A Report on the River Chew
at Chewton Mendip
6th August 1992

A REPORT ON THE RIVER CHEW AT CHEWTON MENDIP, BRINGING TOGETHER INFORMATION FOR THE PURPOSES OF DETERMINING AN ACCEPTABLE APPROACH FOR DEALING WITH POLLUTION RELATING TO UNSEWERED VILLAGES.

Samantha Dawe Water Quality Officer 6th August 1992

RIVER CHEW AT CHEWTON MENDIP

1.INTRODUCTION

The River Chew rises from springs in the village of Chewton Mendip, meeting with the River Avon at Keynsham. The stretch of river from it's source through Chewton Mendip falls into class 3 of the National Water Council scheme for river quality classification. The details of this scheme are appended although at this point it is sufficient to say that this section of river is of poor quality.

Chewton Mendip does not have mains drainage for the disposal of sewage. Individual premises have varying arrangements, many properties appearing to have sewage effluent running either directly or from septic tanks into the River Chew itself. It is unlikely in most cases that treating sewage by passing it through a septic tank will produce effluent of a high enough standard to discharge to the river. Similarly, direct discharges are unacceptable. The poor river water quality is thought to be due to this antiquated method of sewage disposal in the village.

A report written by the area Water Quality Officer in 1988 gives a brief description of sewage disposal and a copy can be found in Appendix 1. This subsequent report aims to build on the information already provided, pulling together as much information on the area as possible. It is angled more towards providing scientific evidence that sewage problems are the cause of poor water quality in the top reaches of the River Chew in order that the extensive remedial work likely to be required can be justified. It also briefly touches on problems likely to be encountered due to the use of this river and it's spring sources as a major water supply for Bristol Waterworks Company, when appraising the options available for remedying the chronic pollution problem.

2.CHEMICAL WATER QUALITY

2.1 Review of Routine Sampling Results

The River Chew has been routinely sampled immediately downstream of Chewton Mendip for several years. It is not uncommon to receive reports of low Dissolved Oxygen levels in the river, from Sampling Officers taking such samples.

For the purposes of classifying the river for the 1990 River Quality Survey, using the NWC scheme, results for samples taken during this and the preceding two years were considered. Based on these results the chemical river quality was found to be class 3. This implies that a number of routine samples taken in the three year period had one or a combination of elevated Ammonia or Biochemical Oxygen Demand (BOD), or a low Dissolved Oxygen level.

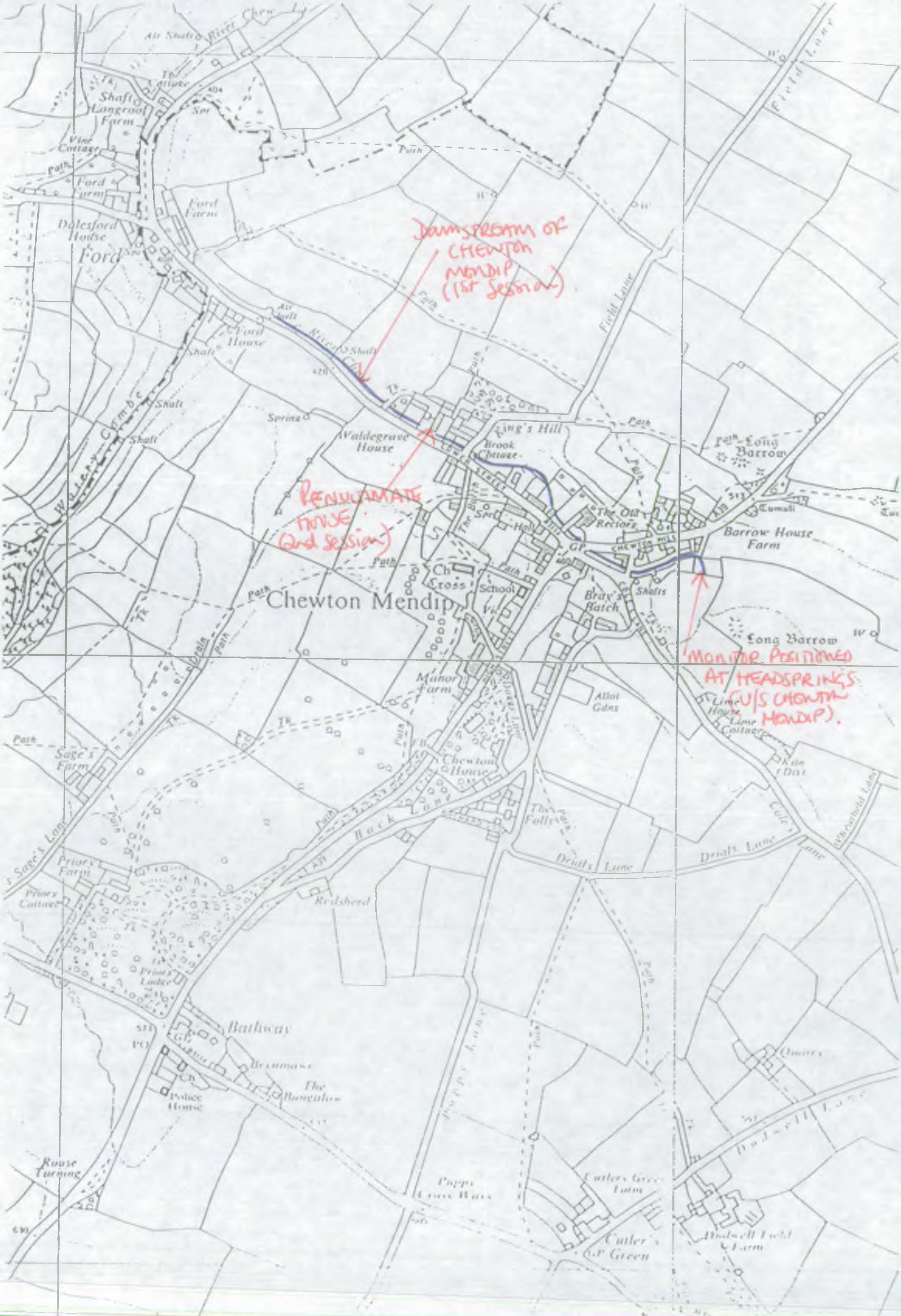
On reviewing results obtained from the beginning of 1991 to the present, the trend continues. Of forty two samples taken between 16th January 1991 and 20th July 1992 there have been numerous examples of low oxygen levels and elevated BOD or Ammonia as detailed below:

Fig.1 Results of Samples Indicating Poor River Quality

DATE	TIME	BODmg/l	DO%	AMMONIA mg/l
7/3/91	12:30	7.0	73	1.22
3/4/91	11:10	14.0	--	2.86
29/4/91	10:30	13.0	49	1.36
17/5/91	11:45	4.4	48	0.79
7/6/91	12:45	8.0	--	0.38
8/7/91	12:25	4.2	46	0.91
23/7/91	14:40	2.2	50	1.5
8/8/91	12:15	3.1	51	1.3
23/8/91	11:00	31.5 >	50	1.6
6/9/91	12:25	3.0	--	1.3
18/9/91	13:25	4.2	52	1.334
24/9/91	10:45	4.9	34	2.009
7/2/92	11:35	6.2	84	1.1
28/4/92	16:55	6.8	76	2.5 >
23/6/92	12:08	2.7	58	1.2
7/7/92	12:30	6.9	50	2.1
20/7/92	11:00	---	38	1.2

It should be noted that a 'fair quality' river would meet the following criteria:

BOD <= 9.0 mg/l
DO >= 40%
Ammonia non toxic to fish (EIFAC terms)


DOWNSTREAM OF CHEWTON MENDIP (1st Session)
PENULTIMATE HOUSE (2nd Session)
MONITOR POSITIONED AT HEADSPRINGS (U/S CHEWTON MENDIP).
Chewton Mendip
River Chew
Air Shaft
The Cottage
Shaft
Langroot Farm
Vine Cottage
Path
Ford Farm
Dolesford House
Ford
Ford House
Watery Combe
Spring
Waldegrave House
King's Hill
Brook Cottage
The Old Rectory
School
Ch Cross
GP
Bray's Batch
Shafts
Long Barrow
Barrow House Farm
Field Lane
Manor Farm
Allot Gdns
Lime House
Lime Cottage
Chewton House
Back Lane
The Folly
Drials Lane
Cole Lane
Sage's Farm
Sage's Lane
Priory Farm
Priory Cottage
Priors Lodge
Redshard
Bathway
Police House
The Bungalow
Rouse Turning
Cutlers Green Farm
Cutler's Green
Bodwell Lane
Bodwell Field Farm

2.2 Automated Monitoring Results.

2.2a Deployment of Monitoring Equipment.

Monitoring equipment was deployed on the River Chew at different points as illustrated by the map opposite. From 6th to 23rd December 1991, the equipment was positioned at the headsprings (upstream) and in a field immediately downstream of the village of Chewton Mendip (the routine sampling point). Monitoring was repeated between 22nd May and 10th June 1992. Due to construction work affecting the river at this time, the downstream monitor was positioned in the garden of the penultimate house on the downstream side of the village.The two parameters measured were percentage Dissolved Oxygen and Ammonia, variations in which are usually indicative of organic pollution. The equipment was set to log results for these two parameters at fifteen minute intervals.

By setting up the equipment in this manner it was hoped that the results would indicate a significant difference in levels of oxygen and Ammonia between the upstream and downstream sample points and show a pattern in levels corresponding to likely peaks of sewage effluent discharges downstream of the village. Other than sewage effluent inputs from individual properties there is little else flowing into the River Chew in this area likely to affect it's organic content. Consented discharges, quantity of water and pollution incidents are dealt with later in this report.

2.2b Monitoring Results.

The results are shown graphically in Appendix II of this report.

From the period 6th to 23rd December 1991, results recorded of Ammonia and Oxygen levels in the Chew Head Springs, show fairly constant low levels of Ammonia as would be expected in uncontaminated river water and Oxygen levels around the 55-60 percent level. It is thought that due to cold weather the battery operated monitoring equipment was not functioning properly during some of this session.

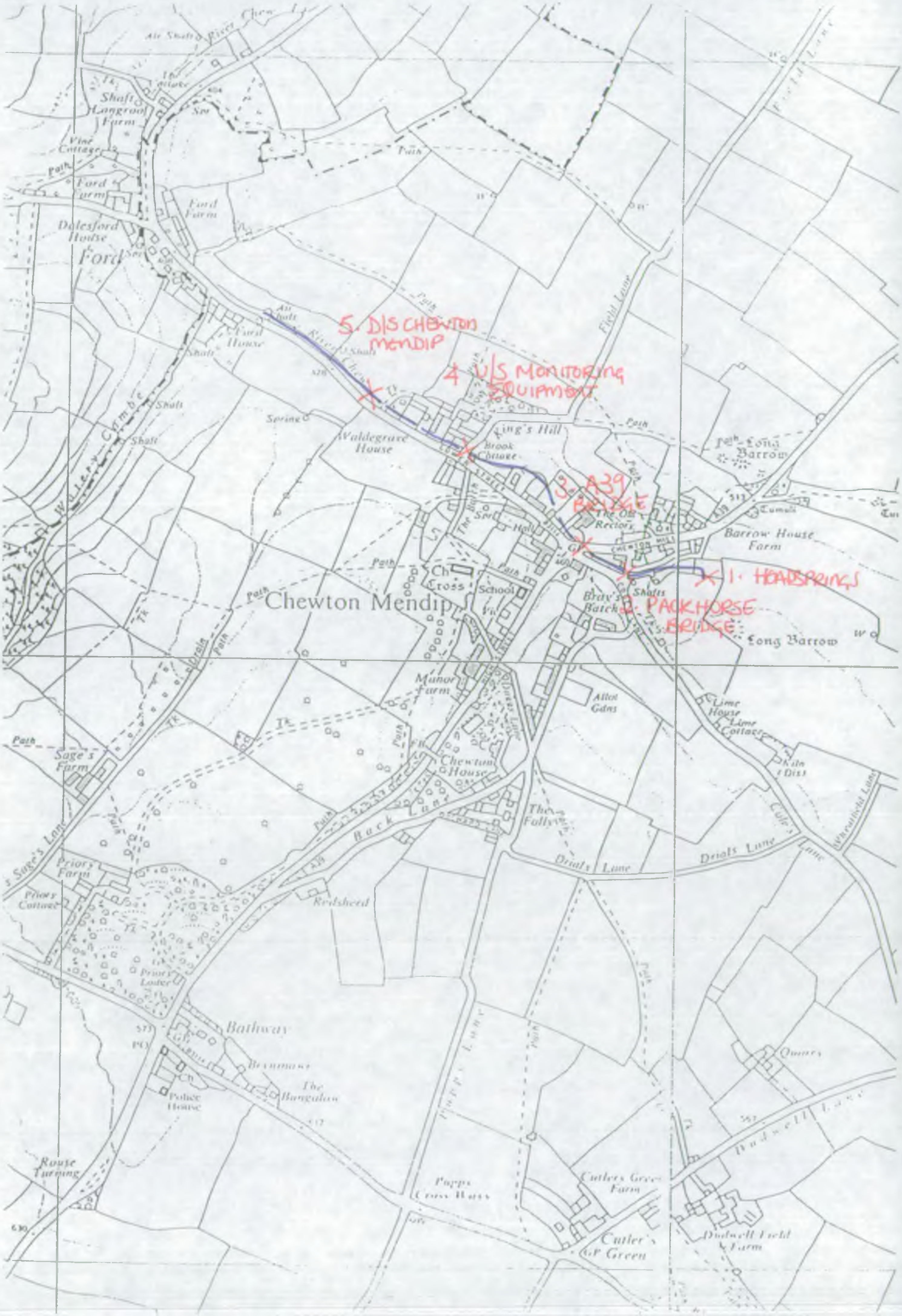
The results for downstream of Chewton Mendip show there to be higher Ammonia levels and also fluctuating, though generally higher Dissolved Oxygen than upstream. A pattern of peaks and troughs can be seen quite clearly if a period of five days such as 11th to 15th December (inclusive) is looked at more carefully. The the scale on the graph is enlarged, thus correlation between high Ammonia levels and low Dissolved Oxygen becomes apparent. Just after 0700 hours each morning, Ammonia levels start to increase and Dissolved Oxygen sags. This starts to reverse during the

