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**A Litter Assessment of Two Major
Tributaries of the Taff, The Cynon
and the Rhondda
Surveyed March - April 1990
Report No. EAE/91/1**

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May 1991

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SUMMARY

1. Following on from the Taff litter survey (Davies 1989) an investigation was carried out to determine the sources, types and distribution of litter in the main Taff tributaries and to assess their contribution to the Taff litter problem.
2. Using the same methods as for the Taff Litter Survey, bankside litter assessments were made at 11 sites on the Cynon, 6 sites on the Rhondda Fach and 11 on the Rhondda Fawr between 15th March 1990 and 6th April 1990.
3. The quantities, types and distribution of litter were very similar to those on the Taff. It is probable that under certain flow regimes substantial amounts of litter must be imported into the Taff from the tributaries.
4. Point sources were identified for much of the sewage derived litter and industrial refuse but there was a substantial background level of domestic refuse emanating from the conurbations on the tributaries that would be very difficult to control or eliminate.
5. Tentative conclusions were drawn about the mechanism of sewage derived litter transport. In the upper reaches of the Cynon litter appears to be transported more under low flow conditions whilst further down the catchment transport appears to occur more under high flows.
6. In attacking the litter problem in the Taff catchment, attention must also be given to the tributaries.

1. INTRODUCTION

One of the conclusions drawn from the Taff Litter investigation (Davies, 1989) was that the major tributaries of the Taff (the Cynon and the Rhondda) import a significant quantity of litter into the main river and that this required further investigation. The assumption was made that if the tributaries have a major litter problem, similar to the Taff, then under high flows this would have a knock-on effect on the Taff. Consequently, a bankside litter assessment of the tributaries was carried out, using the same methodology as in the Taff Litter survey.

2. METHODS

The Cynon and the Rhondda (Fach and Fawr) were divided into 2km reaches and 1 site within each reach was selected in terms of its accessibility.

At each site a 40m reach was subjectively assessed for the amount and type of litter, within the river channel and on both banks, using 35 litter categories and a semiquantitative scale ranging from absence of material to gross contamination (Table 1, Appendix 1). A 5m wide strip of bank was then selected from within the reach and the litter was quantified on a logarithmic scale within bands of the lower, middle and upper bank (Table 2, Appendix 1).

Data were collected for 11 sites on the Cynon, 6 sites on the Rhondda Fach and 11 sites on the Rhondda Fawr. Litter was initially recorded as 35 types within each catchment but was condensed into 12 broad categories for presentation purposes (Table 1).

A photographic record of a) the reach and b) the bankside, was made for each site, the whole survey being carried out between 15/3/90 and 6/4/90.

3. RESULTS

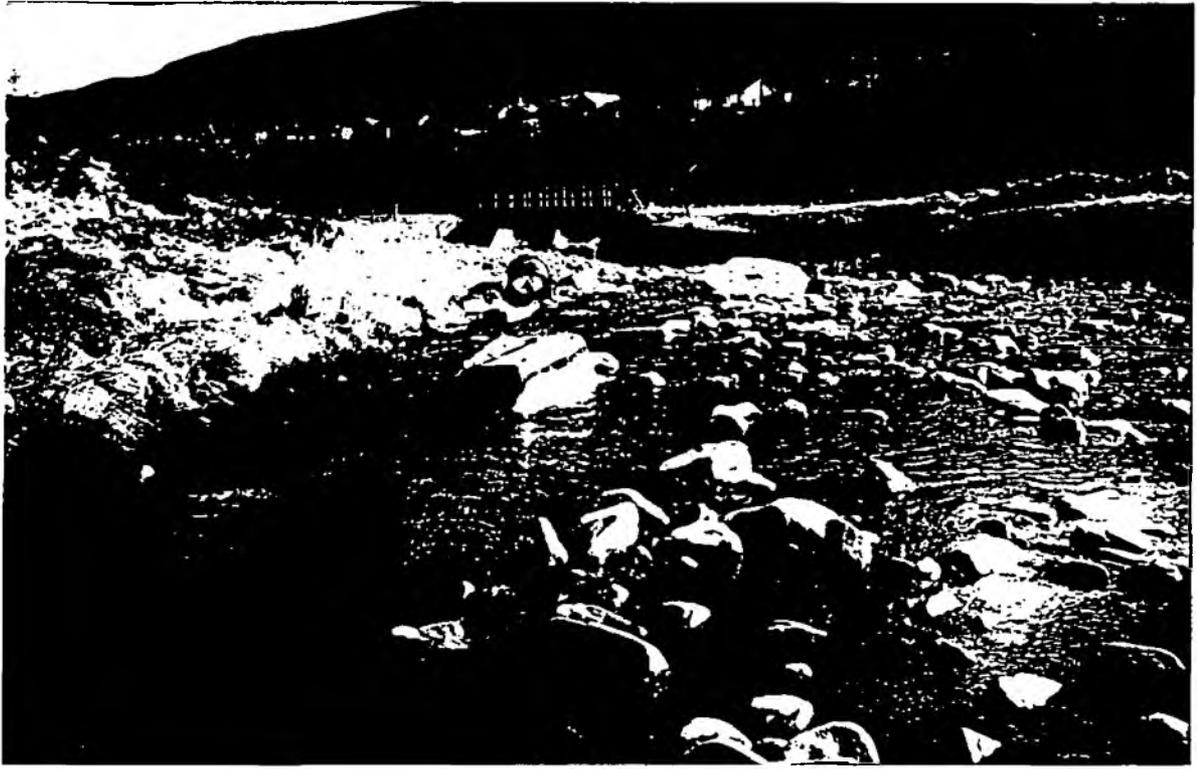
A brief description of each site outlining the amount and main distribution and components of the litter is given in Appendix 2 and photographs of sites to illustrate the main types of litter found are also presented:



Site C1: A clean site high in the Cynon catchment.



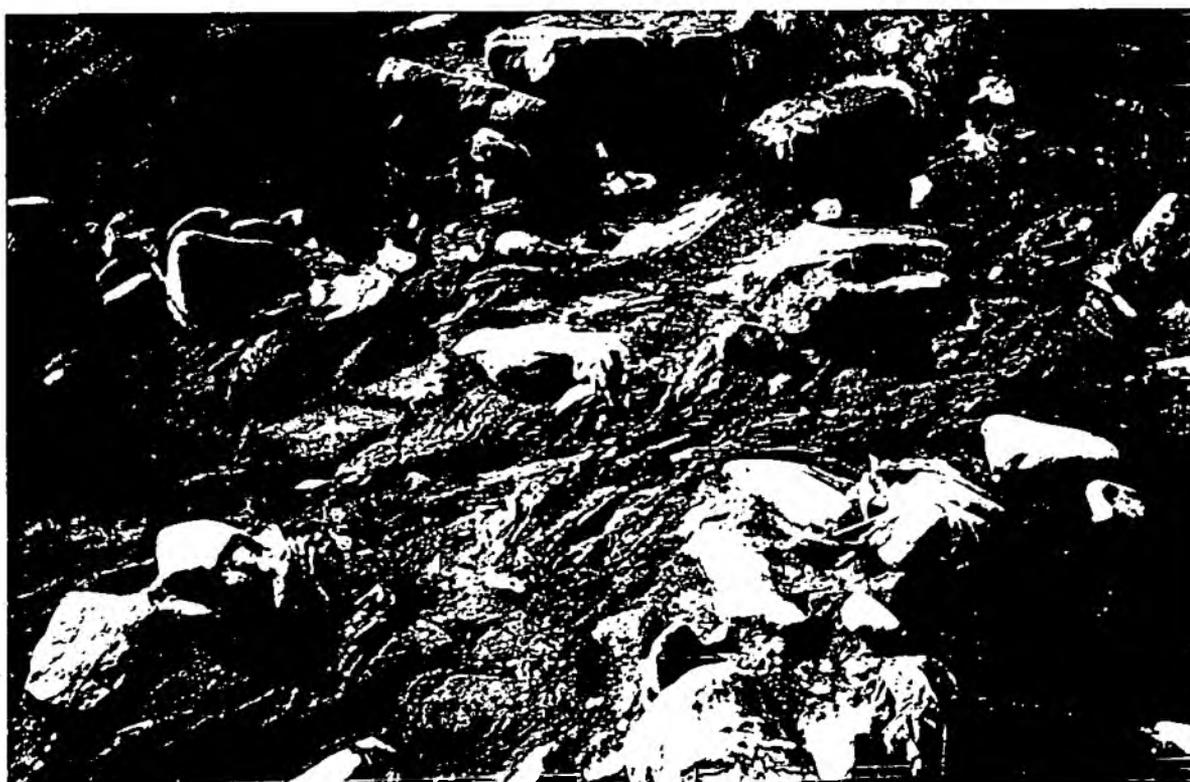
Site C3: A littered site 4Km lower in the catchment.



Site RFC2: Above the reach sampled at Maerdy - one of the more unusual items of litter in the river channel!



Site RFC2: Downstream of the Maerdy SSO showing the gross impact of this outfall.



