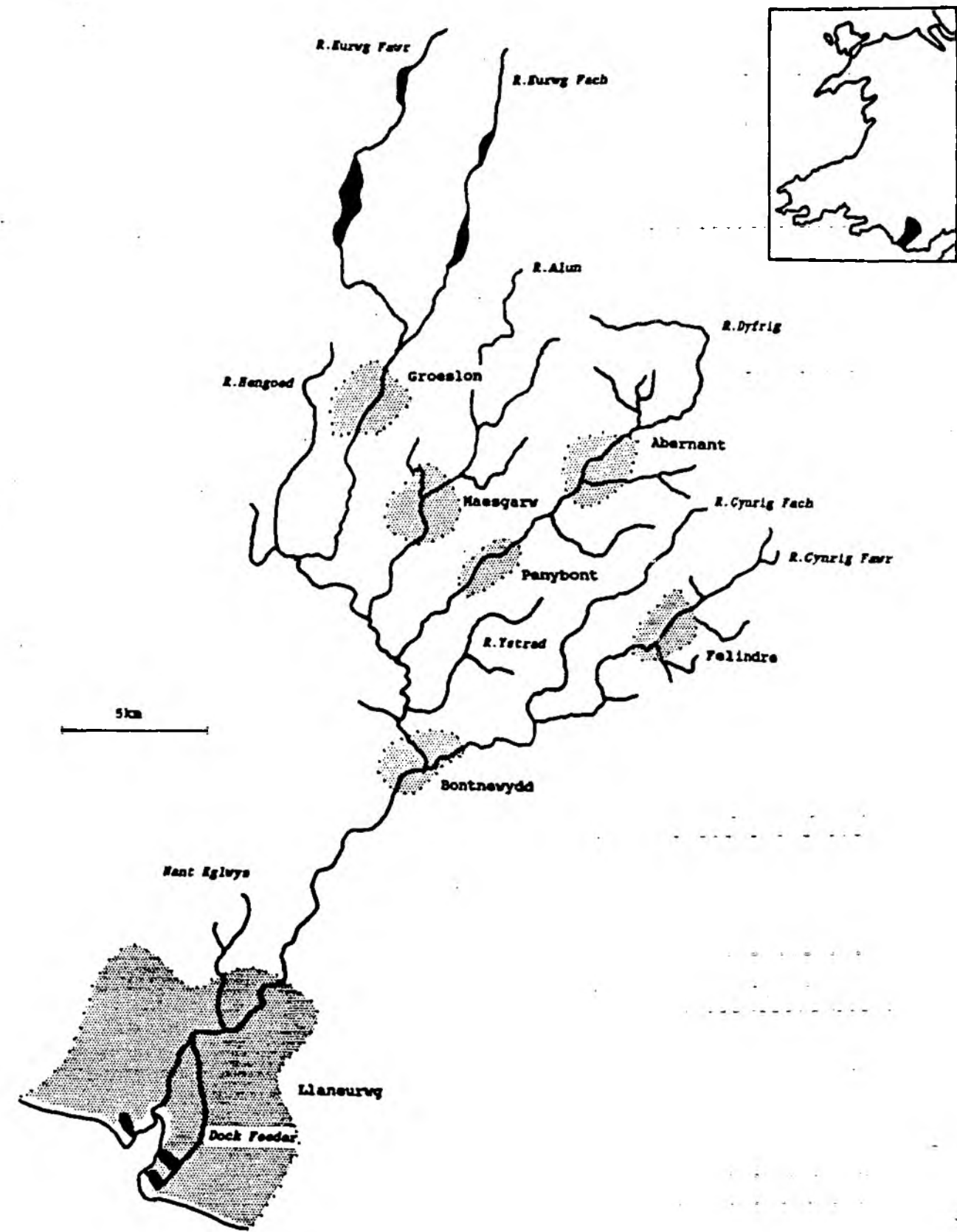
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ENVIRONMENT AGENCY

ENVIRONMENT AGENCY



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**Eurwg Catchment  
Main Towns and Rivers**

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## 1. EURWG CATCHMENT MANAGEMENT PLAN : INTRODUCTION TO PHASE 2

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1.1 This Phase 2 Report of the Eurwg Catchment Management Plan deals specifically with the resolution of those problems which were identified in the Phase 1 Report.

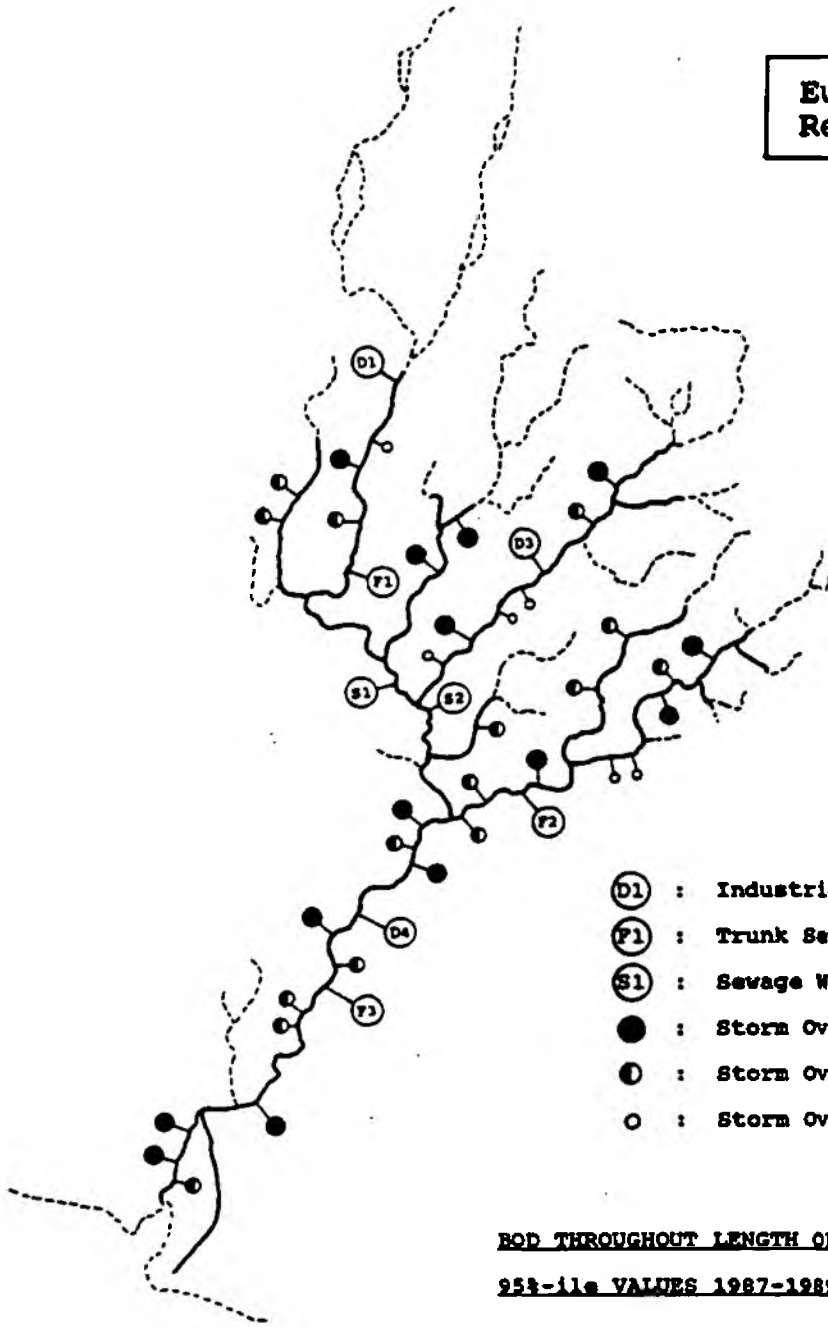
1.2 The report represents the Plan of Action for the catchment, and the problems are dealt with in a standardised way which reflects this philosophy:-

- o The nature of the problem is defined.
- o The cause of the problem is described.
- o The solution to the problem, which has been formulated after consultation between the NRA and relevant outside organisations, is presented.
- o Responsibility for carrying out the remedial work is assigned.
- o The timetable is given for the work to be carried out.
- o The financial implications of carrying out the remedial measures are presented, in terms of the one-off costs required to make an improvement and the ongoing annual costs required to maintain that improvement.

1.3 In line with the concept of a broad-based planning document, the information presented here has deliberately been kept concise. Further details on the various problems, and the evidence on which conclusions have been reached, can be found in the individual support documents which underpin this Plan.

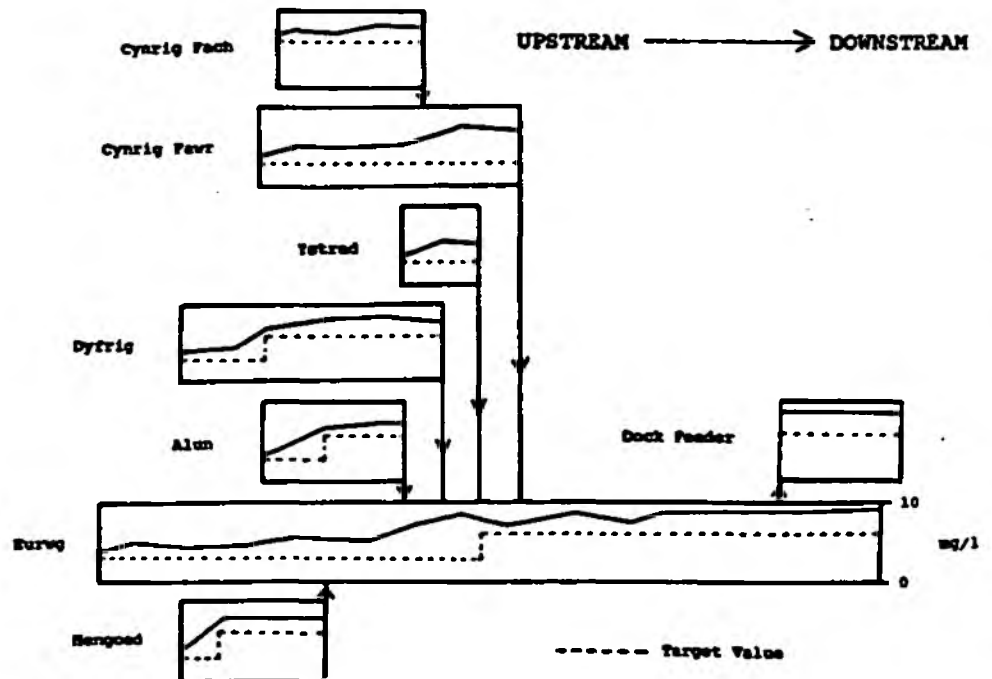
1.4 While this report is seen as the way to address current problems in the catchment, it is recognised that circumstances may change. The Plan will be updated as major new problems or opportunities arise, and will in any case be reviewed in five years' time.