early hours of the following morning, around 0100 hours. It corresponds with times when sewage effluent starts to be discharged to the river as people get up in the morning and discharge levels drop late at night when the population sleeps, enabling the river to recover.

Variables to be considered which might affect the results include rainfall which would offer dilution to the effluent by raising the volume of water in the river, inputs other than sewage which will be discussed later, and temperature which affects how readily oxygen dissolves in the water. Rainfall figures are available in Appendix III and it should be noted that rain occured from the 15th to 23rd of December.

When the excercise was repeated during the early summer of 1992 the conclusions based on the results obtained are not dissimilar to those during the previous December.The Ammonia levels upstream of Chewton Mendip remained constant at just greater than 0mg/l, whilst the downstream levels fluctuated according to the time of day and were generally higher than those recorded upstream. The graphs show levels in excess of 2mg/l occuring frequently. Dissolved Oxygen levels in the upstream site at first appear to be surprisingly low and are lower than those downstream, although this could be due to the physical nature of the river having just emerged from it's spring source. Downstream of the village, fluctuation in Oxygen levels is much more pronounced and again, when results for a few days are graphed on a larger scale, the correlation between Ammonia peaks and Oxygen sags during the period from morning through to the early hours of the following morning becomes more readily visible. The recovery appears to commence at approximately 0200 hours each morning.

Gradual overall decline recorded in Dissolved oxygen is probably due to probes becoming covered with silt or algae.



1. HEADSPRINGS
2. PACKHORSE BRIDGE
3. A39 BRIDGE
4 U/S MONITORING EQUIPMENT
5. D/S CHEWTON MENDIP
Chewton Mendip
Ford
Shaft
Langrool Farm
Vine Cottage
Ford Farm
Dolesford House
Ford House
River Chew
Waldegrave House
Brook Cottage
King's Hill
Field Lane
Long Barrow
Barrow House Farm
The Old Rectory
Bray's Batch
Ch
Cross
School
Manor Farm
Allot Gdns
Lime House
Lime Cottage
Chewton House
Back Lane
The Folly
Drials Lane
Sage's Farm
Sage's Lane
Priory Farm
Priory Cottage
Priory Lodge
Redsheed
Bathway
The Bungalow
Police House
Rouse Turning
Popps Cross Barn
Cutlers Green Farm
Cutler's Green
Dudwell Field Farm
Dudwell Lane
Wheatfield Lane
Quarry
Path
Shaft

3. BIOLOGICAL QUALITY

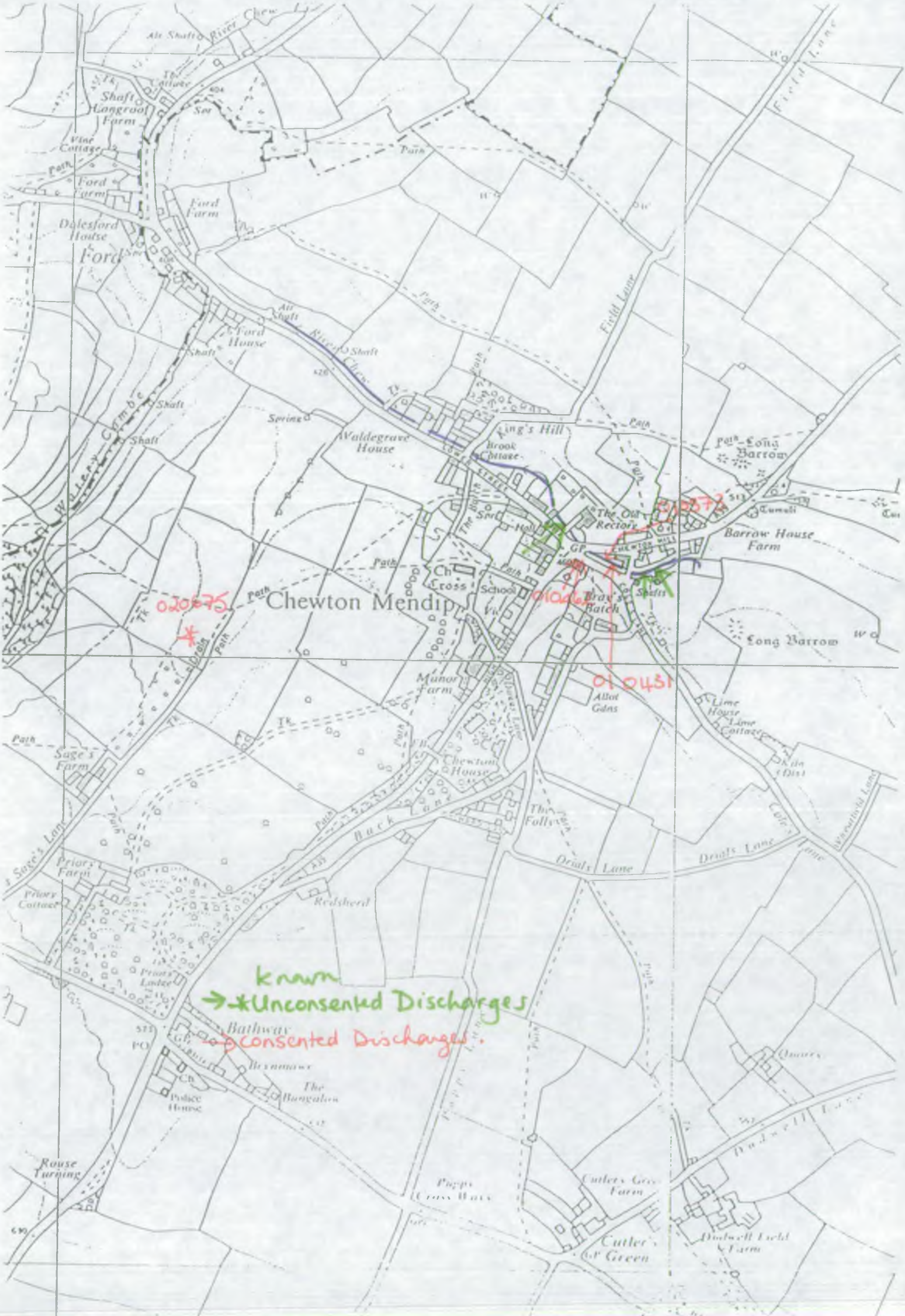
The River Chew was sampled for biological quality immediately downstream of Chewton Mendip on a routine basis during 1991. The results show there to be obvious signs of organic pollution. A copy of the report is enclosed in Appendix IV. It indicates that the biological quality is much lower in the variety of species and numbers of each family which would be expected to be present at a site with these physical characteristics if the river was pollution free.

4. BACTERIAL QUALITY

River water samples were taken for bacterial analysis on four occasions at five sites in Chewton Mendip during the monitoring session in May and June 1992. The five sites are illustrated on the map opposite and include strategic points through the village with a view to identifying or confirming where the most polluting discharges enter the river.

The results of sampling are illustrated graphically in Appendix V of this report. They show that a significant increase in bacterial levels occurs downstream of Chewton Mendip compared with the Headsprings. The most striking difference arises between the sample sites at the A39 bridge and 'upstream of monitoring equipment'. The latter is positioned downstream of the majority of houses, public house, school and village hall, below which bacterial levels are elevated. Upstream of the A39 bridge there are at least two crude discharges to the river and two consented package treatment plant discharges. The 'Packhorse Bridge' sample point should indicate whether a bacterial problem arises from the crude effluent.

There could be little other bacterial input to the watercourse except for field or road run-off under wet conditions. The only significant rainfall occured prior to sampling on 25th May.


Chewton Mendip
River Chew
Ford
Ford Farm
Dalesford House
Ford House
Longroof Farm
Vine Cottage
Waldegrave House
King's Hill
Brook Cottage
The Old Rectory
Barrow House Farm
Long Barrow
Field Lane
Ch
Cross
School
Bray's Batch
Allot Gdns
Manor Farm
Sage's Farm
Chewton House
The Folly
Back Lane
Lime House
Lime Cottage
Kiln (Dis)
Drials Lane
Priory Farm
Priory Cottage
Priory Lodge
Redshard
Bathway
Police House
The Bungalow
Rouse Turning
Cutlers Green
Cutlers Green Farm
Dudwell Field Farm
Quarry
Wallery Combe
Path
Shaft
Spring
020675
010372
010451
known
→*Unconsented Discharges
→consented Discharges.

5. DISCHARGES TO THE RIVER AT CHEWTON MENDIP

5.1 Consented Discharges

There appears to be only four consented discharges to the River Chew in the village itself. These are indicated on the map opposite.

(i) COPA 010373

Discharge from a sewage treatment plant serving several properties converted from the yard of Barrow House Farm now known as Kings Court. The discharge occurs from a pipe in the wall of The Old Estate Yard and is a few metres upstream of the A39. Consented limits are reasonabley strict due to the problem of poor water quality known to exist in the river at the time of issue:
BOD 10mg/l Suspended solids 15mg/l Ammonia 10mg/l

The consent allows a volume of 7.5 cubic metres per day. to be discharged although when visited a discharge of a large enough quantity to be sampled has not been occuring. On times of visiting the area there has been no visible evidence to suggest that this discharge is having a detrimental effect on local water quality.

(ii) COPA 010431

Discharge from a sewage treatment plant serving two existing and one proposed property at The Old Estate Yard. The consent limits are as above and tha volume allowed to discharge is 3.4 cubic metres per day. The only access for sampling this discharge is by wading across the river and as there are several discharge pipes in the immediate vicinity, it is not yet possible to ascertain which would be the discharge point for the effluent. Again, on times of inspecting the river there has not been evidence of a sewage discharge affecting the water quality.

The problem arising at both sites is that the developers have both been bankrupted and control of the discharges does not appear to have been explained to the occupiers of the houses.

(iii)COPA 010462

Discharge of surface water and vehicle cleaning water to the river via an interceptor from a local garage. Standards of 30mg/lSuspended solids and 'no visible oils', 'no detergents or surfactants',have been applied. The volume should not exceed 2 cubic metres per day.

(iv) COPA 020675

This allows a discharge of trade effluent from the piggery and cheese dairy at Priory Farm and Sages Farm.

