

DEVON AREA INTERNAL REPORT

**AN INVESTIGATION INTO HIGH
CONCENTRATIONS OF ATRAZINE IN
SURFACE WATERS AND THE INCREASE IN
MAIZE PRODUCTION IN THE OTTER VALLEY.**

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NRA

*National Rivers Authority
South Western Region*

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AN INVESTIGATION INTO HIGH CONCENTRATIONS OF ATRAZINE IN SURFACE WATERS AND THE INCREASE IN MAIZE PRODUCTION IN THE OTTER VALLEY.

1. CATCHMENT DESCRIPTION

The River Otter rises in the Blackdown Hills at NGR ST 2252 1524 and flows south south-west for approximately 44 km. The river is joined by six main tributaries before discharging into the sea at Budleigh Salterton (see Figure 1).

Much of the catchment is underlain by Triassic Sherwood sandstones forming regionally important aquifers which are extensively exploited via boreholes, wells and springs to serve both public and private supplies. The flow in the River Otter is largely supported from these groundwaters. Water is also abstracted from surface waters within the catchment.

Raising dairy cattle is the predominant agricultural practice in the higher altitude reaches with arable farming (including maize, barley and wheat) and livestock fattening (usually sheep) becoming more significant in the lowland areas.

2. TERMS OF REFERENCE

2.1 OBJECTIVES

The Otter catchment contains major aquifers used by South West Water plc (SWW) to supply potable water to East Devon area. The ground water contained in some of these aquifers is known to be contaminated with Atrazine, an organo-chloro compound used in some herbicides in association with the production of maize. SWW approached the NRA to investigate the source of Atrazine contamination of groundwater from Dotton borehole No. 4 in the Otter Valley. The result of this request was a study by the Water Quality Section Devon area supported by Marcus Hodges Environment Ltd (Ref. 1).

The growing of maize in the catchment area is increasing. The purpose of this investigation was to increase awareness of the local farmers and agricultural contractors to the hazards of Atrazine and try to identify sources of the herbicide entering the surface waters during periods of the chemical's use. This report is the documentation of this study.

2.2 PROJECT TEAM

D. Carter	WQO, Project Leader
J. Maye	Project Manager
P. Rose	Project Manager Author
S. Padley	Laboratory / analysis contact

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2.3 BACKGROUND

Maize production for the Sid and Otter catchments has risen from 625 acres during 1989 to 1971 acres for 1994 (information via MAFF, no comparable figures for 1995 yet available). The Water Quality Officer (WQO) for the Otter Catchment identified that farmers in the area would be generally increasing the quantity of maize grown for 1995 compared to the previous year (acreage to maize for 1995 was 912 acres for the Otter catchment alone and not including the River Tale area).

The concern of the WQO was that increased maize production would inevitably result in an increase in the quantity of herbicide used in the Otter Valley, namely that containing the active organo-chloro compound Atrazine, sold commercially as 'Gesaprim 500 SC' (see APPENDIX I).

Groundwater taken from the boreholes Greatwell 3, Dotton 3, 4 and 5 within the Otter catchment area is known to be contaminated with concentrations of Atrazine (APPENDIX II & Ref 1) and increased use of the herbicide may have the potential to increase concentrations further.

The concerns expressed by the WQO were that the mixing, application and subsequent disposal of the herbicide may not be carried out in accordance with good agricultural practice and may result in contamination of surface and ground waters by run-off, spillage or unsuitable disposal methods. The WQO visited the farmers and agricultural contractors in the area to remind them of the potential hazards that Atrazine presents.

2.4 LAND USE SURVEY

Both the WQO and Investigation team members carried out a land use survey to determine which fields within the area of the Otter Valley would be used for maize production during 1995 (see Figures 2,3,4 & 5). The survey involved talking to farmers and asking them to mark on 1:25000 OS maps the fields to be used.

Farmers and contractors alike were informed that the NRA would be sampling the watercourses in the area during late spring / early summer for Atrazine in order to identify any diffuse and or point sources of contamination. All people approached were found to be very co-operative.

2.5 ATRAZINE USE AND ACTION

Atrazine is an organo chloro-compound of the amino- 1,3,5-triazine group. Simazine was the first member of this group to be used as a herbicide and was introduced in 1956. The major use of both Atrazine and Simazine are as active constituents in herbicides used for the control of annual weeds in maize crops.

Atrazine is a pre and post emergent herbicide applied where ever possible during damp conditions to increase it's effectiveness. The compound is usually taken up by the roots and interferes with the photosynthetic electron process thus inhibiting photosynthesis.

Resistance of maize to this compound is likely to be due to detoxification of the Atrazine via dechlorination and hydroxylation within the plant. Maximum persistence of Atrazine within the soil (assuming full application rates) is very variable, ie between 4 to 18 months due to soil types and climatic conditions (Ref 2).

2.6 ALTERNATIVES TO ATRAZINE USE IN MAIZE

Since the herbicide Atrazine is cheap and very effective, use of the chemical has increased. Herbicides such as the Pendithmethalin based 'Stomp 400' and Pyradate based 'Lentagram' have been proposed as alternatives to 'Gesaprim 500 SC' although they are not as effective and are relatively expensive ('Stomp 400' being approximately £50 kg/ha, 'Gesaprim 500' £5 kg/ha). 'Stomp 400' has been used by Devon Clinton Estates but was found not to be too effective.

A non-chemical approach to weed control in maize is to be tested by Clinton Devon Estate farms in the Otter Valley; the estate has bought an inter-row cultivator for hoeing (see APPENDIX I). If the control is successful, cost of the equipment could be partially off-set by contracting out to other farms in the area interested in a more 'Green' approach.

2.7 ENVIRONMENTAL WATER QUALITY STANDARDS (EQS)

The only statutory standard for Atrazine is the Maximum Allowable Concentration (MAC) of 100 ng/l as stated in the EC Directive relating to the Quality of Water intended for Human Consumption (80/778/EEC) (see APPENDIX III).

The EQS applied to surface waters for the Protection of Freshwater Life proposed by the DoE currently stands at 2000 ng/l as a combined annual average standard for both Atrazine and Simazine dissolved. The MAC is also combined Atrazine and Simazine dissolved and is currently 10000 ng/l (see APPENDIX III).

2.8 HISTORIC RIVER WATER QUALITY DATA

The River Otter and it's tributaries has 23 river monitoring sites routinely chemically sampled (including enclosed waters sites).

Of these, 7 are currently routinely monitored for Atrazine (see APPENDIX IV).

These are: R04B007 at Otterton
R04B006 at Dotton Mill
R04B004 at Ottery St. Mary B3176 Bridge
R04B009 at Taleford
R04B002 at Clapperlane Bridge.
R04B005 at Tipton St. John
R04B052 at Otter Lakes intake

Of the river sites routinely monitored between 01 January 1990 and 01 October 1995 one sample collected from Otter Head Lakes draw-off level contained a concentration of 300 ng/l (20 June 1994) exceeding the MAC of 100 ng/l as stated in the EC directive 80/778/EEC. Conversely no samples collected during this period contained concentrations of Atrazine that exceeded the EQS for the protection of freshwater life (EQS = 2000 ng/l annual average, or 10000 ng/l MAC).

Water samples collected as part of the routine groundwater monitoring programme show current Atrazine concentrations to be above the MAC for Human Consumption in the boreholes Greatwell 3, Dotton 3 and Dotton 4 (See graphs and Table 2 in APPENDIX II). Groundwater samples taken by SWW also show high levels of Atrazine present in Dotton 5 (See Ref. 1); no NRA data is available for this site.

During 1994 the Water Quality Officer took water samples throughout the Otter Valley to determine the concentrations of Atrazine. The highest concentration was in the River Otter at Cadhay Bridge (417.0 ng/l on 12 May 1994, see Figure 6).

3. METHOD

SAMPLING LOCATIONS AND STRATEGY

A sampling programme was agreed between the WQO, Investigations team and the Exeter laboratory on the number of sample sites, frequency of sampling and any follow up work that may be necessary. 23 locations were identified taking into account the results of the Land Use Survey and ease of access. They included sites not only on the River Otter but also sites on tributaries prior to confluence with the main river (see Figure 1).

The methodology of the investigation was to sample the sites every week. The samples were analysed by the laboratory for Atrazine, its metabolites and Simazine. If samples were found to contain concentrations of Atrazine above 100 ng/l, this would trigger a follow up survey in the area to try and identify the source or area of contamination.

A survey was carried out on 20 April 1995 prior to Atrazine application in order to determine background concentrations. The programme of sampling runs commenced on 26 April 1995 prior to pre-emergence herbicide application and finished on 04 July 1995 after the last period of post-emergent spraying. One run was carried out during wet weather to determine impact during periods of rain.

4. RESULTS

From the Land Use Survey a series of maps were produced to show known areas of maize production (see Figures 2,3,4 & 5)

Results of the sampling runs are given in Table 1 and Figure 7. Follow up surveys are reported in proforma form.

5. DISCUSSION

5.1. HISTORIC DATA

The problem of Atrazine contamination of watercourses in the Otter Valley is shown not only in the high levels found in groundwater where the MAC is being exceeded (APPENDIX II) but also where occasionally high concentrations have been identified during the spring and summer months as shown in the historic data gathered from surface waters.

The process of contamination of the boreholes at Greatwell 3, Dotton 3,4 and 5 has as yet not been investigated. It may be that a general front of Atrazine is percolating slowly through the rock during the process of aquifer recharge. In this case, concentrations of the herbicide would probably gradually increase with time (even if the chemicals use were stopped today), level out for a while, then reduce.

A second method of ingress into the borehole could be more localised ie contaminated surface water entering the borehole itself. Boreholes are usually sleeved but water from near-by ditches or from general run-off could conceivable travel between the borehole walls and the lining or via cracks and fissures down into the groundwater quickly. Such contamination may well be expressed in large fluctuations in Atrazine levels over a relatively short time. More investigation into the matter is required.

The survey undertaken by the WQO of surface waters in the Otter Valley during 1994 broadly showed the area of concern as the mid to lower reaches of the River Otter. This area was already suspected of being at risk due to the increasing production of maize for cattle fodder and the subsequent increase in the use of the herbicide 'Gesaprim 500 SC'.

5.2. INVESTIGATION SURVEY

The contamination of the River Gitt and subsequent high concentrations of Atrazine downstream in the River Otter high-lights the potential hazard this compound presents. The herbicide was made up in the correct place on Combe Farm with washings going to a waste water system in accordance with good agricultural practice. However, the major part of the problem arose because the septic tank had insufficient capacity and the overflow which should not have been present contaminated the stream.

The second source of Atrazine on the River Gitt also came from Combe Farm. It appears that a herbicide was used on the banks of a small stream to control nettle growth although the farmer stated that an Atrazine based herbicide was not used.

High concentrations of both Atrazine and Simazine were recorded in Shermans stream. Adjacent to this watercourse is Gittisham Farm which acts as the main sprayer for the Combe Estate farms. From the follow-up survey, it is very likely that the contamination was due to point source input resulting from making up or washing of equipment.

The land use maps, show many maize fields boarder watercourses. However, from the follow up surveys, the main problem of contamination appears not to be from field run-off but areas within the farm yards where the herbicide was made up or equipment cleaned.

It is ironic that the one case of apparent field run-off appears to be from use of the herbicide during early 1994 in a small plantation at Feniton Court very near to the spring supplying water to the court area. Contractors for the Forestry Authority sprayed around the bases of young trees with 'a herbicide not containing Atrazine'. However, samples of the surface water run-off taken from the woodland contained very high concentrations of Atrazine which is very probably the cause of the spring contamination. Metabolites present in the samples taken suggest the herbicide to be gradually breaking down.

Areas identified from the investigation as containing occasional Atrazine sources but were not followed up were the River Tale, the Alfington tributary and the River Otter at Weston. The concentrations at these sites were relatively low (range 101.7 ng/l at Weston to 153.8 ng/l on the Tale) compared with the high of 1350 ng/l recorded on the River Gitt.

The majority of cases in which this chemical was getting into the watercourse indicates point source inputs resulting from mixing / cleaning. However, the weather was very dry during the investigation which may account for an apparent lack of field run-off detected.

The wet weather survey that was carried out 18 June 1995 indicated a run-off occurrence on the Colaton Raleigh stream but was not followed up due to a communication error. Concentrations did not rise above detection limits for the rest of the investigation at this site. Had a wetter spring / summer been experienced, more contamination via field run-off may have been detected.

Most if not all the farmers and contractors using Atrazine herbicides within the Otter catchment area were made aware of the NRA's commitment and intent to monitor for contamination of the watercourses. This high profile interactive approach combined with dry weather conditions of 1995 have undoubtedly contributed to the relatively minor concentrations of Atrazine detected during the investigation.

The investigation has identified the link between the preparation / use of Atrazine and the contamination of surface waters. However, the connection between the chemical and contamination of groundwaters, although suspected, was not confirmed.

6. CONCLUSIONS

1. The acreage of maize grown in the Otter Valley is increasing each year.
2. The Atrazine based herbicide 'Gesaprim 500 SC' is currently the cheapest and most effective compound available for the control of annual weeds in maize.
3. Farmers and contractors using Atrazine based herbicides in the Otter catchment are aware of the NRA's commitment to monitor watercourses for Atrazine and track down polluters.
4. Combe Farm was identified as causing the contamination of the River Gitt with Atrazine.
5. Gittisham Farm was identified as probably causing the contamination of the Shermans Stream with Atrazine.
6. The contamination of the spring supplying Feniton Court was probably the result of Atrazine applied to a young plantation very close to the spring during early 1994.
7. Contamination of watercourses in the Otter Catchment by Atrazine during the application periods of 1995 via farm or field run-off resulted in concentrations of Atrazine present in the watercourses above the MAC stated in the EC Directive relating to the Quality of Water intended for Human Consumption.
8. During the study the EQS for Atrazine relating to the protection of Freshwater Life was not exceeded in the surface waters investigated.