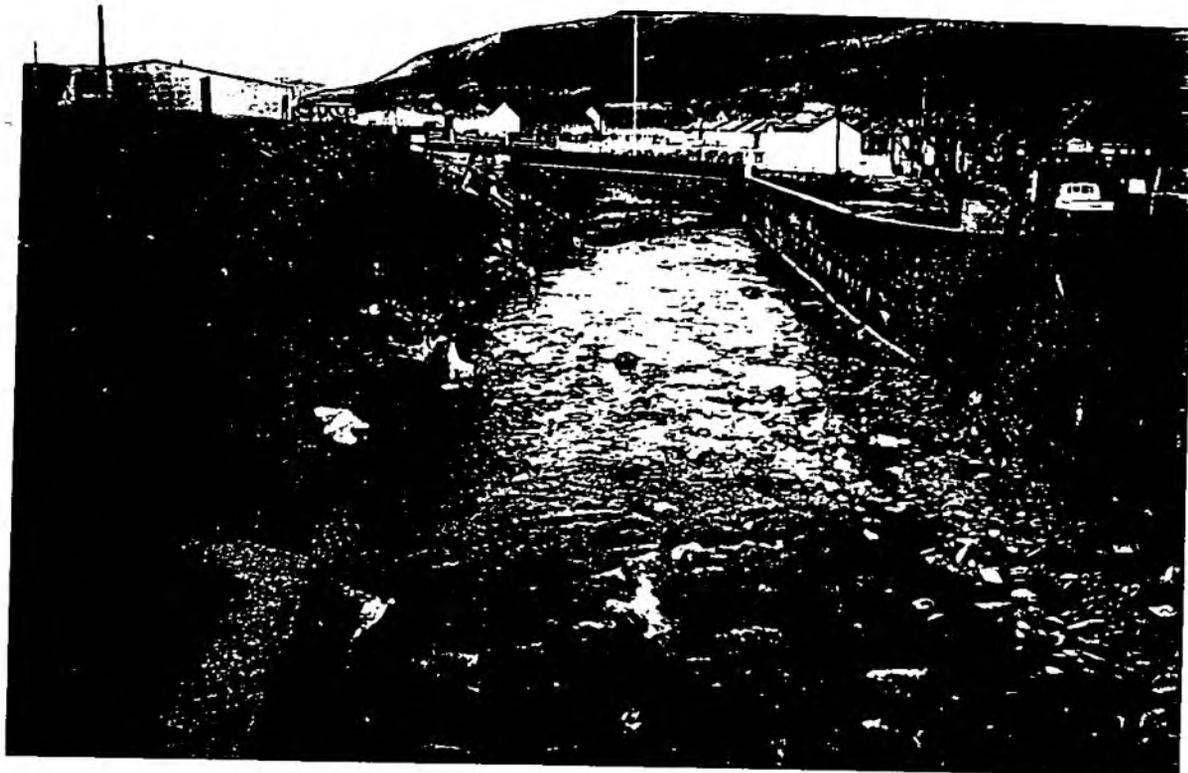


Site RFC3: Downstream of the roadbridge at Blaenllechau - river channel littered.



Site RFC5: Rhondda Fach
downstream of Pontygwaith
Bridge. Very diverse litter.





Site RFW3: Rhondda Fawr at Ynyswen. Large packing material is probably derived from factory units.



Site RFW4: Rhondda Fawr at Pentre - the trunk sewer is very prominent here.



Site RFW9: Rhondda Fawr at Trehafod showing riverine litter at a downstream site.

Fig. 1 shows the distribution of sampling sites and the location of a number of Storm Sewage Overflows (SSO's) within the Cynon and Rhondda catchments, which have been identified by the Pollution Control Section as being potential major inputs of the sewage derived litter (SDL) component.

3.1.i) Qualitative Assessment of Litter in the Cynon

The total score per reach ranged from 10 (C1) to 76 (C8) (Table 1.i) with an average total score of 48.

The river bed was often obscured by coal solids downstream of Hirwaun and the amount of litter within the river channel could not be adequately assessed in those circumstances.

Litter was present in significant quantities at all sites from Hirwaun downstream. The diversity and total amount of litter in each category generally increased with distance downstream, peaking at C8 (Phurnacite) and then reducing slightly at C11 (Abercynon) (Table 1.i; Fig. 3). Plastic strips and metal objects were present at all sites. Heavier objects, such as builders rubble, tended to become more abundant lower down the catchment from C8 to C11.

Overall, the main component of the litter was household debris e.g garden waste, rope and a bin bag full of refuse at C10, but with some industrial component at C7 (behind retail/workshop units) and C10 (railway sleeper and a British Rail sign).

The proportions of sewage derived litter (SDL) to other types of litter is illustrated in Fig. 2 as pie diagrams, with the diameter of the circle representing the logarithm of the total score. Sewage derived litter was present at all sites in the Cynon downstream of C1, the headwaters site. It constituted greater than 25% of all litter at sites C5 (30%), C6 (27%) and C9 (35%). Sewage contamination, in the upper reaches, can be linked directly to storm sewage overflow

discharges at Hirwaun. At site C2 sewage derived litter was left scattered on the bankside following a surcharge from the outfall within the reach (downstream of the roadbridge), but the river channel was relatively free of SDL. The next increase in SDL at C5 was related to SSO's above Aberdare but a further large increase at C9 (Mountain Ash) cannot be related to a known SSO problem.

3.1 ii) Qualitative assessment of litter in the Rhondda

The total scores per reach for the Rhondda Fach (RFC) and Rhondda Fawr (RFW), ranged from 25 (RFC1) and 24 (RFW1) in the headwaters to 85 (RFC6) and 84 (RFW11) above the confluence of the two rivers (Table 1.ii). The average total score per reach was 56 in the Rhondda Fach and 62 in the Rhondda Fawr. Both the tributary (Fach) and the main river (Fawr) exhibited similar characteristics in the types and distribution of litter.

Sewage derived litter was present at all sites on the Rhondda Fach and Rhondda Fawr downstream of the headwater sites (RFC1 and RFW1) (Fig 2). Maximum quantities of SDL (greater than 25%) were recorded at sites RFC2 (45%) and RFC4 (33%) on the Rhondda Fach and site RFW8 (29%) on the Rhondda Fawr. The gross contamination by sewage litter at site RFC2 is directly attributable to the Maerdy SSO, and the increase at site RFC4 is related to the Tylorstown SSO. In contrast, the Rhondda Fawr had a background proportion of sewage litter of less than 25% and the maximum (29%) recorded at site RFW8 (Dinas) could not be related to any known problem inputs.

Plastic strips, dropped litter (ie sweet wrappers, crisp packets etc), metal objects and builders rubble occurred at all sites within the Rhondda catchment. Plastic strips (mainly shredded polythene) were a particularly heavy contaminant (Fig. 2) along with dropped litter.

Generally, the Rhondda Fach was most affected by light domestic refuse of all types (e.g umbrellas, a light bulb, floor covering, garden

waste and dustbin contents etc.). However, higher up in the catchment, there was some industrial debris in addition to the domestic refuse (e.g. cable drums and a railway sleeper at RFC1 and RFC2). The most obvious object was a metal bath found in the river channel upstream of the Maerdy reach (RFC2) (see photograph). Similarly, the Rhondda Fawr refuse was mainly domestic (e.g. dustbin contents, a toilet cistern (RFW2), bed and buckets, etc.) but at site RFW3 at Ynyswen large packaging material was found, probably associated with nearby factory units (see photograph).

3.2 Results of the semi-quantitative bankside transect

Figures 3-10 illustrate the results of the 5m bankside transects designed to compare the distribution of the main litter components between the lower, middle and upper bands of bankside at each site.

Generally, the major single component of litter on the lower bank was riverine sewage derived litter mixed with the type of general refuse often associated with sewage (e.g. plastic strips (mainly shredded polythene) and rags). As the maximum height of the flood channel was reached sewage litter became less evident. Overhanging bankside vegetation traps most of the riverine derived litter at the lower bank level. The upper bank tended to be less littered than the middle and lower bands and the main component was refuse.

3.2 i) Semi-quantitative bankside transects on the Cynon

Sewage derived litter was present at most sites on the lower bank (except sites C1 and C4) (Fig. 3), where it was mainly caught up on bankside vegetation, but penetrated to the middle bank between sites C7-C11 (Fig. 4) and to the upper bank between sites C7-C9 (Fig. 6). This depended to some extent on the profile of the river bank and the maximum level reached by the flood water. The most littered site from this assessment was C2 at Hirwaun (mainly refuse) (Fig. 7).

3.2 ii) Semi-quantitative bankside transects on the Rhondda

Sewage derived litter was present at all sites on the lower bank on the Rhondda Fach, with the exception of the headwater site and at all sites on the Rhondda Fawr, with the exception of the headwater site and RFW5 (Fig. 7). It penetrated the middle bank at RFC2 and between RFW5 and RFW11 (Fig. 9) and the upper bank at RFC2, RFW9 and RFW11 (Fig. 10). The most littered sites from this assessment were RFC6 (mainly refuse) and RFW11 (Fig. 11).

4. DISCUSSION

The quantity, diversity and distribution of litter in both catchments was similar to that found on the Taff (Davies 1989). The relative quantities of each river, as assessed by the total reach scores, are given below :

	MIN	MAX	MEAN	RANGE
Taff	7	112	49	105
Cynon	10	76	48	66
Rhondda Fach	25	85	56	60
Rhondda Fawr	24	84	62	60

Although the range of scores between the least and most littered sites was greatest on the Taff, the highest mean total reach scores were found on the Rhondda Fach and Rhondda Fawr, where even the headwater sites were littered compared to the headwater sites on the Taff and Cynon.

Under certain flow regimes (high flows for large or heavy objects and low flows for light buoyant objects) much of this litter must be imported into the Taff. The amounts and mechanisms have not been defined in this study but will be the subject of a proposed NRA sponsored Research and Development Project to be carried out by a research student in the Polytechnic of Wales.

The proposed clean up of the Taff (an initiative currently being developed by Keep Wales Tidy Group) will need to address a clean-up of the major tributaries, otherwise it is likely that much of the litter removed would be replaced by redeposition from tributary sources following the next high flow episode.

The tributaries, whilst showing the same overall diversity in the types of litter to that found in the Taff, were affected mainly by domestic derived lighter objects (eg. garden waste, household objects, refuse, dropped litter). This background level of domestic refuse can be mainly attributed to the proximity of houses to the watercourses and makes the problem difficult to control in such a densely populated community built up around the rivers.