The consent requires reviewing to take into account the fact that there is no longer a piggery at the site.
Effluent from the cheese making process currently drains into a large lagoon which then overflows into a second. The lagoons are never emptied and there is no outlet. Bearing in mind that approximately 20,000l effluent is discharged to the lagoons on cheese making days it is probable that the liquid soaks away through the base of the lagoon which is not lined.
There is no confirmed pollution from this source in the River Chew.

5.2 Unconsented Discharges

There is evidence of two discharges occuring to the river just upstream of the ford, as marked on the map. It is also known that discharges occur from the school and numerous private dwellings.

In the last few years there have been few pollution incidents confirmed in the stretch of river at Chewton Mendip. A discharge of farm effluent arose under very wet conditions in March 1991 which entered the Chew upstream of the A39. It has also been confirmed on a couple of occasions that the water actually discharging at the headsprings can become contaminated with farm effluent. This appears to occur during or following heavy rain and the most likely explanation is that slurry spread in fields is rapidly washed through the porous limestone and drains into the underground water source.
In May 1992, a report that the river was green and slimey was received. This was found to be due to algal growth which was excessive at this time probably due to low flows.

Two sewage discharges to the river, just upstream of the ford ('Packhorse bridge'). Note algal problem, and discolouration of stream bed.

River Chew just downstream of the Headsprings. Note low flow and algal problem on 22.5.91.

Head springs of River Chew, upstream monitoring point.
This is the flow released by Bristol Water Co.
Photo taken on 22.5.92. Note fairly low flow.

Discharge at Head spring is much greater. Photo taken on 28.6.91.

6.WATER RESOURCES.

Over the past year or so, the River Chew at Chewton Mendip has been monitored for flow both directly downstream of the headsprings and less frequently, downstream of the village. The purpose of this was to determine the quantity of water available for dilution of sewage discharges which would possibley arise due to proposed remedial work. There would be little point in consenting one or several treated discharges if due to a lack of dilution, they still caused the river to remain poor quality.

The Discharge results show the flow to be variable, as might be expected in a spring source fed from porous limestone catchment. In dry summer conditions, there is very little flow from the headsprings and the river becomes completely choked with weed upstream of the A39. Bristol Water Co. take water from the underground strata into a large culvert which runs from Chewton Mendip across the valley and eventually feeds Barrow Tanks just south west of Bristol. The water being discharged at the headsprings is that which is not taken into the culvert. I have been unable to ascertain whether there is any formal arrangement between the NRA and Bristol Water agreeing the volume of compensation water which must be discharged at this point. From visual evidence (some photographs are enclosed) I would suggest that there is insufficient water feeding the river at certain times and that the lack of dilution available contributes significantly to poor water quality. Sample results listed in section 2 do not show a problem with chemical water quality occuring during the wettest months of November, December and January. The low flows would also influence consent standards imposed on any future treated effluents. I feel that further work is required in this area and perhaps a formal agreement drawn up with Bristol Water specifying carefully considered minimum compensation flows and monitoring this.

Spot flow gauging results are contained in Appendix III.

7. LINE OF WORKS CULVERT

As previously mentioned, the Line of Works is a large water transport system which carries water from spring sources in the Chew Valley area to water supply reservoirs just south west of Bristol. The Line of Works starts at Chewton Mendip. A plan of it's route is enclosed in Appendix VI. The culvert is fairly old having been constructed in Victorian times. There has recently been improvement work carried out on some sections to make them watertight. One consideration when determining appropriate methods of sewage disposal for the village is to ensure that the spring sources themselves do not become contaminated and also that soakaways are not situated directly above the culvert or in soil with very high porosity in adjacent areas.

8. THE WAY FORWARD

It appears that the sewage discharges from Chewton Mendip are responsible for poor water quality in the River Chew. This is also likely to be a problem in the stretch of river through Litton where there are again, numerous and in many cases, poorly treated effluents discharging to the river.

A method of sewage disposal must be found, which will give rise to an improvement in river quality and not have a detrimental effect on underground water supply sources.

The options are :

1. Install a sewerage scheme for the village perhaps including Litton's sewage. This idea has been bandied about for years and never actioned. The NRA should bring pressure to bear on Mendip District Council, who are responsible for requisitioning such schemes. However <u>if</u> a sewage works is proposed, to ensure that there is an improvement in water quality the consent will have to be strict to take into account low dilution available.

It is more likely that sewage would be piped away from Chewton Mendip to an existing treatment works, the nearest being at East Harptree. East Harptree STW also discharges to a watercourse which not only suffers with low flows but actually dries up during the summer. The consent for this works is BOD 15mg/l, Solids 15mg/l, Ammonia 10mg/l.

2. Approach individual property owners informing them that they must where necessary, improve or install adequate sewage treatment facilities.

Points outlined in this report should aid in forming a correct plan of attack for the problem. This is to be discussed with Catchment Planning.

Jane Davis.
(Water Quality Officer)

Appendix 0

Table A1 River quality classification

River Class	Quality criteria	Remarks	Current potential uses
	Class limiting criteria (95 percentile)		
1A Good Quality	(i) Dissolved oxygen saturation greater than 80% (ii) Biochemical oxygen demand not greater than 3 mg/l (iii) Ammonia not greater than 0.4 mg/l (iv) Where the water is abstracted for drinking water, it complies with requiurements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 1.5 mg/l (ii) Visible evidence of pollution should be absent	(i) Water of high quality suitable for potable supply abstractions and for all other abstractions (ii) Game or other high class fisheries (iii) High amenity value
1B Good Quality	(i) DO greater than 60% saturation (ii) BOD not greater than 5 mg/l (iii) Ammonia not greater than 0.9 mg/l (iv) Where water is abstracted for drinking water, it complies with the requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 2 mg/l (ii) Average ammonia probably not greater than 0.5 mg/l (iii) Visible evidence of pollution should be absent (iv) Waters of high quality which cannot be placed in Class 1A because of the high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication (v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS)	Water of less high quality than Class 1A but usable for substantially the same purposes
2 Fair Quality	(i) DO greater than 40% saturation (ii) BOD not greater than 9 mg/l (iii) Where water is abstracted for drinking water it complies with the requirements for A3* water (iv) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 5 mg/l (ii) Similar to Class 2 of RPS (iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs	(i) Waters suitable for potable supply after advanced treatment (ii) Supporting reasonably good coarse fisheries (iii) Moderate amenity value
3 Poor Quality	(i) DO greater than 10% saturation (ii) Not likely to be anaerobic (iii) BOD not greater than 17 mg/l. This may not apply if there is a high degree of re-aeration	Similar to Class 3 of RPS	Waters which are polluted to an extent that fish are absent or only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up
4 Bad Quality	Waters which are inferior to Class 3 in terms of dissolved oxygen and likely to be anaerobic at times	Similar to Class 4 of RPS	Waters which are grossly polluted and are likely to cause nuisance
X	DO greater than 10% saturation		Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

Notes

(a) Under extreme weather conditions (eg flood, drought, freeze-up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Class 1, 2 and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results

(b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4.

(c) In most instances the chemical classification given above will be suitable. However, the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be down-graded on the basis of biota actually present, and the reasons stated.

(d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95 percentile limits.

* EEC category A2 and A3 requirements are those specified in the EEC Council Directive of 16 June 1975 concerning the Quality of Surface Water Intended for Abstraction of Drinking Water in the Member State.

Appendix I

A BRIEF REPORT ON SEWAGE DISPOSAL AT CHEWTON MENDIP

N. P. Warren

17 June 1988

SEWAGE DISPOSAL AT CHEWTON MENDIP

Introduction

Chewton Mendip is a village of 480 population situated at the head of the River Chew on the Mendip Hills (Fig 1). It has recently been designated a conservation area by Mendip District Council.

The Chew valley is an important water supply catchment; water being supplied directly to the Chew Valley Lake from the River Chew and, indirectly, by the line of works culvert to the Barrow Reservoir.

The line of works culvert obtains its water in the Chewton Mendip area from springs which arise in the river valley. The spring which arises at Chew Head (Point H, Fig 2) is the source for both the River Chew and the line of works culvert.

The problems associated with sewage disposal at Chewton Mendip also apply, in the main, to the village of Litton, about 2km downstream.

The Present Situation

Chewton Mendip has no sewerage system. Treatment of domestic sewage is based, in general, on the septic tank system. In many cases, the design of these is archaic, usually consisting of one settlement tank with overflow direct to the River Chew. Examples of this type of discharge are marked at points D and E on Fig 2.

Many other properties discharge their sewage crude to the River Chew. This category includes the school, which discharges to a pipe which runs down the High Street and outfalls to the River Chew at the point marked C on Fig 2. The direct connection of the school to the River Chew was proved by means of a dye tracing exercise in conjunction with Somerset County Council. This pipe was probably originally installed to carry spring water and surface run-off away from the road but it is suspected that, since it was laid, a number of other properties have connected and are discharging untreated sewage direct to the River Chew.

Businesses in the valley also experience difficulty in disposing of their effleunt. Tor View Garage has two outlets to the Chew (Points F and G, Fig 2) and is in the process of making a considerable investment in steam cleaning plant and oil interception facilities in order to make its car washing effluent discharges to the Chew acceptable. Normally, this type of discharge would be put to foul sewer after treatment.

Pullen Bros, the milk-bottling depot at Ford and the public house in Litton have also recently experienced problems with disposal of their effluent.

Protection of Water Resources

The safe disposal of sewage in Chewton Mendip is made difficult by the importance of the catchment for supply purposes. Wessex Water operates a policy of embargo on septic tank soakaways in much of the area. This is due to the close proximity of the line of works culvert and the many springs which feed into it.

The line of works culvert dates from 1846 and is still used as the water source for Barrow Reservoirs, situated south of Bristol. Water in the culvert has long suffered from pollution; both from the springs which feed it and from the ingress of polluted water through joints and cracks in the masonry of the culvert. In places, pollution from this latter cause has been so severe that pipes have had to be installed in the culvert to prevent inflow. Septic tanks are, therefore, not an acceptable option for sewage treatment in most of the area.