7. RECOMMENDATIONS

1. Continue liaison with farmers and contractors serving the Otter Catchment to maintain awareness of pesticides, water quality and good agricultural practices.
Action: WQO
2. Continue to monitor surface / ground waters and in the Otter Catchment for Atrazine and Simazine. Action: - Regional Water Quality Planning
3. Carry out future land use surveys to monitor progression of maize growing in the area. Action: WQO / Investigations Devon Area
4. Carry out reduced and more localised investigations in the Otter Valley during 1996 to monitor for and track down Atrazine contamination of surface waters. Action: WQO / Investigations Devon Area
5. Carry out investigations around bore holes known to be polluted by Atrazine to try and determine a link between agriculture and groundwater contamination. Action: WQO / Investigations Devon Area

8. REFERENCES

1. **Marcus Hodges Environment Ltd.** (1994) Atrazine contamination of groundwaters in the Otter Valley - Data review and field visit report no. 50344/PEST/R1.
2. **Hance R J & Holly K.** (1992) Weed control handbook: Principles. British Crop Protection Council. Blackwell Scientific.

PROBLEM AREA: Combe Farm	NGR: SY 1440 9755
WATERCOURSE EFFECTED: River Gitt	
EVIDENCE OF WATER QUALITY PROBLEM: High concentrations of Atrazine detected in samples collected.	
FOLLOW-UP INVESTIGATION: <p>The high concentrations of Atrazine were tracked down to Combe Farm in the Combe Park area of Gittisham (see map attached).</p> <p>A small stream leading from a septic tank appears to be the major cause of the problem with a further input of the herbicide appearing from another small watercourse upstream of the area.</p> <p>The probable cause of contamination of the septic tank is by yard-spillage or washings from the application equipment.</p> <p>Along the banks of the second stream there were dead / dying nettle beds indicating herbicide use. The farmer said that Atrazine was not used to kill the nettles.</p>	
COMMENTS: <p>Combe Farm was growing maize during 1995. No contamination of the watercourse by run off from the maize fields was detected (see result site 5 on map).</p> <p>The high concentrations of Atrazine experienced came from the farm area, probably the result of spillage / washings entering the septic tank and possibly due to use of the herbicide near the stream to control weeds.</p> <p>The elevated levels of Atrazine were detected at the 'River Gitt' site throughout late spring to early summer (see Table 1).</p>	

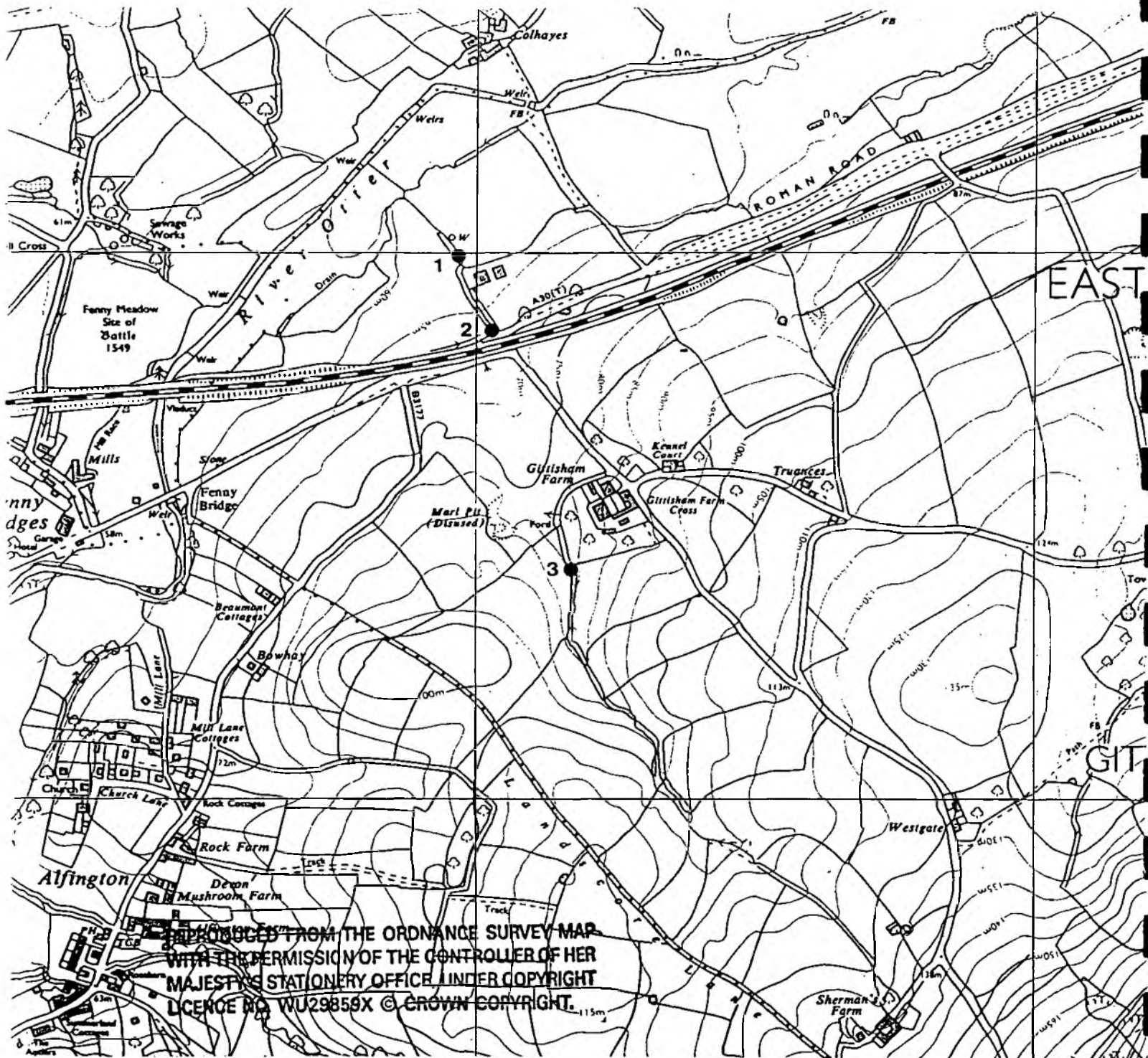
EAST DEVON DISTRICT

Site	Date	Atrazine ng/l	Atrazine I ng/l	Atrazine II ng/l
1	12/05/95	144.8	<17.0	<92.0
2	12/05/95	40.7	64.7	<92.0
3	12/05/95	38.6	30.1	<92.0
4	12/05/95	158.8	<18.0	<97.6
5	12/05/95	<30.0	<17.0	<92.0
6	12/05/95	700.0	17.7	<92.0
7	17/05/95	<32.1	<18.2	100.0
8	17/05/95	1780.0	64.7	<92.0
9	01/06/95	1270.0	73.2	136.5
10	01/06/95	59.7	<17.0	<92.0
11	17/05/95	344.1	35.1	<97.1

Atrazine I: Atrazine Desethyl
Atrazine II: Atrazine Desisopropyl } Metabolites of Atrazine.

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PROBLEM AREA: Gittisham Farm	NGR: SY 1225 9850
WATERCOURSE EFFECTED: Shermans Stream	
EVIDENCE OF WATER QUALITY PROBLEM: A high concentration of Simazine detected in late spring and high concentrations of Atrazine detected in early summer in water samples collected.	
FOLLOW-UP INVESTIGATION: The elevated concentration of Simazine was tracked down to Gittisham Farm although the concentrations were much lower in the follow-up work than first identified (Simazine 580.0 ng/l on 26 April 1995, reduced to 168.0 ng/l on 03 May 1995 follow-up investigation). The metabolites of Atrazine were identified above detection limits downstream of the farm but below detection limits above the farm. Although this indicates contamination of the watercourse at some stage from both Atrazine and Simazine, the detection limits for Atrazine and it's metabolites was higher for the sample taken from the upstream site than for that taken at the downstream site. However, when it is known that not only does Gittisham Farm belong to the group of Combe Estate Farms but is also the main sprayer for the estate, this increases the probability of this farm being the primary cause of the contamination.	
COMMENTS: The investigation follow-up did not manage to identify an exact input location. It is very likely that contamination of the watercourse occurred whilst mixing of the herbicide or washing of equipment used.	



Site	Date	Simazine ng/l	Atrazine ng/l	Atrazine I ng/l	Atrazine II ng/l
1	26/04/95	580.0	<30.0	54.9	150.6
2	03/05/95	168.8	<30.0	24.7	126.7
3	03/05/95	<150.0	<150.0	<85.0	460.0

Atrazine I: Atrazine Desethyl
 Atrazine II: Atrazine Desisopropyl } Metabolites of Atrazine.

PROBLEM AREA: Feniton Court	NGR: SY 1090 9945
WATERCOURSE EFFECTED: Vine Water	
EVIDENCE OF WATER QUALITY PROBLEM: <p>High concentrations of Atrazine detected in samples collected upstream of Feniton Court STW.</p> <p>Well water supplying the Feniton Court historically known to contain high concentrations Atrazine.</p>	
FOLLOW-UP INVESTIGATION: <p>Water samples were taken from the spring supplying the well, the well itself and the stream running adjacent to the well.</p> <p>Although the Atrazine levels are high (1338 ng/l in the spring water), there were also metabolites of Atrazine present suggesting the contamination to be historic rather than very recent (see attached map and table of results).</p> <p>Contamination of the groundwater / spring is thought to have been due to spraying of the herbicide in the nearby plantation area.</p> <p>Users of the Feniton Court supply appear to be unperturbed regrading the high concentrations of Atrazine in their drinking water supply.</p>	
HISTORIC DATA: <p>Water samples taken from the well at Feniton Court and from run-off from the plantation area contained high concentrations of Atrazine (well = 1667 ng/l, plantation run-off = 1854 ng/l) on 22 March 1994.</p> <p>Metabolites of the herbicide were also present which suggests that the contamination of the surface / ground waters happened or had been happening for some time previous to sampling.</p>	

Atrazine I : Atrazine Desethyl
Atrazine II : Atrazine Desisopropyl
Metabolites of Atrazine.

Site	Date	Atrazine ng/l	Atrazine I ng/l	Atrazine II ng/l
1	27/04/95	1338.0	440.9	171.4
2	03/05/95	827.0	439.0	164.2
3	03/05/95	1330.0	584.7	<92.0

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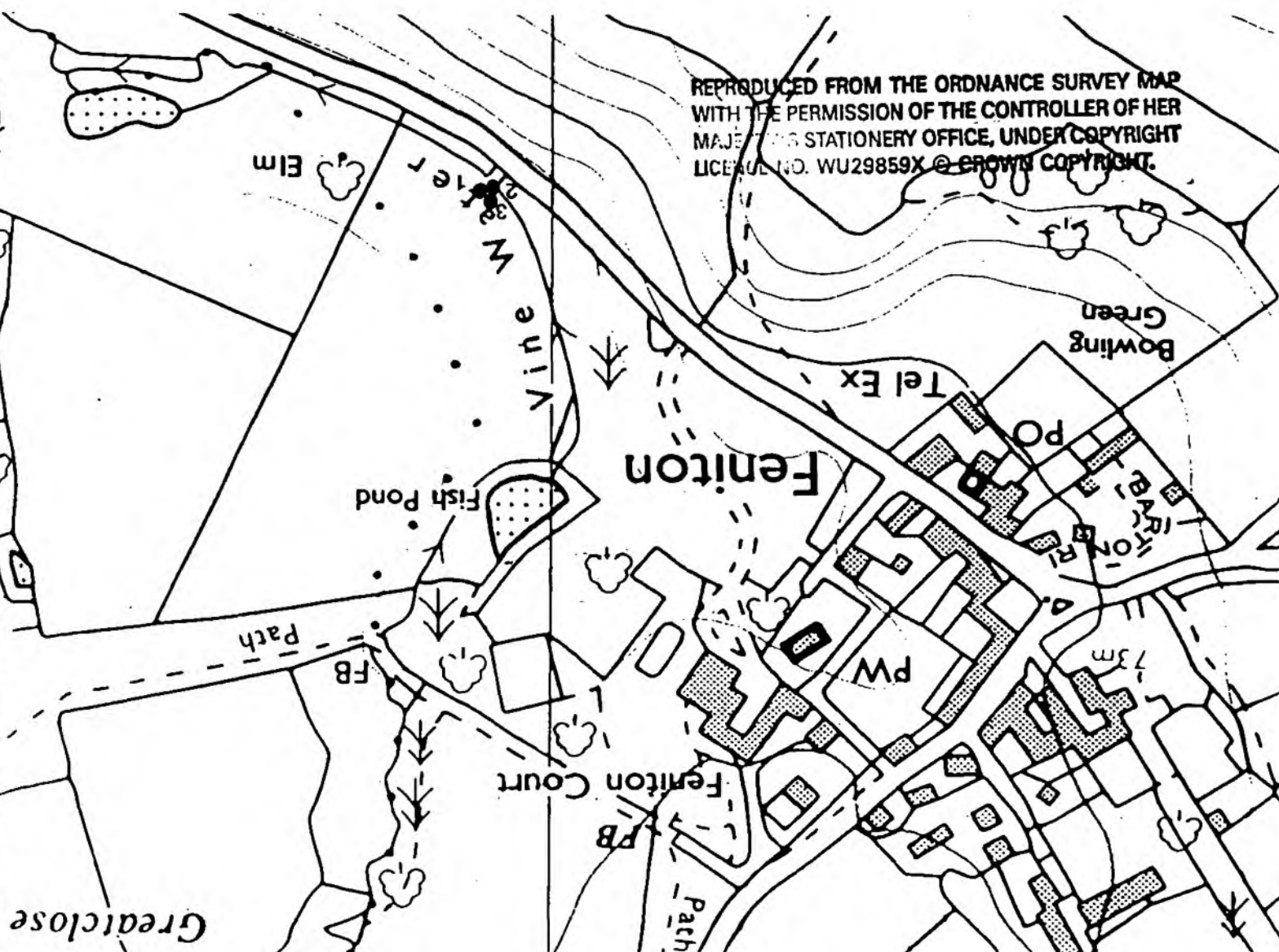


Figure 1. Map of the River Otter catchment showing the chemical sample sites used during the investigation sampling runs.