Within the Taff, certain sites were mainly affected by heavy objects of industrial origin (e.g. at and downstream of Treforest Industrial estate). However on the tributaries, sites affected by industrial objects were fewer and could be related to the point of origin thus making control more possible.

The volume and distribution of sewage derived litter in the tributaries could in many cases be related to known point source inputs (usually SSO's), unlike on the Taff where the accumulated background of litter obscured point source input effects. SSO's were identified as causing particular problems at Hirwaun on the Cynon and Maerdy and Tylorstown on the Rhondda Fach. The background of sewage derived litter at most sites on the Rhondda Fawr could not be attributed to known SSO inputs.

Some tentative conclusions can be drawn about the distribution of sewage derived litter by reference to the bankside banding results for the semi-quantitative transect. Using the Cynon as an example, the greater penetration of SDL up the bank in the lower reaches from C7-C11 implies that it is deposited by flood water. At site C8 (downstream of the Phurnacite works), where the channel is uniform

following flood defence works, SDL was found on the upper bank where flood waters during the previous winter had overtopped the bank. SDL higher up the catchment was only found on the lower bank. This indicates that significant amounts of SDL must be entering the system and being transported during low to medium flow conditions and suggests that the storm sewer overflows are discharging at times other than during storm events.

The Rhondda Fach was most affected by sewage derived litter and screening of the major outfalls would potentially reduce the litter problem in each reach by on average 22%. On the Cynon an average of 19% reduction would be possible by SSO screening but on the Rhondda Fawr, which does not appear to have as major a SDL problem, the potential reduction would be an average of 15%.

The Cynon has a background of pollution from coal solids, often obscuring the river bed, which may have resulted in an underestimation of the litter problem in some reaches.

5. CONCLUSIONS

1. The quantities, types and distribution of litter in the Cynon and Rhondda were very similar to the Taff. It is probable that under certain flow conditions a significant amount of litter is imported into the Taff.
2. Point sources of sewage derived litter and industrial refuse were evident in many stretches, but there was a relatively high background level of domestic refuse at most sites on the tributaries which was not attributable to point sources.
3. Bankside banding indicated that in the upper catchments (particularly on the Cynon) sewage derived litter is transported under low to medium flow conditions and is therefore not always discharged when the river flow is high.

6. RECOMMENDATIONS

1. A detailed study of the sources, sinks and pathways of all riverine litter should be carried out on the tributaries as they are likely to be more clearly defined and therefore more easily controlled than in the main river Taff.
2. To be effective, any clean-up work proposed for the Taff should include a clean-up of the tributaries as they are a significant source of litter input to the Taff.
3. The SSO's identified in this report as being point sources of sewage derived litter should be controlled.

7. REFERENCES

Davies, G.L. (1989). The investigation of the Taff Litter problem. NRA Welsh Region Report No. PL/EAE/89/2.

TABLE 1.1: SUMMARY OF QUALITATIVE ASSESSMENT OF LITTER (TOTAL REACH SCORE PER SITE).

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	
SEWAGE DERIVED LITTER	TOILET PAPER		2	2	3	4	5	4	5	6	4	3	
	NAPIN LINERS		2	2		4	5	4	5	5	4	3	
	SANITARY TOWELS		2	2		4	5	5	5	6	4	3	
	CONTRACPTIVES			1		1			1				
	COTTON BUDS										1		
	TOTAL	0	6	7	3	13	15	13	16	18	12	9	
PLASTIC STRIPS	POLYSTYRENE		4	6			2	2	3				
	<30CM		3	5	4	3	5	5	4	6	5	4	3
	30-60CM		2	5	3	3	4	5	4	5	5	3	3
	>30CM			5	4	3	4	5	4	5	5	3	3
	TOTAL	5	19	17	9	13	17	14	19	15	10	9	
	CLOTHING/SHOES/RAGS	0	4	2	4	4	5	4	9	4	3	3	
DROPPED LITTER	CANS		1	1	2			3	5	2	2	5	
	TAKE-AWAY CARTONS		4										
	PAPER LITTER		2	4		1		2	3	2	1	1	3
	TOTAL		2	9	1	3	0	2	6	7	3	3	8
METAL OBJECTS	METAL OBJECTS		1	5	4	4	3	6	4	6	5	6	5
	CONTAINER DRUMS			1			1	1	1	1	1	2	
	INDUSTRIAL REFUSE							1	1		7		
	TOTAL		1	6	4	4	4	6	6	8	6	14	7
	BOTTLES/GLASS/CHINA	1	3	2	2	2	2	3	5	0	1	2	
BUILDERS RUBBLE	FENCING					1							
	RUBBLE		2	4				4	2	2	3	4	
	WOOD				1		1		3	1	3		
	TOTAL	0	2	4	1	1	1	4	5	3	6	4	
FURNITURE	CARPETS												
	FLOOR-COVERING		1	1		1		2					
	FURNITURE		3	2				2				2	
	MATTRESS/FOAM							1		1			
	TOTAL	0	4	3	0	1	0	5	0	1	0	2	
VEHICLE DEBRIS	TYRES/WHEELS				1	1			1		1	2	
	ROAD CONES/SIGNS		1	1			1		1		1		
	VEHICLE PARTS			1				2	1		2		
	TOTAL	0	1	3	1	0	1	2	3	0	4	2	
LARGE PACKAGING MATERIAL	SUPERMARKET-TROLLEYS				1		2	1					
	CRATYS											1	
	CARDBOARD					1							
	TOTAL	0	0	0	1	1	2	1	0	0	0	1	
MISCELLANEOUS	TOYS										1		
	BUCKETS												
	ROPE					3	5		4	1			
	GARDEN/HOUSEHOLD		2			1						1	
	TOTAL	0	2	0	0	4	5	0	4	1	1	1	
	TOTAL SCORE PER REACH	10	56	43	28	43	56	58	76	51	55	48	

TABLE 1.ii: SUMMARY OF QUALITATIVE ASSESSMENT OF LITTER (TOTAL REACH SCORE PER SITE).

	RPC1	RPC2	RPC3	RPC4	RPC5	RPC6	RFW1	RFW2	RFW3	RFW4	RFW5	RFW7	RFW8	RFW9	RFW10	RFW11	
SEWAGE DERIVED LITTER	TOILET PAPER	6	3	6	6	5	2	4	2	2	5	5	2	5	5		
	NAPKIN LINERS	5		5	5	5	2	4	2	2	4	5	2	5	5		
	SANITARY TOWELS	6	3	6	6	5	2	4	2	2	5	5	2	5	6		
	CONTRACEPTIVES	1				2											
	COTTON BUDS			1													
	TAMPONS					1							1				1
TOTAL	0	18	6	18	18	17	0	6	12	6	6	14	16	6	15	17	
PLASTIC STRIPS	POLYSTYRENE	1		3		2	4	1	1	3	2	4	2	2	1	3	5
	<30CM	2	2	6	5	6	7	2	7	7	5	6	6	6	3	6	8
	30-60CM	2	2	6	5	5	6		7	7	4	6	6	6	4	6	8
	>30CM	1	2	6	5	5	6		7	7	3	6	6	6	4	6	8
	TOTAL	6	6	21	15	18	23	3	22	24	14	22	20	20	12	21	29
CLOTHING/SHOES/RAGS	1	1	1	5	5	6	0	7	5	5	3	4	4	3	5	5	
DROPPED LITTER	CANS	1	1	4	4	2	3	5	5	3	4	5	1	1	1	3	3
	TAKE-AWAY CARTONS							1		6			3	1			
	PAPER LITTER	1	1	4	3	4	2	3	5	4	6	4	2	3	1	2	2
	TOTAL	2	2	8	7	6	5	8	11	7	16	9	3	7	3	5	5
METAL OBJECTS	METAL OBJECTS	5	6	6	3	4	5	2	6	4	5	6	5	4	5	7	5
	CONTAINER DRUMS			1	1	1	4			1		1		1	1	3	1
	INDUSTRIAL REFUSE		1													4	
	TOTAL	5	7	7	4	5	9	2	6	5	5	7	5	5	6	14	6
BOTTLES/GLASS/CHINA	1	1	1	0	2	2	3	2	0	6	4	2	3	2	4	4	
BUILDERS RUBBLE	FENCING																
	RUBBLE	2	2	7	2	6	5	4	6	5	2	7	7	1	3	2	2
	WOOD						7									4	2
	TOTAL	2	2	7	2	6	12	4	6	5	2	7	7	1	3	6	4
FURNITURE	CARPETS																
	FLOOR-COVERING	2	1	1		1	2			1		1	1	2	3		
	FURNITURE	1		2	3	2		1	5	4	2		6	5	2	1	
	MATRESS/FOAM																
	TOTAL	3	1	3	3	3	2	1	5	4	3	0	7	6	4	4	0
VEHICLE DEBRIS	TYRES/WHEELS	1					3						2	2	2	4	
	ROAD CONES/SIGNS	1		1		1			2						1		
	VEHICLE PARTS			1		3	2		1			1	1	2	1	2	3
	TOTAL	2	0	2	0	4	5	0	1	2	0	1	1	4	3	5	7
LARGE PACKAGING MATERIAL	SUPERMARKET-TROLLEYS					1			1	1	1						2
	CRAYIS		1			1											
	CARDBOARD	1															
	TOTAL	1	1	0	0	2	0	0	0	1	1	1	0	0	0	0	2
MISCELLANEOUS	TOYS			1		2				1							
	BUCKETS																1
	ROPE					2		1	2		1	3					1
	GARDEN/HOUSEHOLD	2	1			5	2	2	2					1	2	1	2
	TOTAL	2	1	1	0	7	4	3	4	0	2	3	0	1	2	1	4
TOTAL SCORE PER REACH	25	40	57	54	76	85	24	70	65	60	63	65	67	44	80	84	