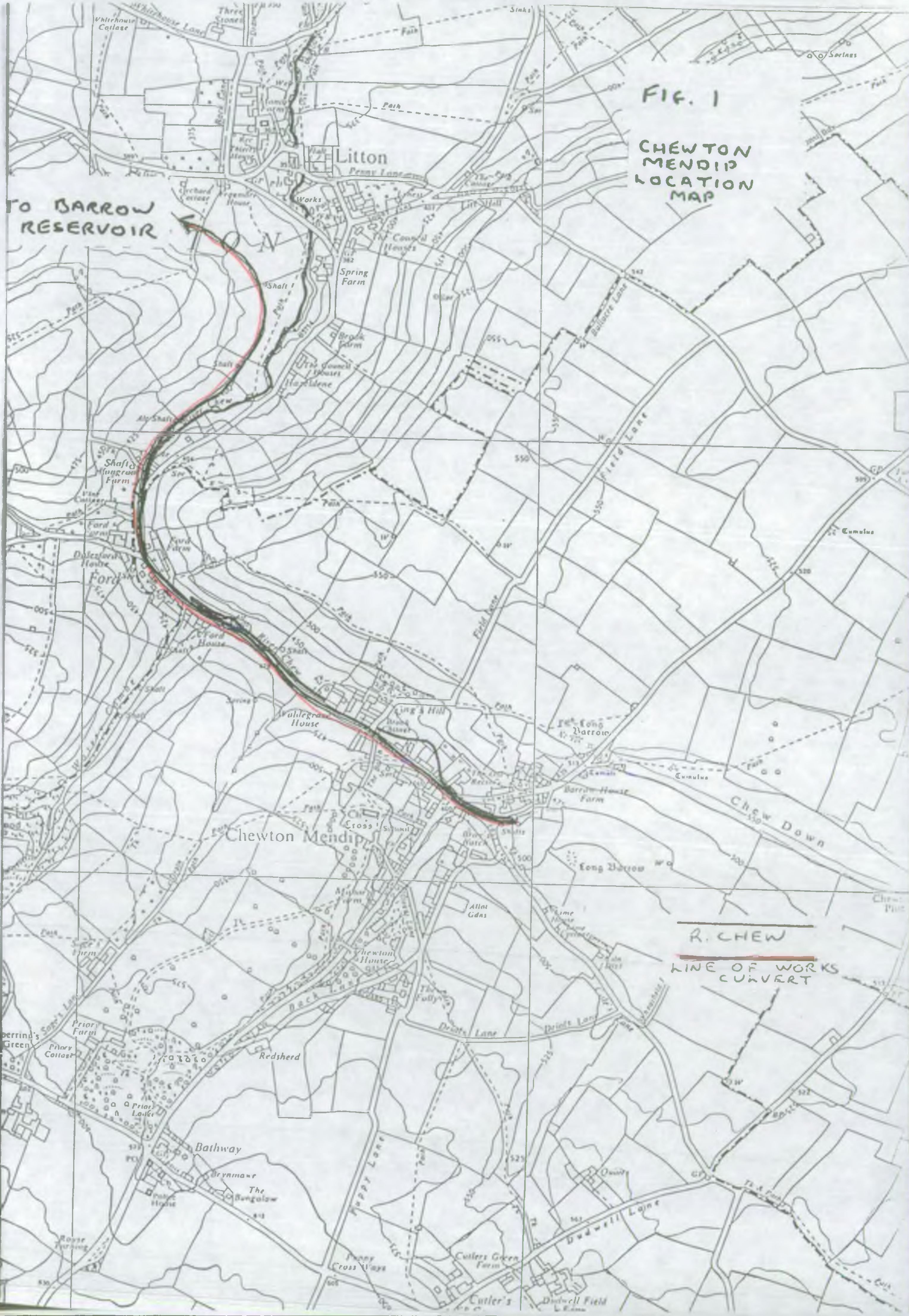


FIG. 1
CHEWTON MENDIP LOCATION MAP
TO BARROW RESERVOIR
R. CHEW
LINE OF WORKS CULVERT
Litton
Chewton Mendip
Ford
Bathway
Chew Down
Field Lane
Dudwell Lane
Redsherd
Spring Farm
Brook Farm
Ford House
Waldegrave House
Chewton House
Barrow House Farm
Long Barrow
Priory Farm
Priory Cottage
Prior Lodge
The Bungalow
Brynmawr
Puppy Lane
Drift Lane
Back Lane
Cutlers Green Farm
Puppy Cross Ways
Cumulus
Springs
Sinks
Path
Shaft
Works
Penny Lane
Lilly Hall
Council Houses
Hazeldene
Dolestone House
Vine Cottage
Sage's Farm
Sage's Lane
Ling's Hill
Long Barrow
Allot Gdns
The Folly
Cutler's
Dudwell Field

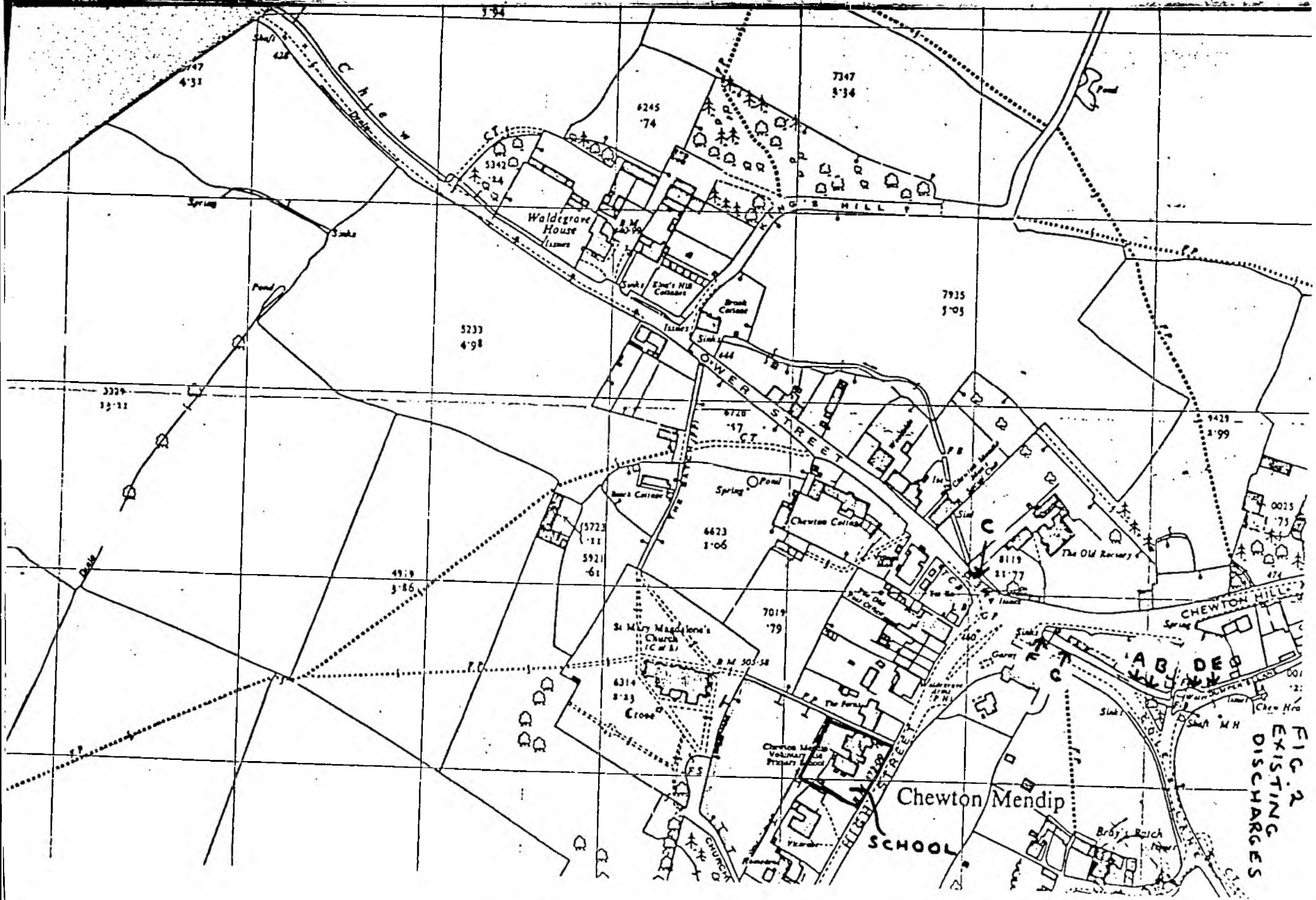


FIG. 2 EXISTING DISCHARGES

The remaining options are total containment (cess-pit), treatment by individual small sewage works or the installation of a sewerage system with treatment at an authority-maintained STW.

Cess-pits are, generally, inconvenient to householders and can cause severe water quality problems if allowed to overflow. Small sewage treatment works have, up to now, probably offered the best solution to the problem. If properly installed and maintained, they can treat the effluent to a high standard. Wessex Water usually insists on a management company, or some other body, being legally set up to maintain the plant and to which all householders connected to the plant must subscribe. Responsibility for consent compliance is usually transferred to this body.

Care must, obviously, be taken when consenting discharges direct to the River Chew since the River constitutes the main supply for Chew Valley water supply reservoir. It would be ironic if, in our efforts to protect the line of works culvert, we imposed a greater pollution load on Chew Valley Lake.

Current Applications for Consent to Discharge

Two applications for consents to discharge from small sewage treatment works are currently pending. These treatment plants will outfall at points A and B on Fig 2. In both cases, the proposed discharges replace existing septic tank and, in one case, farm discharges which were known to cause environmental problems. The standard of effluent achieved by these plants should be a considerable improvement on the previous discharges. However, since the number of properties served by each outfall is increased, the actual load on the river will probably remain constant.

A number of objections have been received regarding the proposed discharges from these small sewage works and, although some of the objections would seem to be unreasonable in the light of the other, more damaging discharges which are occurring nearby, the scale of the response does illustrate the sensitivity of this issue locally.

During the summer months, flows in the river can fall to very low levels; reducing available dilution and causing smell nuisance to residents.

The River Chew at Chewton Mendip is a class 3 river by the terms of the DOE River Classification system. A river of this type, a few hundred metres downstream of its spring source, would normally be class 1A or 1B. The chemical quality of the river at Chewton Mendip is illustrated graphically in Fig 3.

In the longer term, the surest way to reduce the quality problems associated with the Chew is to requisition a first time sewerage scheme for the villages of Chewton Mendip and Litton. Treatment of the sewage could either be undertaken within the catchment or, preferably, exported to another catchment for treatment.

Conclusion

The River Chew at Chewton Mendip suffers pollution from numerous, inadequately treated, domestic discharges. The importance of the river as a water supply source makes this unacceptable to Bristol Waterworks Company and smell nuisance as a result of low flows during the summer causes distress to local residents.

Bristol Avon Division Water Quality Officers have been engaged in discussions with two developers with regard to arrangements for satisfactory disposal of domestic sewage in Chewton Mendip. These discussions were entered into in good faith with an even handed attitude being taken to both parties.

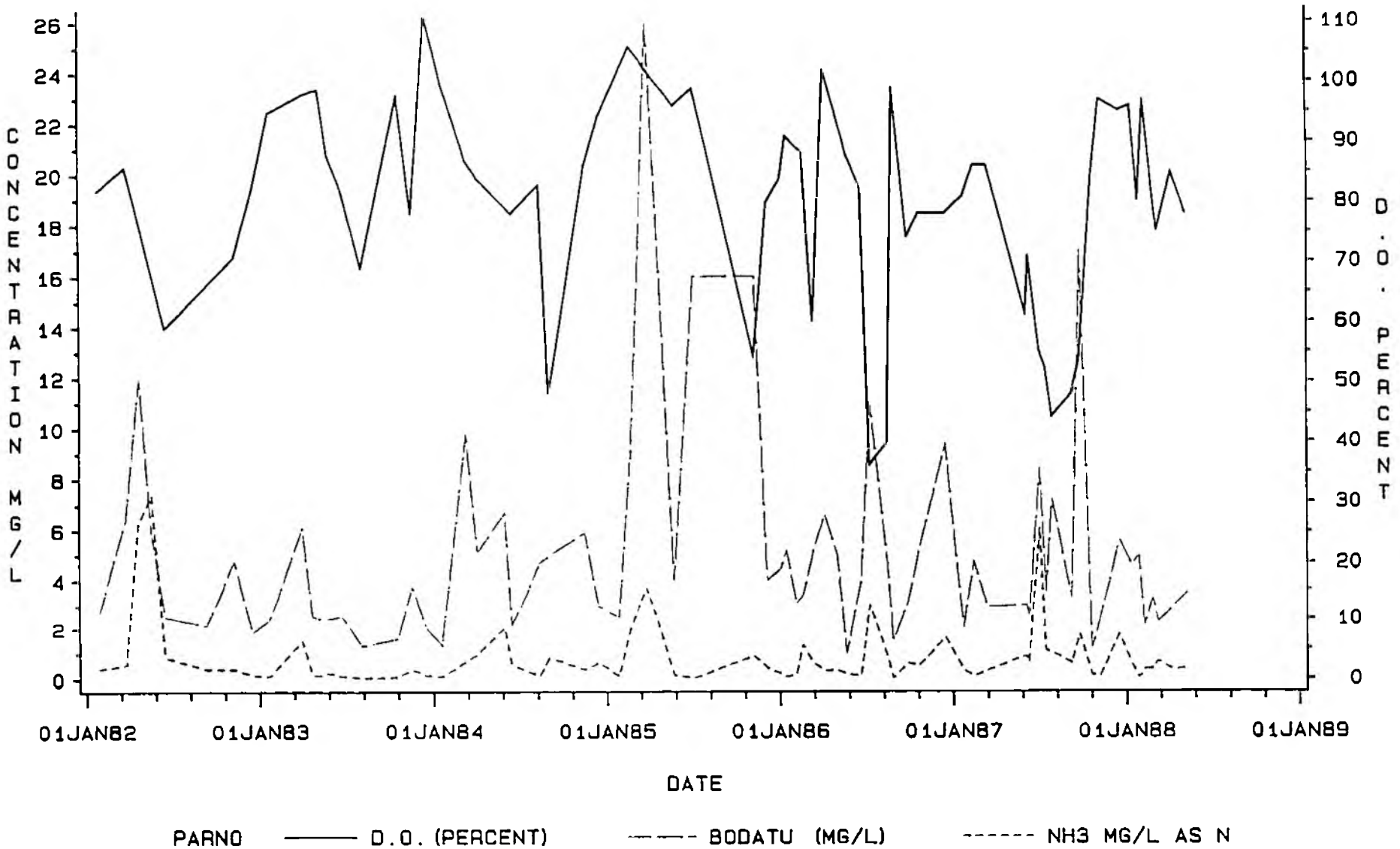
The solution, provisionally agreed in both cases, was for small sewage treatment works to treat effluent from the respective developments. Sufficiently high consent standards were to be applied to both discharges to reduce the risk of any deterioration in the quality of the River Chew.