**Eurwg Catchment  
Reducing BOD Levels**



- Ⓛ1 : Industrial Discharge
- Ⓛ1 : Trunk Sewer Fracture
- Ⓛ1 : Sewage Works Discharge
- : Storm Overflow having major impact
- ⦿ : Storm Overflow having moderate impact
- : Storm Overflow having some impact

**BOD THROUGHOUT LENGTH OF NON-COMPLIANT REACHES**  
**25% - 11% VALUES 1987-1989**



## 2. REDUCING BOD LEVELS

2.1 **Nature of Problem** : There is widespread failure to achieve the BOD and BOD(ATU) targets in the main river downstream of Groeslon, and in the lower reaches of all tributaries.

2.2 **Cause of Problem** : As might be expected from the widespread nature of the problem, a very large number of polluting inputs were identified over and above the loads which the river can be expected to assimilate:-

- o Excessive loads from the discharges D1, D3 & D4, even when complying with their current consents.
- o Faulty operation of Storm Water Overflows (SWO's) throughout the catchment.
- o Serious fractures of trunk sewers at three locations.

2.3 **Solutions** : The solutions which have been formulated, together with the responsible organisations, shown ( ), are listed below.

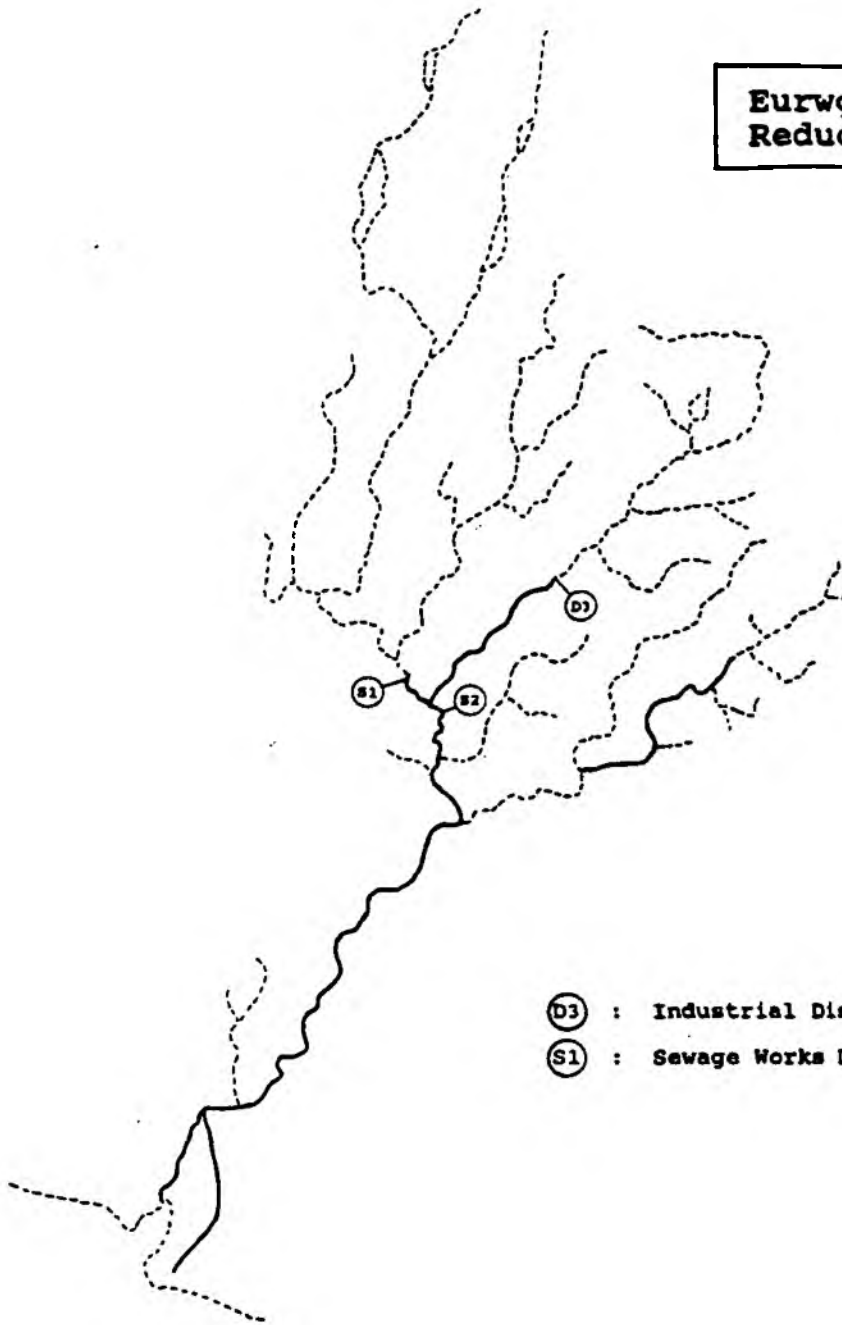
- (1) Reconsent discharges D1, D3 & D4 (NRA).
- (2) Install additional effluent treatment for discharge D1 (Centol plc).
- (3) Install additional effluent treatment for discharge D3 (Glo Dyfrig plc).
- (4) Divert discharge D4 to the sewer (Robinsons plc, Celtic Water plc).
- (5) Renovate SWO's; reset as necessary (Celtic Water plc).
- (6) Repair trunk sewer fractures F1, F2 & F3 (Celtic Water plc).

### 2.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1	-----						-	-
2		-----					150	45
3			-----				260	25
4		--					5	45
* 5a			-----				550	-
* 5b				-----			450	-
* 5c					-----		150	-
* 5d							45	-
* 5e			-----				25	-
6	-----						130	-
<b>TOTAL</b>							<b>1765</b>	<b>115</b>

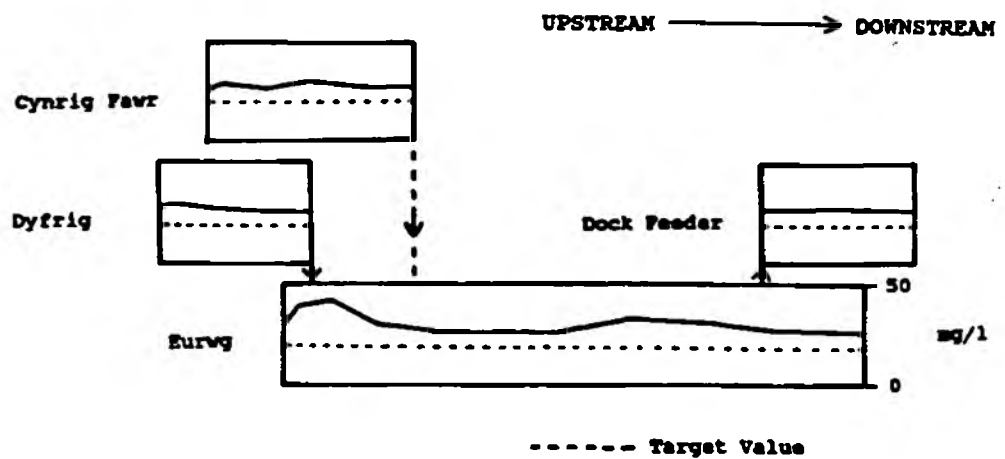
\* 5a:R.Eurwg; 5b:R.Cynrig; 5c:R.Dyfrig; 5d:R.Alun; 5e:R.Ystrad & R.Hengoed.

**Eurwg Catchment  
Reducing Ammonia Levels**



- ⓓ3 : Industrial Discharge
- Ⓢ1 : Sewage Works Discharge

**UNIONISED AMMONIA THROUGHOUT LENGTH OF NON-COMPLIANT REACHES  
253-ile VALUES 1987-1989**



### 3. REDUCING AMMONIA LEVELS

**3.1 Nature of Problem :** There is a failure to achieve the total and unionised Ammonia standard in the main river downstream of Penymynydd Sewage Works, in the R.Dyfrig downstream of discharge D3, and in the Cynrig Fawr downstream of Felindre.

**3.2 Cause of Problem :** The critical input to the catchment is the effluent from Penymynydd Sewage Works (S1), which enters the main river with virtually no nitrification. Elsewhere, localised problems are caused by:-

- o The industrial effluent discharge D3.
- o Faulty Storm Water Overflows (SWO's) on the R.Cynrig Fawr.

**3.3 Solutions:-**

- (1) Install nitrifying capacity at Penymynydd Sewage Works (Celtic Water plc).
- (2) Install additional effluent treatment plant for discharge D3 (Glo Dyfrig plc).
- (3) Renovate SWO's on the R.Cynrig Fawr; reset as necessary (Celtic Water plc).