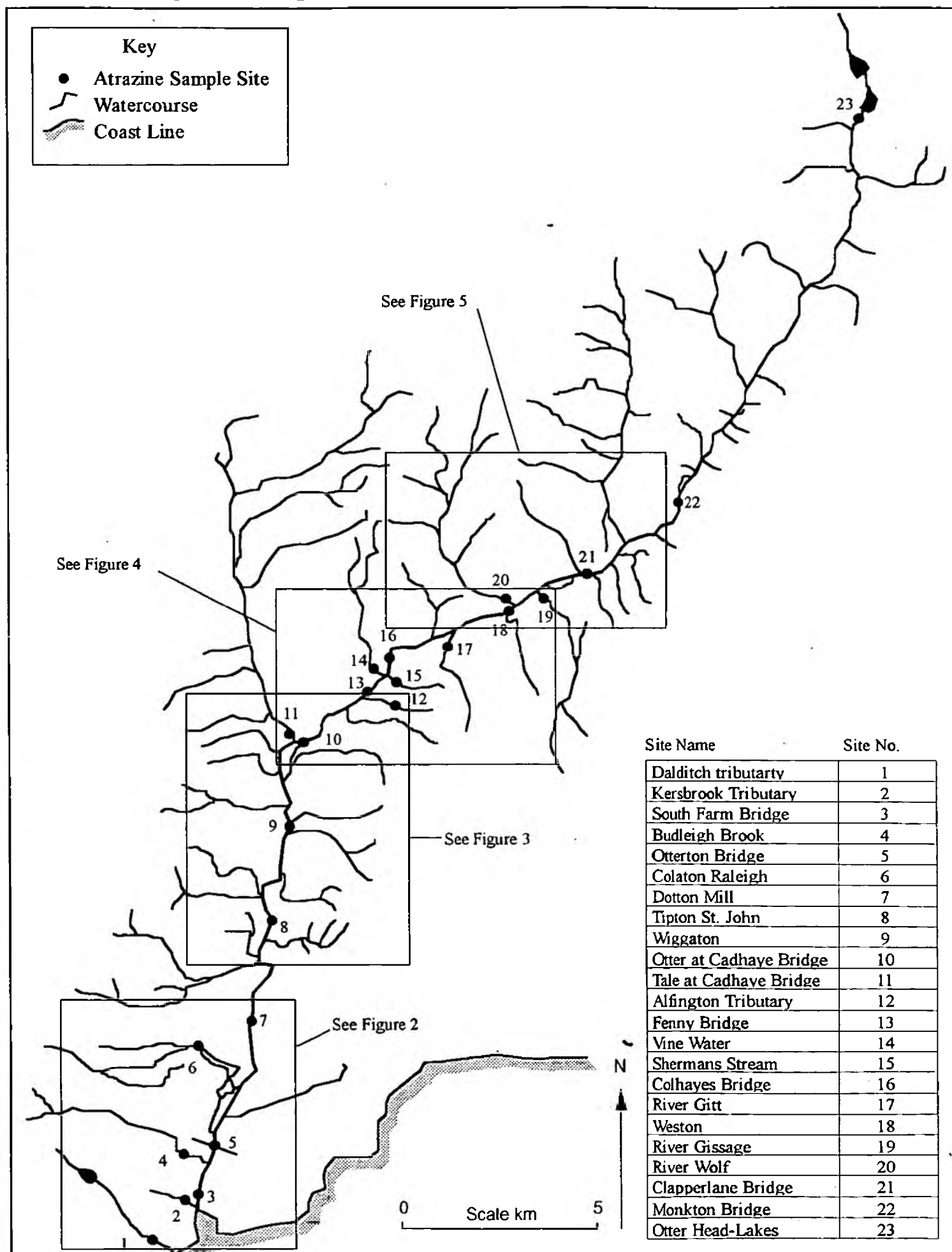


Figure 2. Map showing maize fields present in lower reaches of River Otter 1995.

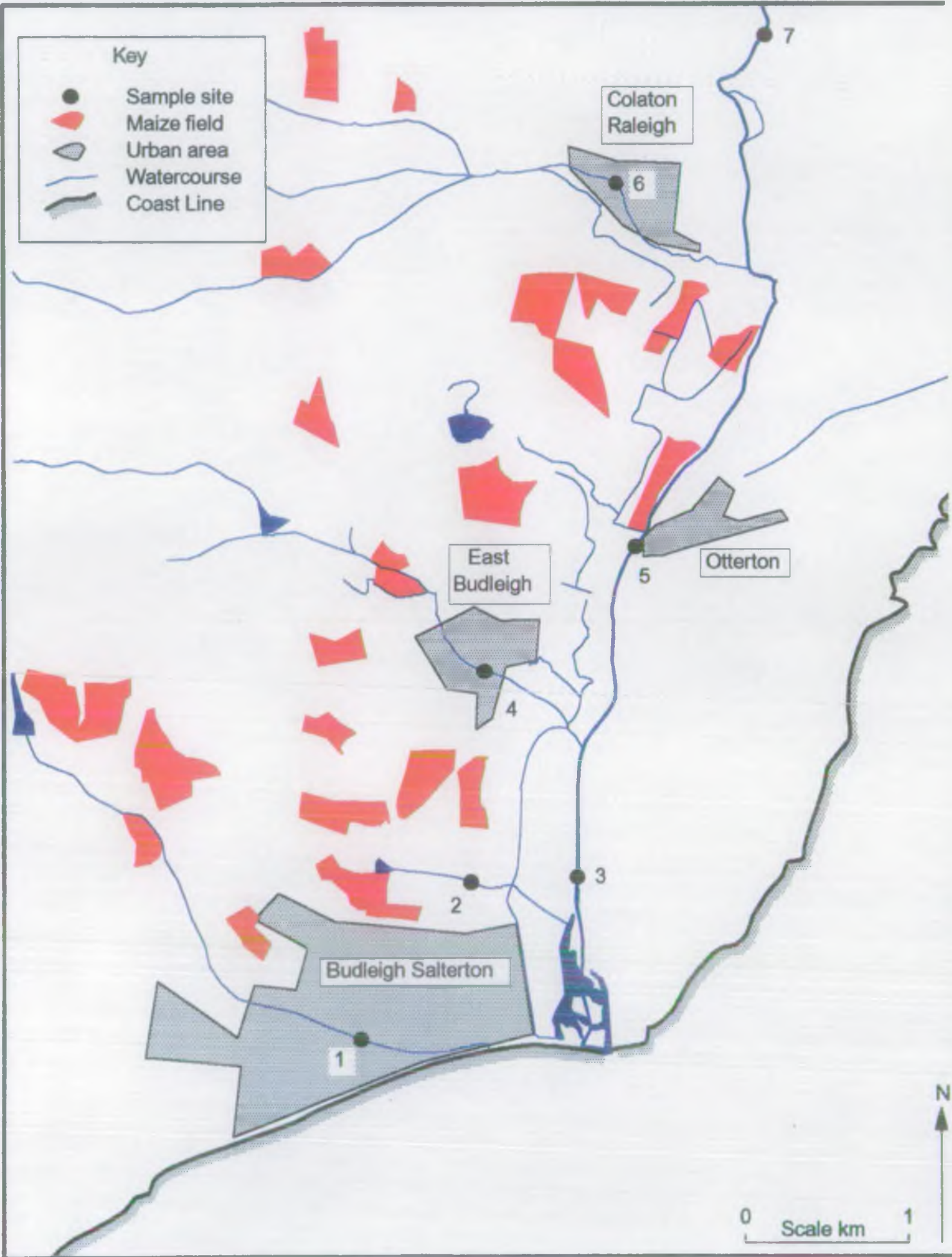


Figure 3. Map showing maize fields present in mid reaches of River Otter 1995.

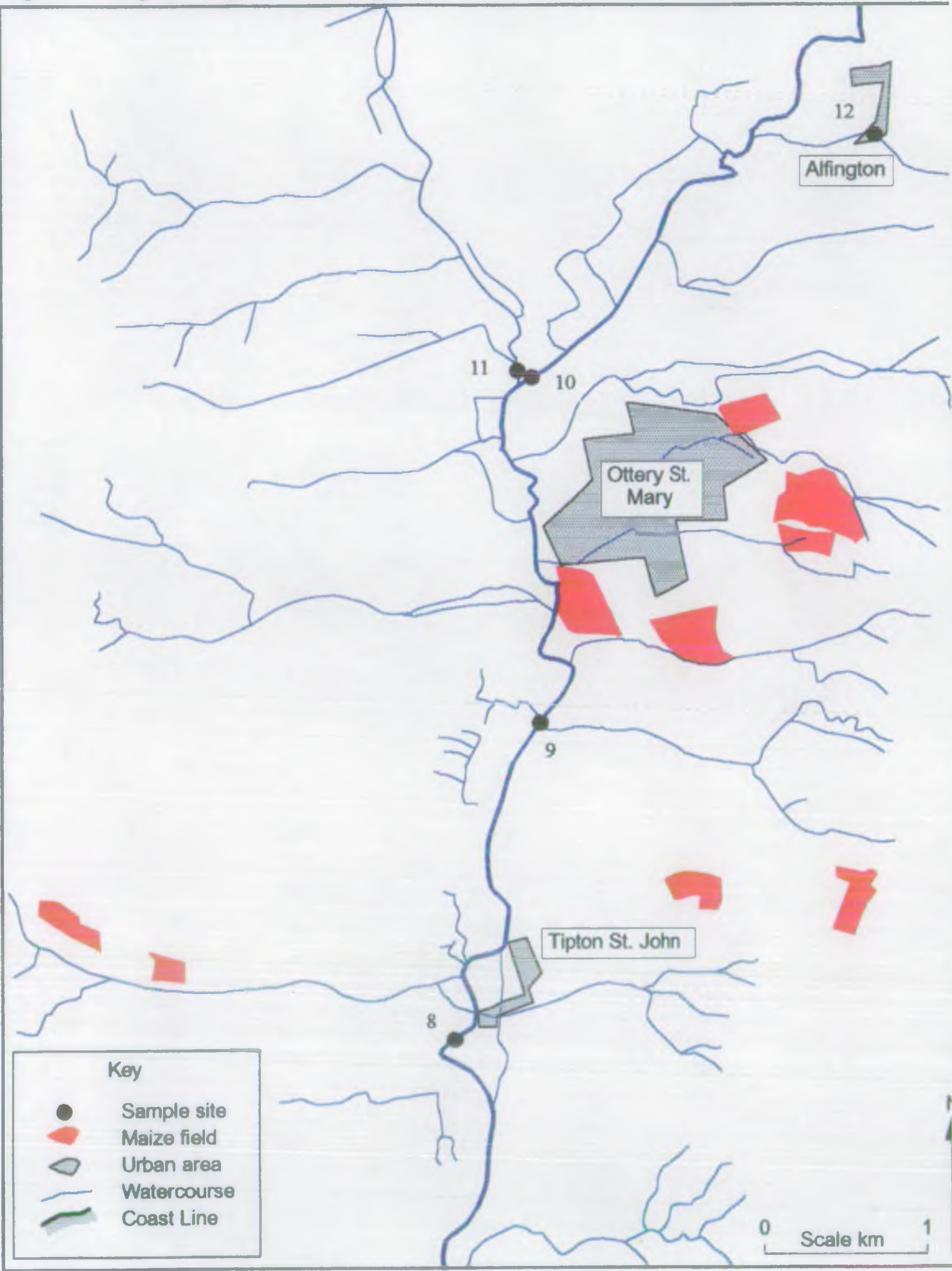


Figure 4. Map showing maize fields in the mid reaches of the River Otter 1995.

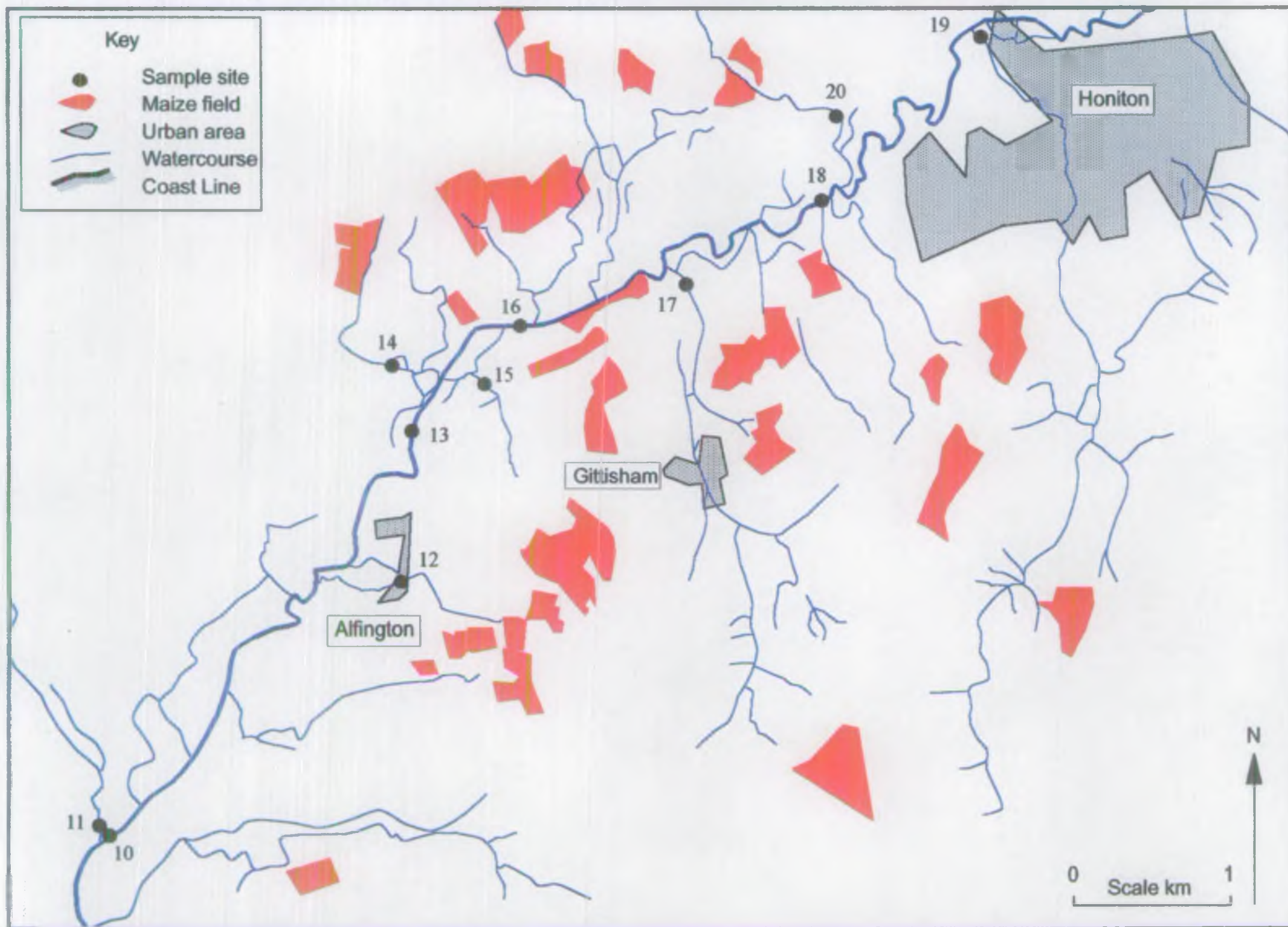


Figure 5. Map showing maize fields present in the upper reaches of the River Otter 1995.