Since this time it has become clear, by the weight of objections generated by the advertisement of the consent applications, that local residents, and others, are far from happy with the present quality of the River Chew; feeling in the village, generally, is quite high on this issue.

It therefore becomes apparent that Wessex Water's objective should now be to secure an improvement in the quality of the River Chew in order to reduce the threat to water resources and alleviate the nuisance caused to local residents. This could best be achieved by refusing to consent any new discharges to the River Chew and, in the medium term, campaigning for the requisitioning of a first time sewerage scheme for the villages of Litton and Chewton Mendip.

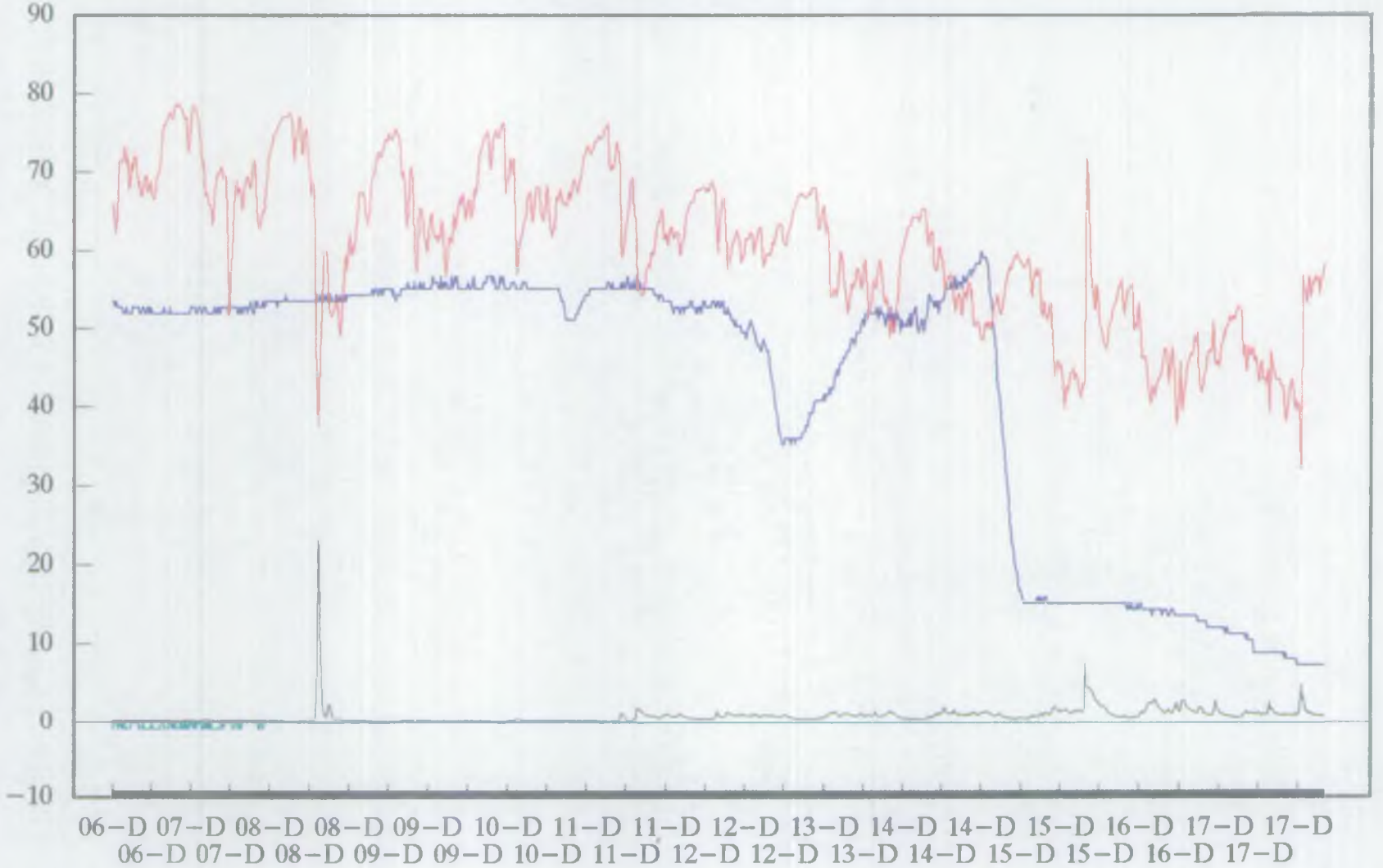
FIG 3. WATER QUALITY AT CHEWTON MENDIP

SITE-14070401 NAME-CHEW CHEWTON MENDIP



RIVER CHEW AT CHEWTON MENDIP

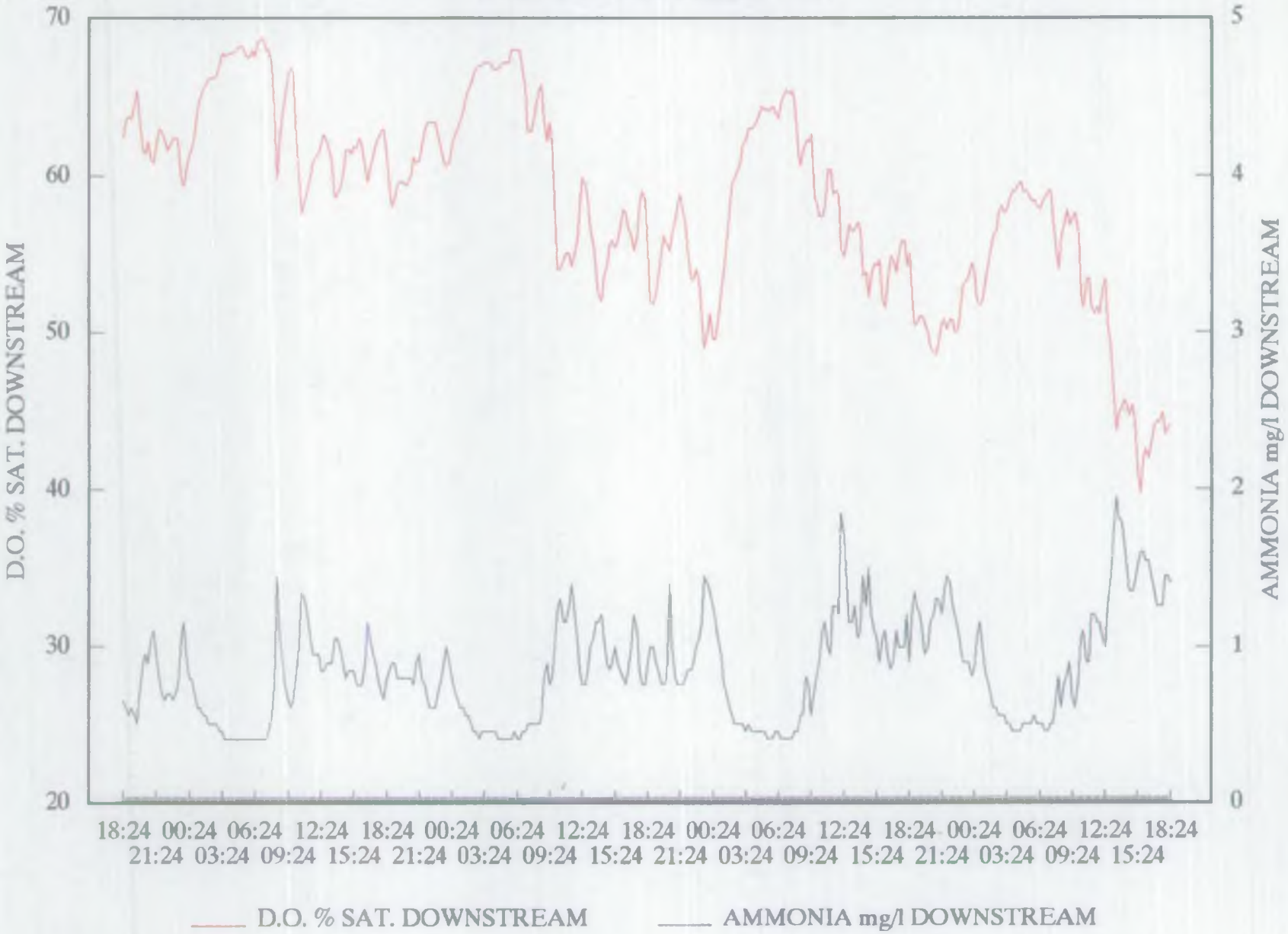
6th TO 17th DECEMBER 1991



Appendix II

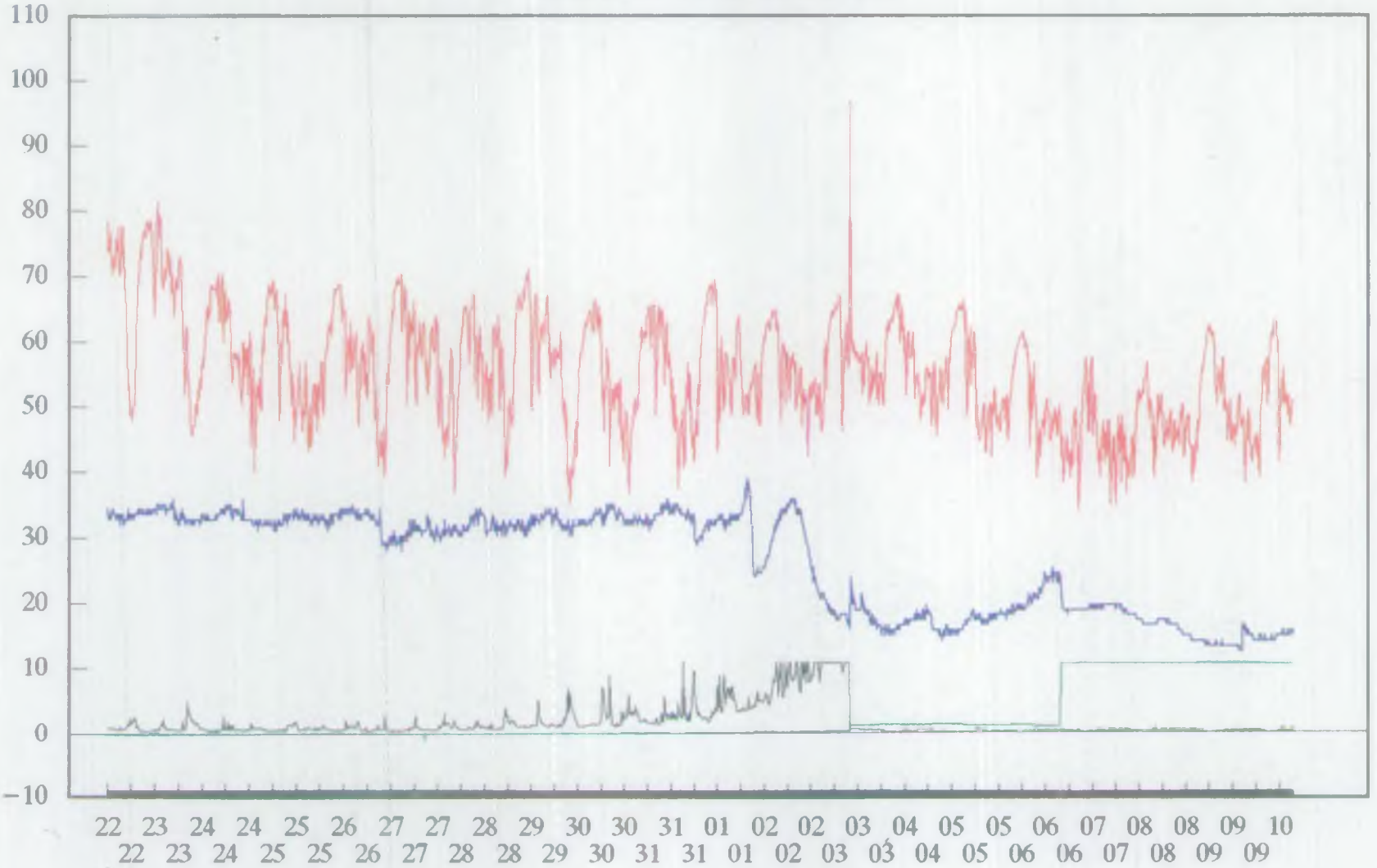
RIVER CHEW AT CHEWTON MENDIP

11th TO 15th DECEMBER 1991



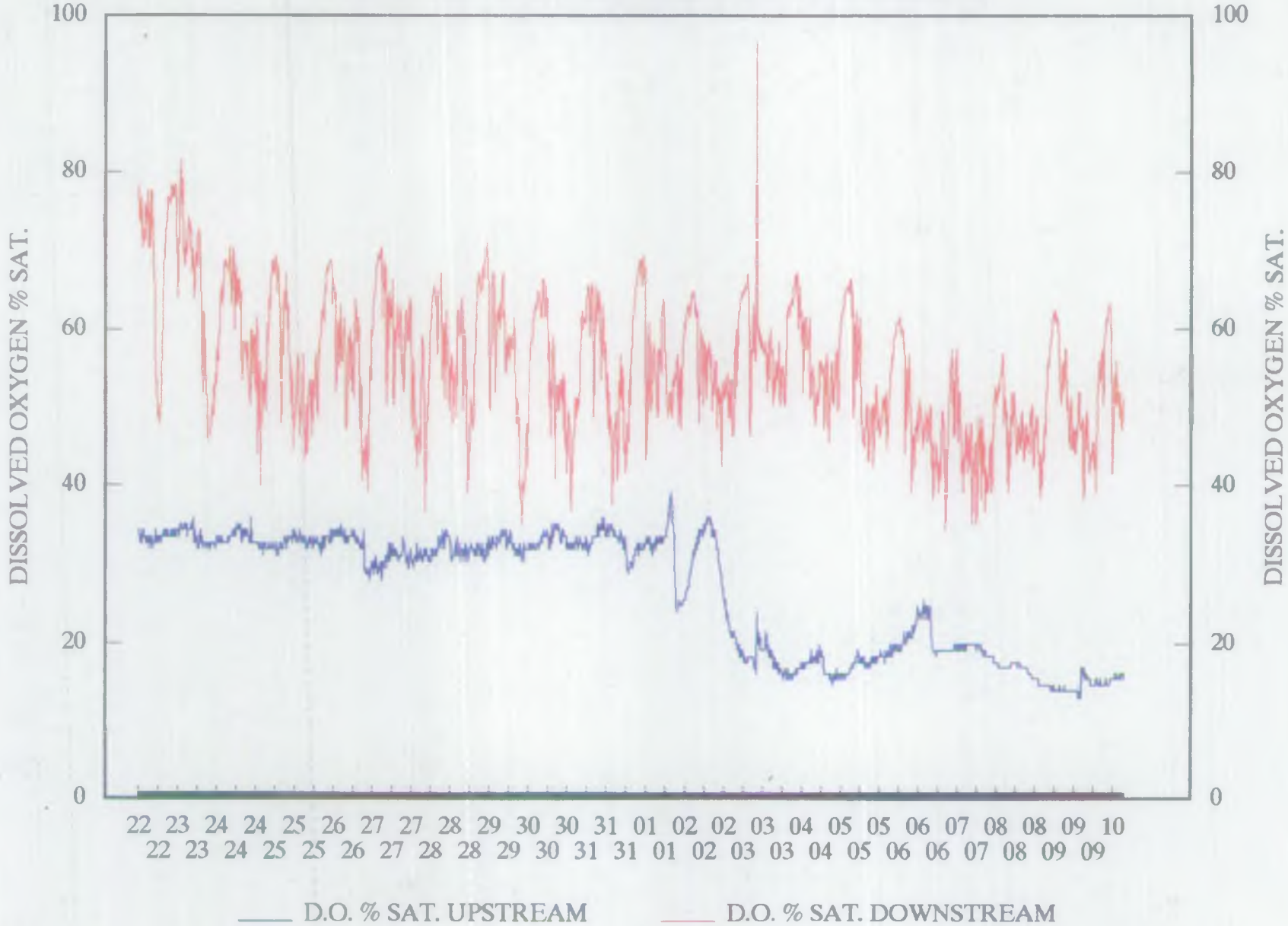
RIVER CHEW AT CHEWTON MENDIP

22nd MAY TO 10th JUNE 1992



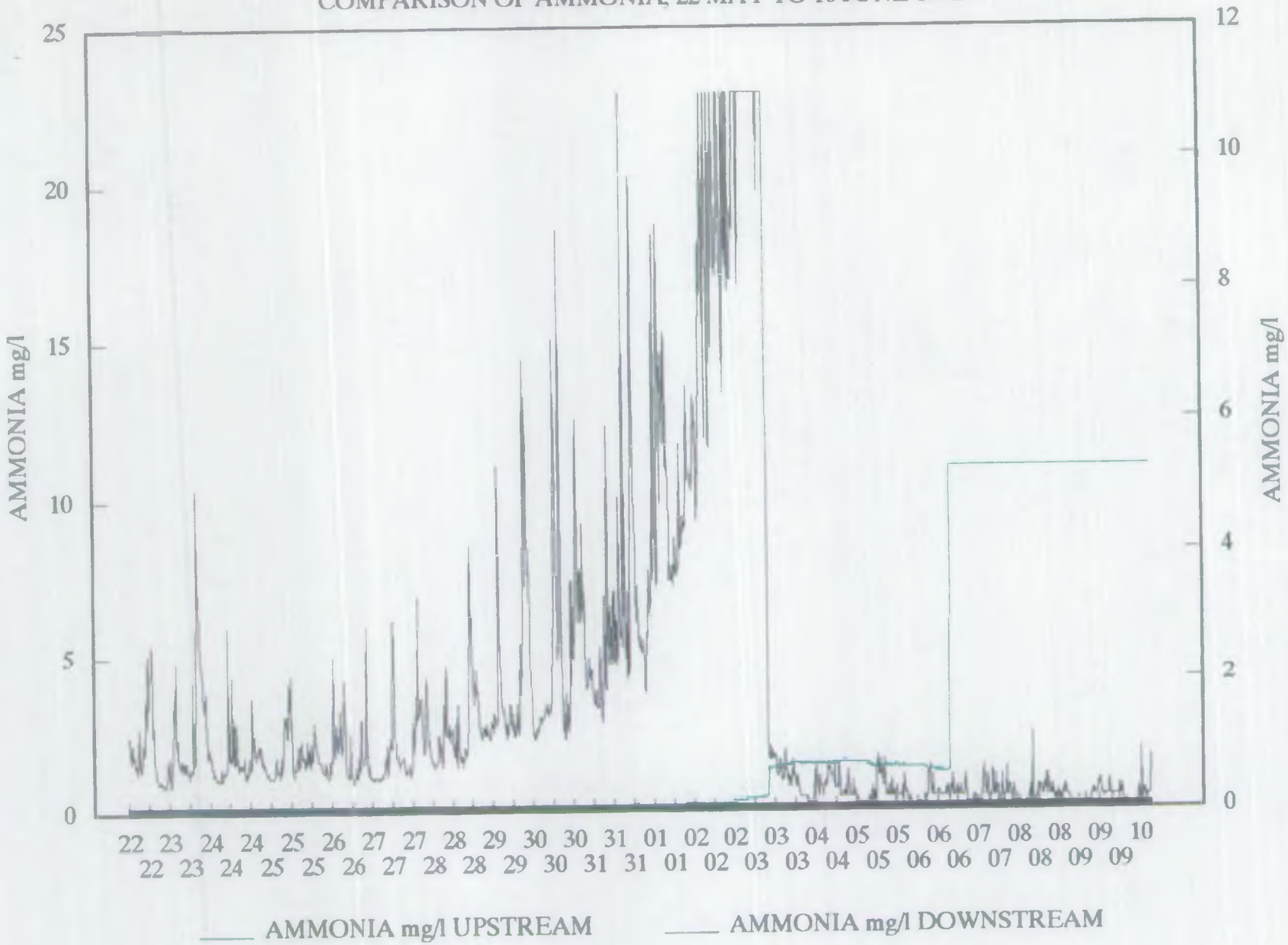
RIVER CHEW AT CHEWTON MENDIP

COMPARISON OF D.O LEVELS, 22 MAY TO 10 JUNE 1992



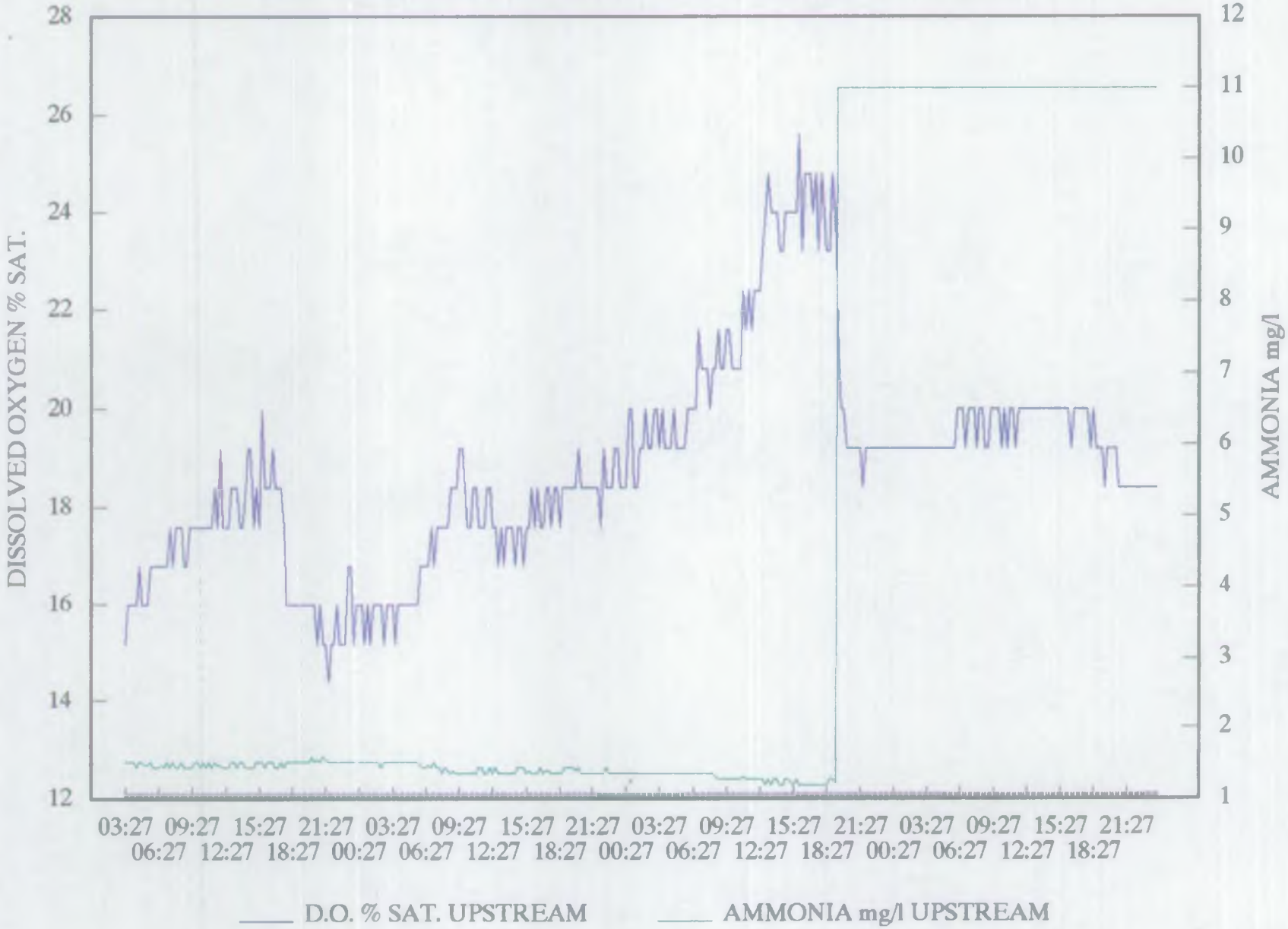
RIVER CHEW AT CHEWTON MENDIP

COMPARISON OF AMMONIA, 22 MAY TO 10 JUNE 1992



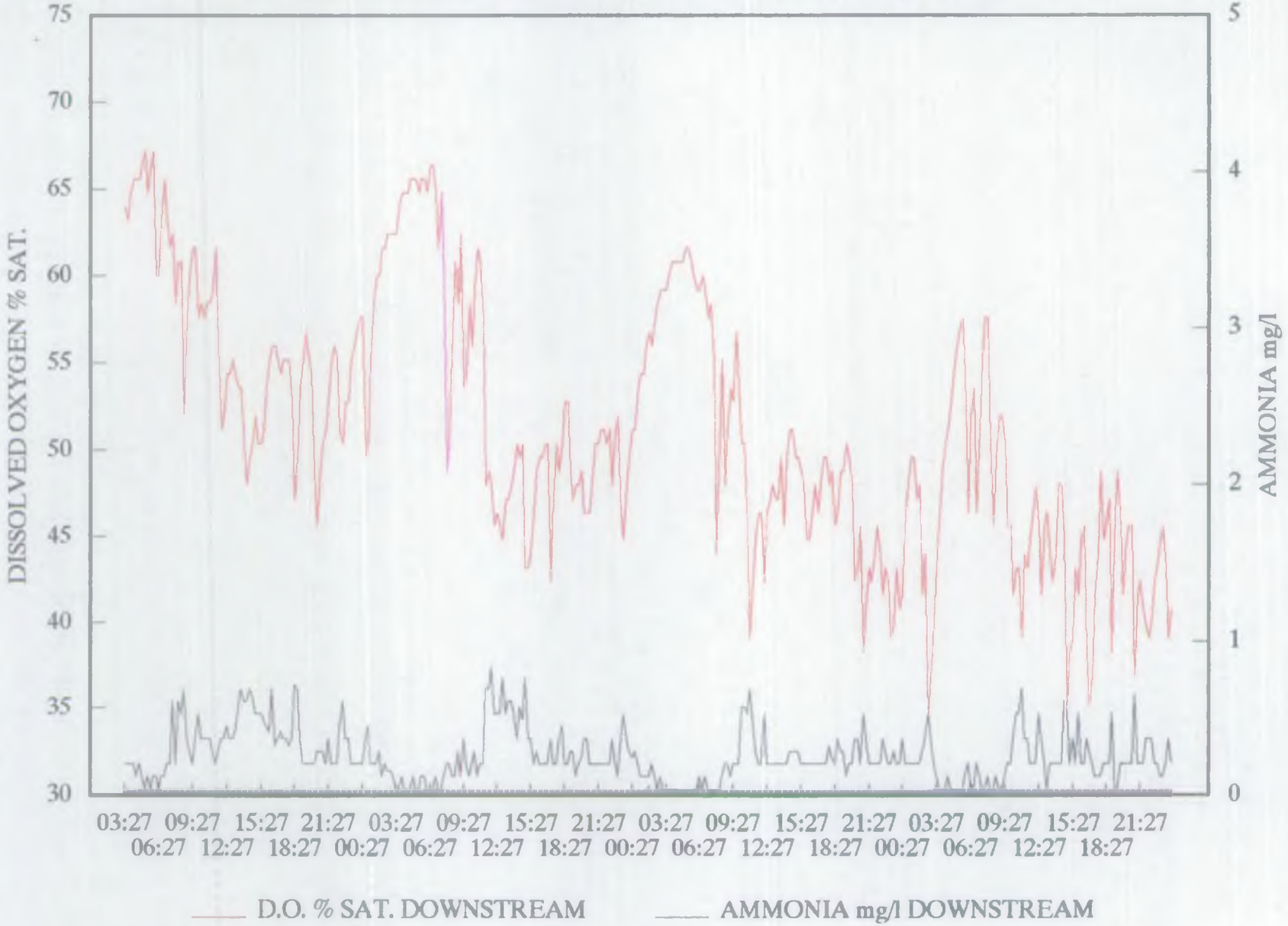
RIVER CHEW AT CHEWTON MENDIP

COMPARISON OF D.O. AND AMMONIA LEVELS, 4–7th JUNE 1992



RIVER CHEW AT CHEWTON MENDIP

COMPARISON OF D.O. AND AMMONIA LEVELS, 4 – 7th JUNE 1992



Appendix III

Output from RAINARK data logging & processing system - (C) 1989 Hydro-Logic Ltd
STATION RAINFALL REPORT Printed on 16/07/1992 at 15:27 hrs.

N.R.A Wessex Region - Bristol Avon

GAUGE REFERENCE : 53140600B
M.O. REFERENCE : 416771
GAUGE TYPE : Standard
RAIN DAY START : 09:00 GMT

STATION NAME : CHEWTON MENDIP
LOCATION : CHEWTON HOUSE
GRID REF : ST597528
ALTITUDE : 0.0 m

Annual Summary : Nov 1991 to Oct 1992

Record Type : Archive file

Daily Rainfall totals recorded in mm

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