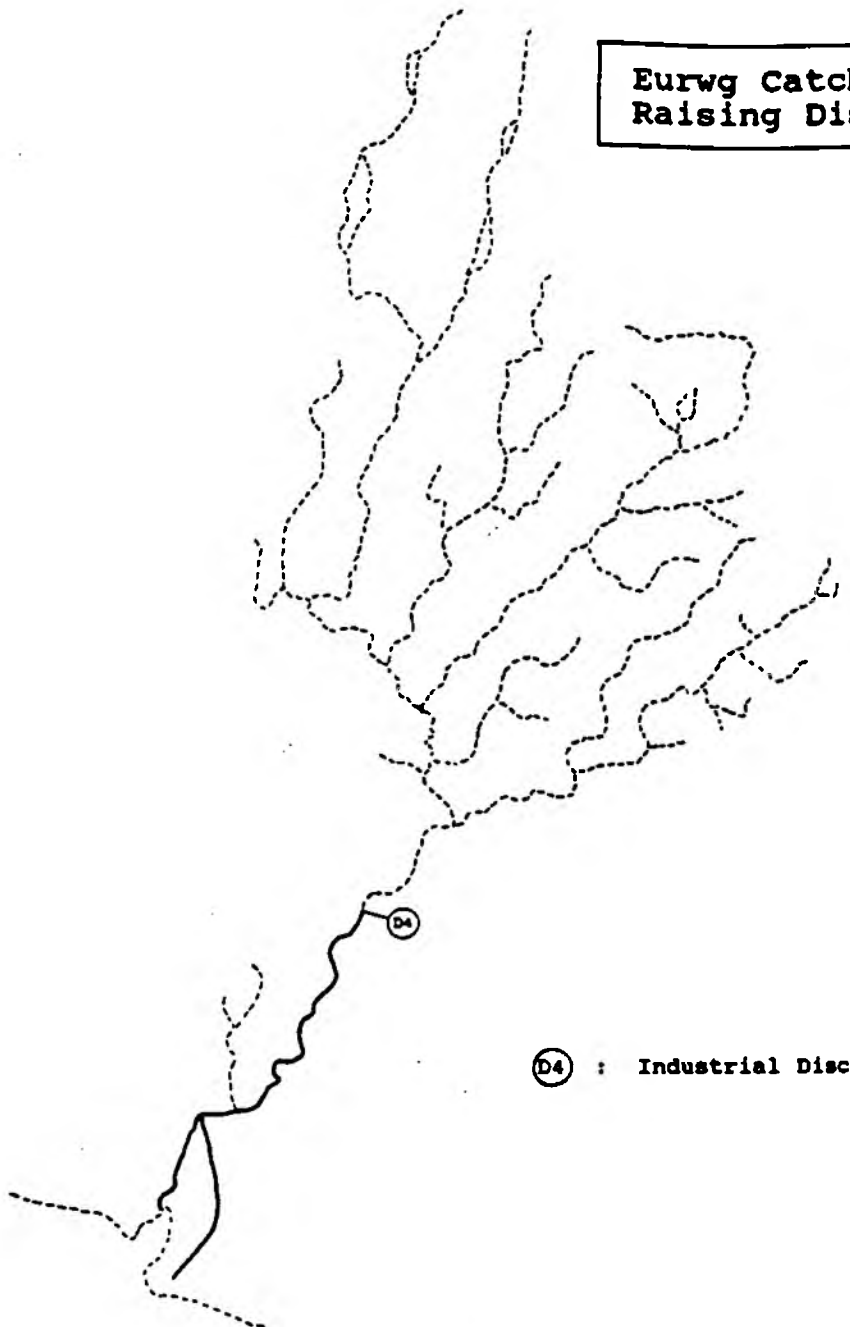
**3.4 Timetable & Financial Implications:-**

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST fk	ANNUAL COST fk
1		.....					1400	60
2		.....					*	*
3			.....				*	*
<b>TOTAL</b>							<b>1400</b>	<b>60</b>

\* Costs already included in earlier table (Reducing BOD Levels).

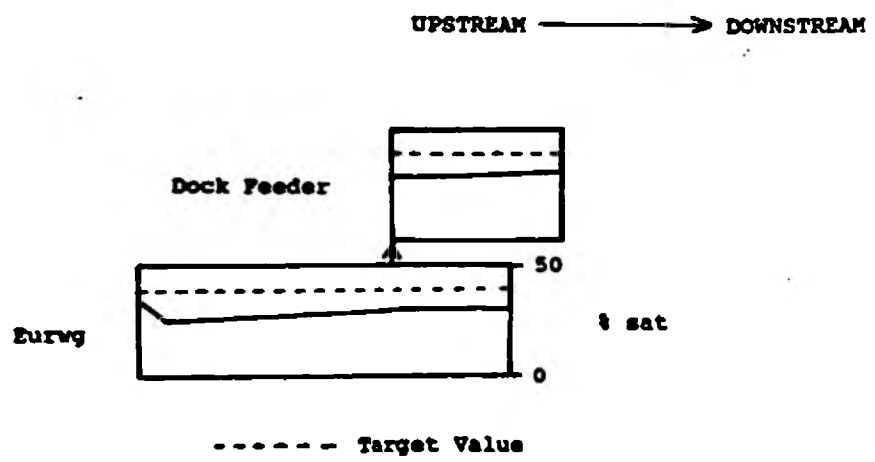


**Eurwg Catchment  
Raising Dissolved Oxygen Levels**



**D4** : Industrial Discharge

DISSOLVED OXYGEN THROUGHOUT LENGTH OF NON-COMPLIANT REACHES  
258-ile VALUES 1987-1989



#### 4. RAISING DISSOLVED OXYGEN LEVELS

4.1 **Nature of Problem** : The main river fails to achieve the Dissolved Oxygen standard downstream of discharge D4, as does the Dock Feeder flowing through Llaneurwg.

4.2 **Cause of Problem** : Under existing circumstances, the failure to comply can be attributed to the high organic load in discharge D4, in conjunction with an upstream Dissolved Oxygen concentration which is already marginal as a result of other discharges.

4.3 **Solutions** : The solutions to this problem are the same as those to be adopted in order to reduce BOD and Ammonia levels:-

- (1) Reconsent discharges D1, D3 & D4 (NRA).
- (2) Install additional effluent treatment for discharge D1 (Centol plc).
- (3) Install additional effluent treatment for discharge D3 (Glo Dyfrig plc).
- (4) Divert discharge D4 to the sewer (Robinsons plc, Celtic Water plc).
- (5) Renovate SWO's; reset as necessary (Celtic Water plc).
- (6) Repair trunk sewer fractures F1, F2 & F3 (Celtic Water plc).
- (7) Install nitrifying capacity at Penymynydd Sewage Works (Celtic Water plc).

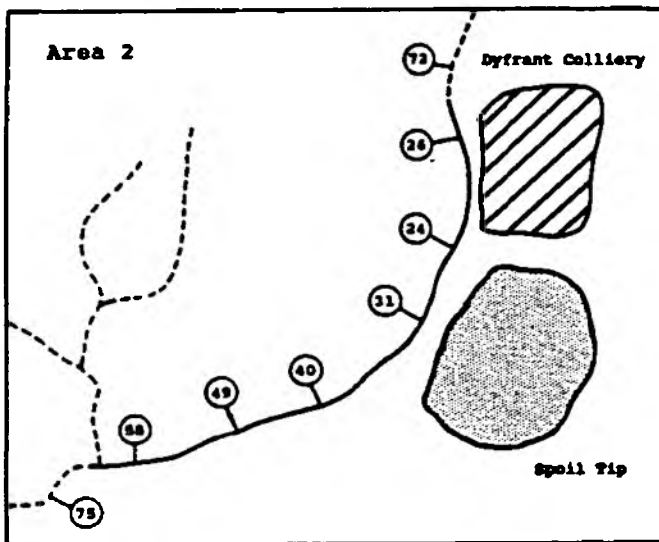
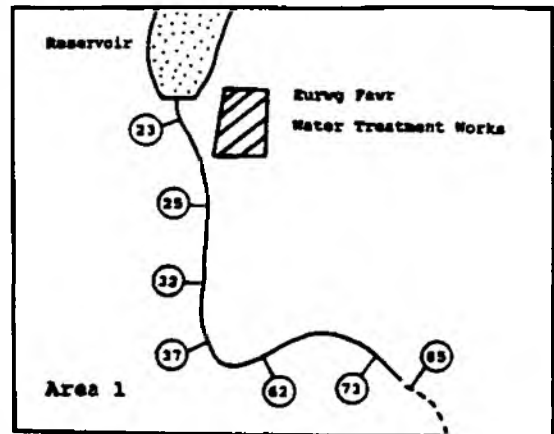
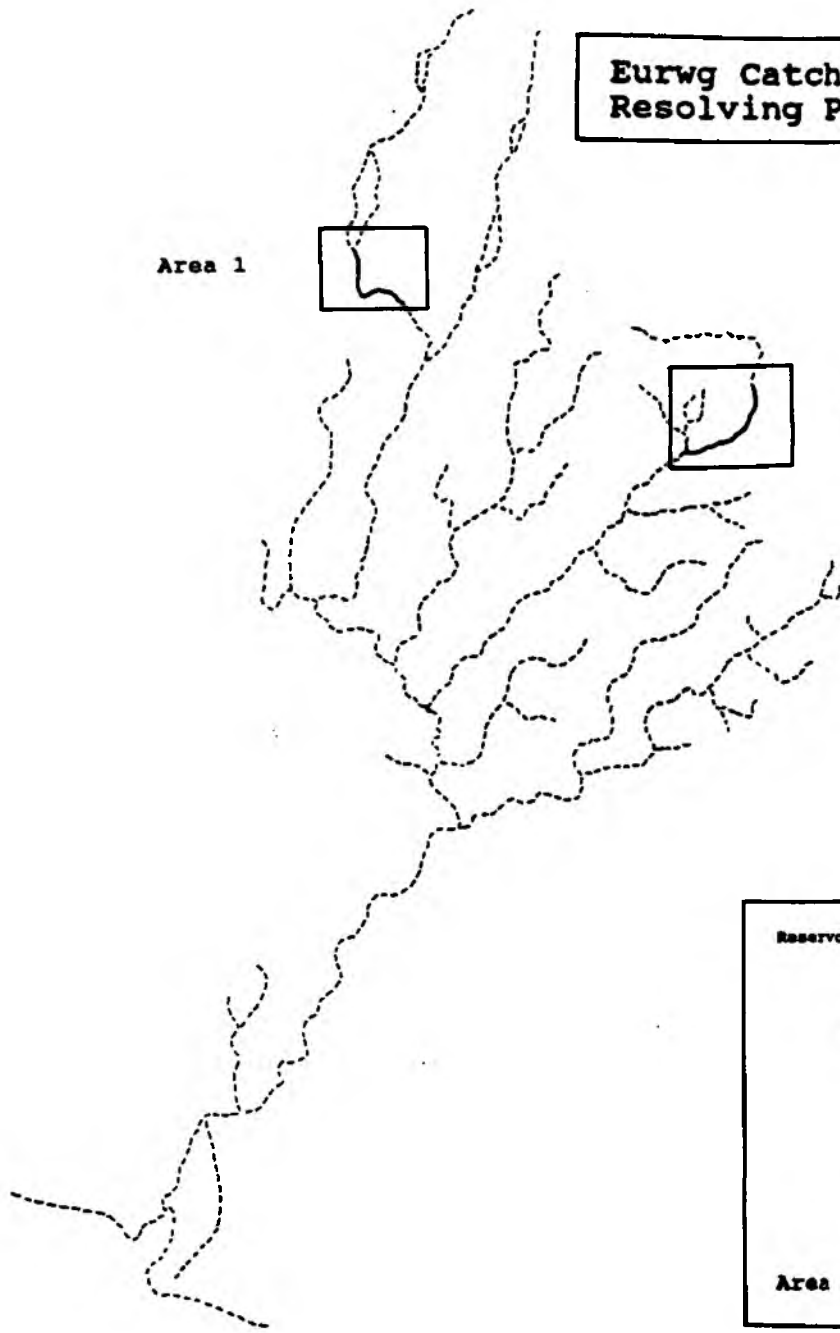
#### 4.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1	.....						-	-
2		.....					**	**
3			.....				**	**
4		..					-	**
* 5a			.....				**	-
* 5b				.....			**	-
* 5c					.....		**	-
* 5d			.....				**	-
* 5e					.....		**	-
6	.....						**	-
7		.....						
<b>TOTAL</b>							<b>**</b>	<b>**</b>