Fig. 1: Survey sites in the Cynon, Rhondda Fach and Rhondda Fawr

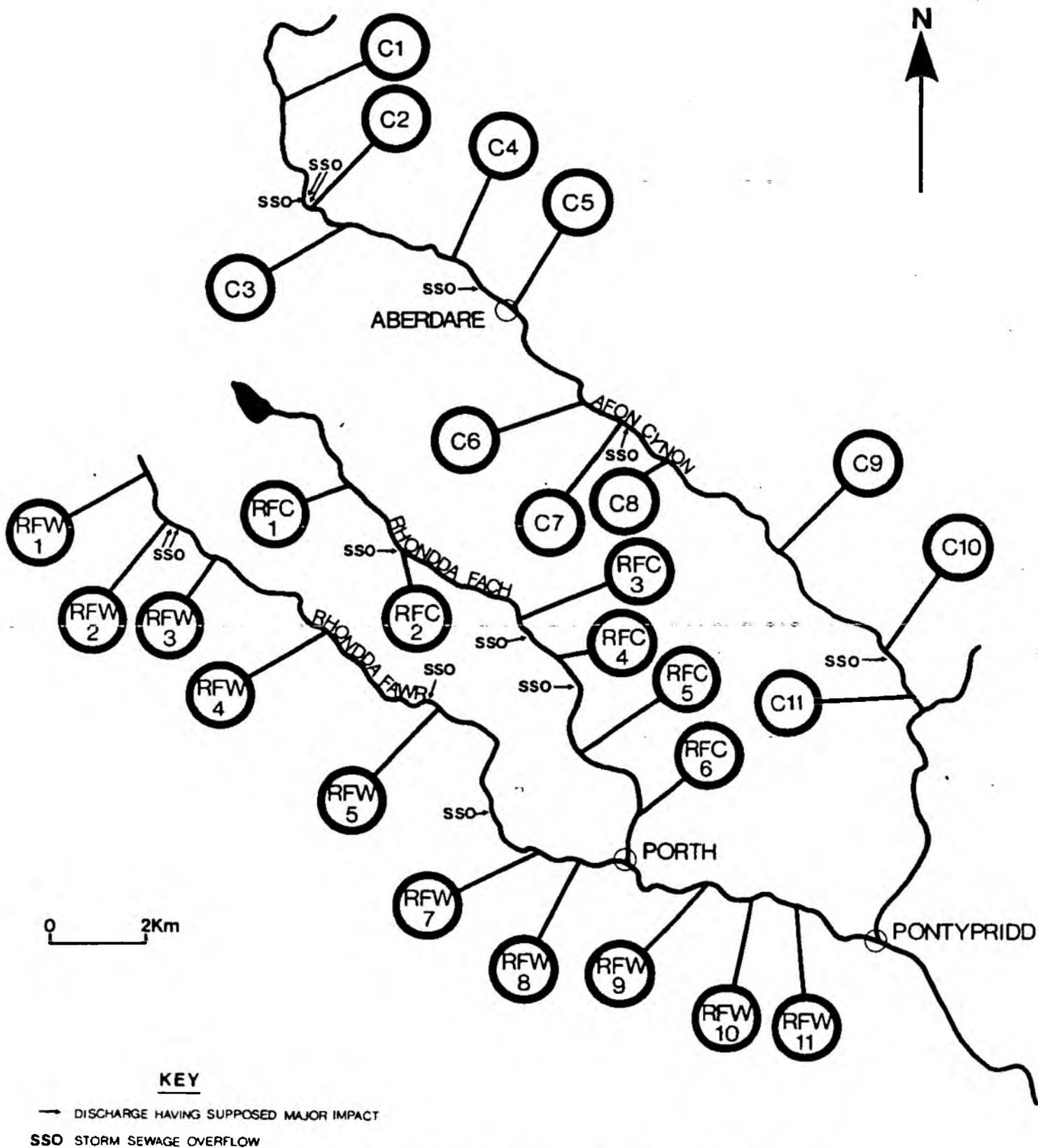


Fig. 2. Abundance of litter and the proportion which is sewage derived at each survey site of the Cynon, Rhondda Fach and Rhondda Fawr.