1	11.2	T	-	0.4	12.2	1.7	T	17.8					1
2	11.8 E	-	-	0.5	0.3	-	-	-					2
3	8.3 E	-	4.6	-	0.2	-	-	-					3
4	0.8	-	1.3	-	-	-	0.2	0.5					4
5	-	-	0.1	-	0.7	7.4	-	4.2					5
6	6.8	-	-	-	3.2	20.7	T	3.2					6
7	18.5	-	8.2	-	0.3	14.8	0.8	0.6					7
8	1.7	-	15.8	2.3	-	-	3.5	-					8
9	0.6	-	3.2	5.8	1.8	-	11.2	-					9
10	7.4	-	-	21.4	2.2	-	4.2	-					10
11	-	-	-	1.5	24.2	T	6.3						11
12	13.4	-	0.2	5.6	3.5	1.8	0.2	-					12
13	18.4	-	-	0.4	2.8	-	-	-					13
14	0.2	-	-	5.8	0.8	14.2	-	-					14
15	-	8.4	-	0.1	-	0.4	-	T					15
16	0.6	4.7	0.2	-	-	2.8	-	-					16
17	8.8	11.3	0.2	5.7	-	0.1	-	-					17
18	9.5	7.2	-	0.8	9.2	T	-	-					18
19	8.7	10.3	-	-	-	-	-	1.2					19
20	-	9.8	-	-	5.8	-	-	-					20
21	0.1	2.8 E	-	-	9.5	-	-	-					21
22	T	0.7	-	4.8	1.6	5.4	-	-					22
23	-	0.2	-	1.2	2.8	T	4.0	-					23
24	0.8	-	-	-	0.1	4.6	-	-					24
25	1.2	-	7.4	T	4.4	2.8	-	-					25
26	T	0.1	0.3	0.8	3.2	3.3	-	-					26
27	0.2	T	-	2.1	-	20.4	0.5	-					27
28	-	-	-	0.2	3.4	0.5	0.4	-					28
29	-	-	-	0.1	5.6	4.4	2.8	0.2					29
30	0.3	-	T		0.3	10.5	T	21.2					30
31		-	-		17.8		T						31
Totals:	129.3 E	55.5 E	41.5	59.5	115.9	115.8	34.1	48.9					
Mx.Day:	18.5 E	11.3	15.8	21.4	24.2	20.7	11.2	21.2					

Annual Total : 600.5 mm M

Quality Key : E = Edited S = Snow ? = Suspect M = Incomplet

N.R.A. Wessex Region, Bristol Avon Division.

Primary Station Details

Station Name : CHEWTON MENDIP 1
Watercourse : CHEW
Station Reference : 140704019
N.G.R. : ST600532

Location : D/S SPRING HEAD
Structure : No Weir Structure
Gauge Zero height : 0.000 Metres

Date 1st gauging 17/04/1991 last gauging 23/06/1992 No. of gaugings 14
Date 1st rating last rating No. of ratings 0

Gauging Details

Date	Time	Stage	Units	Variation	Area	Velocity	Discharge	X-Ref	Deviation	Observer
17/04/91	12:00	9.999	Metres	Steady	0.0255	0.2827	0.0072		0.00	RJH
15/05/91	10:45	9.999	Metres	Steady	0.0290	0.1814	0.0053		0.00	RJH
18/06/91	13:50	9.999	Metres	Steady	0.0170	0.1941	0.0033		0.00	RJH
16/07/91	13:00	9.999	Metres	Steady	0.0280	0.2017	0.0056		0.00	RJH
04/09/91	13:00	9.999	Metres	Steady	0.0080	0.2250	0.0018		0.00	AJB
20/09/91	13:25	9.999	Metres	Steady	0.0120	0.2105	0.0025		0.00	RJH
17/10/91	11:40	9.999	Metres	Steady	0.0790	0.3913	0.0308		0.00	MAS