\* 5a:R.Eurwg; 5b:R.Cynrig; 5c:R.Dyfrig; 5d:R.Alun; 5e:R.Ystrad & R.Hengoed.

\*\* Costs already included in earlier tables (Reducing BOD & Ammonia levels).

**Eurwg Catchment  
Resolving Poor Biological Quality**



32 : BMWP Score

**BMWP Score:-**

- <25 : Very Poor Quality
- 25 - 49 : Poor Quality
- 50 - 99 : Moderate Quality

## 5. RESOLVING POOR BIOLOGICAL QUALITY

**5.1 Nature of Problem :** Two stretches, the Eurwg Fawr downstream of the Water Treatment Works, and the Dyfrig downstream of colliery discharge C1 (Dyfrant Colliery), both met their water quality targets based on a simple examination of chemical data. However, the biological quality of the two stretches was so poor, relative to the apparent water chemistry, that they were both signalled for further investigation.

**5.2 Cause of Problem :** In both cases, the problems were traced to intermittent discharges :-

- o In the Eurwg Fawr, the problem was traced to the periodic release of water works sludge, containing high concentrations of polyelectrolyte, Aluminium Hydroxide precipitate and other polluting material. In two of the incidents, brown trout were also killed. The problem was compounded by the consistently low flow immediately downstream of the reservoir (the compensation flow) which has only a weak scouring effect. In addition, the lack of invertebrate populations upstream meant that recolonisation took place very slowly following such pollution incidents.
- o In the Dyfrig, the problem was attributed to the discharge of surface runoff from the colliery site under wet weather conditions, and to the runoff from the adjacent spoil tip. The problem was a long standing one, and the river bed was, consequently, highly compacted.

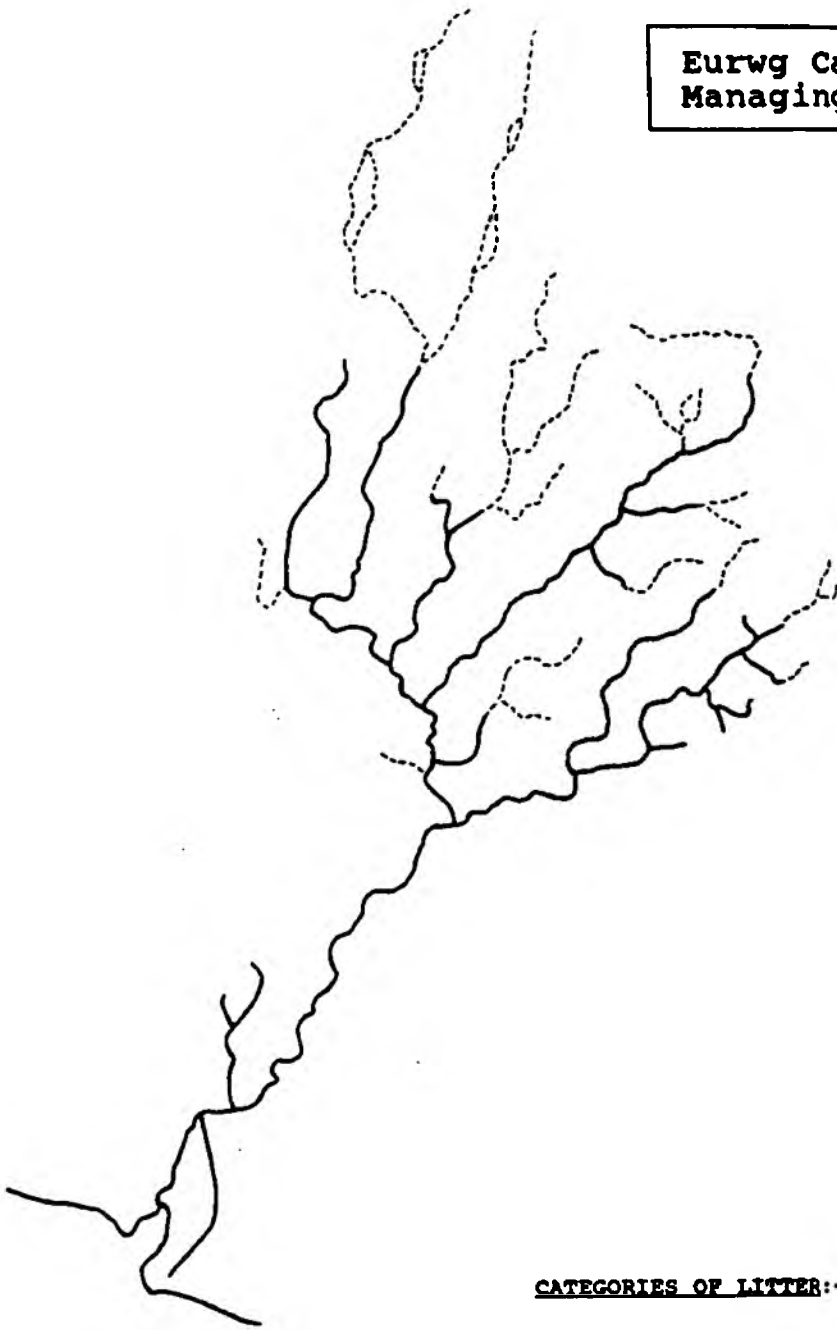
**5.3 Solutions:-**

- (1) Improvement in sludge handling practices at Eurwg Fawr Water Treatment Works, and in particular the provision of larger sludge dewatering facilities (Celtic Water plc).
- (2) Improved coal handling practices at Dyfrant Colliery, and in particular the more effective containment of coal prior to being transported off the site (Glo Dyfrig plc).
- (3) Stabilisation of the spoil tip adjacent to Dyfrant Colliery by a combination of partial removal, and improved planting of grass on the tip that will remain (Glo Dyfrig plc).

**5.4 Timetable & Financial Implications:-**

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1		-----					110	10
2		-----					230	10
3			-----				200	-
<b>TOTAL</b>							<b>540</b>	<b>20</b>

**Eurwg Catchment  
Managing the Litter Problem**



**CATEGORIES OF LITTER:-**

<b>Sewage Debris</b>	<b>:</b>	<b>Toilet Paper, Contraceptives</b>
<b>Plastic Strips</b>	<b>:</b>	<b>Various Lengths</b>
<b>Dropped Litter</b>	<b>:</b>	<b>Cans, Cartons</b>
<b>Metal Objects</b>	<b>:</b>	<b>Container Drums</b>
<b>Builders Rubble</b>	<b>:</b>	<b>Fencing, Rubble</b>
<b>Furniture</b>	<b>:</b>	<b>Carpets, Furniture</b>
<b>Vehicle Debris</b>	<b>:</b>	<b>Tyres, Vehicle Parts</b>
<b>Large Packages</b>	<b>:</b>	<b>Trolleys, Crates</b>
<b>Clothing</b>	<b>:</b>	<b>Clothing, Rags</b>
<b>Glass &amp; China</b>	<b>:</b>	<b>Bottles, Crockery</b>
<b>Angling Litter</b>	<b>:</b>	<b>Line, Weights</b>
<b>Miscellaneous</b>	<b>:</b>	<b>Toys, Buckets, Rope</b>

## 6. MANAGING THE LITTER PROBLEM

6.1 **Nature of Problem** : There is a widespread problem of litter throughout the urbanised parts of the catchment, which detracts from the Public's view of the river environment, and contravenes basic aesthetic requirements.