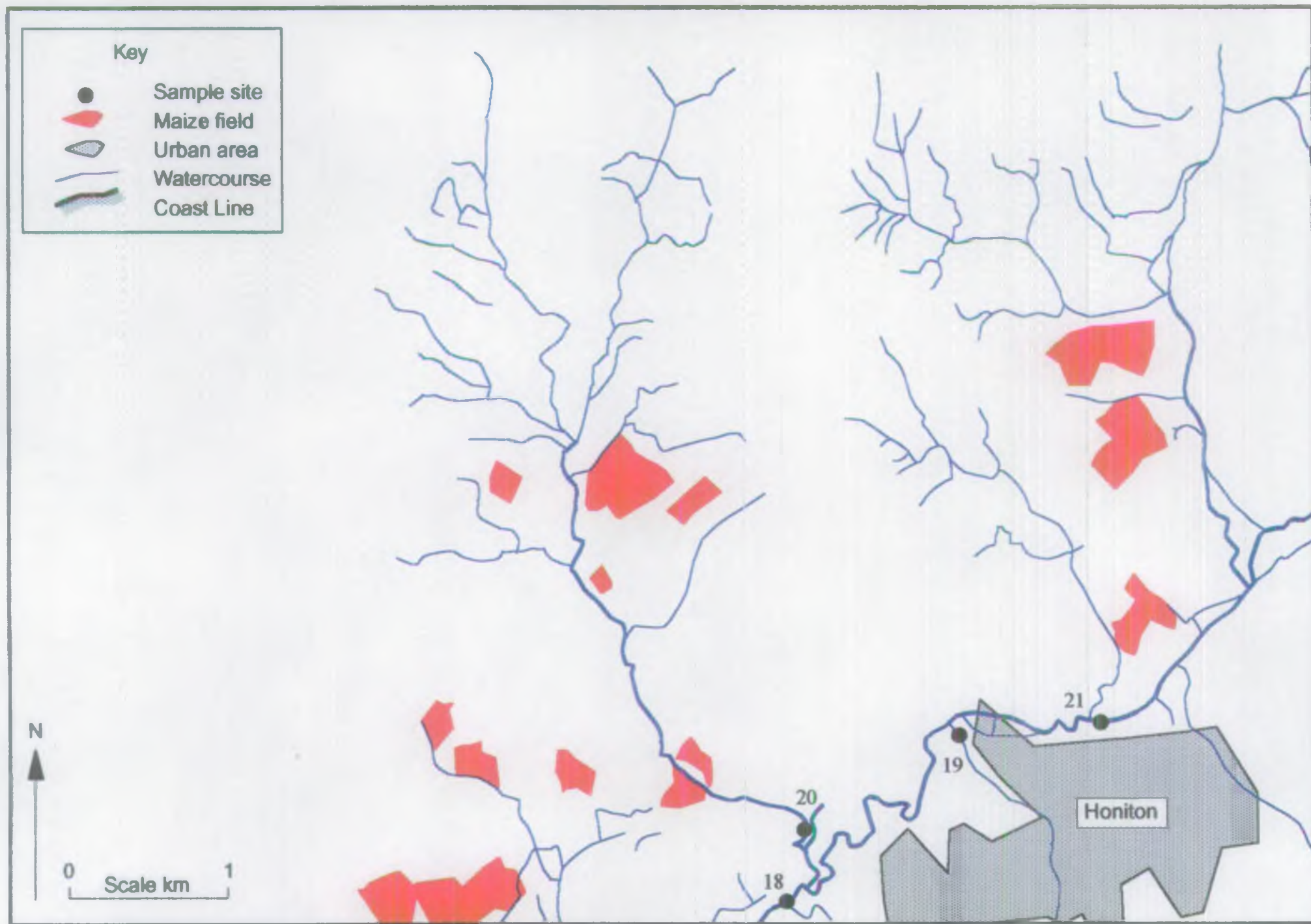


Figure 6. Map of the River Otter catchment showing the chemical sample sites used by the WQO during 1994.

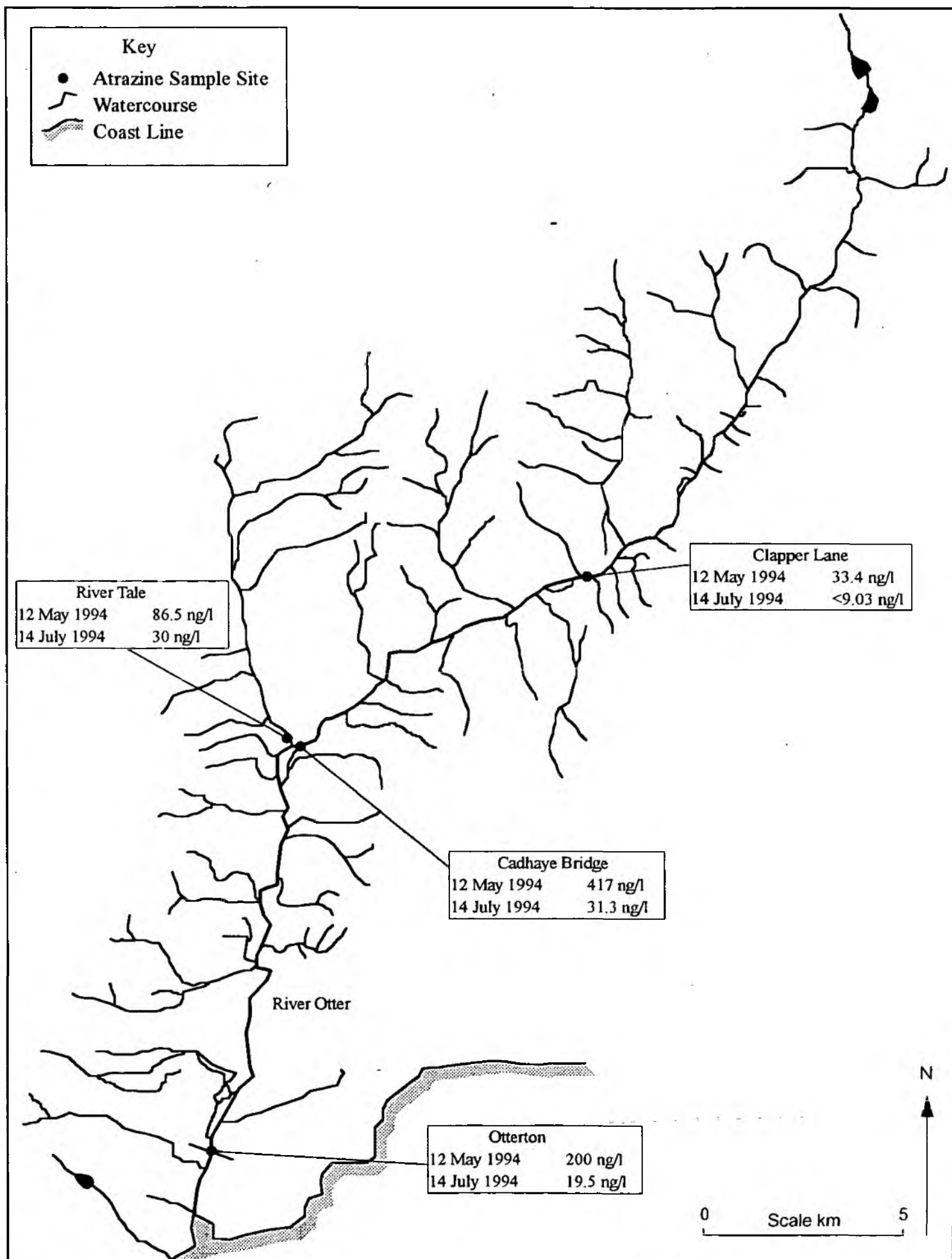


Figure 7. Results from the River Otter Atrazine surveys 1995.

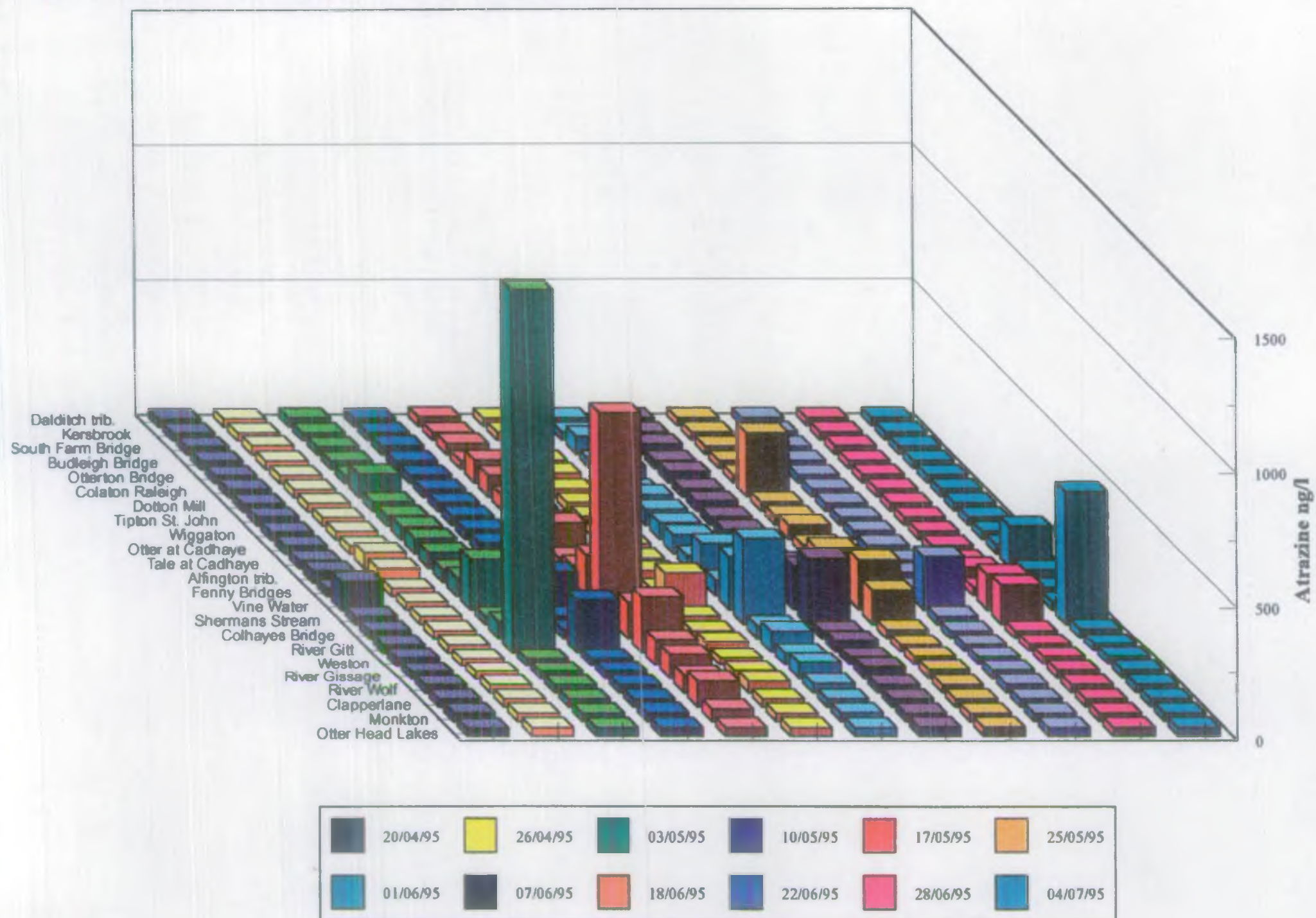


TABLE 1. River Otter Atrazine Surveys 1995

Sites	Site	Base Survey							Wet Weather				
		20-Apr	26-Apr	03-May	10-May	17-May	25-May	01-Jun	07-Jun	18-Jun	22-Jun	28-Jun	04-Jul
Dalditch Tributary	1	< 30	< 30	< 33.2	< 30	36.2	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Kersbrook Tributary	2	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	30.6	< 30	< 30
South Farm Bridge	3	< 30	34.6	< 30	33.5	41.4	37.5	67.5	38.6	< 30	< 30	32.6	< 30
Budleigh Brook	4	< 30	< 30	< 30	< 30	< 30	31.8	< 30	< 30	< 30	< 30	< 30	< 30
Ottertton Bridge	5	< 30	< 30	< 30	< 30	85.2	36.8	61.4	41.4	30.6	< 30	31	< 30
Colaton Raleigh	6	< 31.7	< 30	87.9	< 30	81.3	< 30	< 30	< 30	236.4	< 30	< 30	< 30
Dotton Mill	7	< 30	31.3	35.9	32.3	57.6	32.1	60.8	36.9	33.9	< 30	< 30	< 30
Tipton St. John	8	< 32.6	< 30	37.2	36.2	64.7	33.3	59.2	31.9	35.8	< 30	< 30	< 30
Wiggaton	9	< 30	< 31.2	50.3	38.5	70.6	35.2	63.1	36.5	55.7	< 32.5	< 30	< 30
Otter at Cadhay Bridge	10	< 31.7	< 30	58.5	40.9	115.8	36	70.7	31.2	33.4	< 31.9	30.5	34.1
Tale at Cadhay Bridge	11	< 30	58.6	58.1	< 30	40.2	36.8	46	36.3	74.2	< 30	< 30	153.8
Alfington Tributary	12	43.2	53.2	48.2	43	64.5	43.6	143.6	75.5	56.8	36.2	56.1	45.5
Fenny Bridge	13	< 30	< 30	72.5	32.2	154.8	< 30	62.6	33.3	47.2	< 30	< 30	< 30
Vine Water	14	111.1	< 30	192.1	145.7	736	140.9	200.9	164.6	189.9	200.9	134.5	< 30
Shermans Stream	15	< 30	< 30	< 30	< 30	48.7	< 30	320.5	247.6	126.7	< 30	145.9	492
Colhayes Bridge	16	< 30	< 30	62.2	< 32.2	134	< 30	49.3	< 30	34.2	< 30	< 30	36.1
River Gitt	17	< 30	< 30	1350	196.5	207.3	41.3	81.1	45.4	< 30	< 30	< 30	< 30
Weston	18	< 34.5	< 30	< 30	< 30	101.7	< 30	48.8	31.6	33.7	< 30	< 30	< 30
River Gissage	19	< 30	< 30	< 30	< 30	97.6	< 30	63	43.8	< 32.4	< 30	< 30	< 30
River Wolf	20	< 30	< 30	< 30	< 30	66.1	42.8	34.9	< 30	< 30	< 32	< 30	< 30
Clapperlane Bridge	21	< 30	< 30	< 30	< 30	96.9	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Monkton Bridge	22	< 32	< 30	< 30	< 33.2	45	< 30	< 32.2	< 30	< 30	< 30	< 30	< 30
Otter Head-Lakes	23	< 28.2	< 30	< 30	< 30	< 30	< 30	< 30	< 32.7	< 31.7	< 30	< 30	< 30

All concentrations in ng/l

APPENDIX I

Gesaprim® 500 SC



1 Gesaprim 500 SC

Gesaprim® 500 SC

GESAPRIM 500 SC is a suspension concentrate formulation containing 500 g of atrazine per litre for pre- and post-emergence control of most annual weeds in maize and sweetcorn.