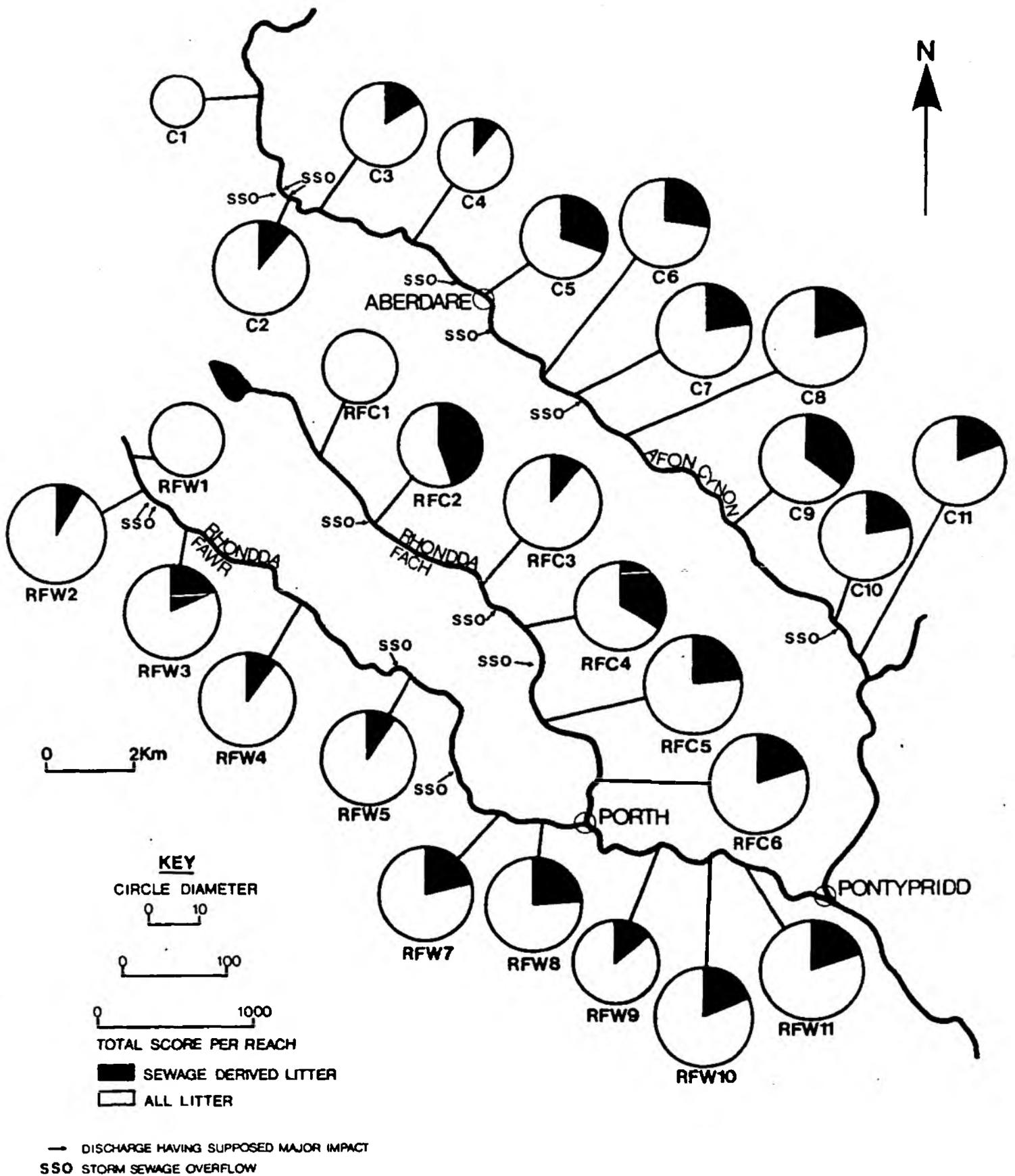


FIG. 4
CYNON LITTER:SEMI-QUANTITATIVE ASSESSMENT

LOWER BANK

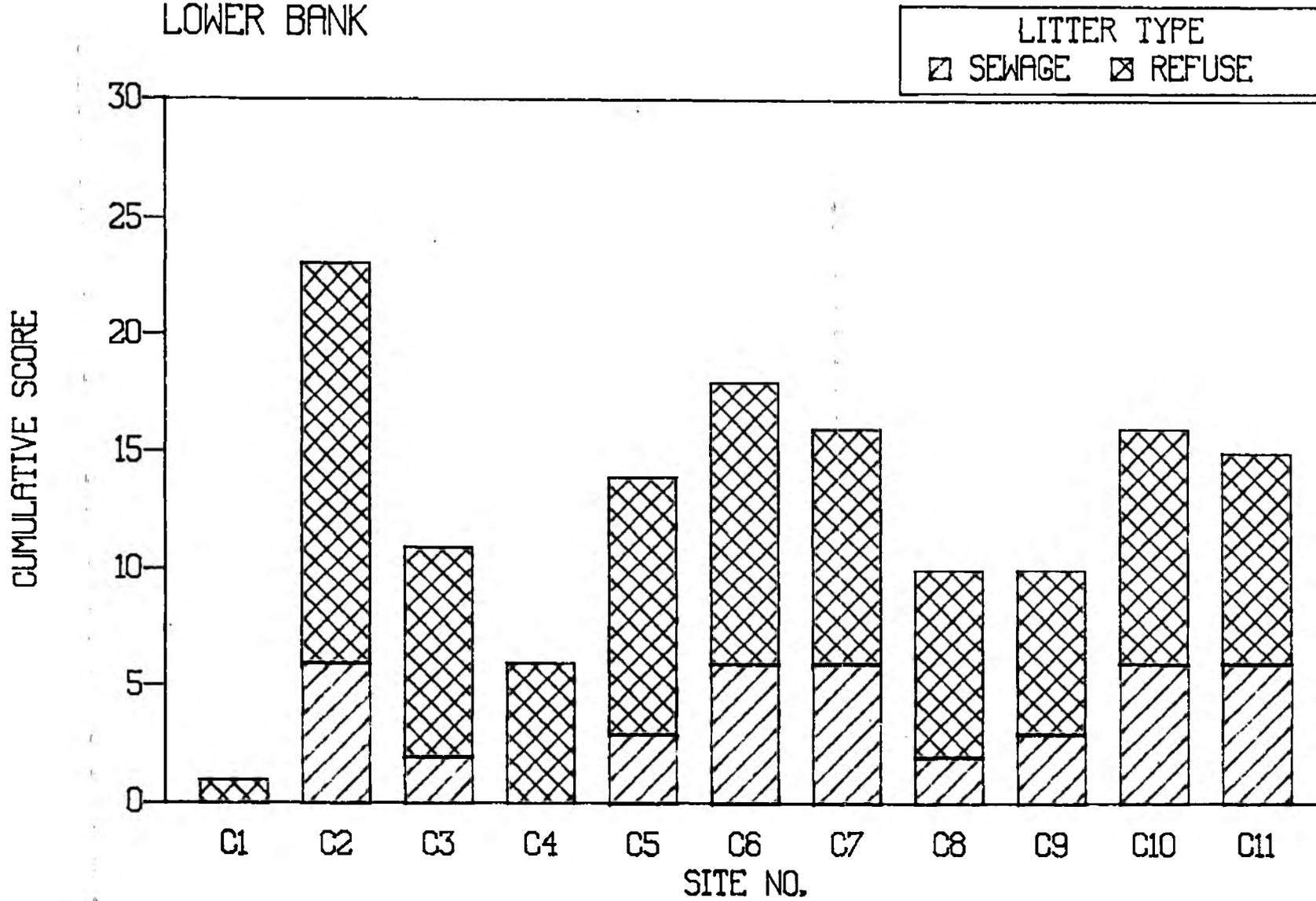


FIG. 5
CYNON LITTER:SEMI-QUANTITATIVE ASSESSMENT

MIDDLE BANK

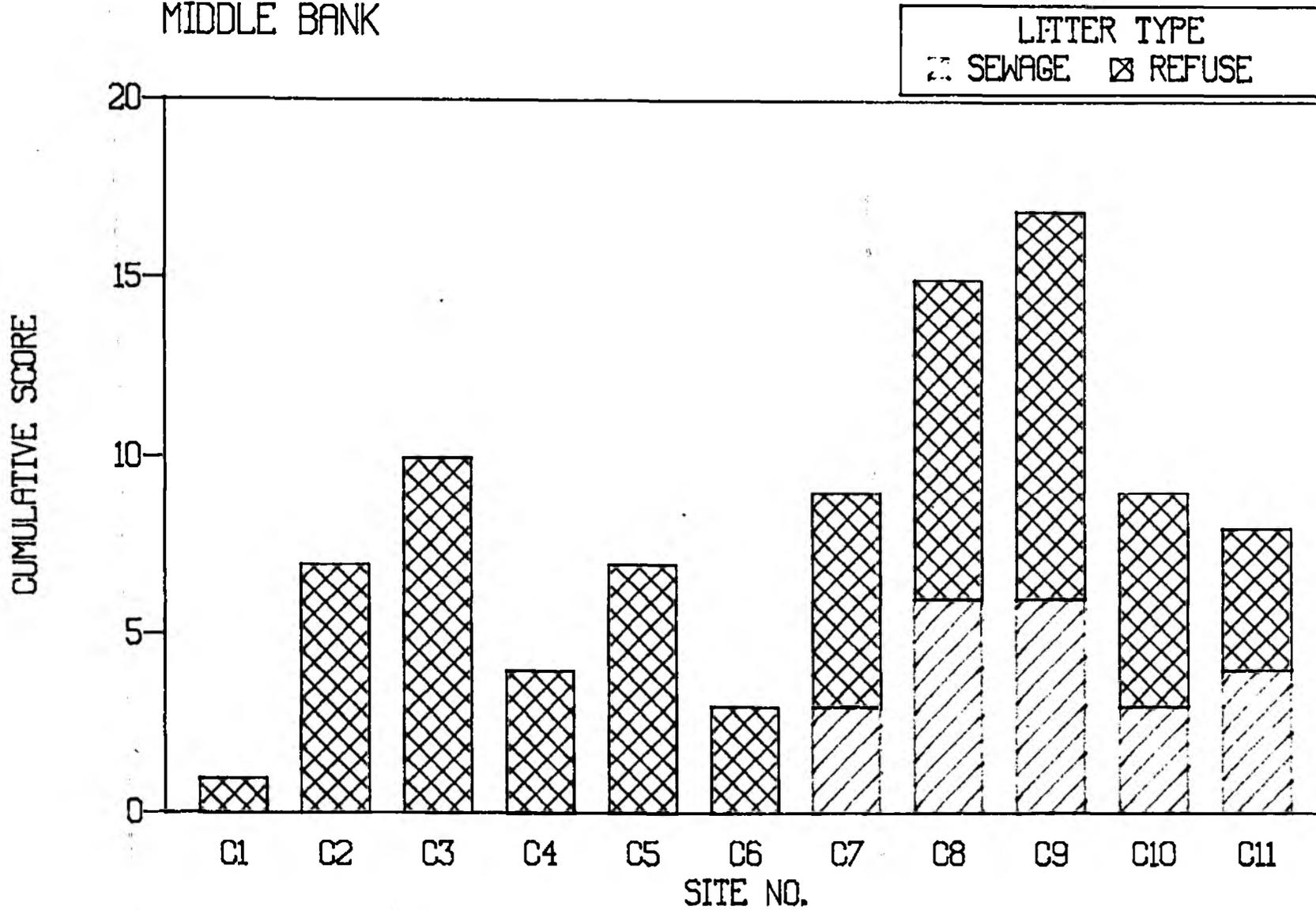


FIG. 6