6.2 **Cause of Problem** : The many sources of litter are obvious from the wide range of litter categories identified. Briefly, these may be categorised as:-

- o Sewage - derived (see opposite).
- o The result of deliberate dumping in the watercourse, especially of relatively large objects (builders' rubble, furniture, cars etc.)
- o Litter which is transported to the river from the surrounding land (often relatively small items blown by the wind, or carried in surface runoff).

The visual impact of the smaller, more easily transportable items is exacerbated by flood flows which leave the litter caught up in vegetation high up the bankside, and is reduced by leaf growth in the summer.

6.3 **Solutions** : The wide variety of sources, and the chronic nature of the problem, mean that this problem has to be attacked on a number of different fronts. The problem is further complicated by the lack of explicit guidelines outlining the responsibilities of the various bodies which are involved in controlling and reacting to the problem. Put briefly, however:-

- o The NRA removes large objects from the watercourse where they constitute an obstruction to flow, and is entitled to recover the expenses incurred from the person who caused or knowingly permitted the dumping.
- o The NRA is empowered to prosecute those who are caught in the act of illegal dumping of any solid waste matter.
- o District Councils have wider legislative powers through the Environmental Health Departments to control illegal dumping of refuse along the bankside and cooperate with the Police Force in enforcing the Litter Act.

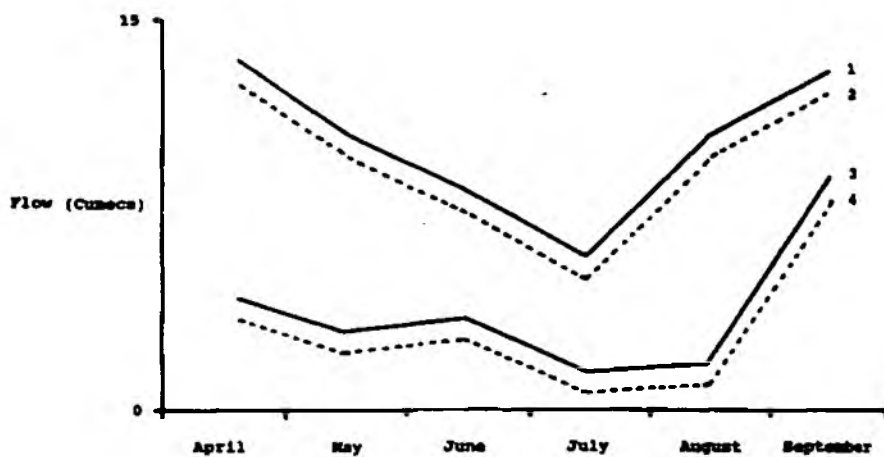
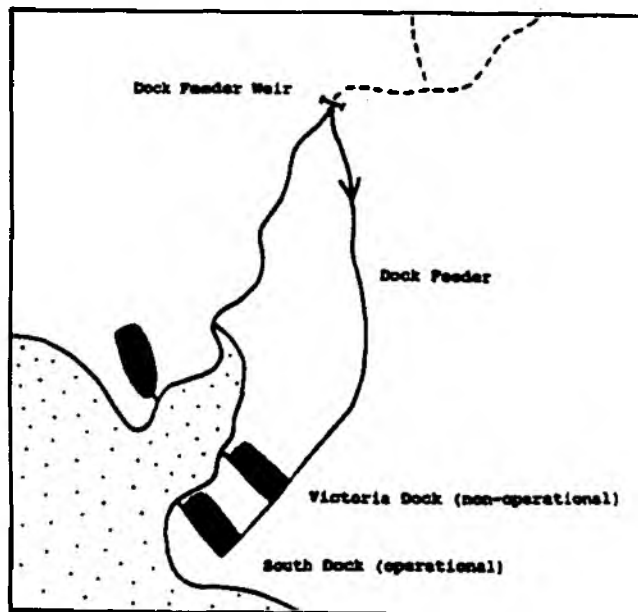
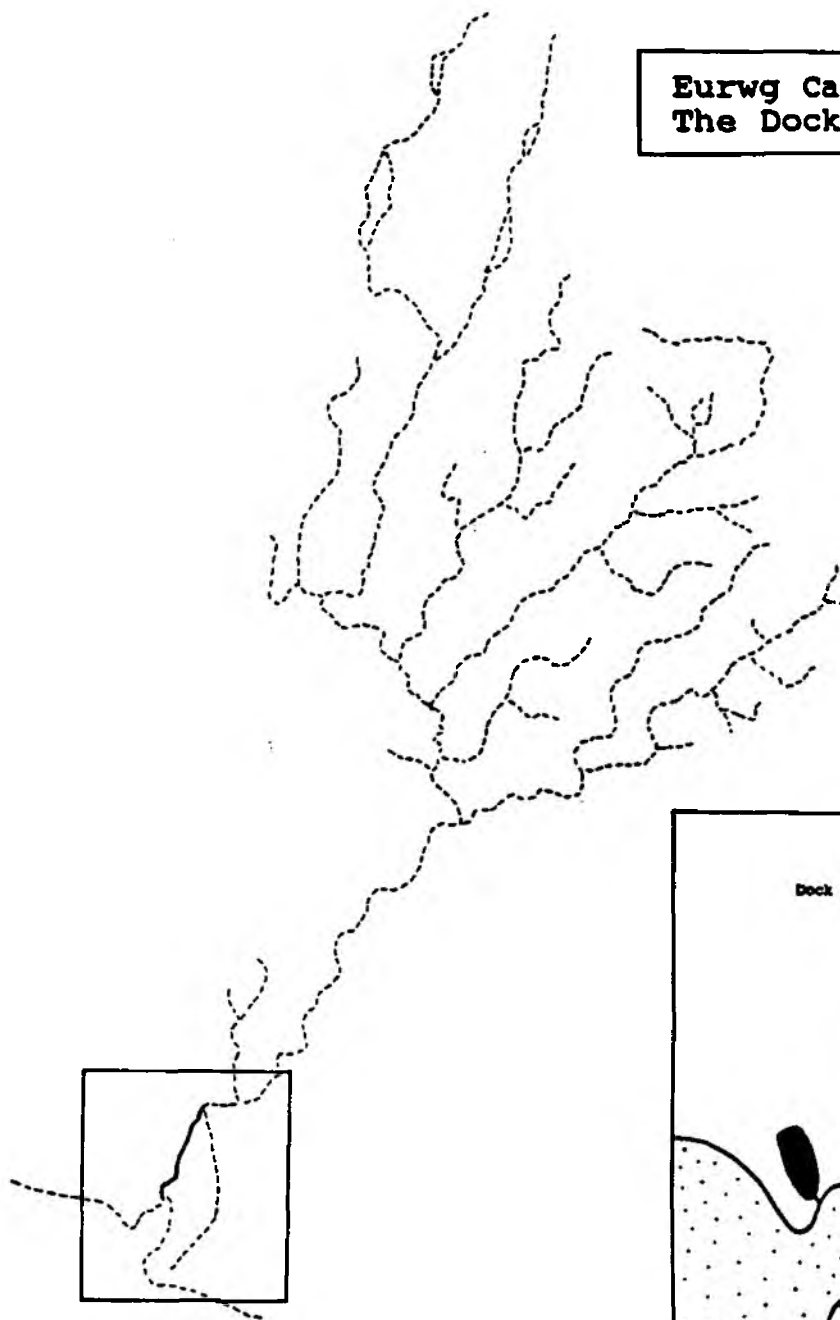
Consultation between these various bodies has generated the following plan for the Eurwg:-

- (1) Removal of large items from the river channel (NRA).
- (2) Removal of the existing backlog of litter from the bankside (Glan Eurwg District Council).
- (3) Programme for the continued removal of litter on a maintenance basis (Glan Eurwg District Council).
- (4) Public education campaign (Keep Wales Tidy, Glan Eurwg District Council, Police Force).

6.4 **Timetable & Financial Implications:-**

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1	.....						50	60
2	.....						120	-
3	....						30	25
4	.....			.....			20	-
<b>TOTAL</b>							<b>220</b>	<b>85</b>

**Eurwg Catchment  
The Dock Feeder Abstraction**



**MONTHLY MEAN FLOWS (CUMECs)**

- 1 & 2 : Mean Values 1970-1988
- 3 & 4 : Drought Year 1984
- 1 & 3 : Upstream of Dock Feeder
- 2 & 4 : Downstream of Dock Feeder

## 7. THE DOCK FEEDER ABSTRACTION

7.1 Nature of Problem : The river flow in the Eurwg is reduced below the Dock Feeder Weir by the diversion of flow along the Dock Feeder. While in a typical year the abstraction does not reduce river flow to the natural Q95 value, in the prolonged dry weather experienced during drought years, over half the flow is abstracted and much of the channel runs dry.

7.2 Cause of Problem : The abstraction is made by the Llaneurwg Docks Board, in order to maintain water levels in Victoria Dock and South Dock, which both lose water to the sea as the tide falls. Over a typical tidal cycle, the volume of water abstracted equates to a fall in level of 2.5m in each dock.

7.3 Solutions : In drawing up a solution to this problem, it was recognised that:-

- o Legally, the Llaneurwg Docks Board have a right to abstract whatever amount of water they wish from the Eurwg along the Dock Feeder, and are therefore not obliged to change their current practice.
- o Environmentally, this practice can be tolerated within the stated minimum flow target for the catchment over the whole of a typical year.
- o In assessing the importance of maintaining water levels, a distinction can be drawn between the needs of the South Dock which is still fully operational and the Victoria Dock which is now closed to shipping and is thus simply an amenity feature.

The following course of action has therefore been formulated:-

- (1) Repairs to both Docks, in order to minimise the largest identifiable point losses (Llaneurwg Docks Board).
- (2) Installation of pumping equipment, in order to transfer water from the Victoria Dock to South Dock, whenever river flow in the Eurwg falls to the natural Q95 value (Llaneurwg Docks Board).