Restrictions

Following repeated and exclusive use of atrazine or other triazines, resistant strains of weeds may develop. Where resistant strains develop or are introduced, weed control may be reduced.

Pack size
5 litre plastic container (4 to an outer).

This product information incorporates changes to the following sections:
All sections.
Only recommended for Maize and sweetcorn

Read the label before you buy; use pesticides safely.
GESAPRIM 500 SC contains atrazine.

3 Gesaprim 500 SC

Gesaprim 500 SC

Broad-leaved weed control
When used at 2.3 - 3.0 litres per hectare, the following broad-leaved weed control can be expected:

Susceptible:		
Amphibious bistort	Fat-hen	Scarlet pimpernel
Annual mercury	Field-gromwell	Scotless mayweed
Black mustard	Forget-me-not	Shepherd's-a-needle
Bugloss	Gallant soldier	Shepherd's-purse
Charlock	Groundsel	Spiny cocklebur
Common chickweed	Henbit dead-nettle	Spiny sow-thistle
Common hemp-nettle	Large flowered	Spurrey
Common mouse-ear	hemp-nettle	Stinking mayweed
Common poppy	Long-headed poppy	Toadflax
Corn chamomile	Parsley-plant	Treacle mustard
Corn marigold	Penny-cress	White mustard
Dwarf spurge	Pineappleweed	Wild chamomile
	Red dead-nettle	Wild radish
	Small nettle	
Moderately susceptible:		
Black-bindweed	Fool's parsley	Pale persicaria
Black medick	Fumitory	Purslane
Common field-speedwell	Heart's ease	Redshank
Field pansy	Ivy-leaved speedwell	Wall speedwell
Moderately resistant:		
Cleavers	Hairy tare	Sheep's sorrel
Common vetch	Hare's-ear	Stork's-bill
Creeping buttercup	Knotgrass	Sun spurge
Out-leaved crane's-bill	Mallow	Wild pansy
Dandelion	Orache	
Resistant:		
Betibine	Corn buttercup	Creeping cineroid
Bur-marigold	Corn mint	Willowherb

GESATOP 500 SC is likely to have a similar spectrum.

5 Gesaprim 500 SC

Light to heavy soils (sandy loam to silty clay)
GESAPRIM 500 SC should preferably be applied during seedbed cultivations so that it is followed by a light harrowing which will incorporate the chemical into the top 25 mm of soil. If it is not possible to incorporate GESAPRIM 500 SC into the seedbed, it may be applied after drilling or after emergence of the crop, provided the weeds are not more than 40 mm high.

Sands and very light soils (coarse sand to coarse sandy loam (85)) or soils with a high organic matter content
If the soil is moist at the time of drilling, apply GESAPRIM 500 SC immediately after drilling. If the soil is dry at the time of drilling, apply GESAPRIM 500 SC at the time of weed emergence, but before the weeds are more than 40 mm high.

The stage of growth of the maize or sweet corn is immaterial.

Dose

Pre-emergence of weeds:	
Sands, very light and light soils (coarse sand to coarse sandy loam (85))	2.3 litres per hectare GESAPRIM 500 SC
Medium and heavy soils (sandy clay loam to silty clay)	3.0 litres per hectare GESAPRIM 500 SC
Post-emergence of weeds:	
All soil types	3.0 litres per hectare GESAPRIM 500 SC

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Gesaprim® 500 SC

Product Summary

MAFF 05845

Formulation	Suspension concentrate containing 500g atrazine per litre.	
Crops	Maize and sweet corn.	
Target	Annual grass and broad-leaved weeds.	pages 4-5
Dose	2.3 - 3.0 litres per hectare.	page 8
Volume	Minimum of 200 litres per hectare.	page 7
Timing	Pre- and post-emergence.	page 7
Succeeding crops	Minimum of 7 months.	page 6
Pack	5 litres (4 to an outer).	page 3
Notes	Restrictions.	page 3

Gesaprim 500 SC

Broad-leaved weed control

When used at 2.3-3.0 litres per hectare, the following broad-leaved weed control can be expected:

Susceptible:		
Amphibious bistort	Fat-hen	Scarlet pimpernel
Annual mercury	Field-gromwell	Scotless mayweed
Black mustard	Forget-me-not	Shepherd's-purse
Buglossa	Gallant soldier	Spiny cocklebur
Charlock	Groundsel	Spiny sow-thistle
Common chickweed	Henbit dead-nettle	Sourcay
Common hemp-nettle	Large flowered	Stinking mayweed
Common mouse-ear	hemp-nettle	Toadflax
Common poppy	Long-headed poppy	Treacle mustard
Corn chamomile	Pansley-plant	White mustard
Corn marigold	Penny-cress	Wild chamomile
Dwarf spurge	Pineappleweed	Wild radish
	Red dead-nettle	Small nettle
Moderately susceptible:		
Black-bindweed	Fool's pansley	Pale persicaria
Black medick	Fumitory	Purshane
Common field-speedwell	Heart's ease	Redshank
Field pansy	Ivy-leaved speedwell	Wall speedwell
Moderately resistant:		
Cleavers	Hairy lare	Sheep's sorrel
Common vetch	Hare's-ear	Stork's-bill
Creeping buttercup	Knotgrass	Sun spurge
Cut-leaved crane's-bill	Mallow	Wild pansy
Dandelion	Orache	
Resistant:		
Belbline	Corn buttercup	Creeping cinquefoil
Bur-marigold	Corn mint	Willowherb

GESATOP 500 SC is likely to have a similar spectrum.

Gesaprim® 500 SC

GESAPRIM 500 SC is a suspension concentrate formulation containing 500 g of atrazine per litre for pre- and post-emergence control of most annual weeds in maize and sweetcorn.

Restrictions

Following repeated and exclusive use of atrazine or other triazines, resistant strains of weeds may develop. Where resistant strains develop or are introduced, weed control may be reduced.

Light to heavy soils (sandy loam to silty clay)

GESAPRIM 500 SC should preferably be applied during seedbed cultivations so that it is followed by a light harrowing which will incorporate the chemical into the top 25 mm of soil. If it is not possible to incorporate GESAPRIM 500 SC into the seedbed, it may be applied after drilling or after emergence of the crop, provided the weeds are not more than 40 mm high.

Sands and very light soils (coarse sand to coarse sandy loam (S5)) or soils with a high organic matter content. If the soil is moist at the time of drilling, apply GESAPRIM 500 SC immediately after drilling. If the soil is dry at the time of drilling, apply GESAPRIM 500 SC at the time of weed emergence, but before the weeds are more than 40 mm high. The stage of growth of the maize or sweet corn is immaterial.

Dose

Pre-emergence of weeds:	
Sands, very light and light soils (coarse sand to coarse sandy loam (S5))	2.3 litres per hectare GESAPRIM 500 SC
Medium and heavy soils (sandy clay loam to silty clay)	3.0 litres per hectare GESAPRIM 500 SC
Post-emergence of weeds:	
All soil types	3.0 litres per hectare GESAPRIM 500 SC

Pack size
5 litre plastic container (4 to an outer).

This product information incorporates changes to the following sections:
All sections.
Only recommended for Maize and sweetcorn

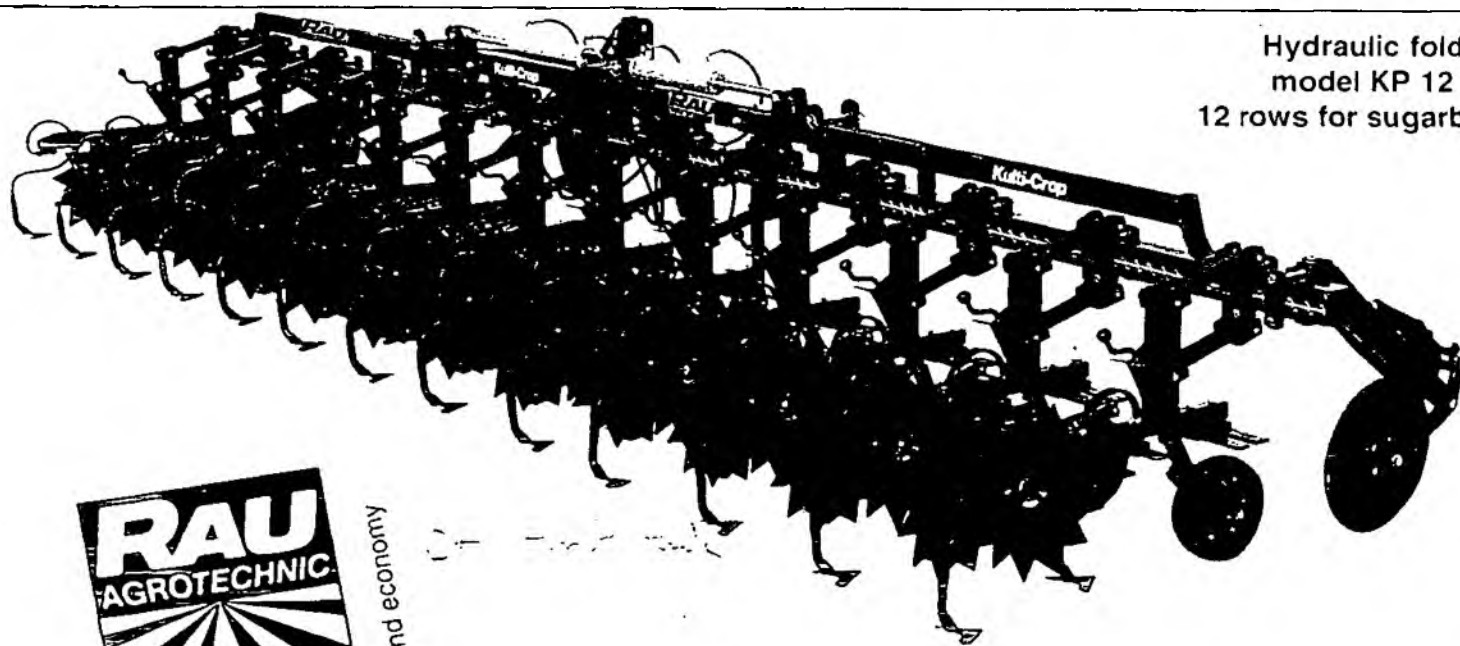
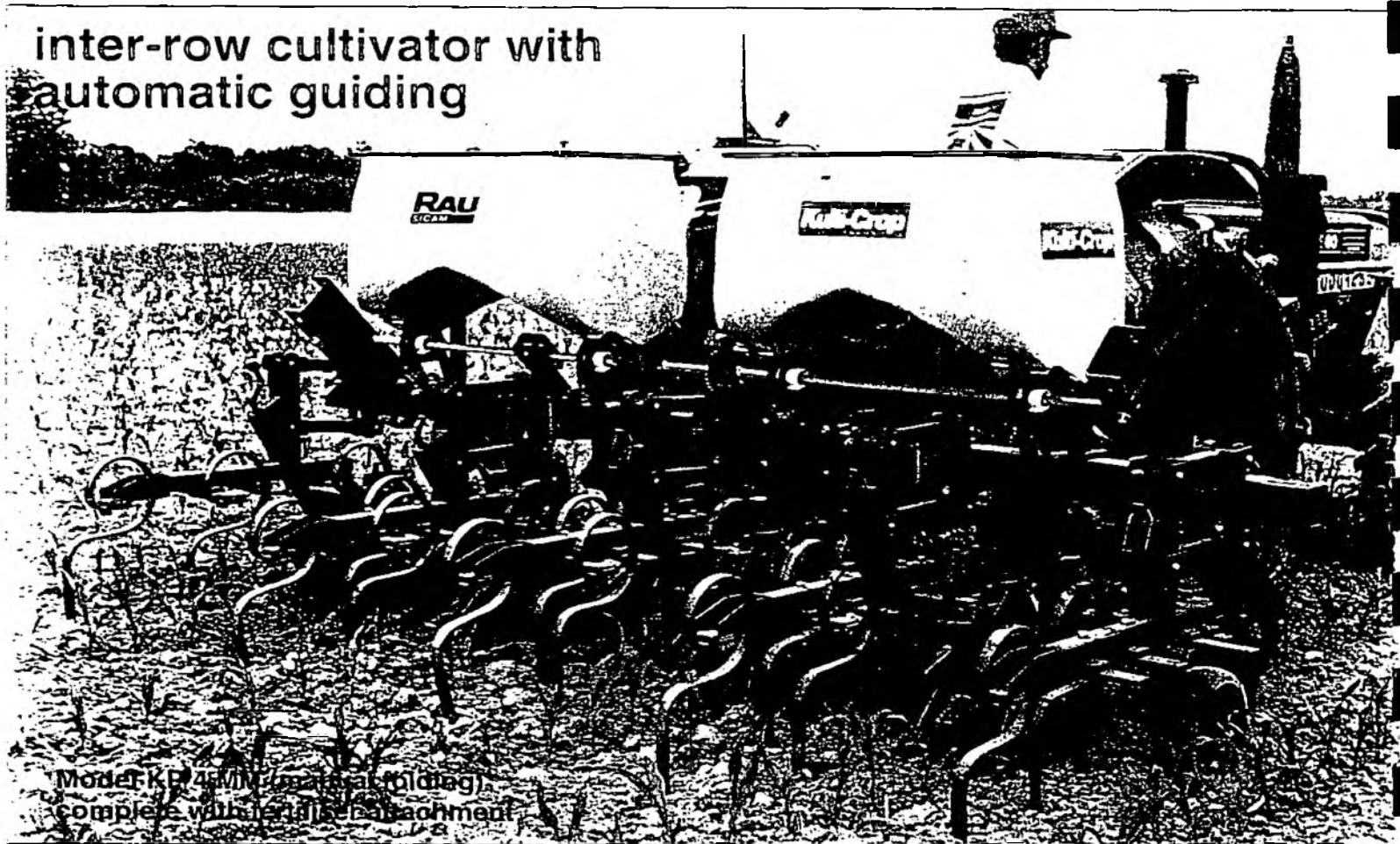
Read the label before you buy; use pesticides safely.
GESAPRIM 500 SC contains atrazine.