18/11/91	11:15	9.999	Metres	Steady	0.1310	0.5057	0.0662		0.00	AJB
20/12/91	09:40	9.999	Metres	Steady	0.2780	0.5796	0.1611		0.00	RJH
14/01/92	14:20	9.999	Metres	Steady	0.0756	0.3208	0.0243		0.00	RJH
20/02/92	13:50	9.999	Metres	Steady	0.0920	0.2217	0.0204		0.00	RJH
19/03/92	11:20	9.999	Metres	Steady	0.0659	0.2899	0.0191		0.00	AJB
01/06/92	14:00	9.999	Metres	Steady	0.0295	0.1923	0.0057		0.00	LSPP
23/06/92	11:35	9.999	Metres	Steady	0.0283	0.1149	0.0032		0.00	RJH

Station Name : CHEWTON MENDIP 2
Watercourse : CHEW
Station Reference : 140704485
N.G.R. : ST595535

Location : D/S CHEWTON MENDIP
Structure : No Weir Structure
Gauge Zero height : 0.000 Metres

Date 1st gauging 17/04/1991 last gauging 14/01/1992 No. of gaugings 6
Date 1st rating last rating No. of ratings 0

Gauging Details

Date	Time	Stage	Units	Variation	Area	Velocity	Discharge	X-Ref	Deviation	Observer
17/04/91	13:00	9.999	Metres	Steady	0.0255	0.2743	0.0070		0.00	AJB
18/06/91	14:15	9.999	Metres	Steady	0.0560	0.0857	0.0048		0.00	RJH
16/07/91	13:45	9.999	Metres	Steady	0.0990	0.1021	0.0101		0.00	RJH
04/09/91	14:30	9.999	Metres	Steady	0.0120	0.2583	0.0031		0.00	AJB
17/10/91	12:15	9.999	Metres	Steady	0.1460	0.2157	0.0315		0.00	MAS
14/01/92	13:30	9.999	Metres	Steady	0.1687	0.1822	0.0307		0.00	RJH

Appendix IV

The River Chew at Chewton Mendip

The River Chew is sampled at ST 595534 , immediately downstream of Chewton Mendip. Results for 1991 are listed below.

Date	Taxa	BMWP	Pred BMWP	BMWP EQI	ASPT	Pred ASPT	ASPT EQI
17-04-91	10	42	108	0.39	4.20	5.40	0.78
08-07-91	13	49	102	0.48	3.77	5.40	0.70
30-09-91	10	37	92.2	0.40	3.70	5.20	0.71

Biotic scores were calculated using the BMWP Biotic Score System (National Water Council, 1981). Average Scores Per Taxon (ASPT) are widely used in the assessment of organic pollution, and were calculated by dividing the total BMWP score by the number of scoring taxa (Armitage *et al.*, 1983). Predicted scores were calculated using the IFE computer package RIVPACS II (River InVertebrate Prediction and Classification System). The Environmental Quality Indices (EQI) were calculated by dividing the observed ASPT (or BMWP) by the predicted ASPT (or BMWP), with a value below 1 indicating a poorer fauna than would be expected.