In addition, negotiations will continue between the NRA and the Llaneurwg Docks Board with a view to reducing the total dry weather period abstraction towards the NRA's target, subject to some form of remuneration package being devised.

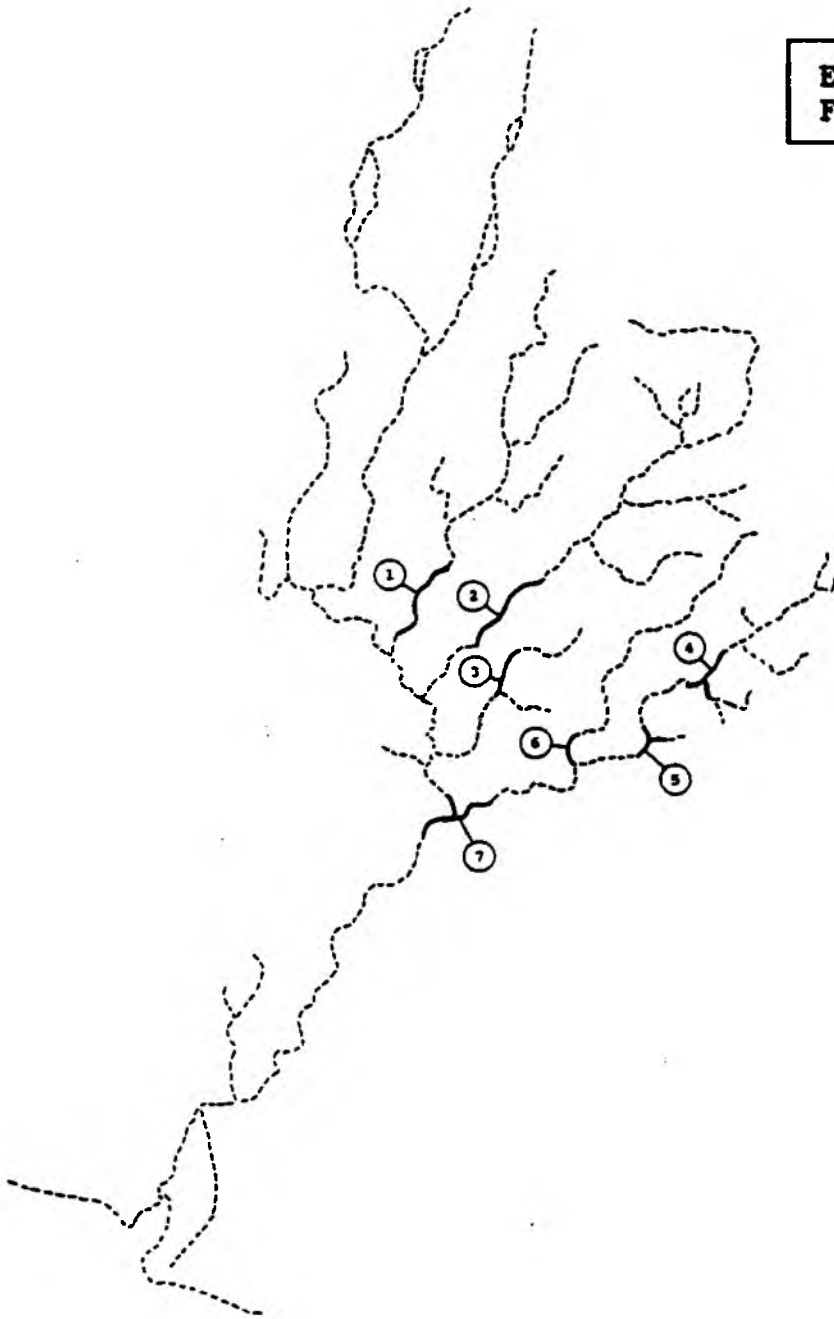
7.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1		-----					320	15
2			-----				300	*
TOTAL							620	*

\* These costs depend upon the flow regime in the Eurwg. As a highest estimate, it has been calculated that, with the anticipated reduction in leakage from the Docks, the revenue cost of maintaining the above pumping strategy would amount to £65000 over a drought year similar to 1984.



**Eurwg Catchment  
Flood Alleviation**



**FLOOD SEVERITY - 1979 FLOODS**

	Scheme						
	1	2	3	4	5	6	7
Total Area Flooded (ha)	28	35	15	23	13	11	14
No. of Properties	120	240	40	210	35	30	160
Commercial & Industrial Premises (ha)	4	9	-	5	2	-	3
Trunk Roads Affected	A4167	A4231	A4219	A4137	A4137	A4137	A4167 A4137
Railways Affected	-	+	-	-	-	-	+

## 8. FLOOD ALLEVIATION

**8.1 Nature of Problem :** Despite widespread flood alleviation work carried out in the catchment since the major floods of 1979, properties remain at risk at seven locations in particular. While it is impractical to protect every property in the catchment against flooding at all times, these areas have been selected for attention because:-

- o The number of properties affected is relatively large.
- o The degree of protection afforded does not meet the NRA's standard of service for flood protection in relation to the land use concerned.

**8.2 Cause of Problem :** Simplistically, the height and the integrity of the river bank in the areas concerned are such that it is breached by flood flows with a relatively short return period. In Bontnewydd (Scheme 7) the situation is aggravated by backing up of the R.Cynrig as it meets the R.Eurwg, when this is also in flood.

**8.3 Solutions :** In each case, remedial measures involve raising and strengthening the river bank in the vulnerable area. All the schemes:-

- o Will provide the degree of protection in relation to the land use concerned that is stated in the NRA's standard of service for flood protection.
- o Will be carried out as sympathetically as possible in relation to aesthetic impact and any conservation issues that may be involved.

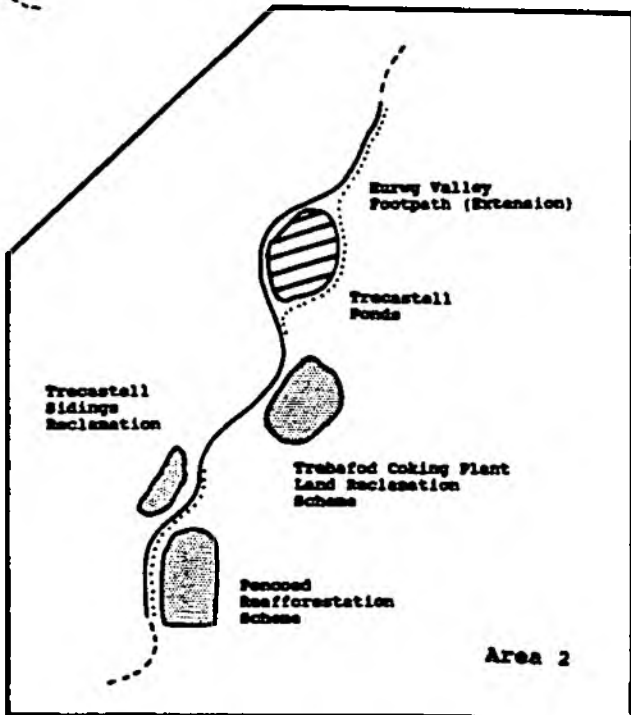
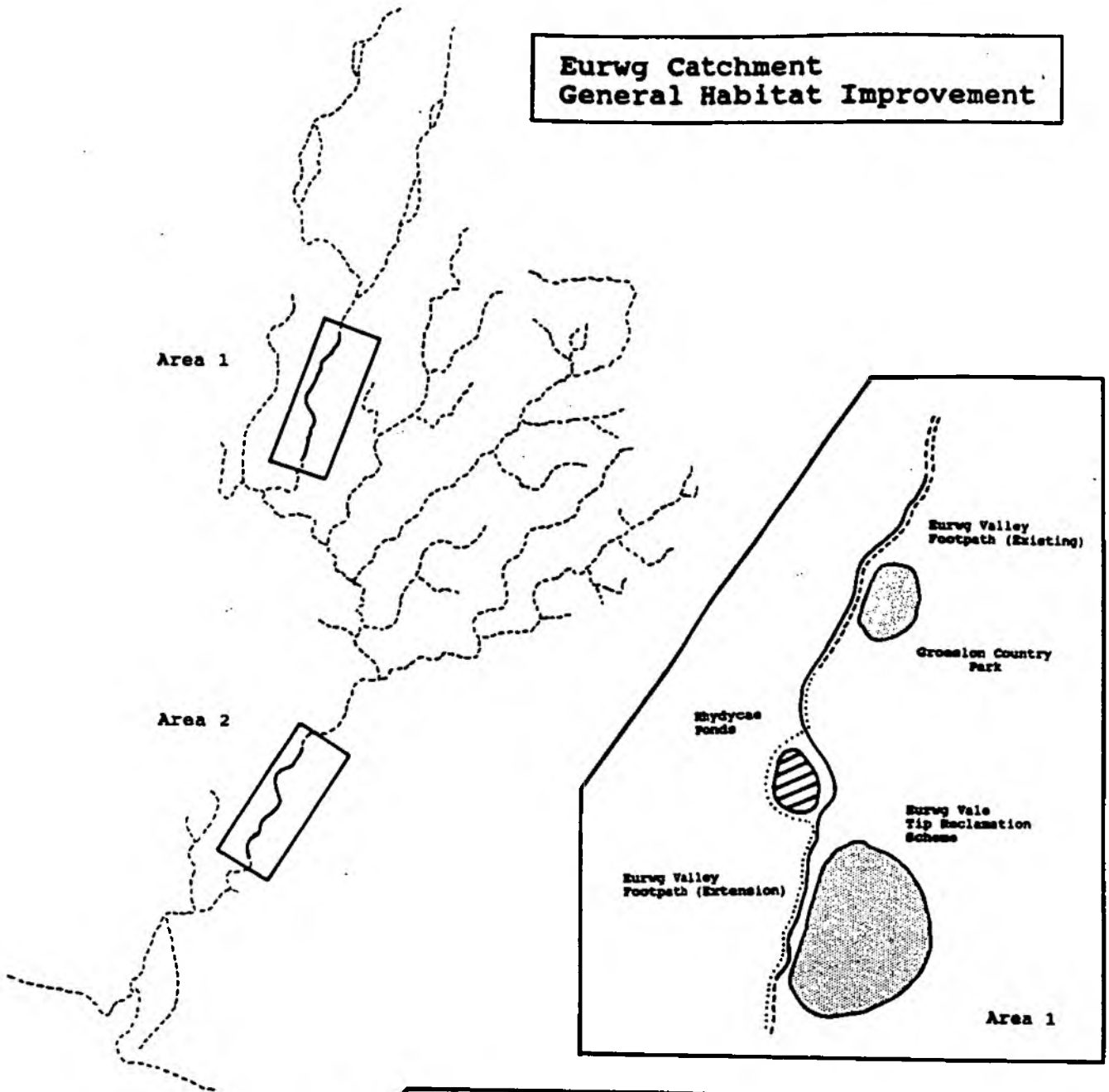
- (1) R.Alun flood defence scheme at Maesgarw (NRA).
- (2) R.Dyfrig flood defence scheme at Penybont (NRA).
- (3) R.Ysrad flood defence scheme (NRA).
- (4) R.Cynrig Fawr flood defence scheme u/s Felindre (NRA).
- (5) R.Cynrig Fawr flood defence scheme d/s Felindre (NRA).
- (6) R.Cynrig Fach flood defence scheme (NRA).
- (7) R.Eurwg & R.Cynrig flood defence scheme at Bontnewydd (NRA).