of fine implements for soil
cultivation

KULTICROP

RAU SICAM

inter-row cultivator with
automatic guiding



Hydraulic folding
model KP 12 TH,
12 rows for sugarbeet



No. 1 in ecology

and economy

SICAM

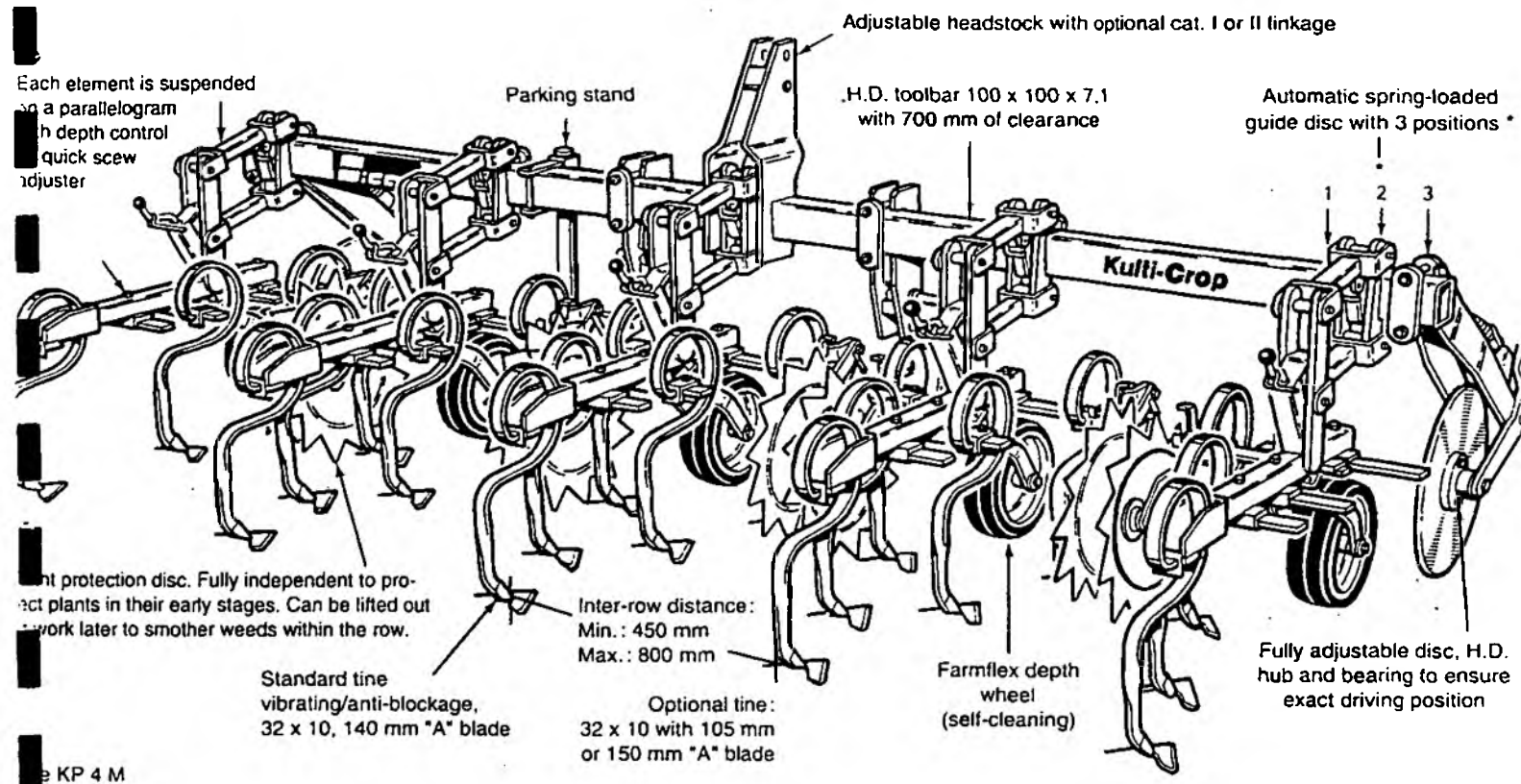
9, rue du poitou - B.P. N° 2

85130 Les Landes Genusson - FRANCE

Tél. 51.64.13.00 - Télex 711 309

Téléfax 51.91.61.24

Technical specification of the KULTICROP



RIGID MODELS

MAIZE EQUIPMENT:

- 5 lines per parallelogram (3 on the end elements)
- Space between rows: 600 mm to 800 mm
- 2 independent plant protection discs

Model	No. of rows	No. of tines	Working width	Weight
KP 4 M	4	21	3.50 m	560 Kg
KP 5 M	5	26	4.30 m	660 Kg
KP 6 M	6	31	5.10 m	760 Kg
KP 8 M	8	41	6.60 m	1040 Kg

SUNFLOWER/SUGARBEET EQUIPMENT:

- 3 lines per parallelogram (2 on the end elements)
- Space between rows: 450 mm to 600 mm
- 2 plant protection discs

Model	No. of rows	No. of tines	Working width	Weight
KP 5 T	5	16	3.50 m	610 Kg
KP 6 T	6	19	4.30 m	710 Kg
KP 7 T	7	22	5.10 m	810 Kg
KP 8 T	8	25	5.10 m	880 Kg
KP 9 T	9	28	6.60 m	970 Kg
KP 12 T	12	37	6.60 m	1180 Kg

ACCESSORIES:

- Fertiliser placement: 4 rows suitable for KP 4 M and 4 MM
- Fertiliser placement: 6 rows suitable for KP 6 M, and KP 6 T
- Fertiliser placement: 8 rows suitable for KP 8 M
- Pneumatic guide wheel in lieu of guide disc

FOLDING MODELS

MODEL KP MM MANUAL FOLDING - MAIZE:

- Row distance 750 mm or 800 mm
- 5 lines per element, 2 independent plant protection discs

Model	No. of rows	No. of tines	Working width	Transport width	Weight
KP 4 MM	4	21	3.50 m	3.00 m	650 Kg

MODEL KP M-H HYDRAULIC FOLDING - MAIZE:

- 2 double acting rams

Model	No. of rows	No. of tines	Working width	Transport width	Weight
KP 4 M-H	4	21	3.50 m	3.00 m	690 Kg
KP 5 M-H	5	26	4.30 m	3.00 m	820 Kg
KP 6 M-H	6	31	5.10 m	3.00 m	920 Kg
KP 8 M-H	8	41	6.60 m	3.00 m	1230 Kg

MODEL KPT-H HYDRAULIC FOLDING - SUNFLOWERS/SUGARBEET:

- 2 double acting rams
- Possible spacing: 450, 500, 550 mm; except 12 rows 450 and 500 mm only
- 3 lines per element
- 2 plant protection discs

Model	No. of rows	No. of tines	Working width	Transport width	Weight
KP 6 T-H	6	19	4.30 m	3.00 m	865 Kg
KP 7 T-H	7	22	4.30 m	3.00 m	945 Kg
KP 8 T-H	8	25	5.10 m	3.00 m	1045 Kg
KP 9 T-H	9	28	6.60 m	3.00 m	1310 Kg
KP 12 T-H	12	37	6.60 m	3.00 m	1520 Kg

FERRAG LIMITED

PO Box 90, Haydock Lane,
Haydock Industrial Estate, St. Helens,
Merseyside, WA11 9UU.
Telephone : 0942 272 777
Fax : 0942 271 287

- ☐ Soakaways must not be used because of the risk of groundwater contamination.

Containers

Eliminate packaging waste, where possible. When they become available, choose products as tablet formulations, in water-soluble bags or in refillable containers.

When conventional containers have been emptied:

- ☐ Immediately wash them out thoroughly by triple-rinsing (some pesticides solidify quickly and become difficult to remove) and add the washings to the sprayer tank;
- ☐ Puncture or crush the containers so they cannot be re-used and send them to a licensed disposal site.
- ☐ Alternatively burn the containers or bury them where they cannot pollute surface or groundwater, at least 0.8 metres deep and below any land-drains. Mark the area and keep a record of the type and quantity buried.

IN CASE OF AN ACCIDENTAL SPILL...

...in the store, while mixing or during transport:

- Have written contingency plans readily available in the event of a serious spill;
- Stop the spill entering yard drains or watercourses; do not hose it down;
- Soak up liquids with an inert material such as fine sand, Fullers Earth or a proprietary absorbent;
- Collect and dispose of the contaminated absorbents via a reputable contractor specialising in waste disposal;
- If there is a threat to watercourses or drains, phone the national NRA Emergency Hotline on freephone **0800 807060** which is open 24 hours a day.

If you want further copies of this leaflet either photocopy this one or request them from:



NRA

The National Rivers Authority
by phoning 01733 464138 or
faxing 01733 231840 or



British
Agrochemicals
Association

The British Agrochemicals
Association by phoning 01733
349225 or faxing 01733 62523.

THINK WATER — KEEP IT CLEAN

How to protect surface and
groundwater from contamination
by pesticides



British
Agrochemicals
Association



NRA



THINK WATER — KEEP IT CLEAN

How to protect surface and groundwater from contamination by pesticides

Serious pesticide pollution incidents in watercourses are rare but the National Rivers Authority (NRA) is detecting low concentrations of a wide range of pesticides in many of the watercourses it monitors.

It seems likely that much of this contamination arises from small spillages and careless handling or misuse of approved pesticides during storage, preparation, application or disposal.

It is essential that contamination by pesticides is prevented:

- To meet drinking water standards. As little as 250gm of pesticide could be enough to cause the daily supply to a city the size of London to exceed the permitted limits.
- To protect fish and other aquatic life. Even when diluted, many pesticides are potentially toxic to fish and other aquatic life.
- To protect groundwater.

As a user, you should first consider whether you need to use a pesticide. If pesticides do have to be used, the risk of pollution arising from storage use and disposal can be minimised by following the MAFF and HSE Code of Practice*.

Under the Water Resources Act (1991), every pesticide user must prevent pesticide pollution, deliberate or accidental, or face a fine of up to £20,000.

Improving practices can reduce contamination without affecting crop yields or reducing profit. Follow these simple guidelines to reduce the risk of pollution.

**Code of Practice for the Safe Use of Pesticides on Farms and Holdings*

STORAGE

Even if you only store small amounts of pesticides, you should:

- Site any new stores in areas free from flooding and well away from any watercourses, drains, ponds or boreholes. Seek advice from the NRA in good time before starting work;
- Make sure the store has no internal drains and can contain any pesticide leakage;
- Protect the store against fire and theft;
- Keep the store locked and clearly marked;
- Put records of the store contents in a separate place in case of an incident;
- Store only enough pesticide for your immediate needs;
- Check the store regularly for leaking packs.

MIXING

Always take extreme care when mixing pesticides.

- Use a designated area in the farmyard or in each field, well away from drains or watercourses and preferably where any spillage can be contained;
- Avoid any spillage;
- Use closed transfer and induction mixing systems whenever possible;
- Mix the exact quantity of spray needed for the job, so you don't have to dispose of any surplus;
- Don't mix up large quantities if a change in the weather will stop you spraying;
- Fit all hose connections with a syphon break device so that spray is not back-siphoned into water supplies;
- Check all application equipment for leaks each day.

TRANSPORT

- Always cross watercourses by bridge or tunnel rather than by fords;
- Secure all hatches and containers;
- Drive at a steady pace, gently accelerating and braking to avoid slopping the contents.

USE

When applied correctly, there is minimal risk of water contamination. To reduce the risk still further:

- Never spray if:
 - 1 It is raining;
 - 2 Heavy rain is expected within half a day which might lead to run-off;
 - 3 Wind speeds might cause drift into watercourses;
 - 4 The ground is already water-logged.
- Follow all instructions on the manufacturer's label which can include advice on spray quality and avoiding drift through the use of correct nozzles, pressure, boom height, disc speed and water volume;
- Do not apply pesticides over ditches and watercourses (unless the product is specifically approved for use in or near water). Get NRA agreement before application of herbicides in or near water;
- Consider leaving unsprayed buffer strips alongside drainage ditches and watercourses;
- Check the likelihood of leaching into groundwater; the NRA can provide groundwater vulnerability maps.

DISPOSAL

Careless or incorrect disposal of even very small amounts of pesticides is a potential source of pollution.

Concentrated product

- Your local distributor may consider taking back sound unopened containers with complete and up-to-date labels;
- A neighbouring farm may be willing to take such products if it is still growing crops for which the products are still approved;
- In all other cases, contact a reputable waste disposal contractor.

Diluted pesticides and tank washings

Avoid surplus spray by mixing only enough to do the job in hand;

- Consider the use of a sprayer which direct-meters chemicals from the container to the spray line where it combines with clean water from the tank; there is then no spray mix for disposal;
- Choose integral washing systems which flush out tanks to reduce sprayer washings considerably;
- Re-use tank washings in further batches of the same spray making sure that maximum concentration is not exceeded;
- Spray out the surplus or the washings on a relatively weed or pest free part of the crop left unsprayed for the purpose or on another untreated crop for which the product is approved;
- Alternatively choose areas of uncropped land (not fallow or stubble) of minimal wildlife value well away from watercourses, drains and environmentally sensitive areas, which are not prone to flooding.