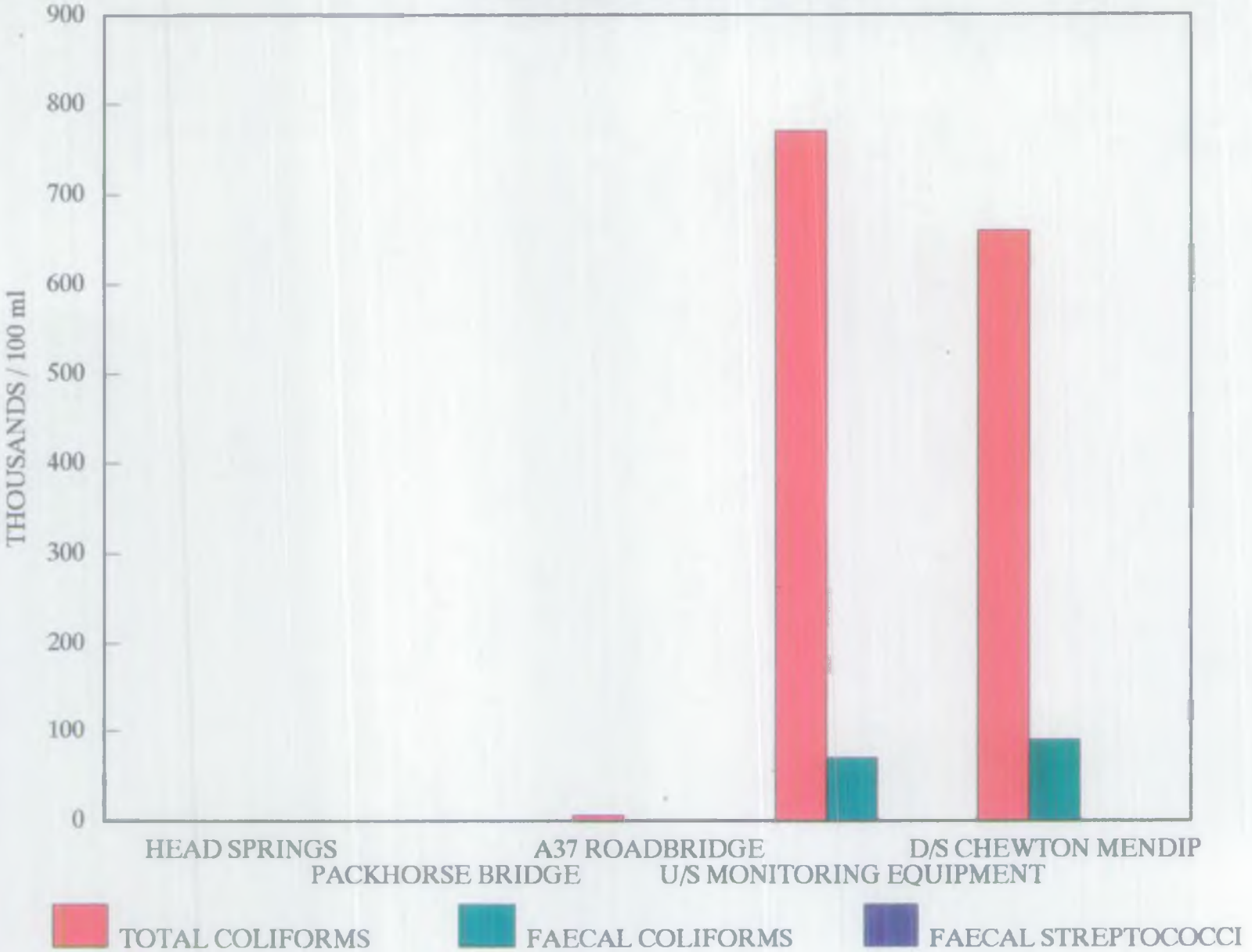
With the small size and close proximity to the source of the river here, care should be taken with interpreting the predicted results. Having said this, the above results show obvious signs of organic pollution. The low observed biotic scores for all three seasons, ASPT EQI's ranging between 0.70-0.78, and presence of high numbers of certain indicator species such as Chironomidae and Oligochaeta all suggest this. The extremely low BMWP EQI's, 0.39-0.48, further illustrate the sparseness of the fauna found here.

Debbie Snook (Assistant Biologist)
NRA Wessex Region
8th November 1991

Circulation
SD
GPG

RIVER CHEW

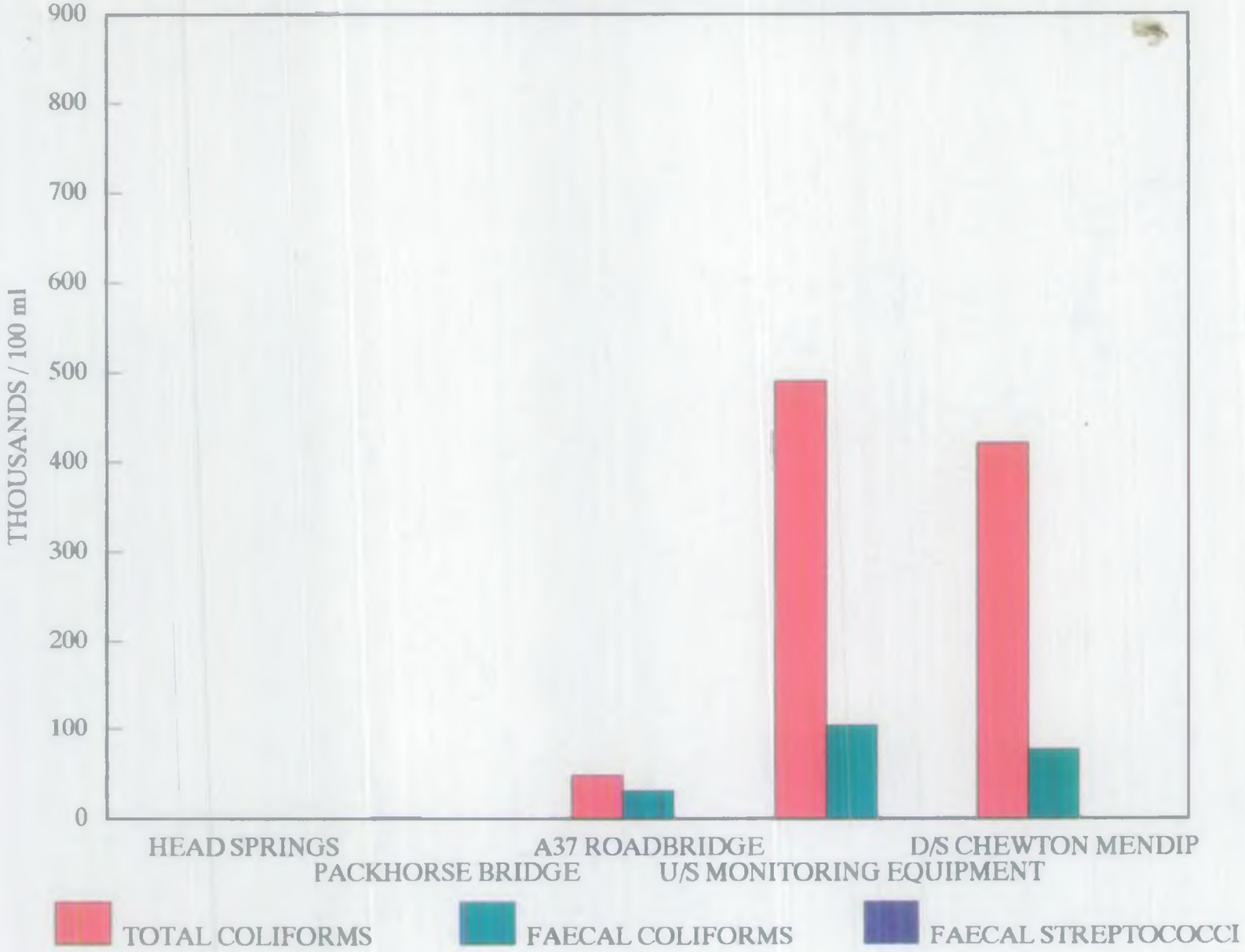
CHEWTON MENDIP – 22 MAY 1992



Appendix 12

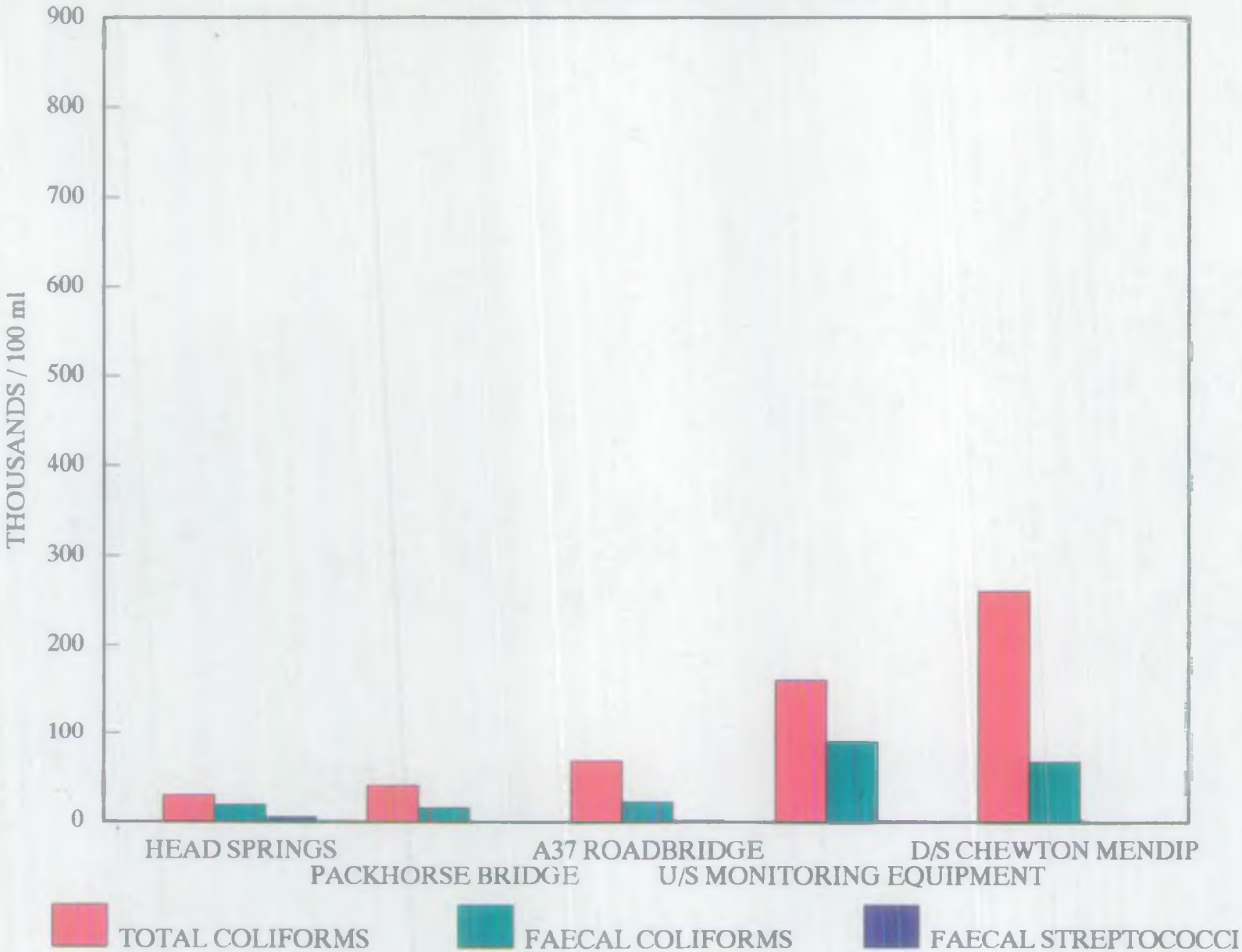
RIVER CHEW

CHEWTON MENDIP – 28 MAY 1992



RIVER CHEW

CHEWTON MENDIP – 03 JUNE 1992



RIVER CHEW

CHEWTON MENDIP – 10 JUNE 1992