CYNON LITTER:SEMI-QUANTITATIVE ASSESSMENT

UPPER BANK

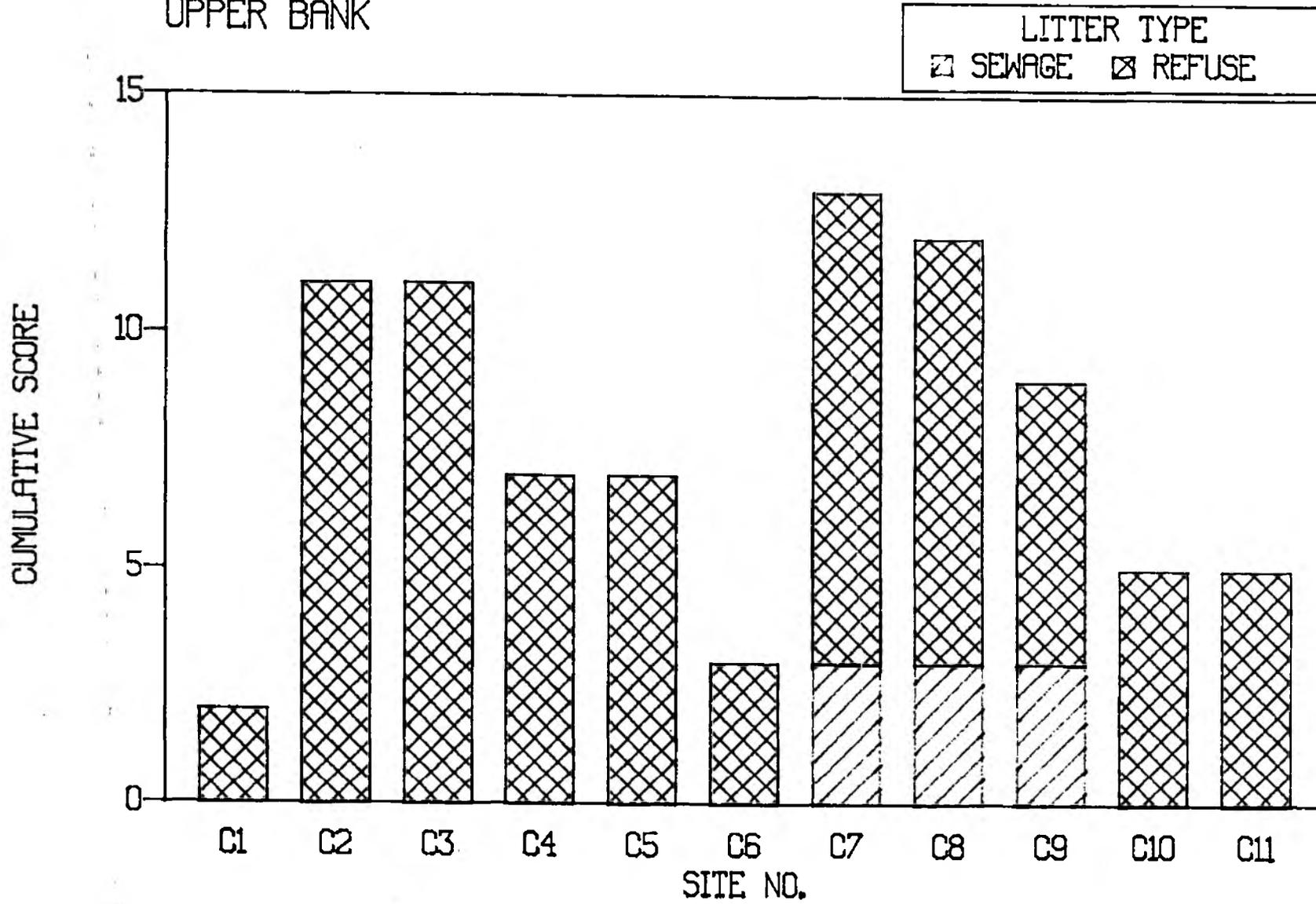


FIG. 7
CYNON LITTER:SEMI-QUANTITATIVE ASSESSMENT

TOTAL BANK SCORE

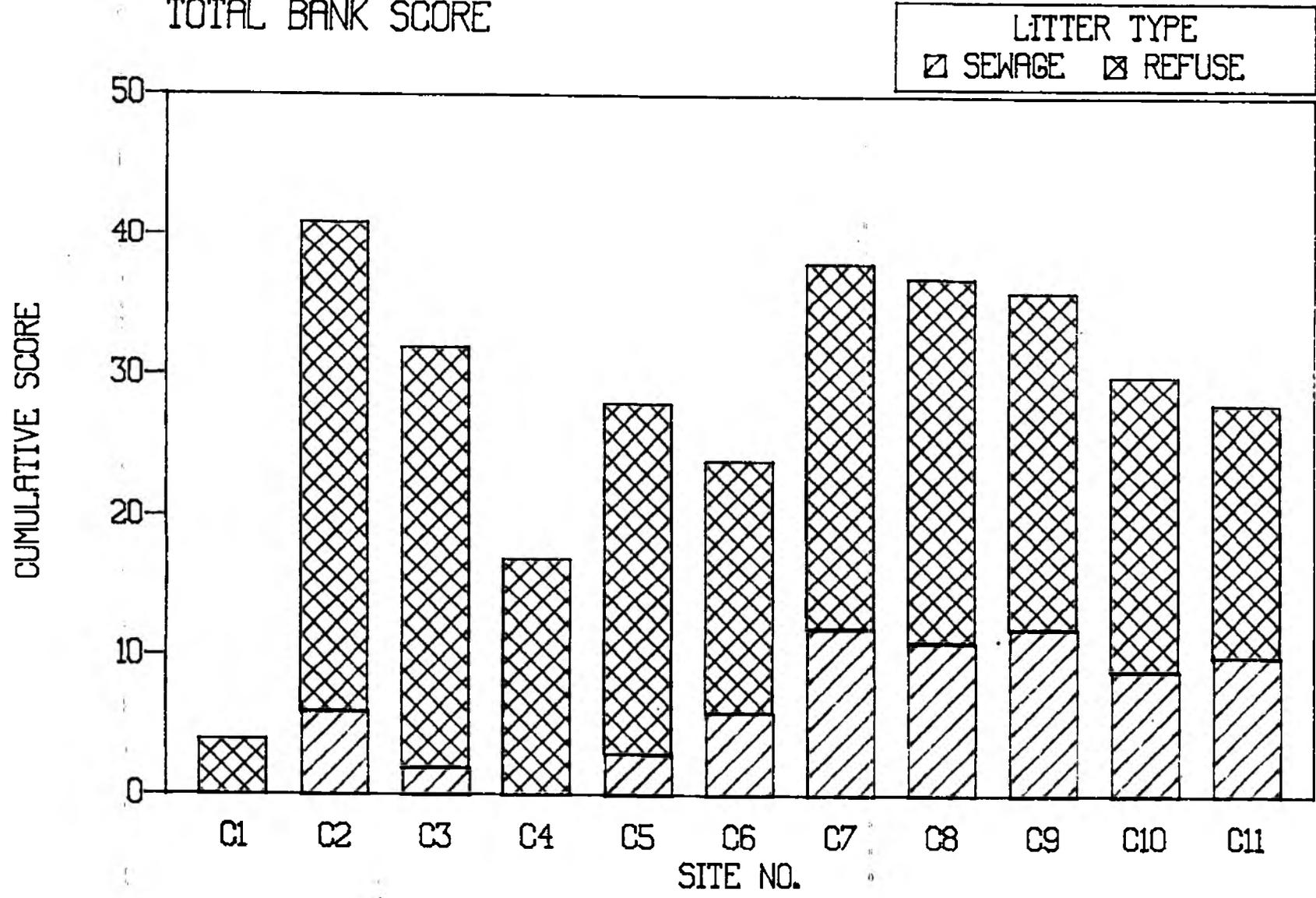


FIG. 8
RHONDDA LITTER: SEMI-QUANTITATIVE ASSESSMENT

LOWER BANK

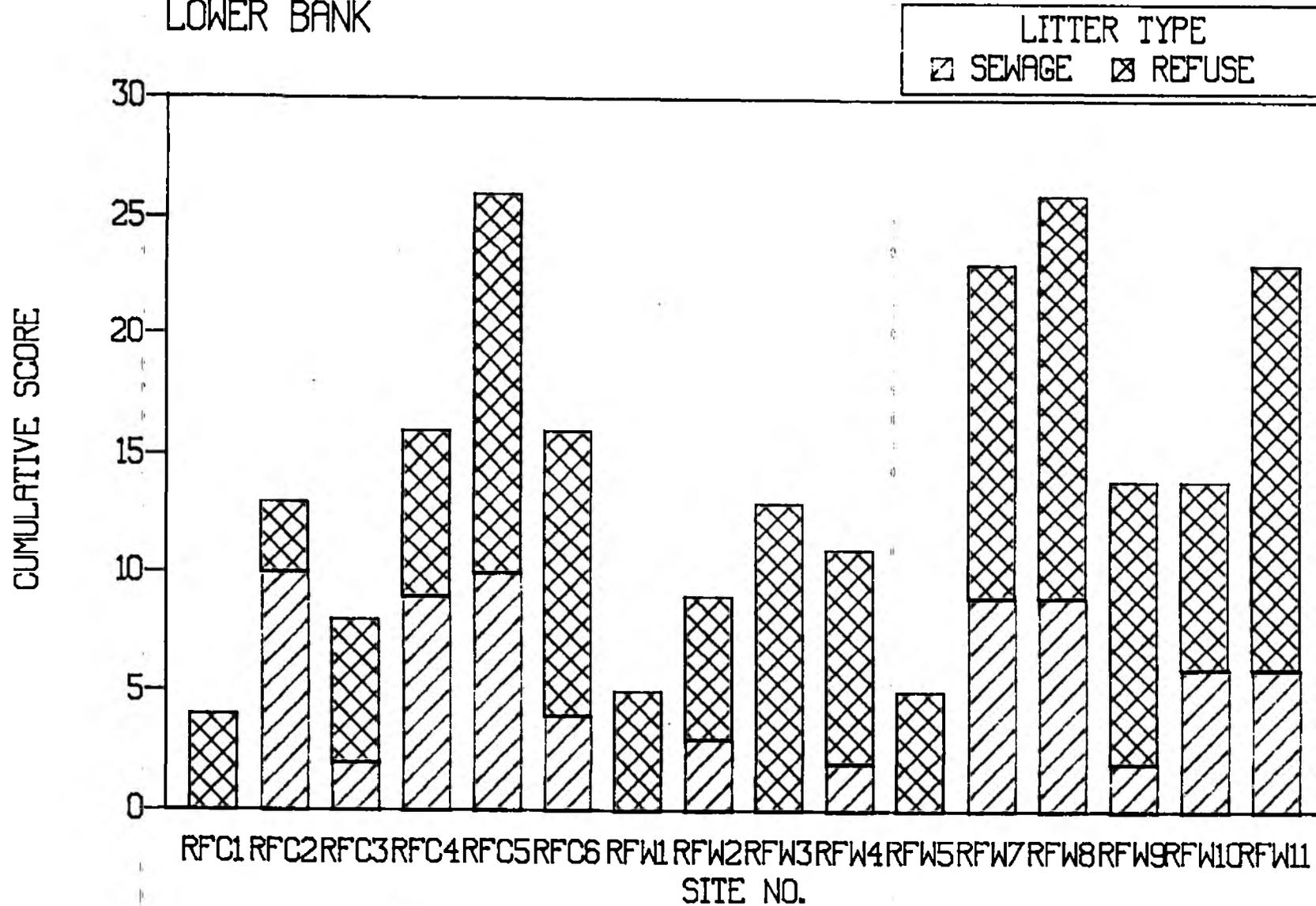