It has been demonstrated that Schemes 1, 2, 4 and 7 show a Cost / Benefit ratio >1; these schemes are therefore eligible for Grant Aid from the Welsh Office and will proceed according to the timetable shown below. Final adoption of the remaining Schemes is conditional upon their showing a similarly favourable Cost / Benefit ratio, and this seems likely.

### 8.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1	-----						380	20
2	-----						450	22
3			-----				110	6
4		-----					280	18
5				-----			130	6
6			-----				150	8
7	-----						190	10
<b>TOTAL</b>							<b>1690</b>	<b>90</b>

# Eurwg Catchment General Habitat Improvement



## 9. HABITAT IMPROVEMENT

**9.1 Nature of Problem :** As an environmental protection agency, the NRA has a prime responsibility towards the preservation and improvement of general habitats throughout the catchment. In an urbanised catchment like the Eurwg, it is clearly impractical that the habitat should be entirely "natural", but it is still possible to create areas which support a diversity of wildlife. Two stretches of the main river have been identified, where there is considered to be particular scope for habitat enhancement on either side of the river as opposed to the main channel, which has been extensively worked for flood defence purposes.

**9.2 Cause of Problem :** The current poor state of river corridor habitat in these two areas is a legacy of the Eurwg's industrial past : derelict industrial sites and spoil tips. While such habitats can be colonised by wildlife this is proceeding very slowly here and needs to be accelerated.

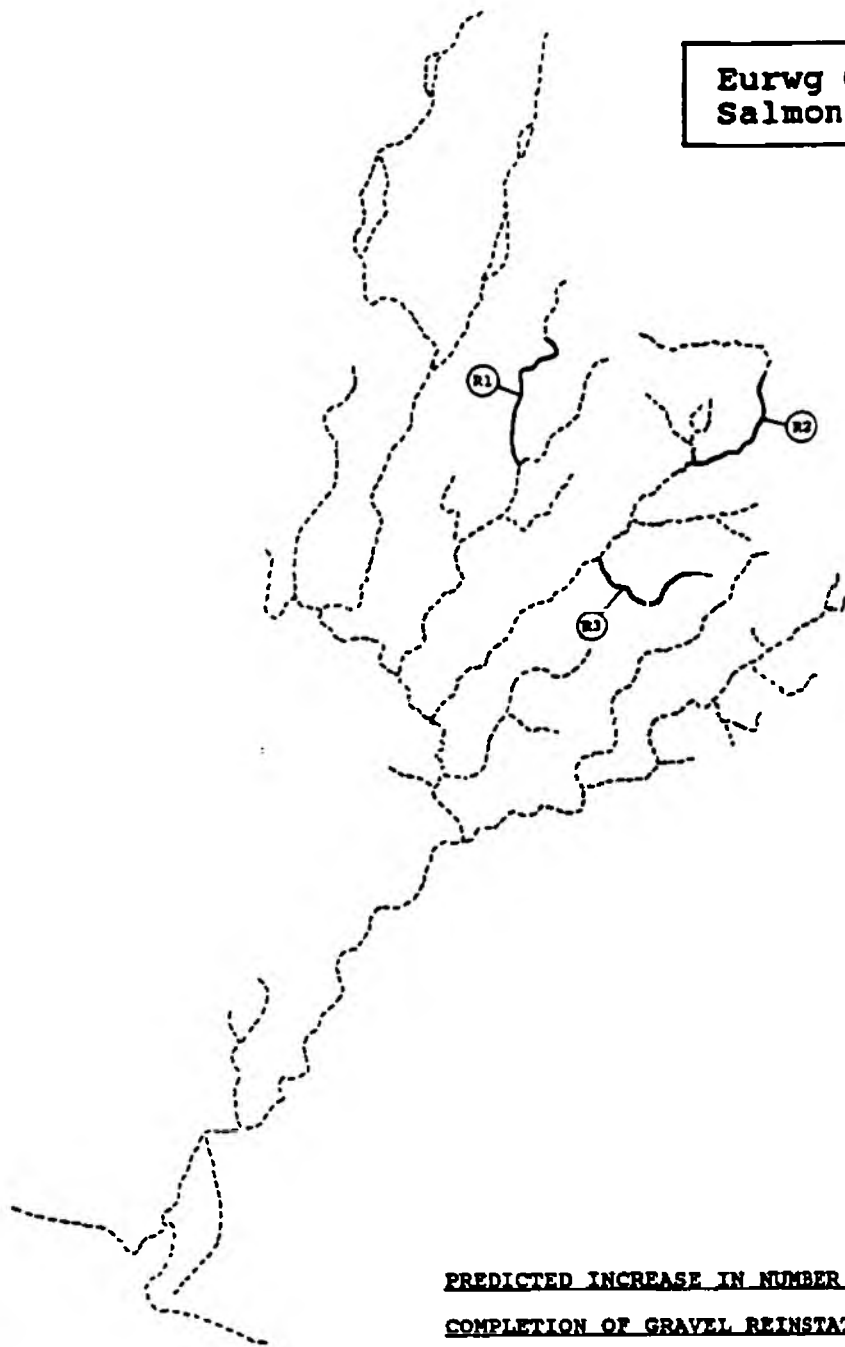
**9.3 Solutions :** Any strategy for Habitat improvement in the Eurwg has to take account of the high population density, and the pressure for outdoor recreational resources. Both of the major schemes devised involve a tree planting scheme alongside an extension of the Eurwg Valley Footpath, and the creation of artificial lakes, with separate areas reserved for anglers and wildlife. In addition, the creation of small artificial wetlands adjacent to these lakes will provide nesting habitat for birds which will compensate in some measure for the scarcity of such sites on the river bank itself. The construction of these lakes will be delayed until the water quality targets set out in this plan have been accomplished. Both of these lakes, together with their associated nature reserves, will be run according to a management programme devised by the District Council, the Eurwg Naturalists Trust and the NRA.

- (1) Extension of Eurwg Valley Footpath at Rhydycae & Trecastell, with associated tree planting (Glan Eurwg District Council).
- (2) Creation of Groeslon Country Park (Glan Eurwg District Council).
- (3) Pencoed Reafforestation Scheme (Forestry Commission).
- (4) Trecastell Sidings Reclamation Scheme (British Rail, Glan Eurwg District Council).
- (5) Creation of Rhydycae Ponds (Glan Eurwg District Council).
- (6) Creation of Trecastell Ponds (Glan Eurwg District Council).

### 9.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1		-----					40	5
2			-----				400	15
3			-----				150	20
4			-----				50	10
5					-----		80	20
6					-----		90	20
<b>TOTAL</b>							<b>810</b>	<b>90</b>

**Eurwg Catchment  
Salmonid Breeding Habitat**



**PREDICTED INCREASE IN NUMBER OF MIGRATORY SALMONIDS ON  
COMPLETION OF GRAVEL REINSTATEMENT PROGRAMME:-**

Scheme	Area Reinstated (m <sup>2</sup> )	No. of Returning Adults * Salmon or Sea Trout	
1	60000	60	180
2	50000	50	150
3	70000	70	210
<b>TOTAL</b>	<b>180000</b>	<b>180</b>	<b>or 540</b>

\* Figures presented assume a smolt production of 1 / 100m<sup>2</sup> and 5% or 15% survival for Salmon & Sea Trout respectively.

Figures also assume that the Water Quality targets set out in this Plan are realised, and that all relevant weirs are by-passed.