Continued overleaf

APPENDIX II

Table 2. Routine Groundwater Monitoring Programme. Atrazine Concentrations In Otter Valley Boreholes.

Site: Greatwell 1 URN: GSY19/100	
Date	Atrazine ng/l
14/10/92	16.30
23/09/93	19.03
14/07/94	< 9.00
26/10/94	< 9.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Greatwell 2 URN: GSY19/101	
Date	Atrazine ng/l
14/10/92	< 10.00
23/09/93	< 9.00
14/07/94	10.80
26/10/94	< 9.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Greatwell 3 URN: GSY19/102	
Date	Atrazine ng/l
14/10/92	111.90
14/07/94	139.50
26/10/94	126.70
13/07/95	192.60
05/10/95	145.00

Site: Greatwell 4B URN: GSY19/103	
Date	Atrazine ng/l
14/07/94	< 9.00
26/10/94	< 9.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Colaton Raleigh 2 URN: GSY08/101	
Date	Atrazine ng/l
24/09/93	< 9.00
24/03/94	< 9.00
22/07/94	< 9.00
26/10/94	< 9.00
29/12/94	< 30.00
06/04/95	< 32.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Colaton Raleigh 4 URN: GSY08/102	
Date	Atrazine ng/l
24/09/93	< 9.00
22/07/94	< 9.00
26/10/94	< 9.00
29/12/94	< 30.00
06/04/95	< 30.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Harpford 6 URN: GSY09/100	
Date	Atrazine ng/l
14/10/92	34.30
23/09/93	< 29.04
22/07/94	24.20
26/10/94	25.70
13/07/95	< 30.00
05/10/95	< 30.00

Site: Harpford 7 URN: GSY09/101	
Date	Atrazine ng/l
14/10/92	41.10
23/09/93	< 52.34
05/10/95	< 30.00

Site: Harpford 8 URN: GSY09/102	
Date	Atrazine ng/l
14/10/92	34.20
23/09/93	< 35.40
22/07/94	18.70
26/10/94	18.50
13/07/95	< 30.00
05/10/95	< 30.00

Site: Harpford 9P URN: GSY09/103	
Date	Atrazine ng/l
14/10/92	20.30
23/09/93	< 29.41
22/07/94	16.00
26/10/94	19.50
13/07/95	< 30.00
05/10/95	< 30.00

Site: Dotton 1 URN: GSY08/103	
Date	Atrazine ng/l
14/10/92	57.70
23/09/93	< 31.80
22/07/94	33.00
26/10/94	83.10
29/12/94	42.10
06/04/95	59.40
13/07/95	107.20
05/10/95	45.30

Site: Dotton 2 URN: GSY08/104	
Date	Atrazine ng/l
23/03/94	45.30
22/07/94	30.00
26/10/94	81.20
29/12/94	38.90
06/04/95	< 30.00
13/07/95	34.90
05/10/95	< 31.90

Site: Dotton 3 URN: GSY08/105	
Date	Atrazine ng/l
14/10/92	51.40
23/09/93	< 51.50
26/10/94	90.10
29/12/94	118.10
06/04/95	91.50
13/07/95	120.10
05/10/95	158.00

Site: Dotton 4 URN: GSY08/106	
Date	Atrazine ng/l
25/01/94	107.10
22/07/94	70.40
26/10/94	110.50
29/12/94	142.10
23/06/95	116.50
13/07/95	129.00

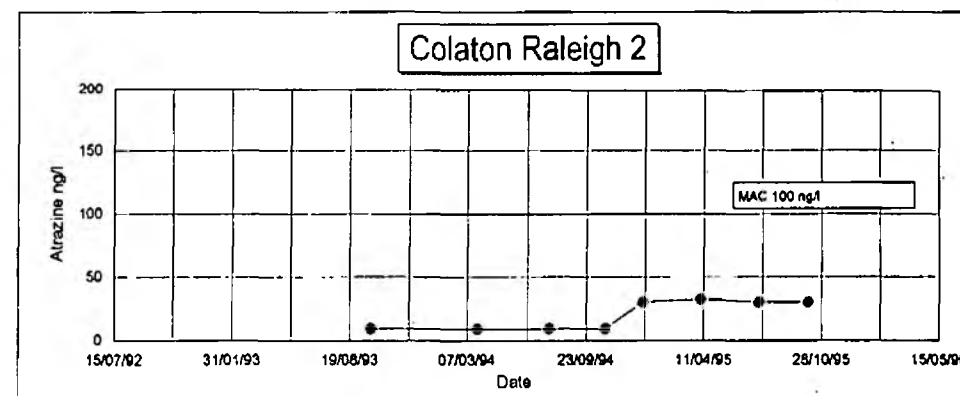
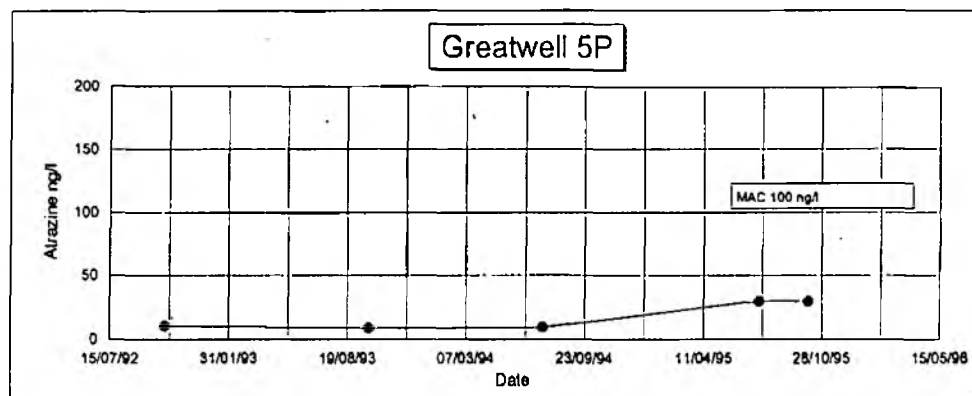
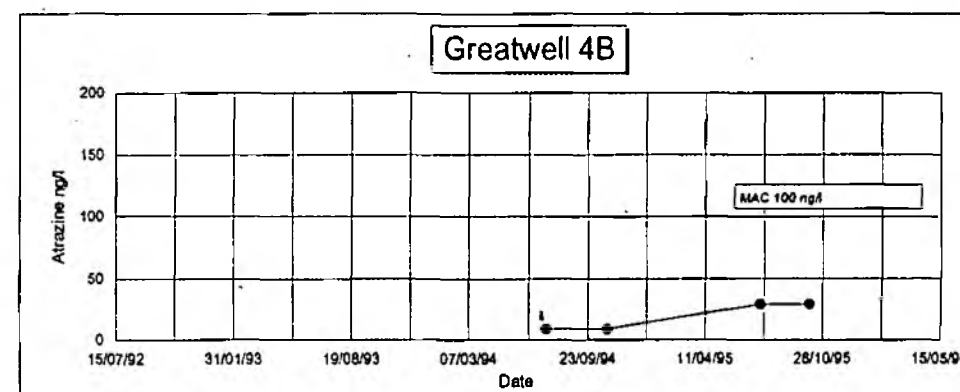
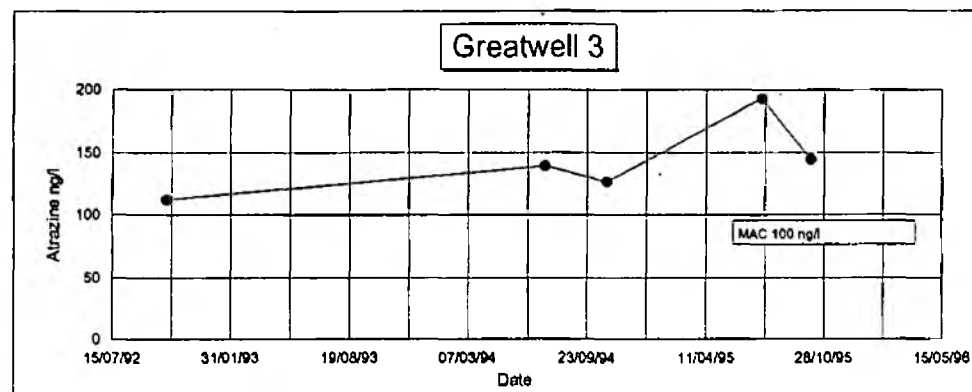
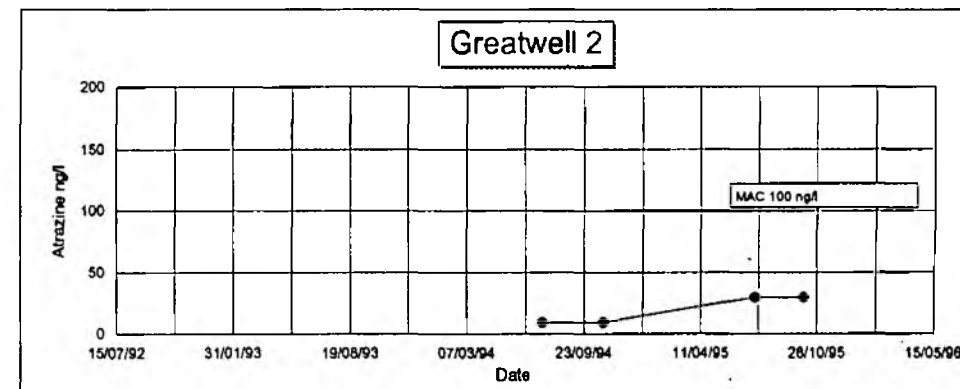
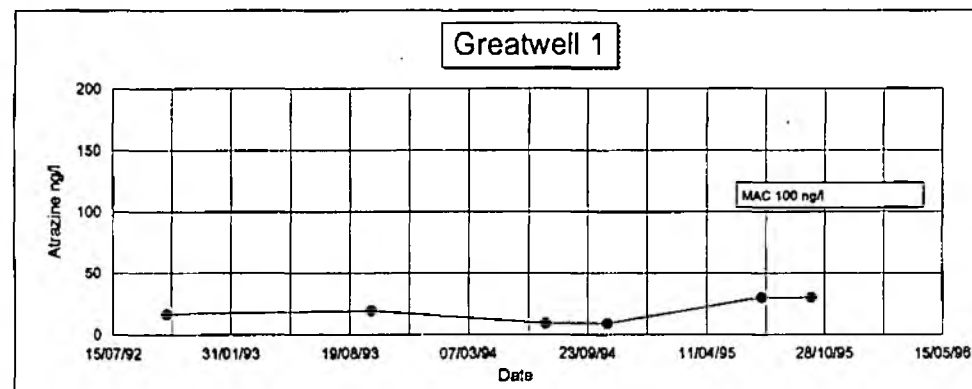
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Date	Atrazine ng/l
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22/07/94	< 9.00
26/10/94	< 9.00
29/12/94	< 30.00
06/04/95	< 31.80
13/07/95	< 30.00
05/10/95	< 30.00

Site: Otterton 1A URN: GSY08/111	
Date	Atrazine ng/l
23/09/93	< 9.00
22/07/94	< 9.00
26/10/94	< 9.00
13/07/95	< 30.00
05/10/95	< 30.00

Site: Otterton 4 URN: GSY08/110	
Date	Atrazine ng/l
14/10/92	27.10
23/09/93	< 40.90
26/10/94	26.20
13/07/95	32.10
05/10/95	< 30.00