FIG. 9
RHONDDA LITTER: SEMI-QUANTITATIVE ASSESSMENT

MIDDLE BANK

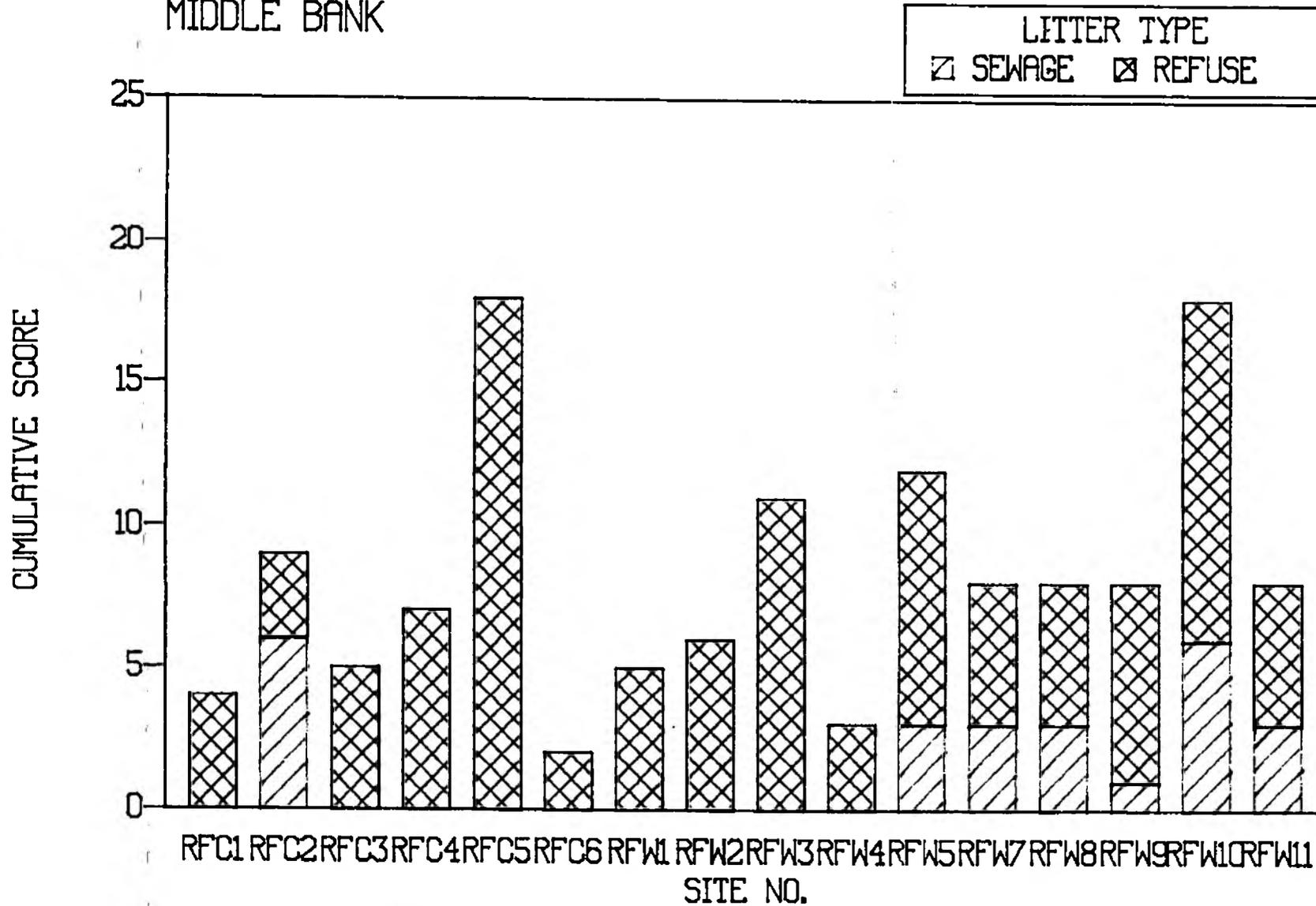


FIG. 10
RHONDDA LITTER:SEMI-QUANTITATIVE ASSESSMENT

UPPER BANK

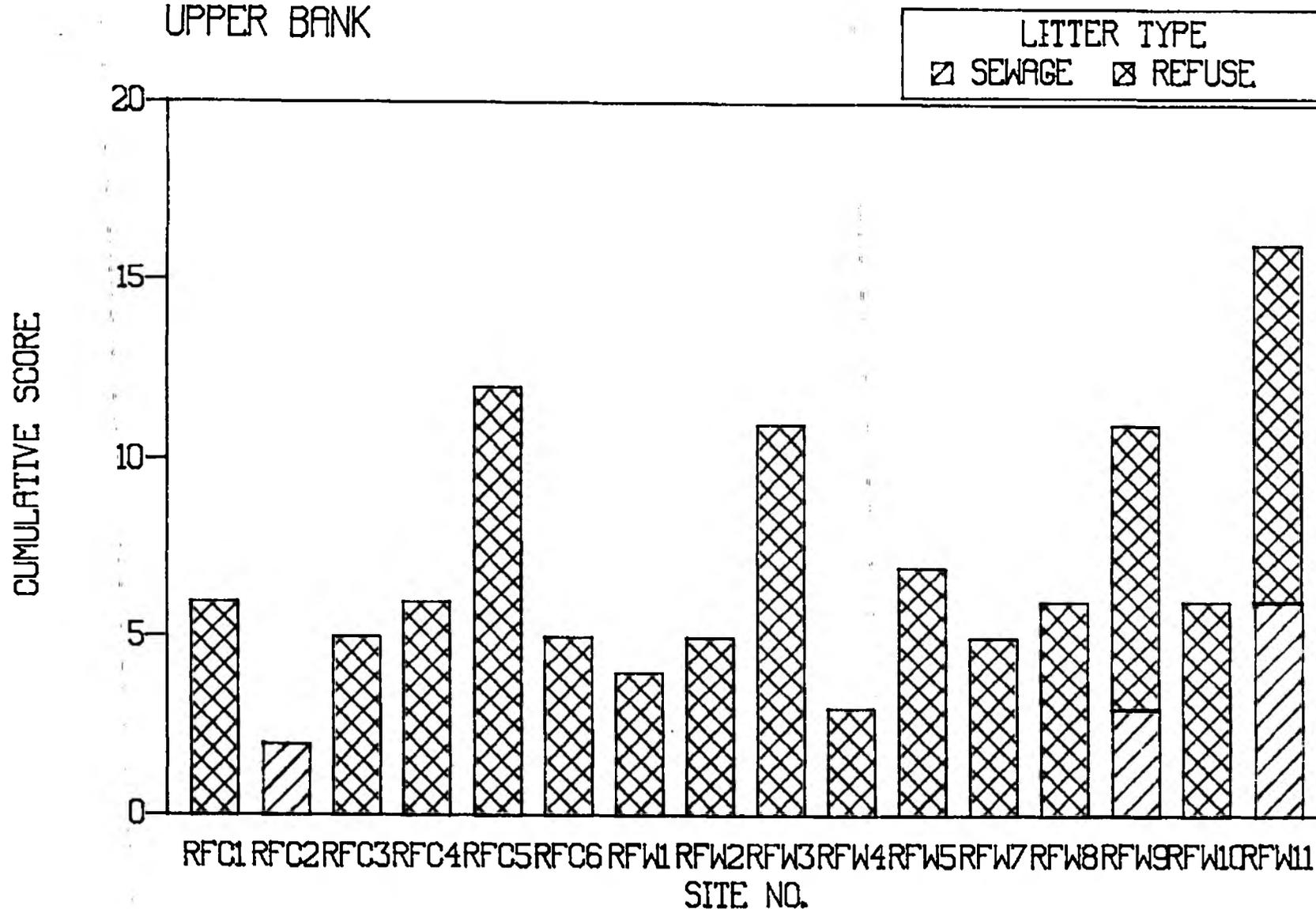
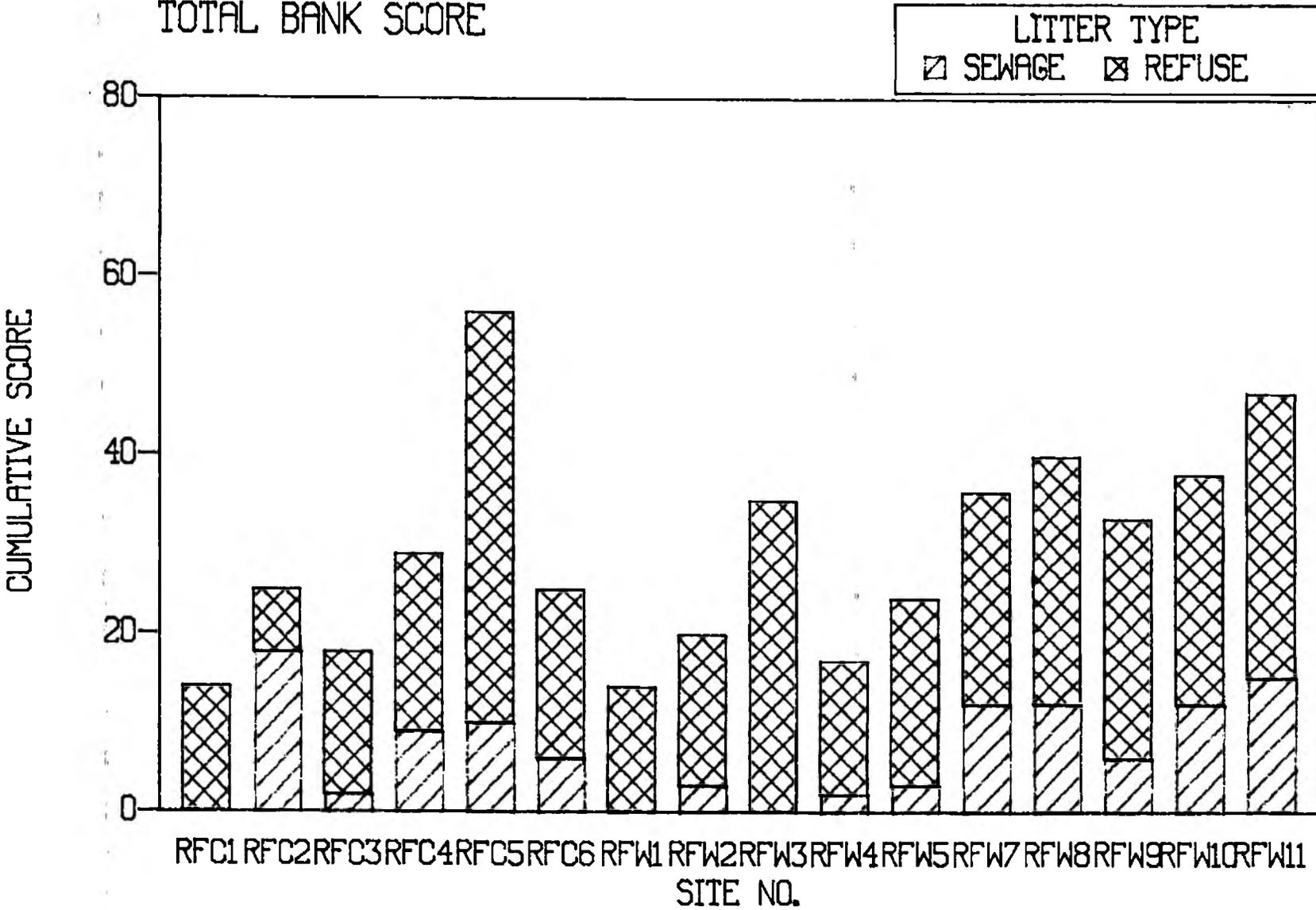