## 10. SALMONID BREEDING HABITAT

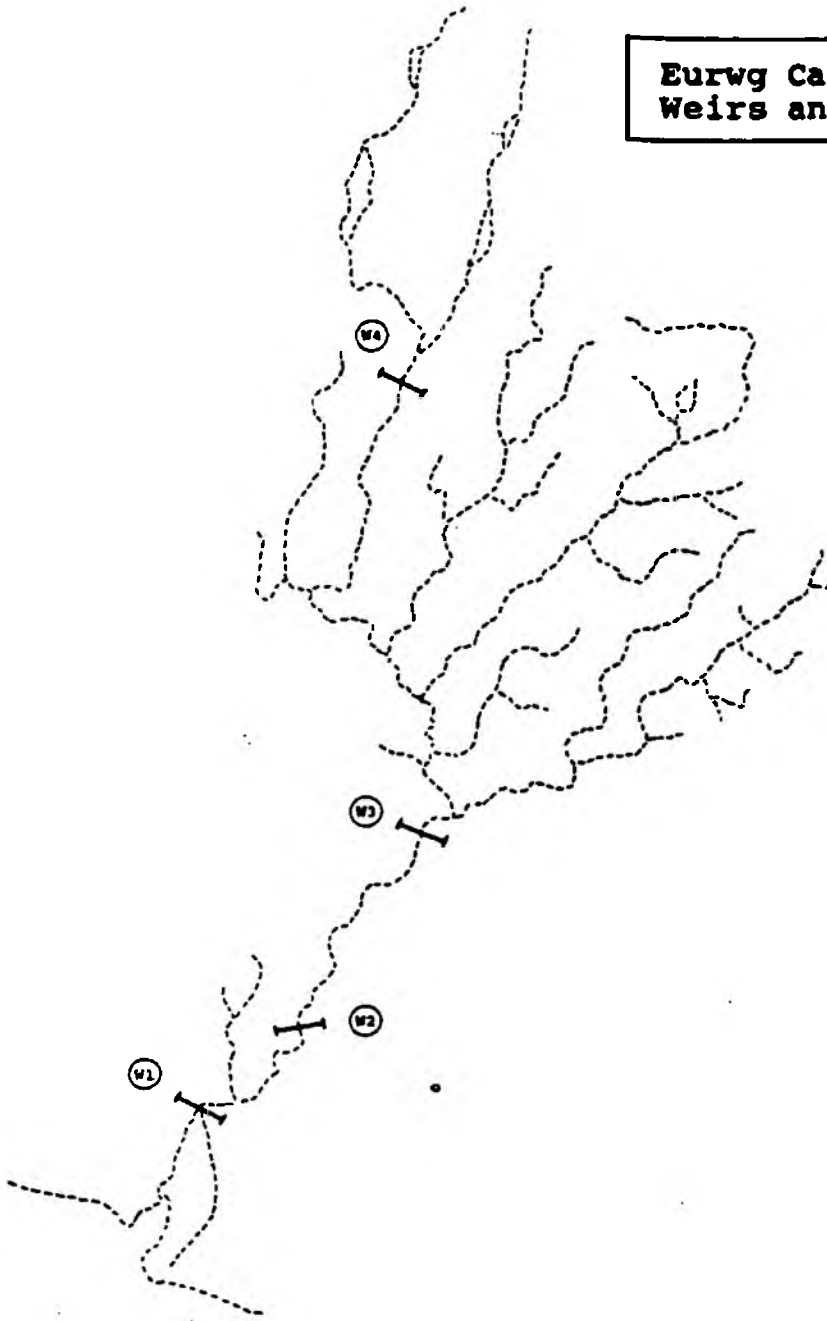
- 10.1 **Nature of Problem** : Salmon and trout have a particular requirement for river gravels in which to construct their redds. In three stretches where the Salmonid Fishery use applies, the availability of suitable gravels is severely restricted and is seen as limiting the development of the fishery.
- 10.2 **Cause of problem** : In each case, these problems are a consequence of extensive coal mining activity, and pollution of the river by coal solids in particular. The effect of these solids is that the river gravels become increasingly clogged, lose their fluidity and eventually become compacted. For two of the reaches (R1 & R3), the collieries concerned have closed, although there are residual problems associated with runoff from the spoil tips that remain. These problems can be expected to diminish, however, since a programme of tip reclamation and stabilisation was instigated in 1983 and the tips are now well grassed over. In the third case (R2), Dyfrant Colliery is still active, and has already been identified as a source of coal solids pollution in this Plan.
- 10.3 **Solutions** : In some circumstances the gravel beds affected can be reinstated by mechanical excavation and breaking up; in other situations, fresh gravel has to be imported. With the current schemes it is envisaged that a combination of both techniques will have to be used. There is little point in attempting such reinstatement until the source of the solids pollution has been stemmed, and this will determine the sequence of the following remedial actions:-
- (1) Improved coal handling practices at Dyfrant Colliery (R2), and in particular the more effective containment of coal prior to being transported off the site (Glo Dyfrig plc).
  - (2) Stabilisation of the spoil tip adjacent to Dyfrant Colliery (R2) by a combination of partial removal, and improved planting of grass on the tip that will remain (Glo Dyfrig plc).
  - (3) Reinstatement of gravels in the R.Alun (R1) (NRA).
  - (4) Reinstatement of gravels in the R.Dyfrig (R2) (NRA).
  - (5) Reinstatement of gravels in the R.Dyfrig (R3) (NRA).

### 10.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1		-----					*	*
2		-----					*	-
3		-----					50	3
4					-----		60	4
5		-----					50	3
<b>TOTAL</b>							<b>160</b>	<b>10</b>

\* Costs already included in earlier table (Resolving poor biological quality).

**Eurwg Catchment  
Weirs and Salmonid Migration**



**PREDICTED INCREASE IN NUMBERS OF MIGRATORY SALMONIDS  
ON BY-PASSING OF SUCCESSIVE WEIRS:-**

WEIR	NUMBERS OF RETURNING ADULTS *	
	Salmon	Sea Trout
W1 : Dock Feeder	70	210
W2 : Pencoad	300	900
W3 : Bontnewydd	900	2700
W4 : Gresslon	200	600
<b>TOTAL</b>	<b>1470</b>	<b>or 4410</b>

\* Figures presented assume a smolt production of 1 / 100m<sup>2</sup> and 5% or 15% survival for Salmon & Sea Trout respectively.

Figures also assume that the Water Quality targets set out in this Plan are realised, and that the Gravel Reinstatement programme is completed.

## 11. WEIRS AND SALMONID MIGRATION

**11.1 Nature of Problem :** In order to complete their breeding cycle, Salmon and Sea Trout need ready access from the sea to the river stretches, often in the headwaters, where they construct their redds. In the Eurwg, their way is blocked by four weirs which render virtually the whole catchment inaccessible. The problem has only come into prominence over the last few years with the improvement in water quality to a state where salmonid migration has become a realistic proposition.

**11.2 Cause of Problem :** Three of the weirs concerned - the Dock Feeder, Pencoed and Bontnewydd - were constructed to support abstractions; only the Dock Feeder Weir is now needed for this purpose. The Groeslon Weir was constructed simply as an amenity feature and to generate pools upstream.

**11.3 Solutions :** In each case the solution is straightforward : the construction of fish passes to bypass the weir; this solution has now been agreed between the relevant parties. The increase in the numbers of migratory salmonids has been predicted based on the area of river bed made accessible (see opposite). In making these calculations it has been assumed that:-

- o The river bed liberated will be colonised by Salmon and Sea Trout, but the balance between these two species can not be accurately predicted. For this reason separate predictions have been made for each species on the understanding that these are alternatives and should not be summed.
- o The migratory fish will compete with resident Brown Trout populations, whose populations may therefore be reduced. The numbers of migratory fish have therefore been calculated based on a typical balance between these populations in such a river.
- o The improvements in water quality, and in river flow downstream of the Dock Feeder Weir that are outlined in this Plan are achieved.

In constructing the Dock Feeder Weir, the opportunity will be taken to include a fish counter and trap, which will provide valuable information on the numbers and condition of fish returning to the Eurwg during the recovery of the river and will assist in the long-term management of these stocks.

- (1) Construct fish pass, counter and trap at Dock Feeder Weir (NRA).
- (2) Construct fish pass at Pencoed Weir (NRA).
- (3) Construct fish pass at Bontnewydd Weir (NRA).
- (4) Construct fish pass at Groeslon Weir (NRA).

### 11.4 Timetable & Financial Implications:-

SCHEME	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k
1		-----					120	25 *
2			-----				70	3
3			-----				70	3
4				-----			35	3
<b>TOTAL</b>							<b>295</b>	<b>34</b>

\* Includes £20k to service fish counter and trap, and to analyse information.



## 12. PROGRAMME OVERVIEW

**TABLE 1 : SUMMARY OF EXPENDITURE BY PROBLEM AREA**

PROBLEM AREA	1990	1991	1992	1993	1994	1995	ONE-OFF COST £k	ANNUAL COST £k	
REDUCING BOD LEVELS	-----						1765	115	
REDUCING AMMONIA LEVELS	-----						1400	60	
RAISING DISSOLVED OXYGEN LEVELS	-----						*	*	
RESOLVING POOR BIOLOGICAL QUALITY	-----						940	20	
MANAGING THE LITTER PROBLEM	-----			-----				220	89
THE DOCK FEEDER ABSTRACTION	-----						620	**	
FLOOD ALLEVIATION	-----						1690	90	
HABITAT IMPROVEMENT	-----						810	90	
SALMONID BREEDING HABITAT	-----				-----		160	10	
WEIRS AND SALMONID MIGRATION	-----			-----				299	34
<b>TOTAL</b>							<b>7500</b>	<b>504</b>	

\* Costs already included in figures for reducing BOD & Ammonia levels.  
 \*\* Costs dependant on flow in R.Eurwg; maximum estimate in worst years = £65k.

**TABLE 2 : SUMMARY OF EXPENDITURE BY PARTICIPATING ORGANISATION**

ORGANISATION	ONE-OFF COST £k	ANNUAL COST £k
BRITISH RAIL	50	10
CELTIC WATER plc	2860	70
CENTOL plc	150	45
FORESTRY COMMISSION	150	20
CLAN EURWG DISTRICT COUNCIL	780	85
GLO DYFRIG plc	690	35
LLANEURWG DOCKS BOARD	620	*
NATIONAL RIVERS AUTHORITY	2195	184
ROBINSONS plc	5	45
<b>TOTAL</b>	<b>7500</b>	<b>504</b>

\* Costs dependent on flow in R.Eurwg; maximum estimate in worst years = £65k.