FIG. 11

RHONDDA LITTER: SEMI-QUANTITATIVE ASSESSMENT

TOTAL BANK SCORE



APPENDIX 1

WELSH WATER - REGIONAL RIVERS DIVISION
South East Environmental Appraisal Unit

Bankside Litter Survey Form

River: River Reach: u/s NGR

d/s NGR

Reach Code:

Date: Recorder (s):

Sketch of Survey Area:

(Select a survey area to a maximum length of 40m i.e. 20m u/s and d/s of your access point. If possible survey the whole length and width of the survey area but if it is not possible to access both banks then define clearly the area surveyed onto the plan)

Physical characteristics of Reach:

1. Riffle/fast run/slow run/glides/pool, etc.?

2. Description of bank - walled / steeply sloping / gently sloping / overhanging, etc.?

3. Vegetation types (tick if present)

Trees Tree Roots Shrubs/Bushes Low plants Grasses

Estimate %age of reach with overhanging vegetation:

Record maximum height of litter (m) in branches and state whether or not this is still within the flood channel if possible:

Describe any point sources of litter from e.g. SFW storm water, Storm Sewage Overflows (S.S.O's). Complete the quantitative and qualitative litter descriptions - 1 for u/s and 1 for d/s source. Include the name of the outfall:

Was the discharge occurring under Dry Weather Flow conditions?

Record any tributaries and state whether or not the input appears to be a major source of litter. If necessary complete an u/s and d/s assessment as above.

select a 5m wide transect of the bank and semi-quantitatively assess the bankside litter from the river channel upwards. Divide the bank subjectively into lower, middle and upper bank and record in table 1 overleaf:

TABLE 1 QUALITATIVE DESCRIPTION OF LITTER IN SURVEY AREA

REACH CODE:

MAJOR CATEGORIES	DESCRIPTION	RIVER CHANNEL	BANKSIDE		TOTAL REACH SCORE
			LEFT	RIGHT	
SEWAGE	toilet paper				
	contraceptives				
	sanitary towels				
	napkin liners				
	cotton buds				
	sewage smell				
	other (specify)				
REFUSE	angling litter				
	road cones				
	polystyrene				
	plastic crates				
	plastic strips				
	<30cm length				
	30-60cm length				
	>60 cm length				
	clothing				
	cans				
	metal objects				
	bottles				
	vehicles (or parts of vehicles)				
	tyres/wheels				
	supermarket-trolleys				
	furniture				
	plastic/metal drums				
	builders rubble				
other (specify)					
OTHER	(specify)				

TICK IF LITTER PREDOMINATELY CAUGHT ON BANKSIDE VEGETATION

- 0=Absence of material
- 1=traces of material
- 2=Some material at intervals
- 3=Gross contamination

TABLE 2 SEMI-QUANTITATIVE ASSESSMENT OF LITTER IN 5M TRANSECT

REACH CODE:

LEFT OR RIGHT BANK?

MAJOR CATEGORIES	DESCRIPTION	LEFT OR RIGHT BANK?		
		LOWER BANK	MID BANK	UPPER BANK
SEWAGE	toilet paper			
	contraceptives			
	sanitary towels			
	napkin liners			
	cotton buds			
	sewage smell			
	other (specify)			
REFUSE	angling litter			
	road cones			
	polystyrene			
	plastic crates			
	plastic strips			
	<30cm length			
	30-60cm length			
	>30 cm length			
	clothing			
	cans			
	metal objects			
	bottles			
	vehicles (or parts of vehicles)			
	tyres/wheels			
	supermarket-trolleys			
	furniture			
	plastic/metal drums			
builders rubble				
other (specify)				
OTHER	(specify)			

TICK IF LITTER PREDOMINATELY CAUGHT ON BANKSIDE VEGETATION

0=0

1-10=1

11-100=2

101-1000=3

>1000=4

NUMBER OF ITEMS OF LITTER

APPENDIX 2: TAFF TRIBUTARIES SURVEY SITE DESCRIPTIONS

Cynon

C1-Nant Cadlan (upper Cynon) at Penderyn (SN 952 080)

Wooded and clean.

C2-Hirwaun Roadbridge (SN 961 055)

Gross contamination to small section of right hand bank from SWO. Generally very littered from the road bridge above with paper litter, take-away cartons, etc.

C3-Housing Development below Hirwaun (SN 965 054)

Mainly affected by building site litter and clay solids from the excavation of the site with a background of sewage derived litter.

C4-At Llwydcoed (SN 986 047)

Quite clean, wooded. Accessible from footbridge.

C5-Robertstown Footbridge (SO 002 035)

Affected by a SWO above Robertstown. A high diversity of domestic refuse, e.g. bathroom scales!

C6-Below Aberdare (SO 014 016)

Generally littered. This site is adjacent to a park and is used by people for walking and recreation.

C7-At A4059 Roadbridge (below Aberdare) (SO 025 010)

This site is behind retail/workshop units downstream of Aberdare. Abundant industrial refuse and must be a general tipping site from the units but with some domestic litter e.g. foam mattress. A car was deposited in the river channel.

C8-At footbridge d/s Phurnacite (ST 037 998)

Downstream of the Phurnacite works. The water quality at this site is affected by the works. Although the bankside has been modified for Land Drainage purposes and has little overhanging vegetation it is

affected by a diversity of litter (especially the river channel) of mainly domestic origin e.g. shoes, clothing/rags, rope, etc.

C9-At Mountain Ash (ST 053 983)

An industrial wasteground (NCB?) but litter mainly channel derived.

C10-Above Abercynon (ST 0756 9595)

Badly affected by sewage litter and general rubbish deposited mainly from the river on the right bank including some heavier objects such as a British Rail sign and railway sleeper. Fresh rat droppings at this site!

C11-At Abercynon (ST 083 951)

Banks steep sided without much overhang therefore not much area for litter to deposit on. Mainly domestic refuse e.g. a bin bag full of rubbish.

Rhondda Fach

RFC1-Rhondda Fach above Maerdy (SS 9703 9937)

Just below Maerdy colliery. Vegetation peat - open moorland. Some evidence of fly-tipping and colliery derived refuse e.g. an L-plate, floor covering, industrial rubber hosing but diffuse.

RFC2-Downstream SWO at Maerdy (SS 9761 9835)

Gross sewage derived litter contamination from the SWO which discharges via a minor tributary stream. Just above this site a full size metal bath was found in the river channel and large objects such as a cable drum.

RFC3-Downstream of Roadbridge at Blaenllechau (ST 0007 9716)

Steeply sloping banks (possibly a reclaimed coal tip). Lots interesting pipes discharge at this point, possibly SWO's, but could have been culverted streams. Not much evidence of sewage derived litter but fly-tipped objects in abundance (toys, floor-covering, metal objects and builders rubble).

RFC4-At Tylorstown (ST 0085 9610)

There is a very steep gorge at this point - can only drive to this site with care. Seems to be a recreation area, but there is a problem with SWO's in this area (comments from local people)

RFC5-Downstream Pontygwaith Bridge (ST 0122 9393)

The whole bank appears to be a refuse tip. Very diverse litter (e.g red light bulb, garden refuse, umbrella, dustbin contents). Much of the refuse derives from houses which back onto the left bank and factory premises back onto the right bank.

RFC6-At Ynyshir (ST 025 925)

The river is deep and fast flowing here with a bedrock/boulder substrate. The river is culverted downstream of this site. The bank is very steep and access is limited, therefore there is less dropped litter and the bulk of the litter consists of large objects washed down the river channel.

Rhondda Fawr

RFW1-Rhondda Fawr upstream of Blaenrhondda (SN 925 002)

A clean upland site with vegetation type typically peat. Houses back onto river (left bank) but there was not much evidence of fly-tipping.

RFW2-At Treherbert (SS 9380 9845)

Although close to the headwater site, from Treherbert downstream the area is heavily built up. A grotty site with houses backing onto the left bank and playing fields onto the right with domestic litter mainly (toilet cistern, plastic chair, dustbin contents, etc.).

RFW3-At Ynyswen (SS 951 974)

Very steep grassy bank (right) and walled (left). Large packing material in abundance on the right bank, probably derived from nearby factory units (see slide).

RFW4-At Pentre (SS 9655 9592)

The trunk sewer is very prominent here with an above ground pipe running along the left bank. The river is quite fast-flowing in this reach but with some ponding and riverine derived litter on the right bank.

RFW5-At Ystrad Railway Station (SS 985 950)

This site was affected by mainly riverine litter even though houses back onto the left bank.

RFW6-This reach was missed

RFW7-Upstream of Dinas Railway Station (ST 0040 9195)

Site not accessible (both banks steeply sloping), litter diffuse. A motorbike had been dumped into the river channel just above this reach.

RFW8-At Dinas (ST 014 9175)

Council flats back onto the site (right bank) and the railway onto the left bank which has lots of dense overhanging vegetation. The site is very littered (fly-tipping of mainly domestic objects such as a bed and floor covering) even though the site is inaccessible to walk along the river bank. Lots dropped litter (take-away cartons, drinks cans and cartons.

RFW9-At Trehafod (ST 042 913)

Quite remote within a very steep gorge. The river bed is mainly bedrock and boulders and the litter is mainly riverine.

RFW10-Downstream of Trehafod (ST 049 909)

Houses back onto the left bank. The right bank is of open aspect with an access road to the forestry. Mainly domestic refuse such as a radio and bed but with some industrial rubber hosing.

RFW11-Rhondda upstream of Pontypridd (ST 064 904)

Built-up area, the river is inaccessible from either bank. The main road runs parallel to the river at the left bank. This site was heavily littered with all categories of litter and including a window and roofing sheets from the right bank.