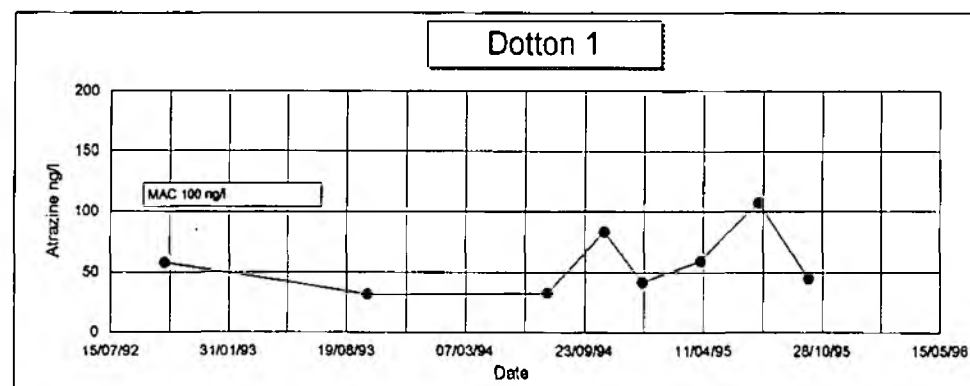
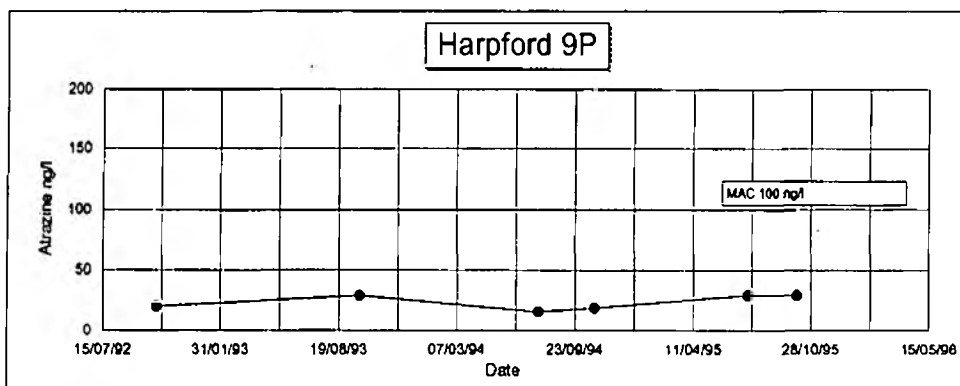
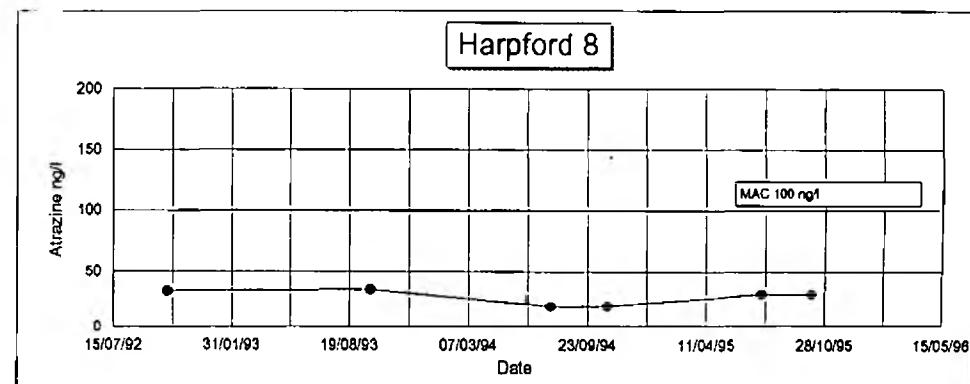
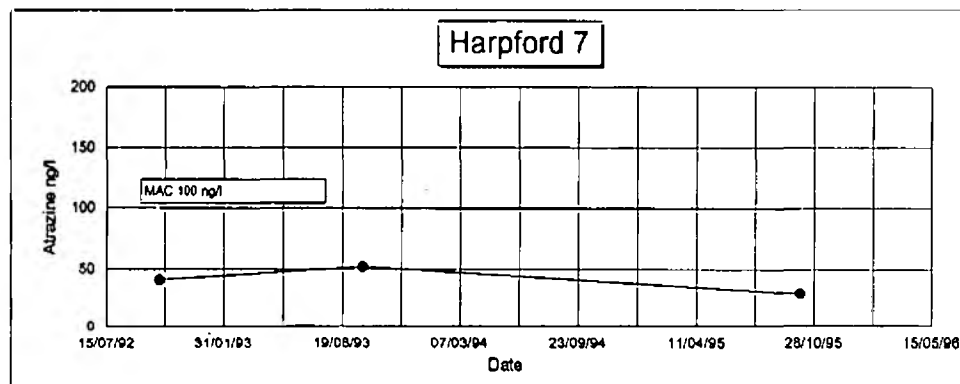
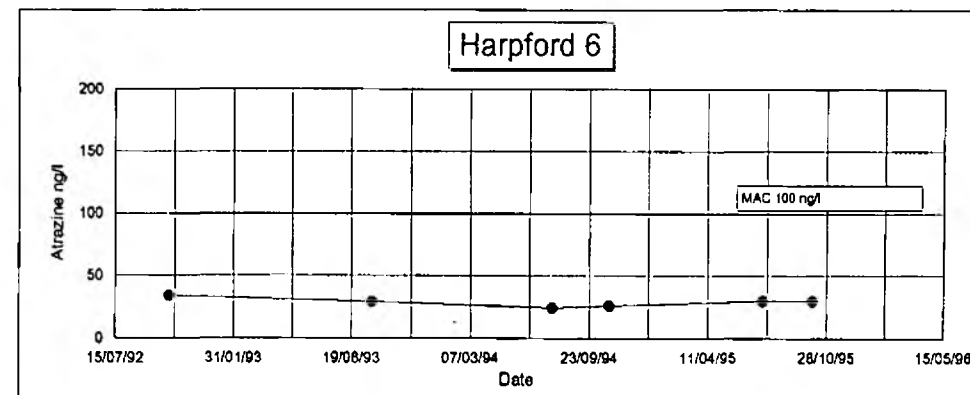
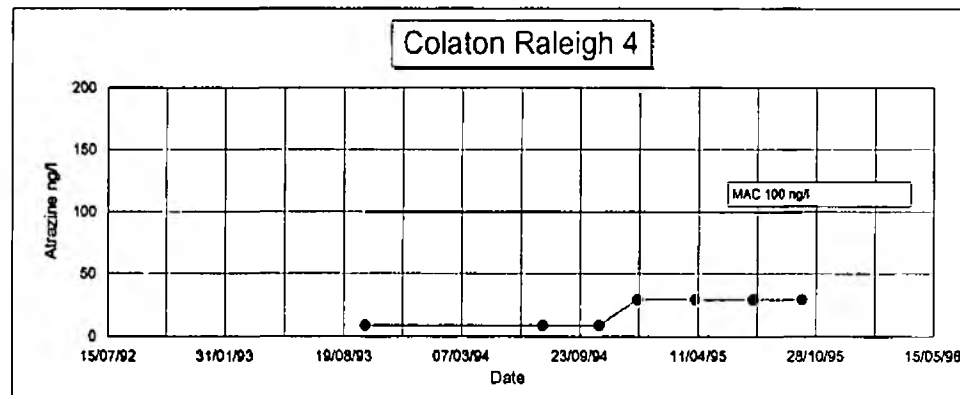
Site: Greatwell 5P	
URN: GSY19/104	
Date	Atrazine ng/l
14/10/92	< 10.70
23/09/93	< 9.00
14/07/94	< 9.60
13/07/95	< 30.00
05/10/95	< 30.00

Routine Groundwater Monitoring Programme Atrazine concentrations in the Otter Valley Boreholes.



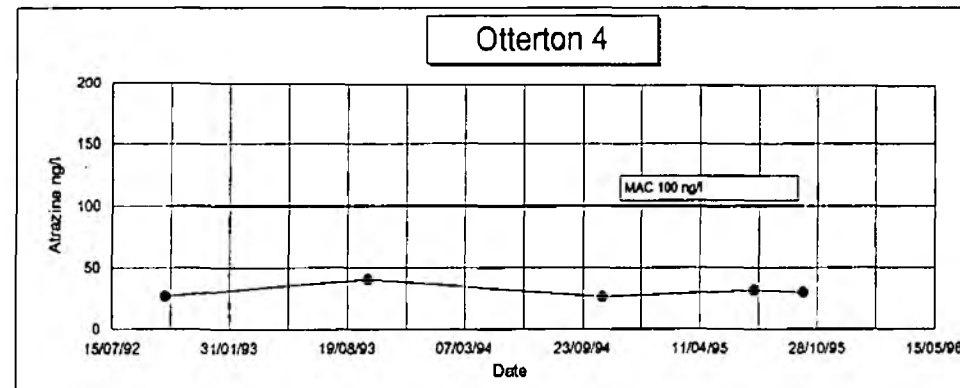
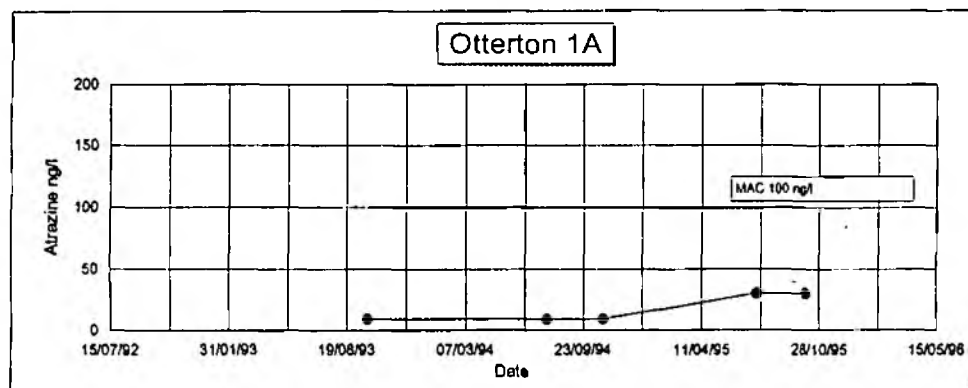
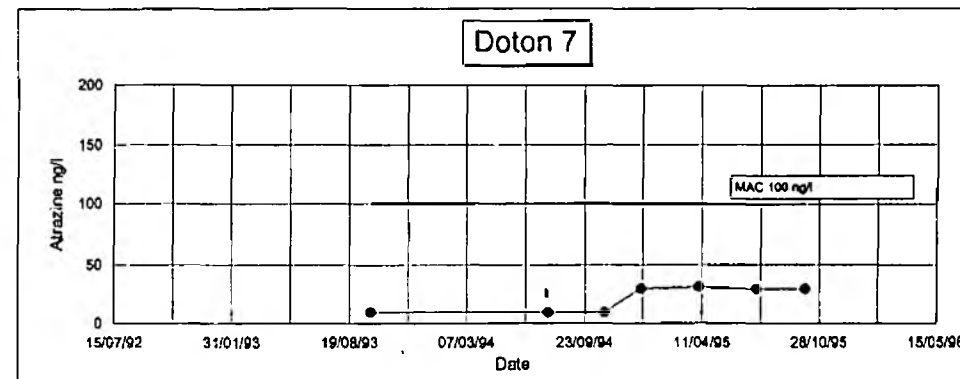
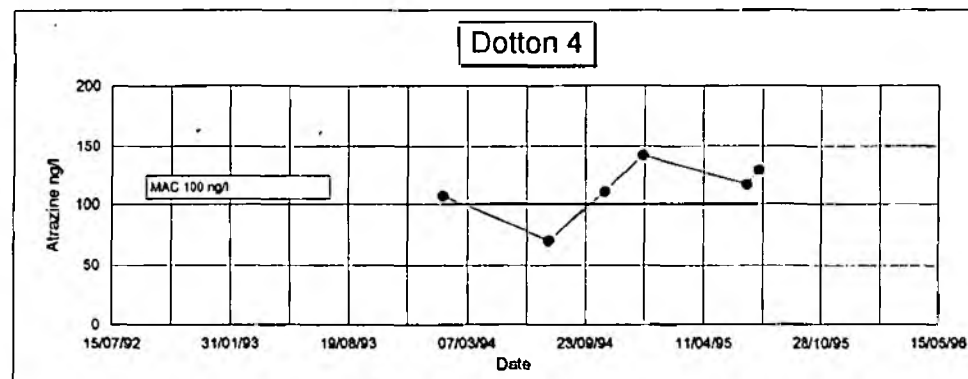
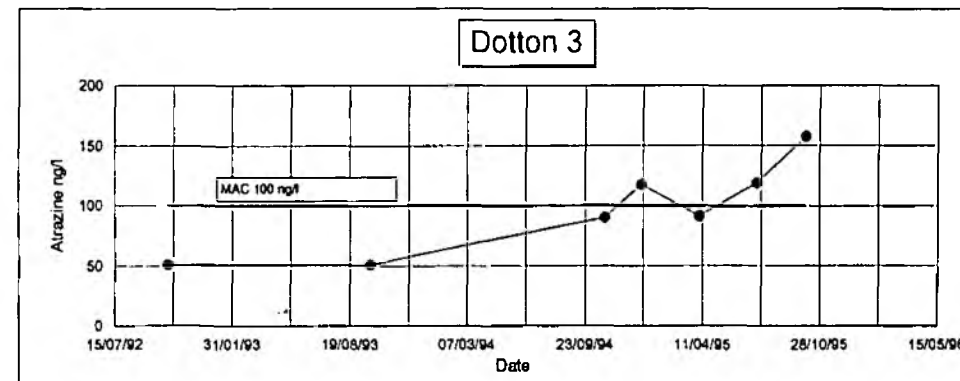
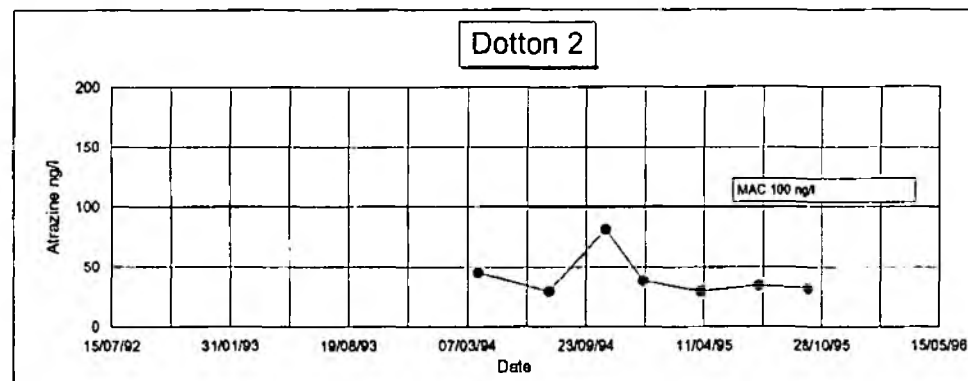
All < results shown at face value

Routine Groundwater Monitoring Programme Atrazine concentrations in the Otter Valley Boreholes.



All < results shown at face value

Routine Groundwater Monitoring Programme Atrazine concentrations in the Otter Valley Boreholes.



All < results shown at face value

ANALYTICAL SUMMARY OF:-

HARPFORD 9F-TOP OF TRACK AT BACK OF HARPFORD WOODS-TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATFAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NE/L	NE/L
1092	1415	SZZZ	ZE		20.30	5.00		
1093	1030	SQMR	ZE		29.41	5.00		
220794	1355	SQMR	ZE		16.00	5.00		
241094	1415	SQMR	ZE		19.50	5.50		
00795	1135	SQMR	ZE		30.00	30.00	18	92.0
051095	1400	SQMR	ZE		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

BUTTON 1 - ADJACENT TO BUILDING IN WORKS
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NE/L	NE/L
11092	1500	SZZZ	ZE		57.70	6.80		
10995	1225	SQMR	ZE		21.50	5.00		
220794	1300	SQMR	ZE		32.00	5.00		
241094	1045	SQMR	ZE		32.10	7.10		
241294	1200	SQMR	ZE		42.10	30.00	40	92.0
080495	1140	SQMR	ZE		59.40	30.00	47	92.0
120795	0930	SQMR	ZE		107.20	30.00	40	105.6
241095	1130	SQMR	ZE		45.30	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

DOTTON 2 - TOP OF SITE BEHIND WORKS

Date	Time	Type	Purp	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
240694	1405	SGMR	2E		45.30	8.00	47	92.00
20794	1245	SGMR	2E		30.00	5.00		
261094	1100	SGMR	2E		31.20	12.20		
291294	1130	SGMR	2E		33.30	30.00	38	92.00
30495	1150	SGMR	2E		30.00	30.00	22	92.00
30795	0940	SGMR	2E		34.90	30.00	23	92.00
051095	1115	SGMR	2E		31.90	31.90		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

DOTTONS - RAW WATER TAP INSIDE WORKS

Date	Time	Type	Purp	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
241092	1545	SZZZ	2E		51.40	5.70		
30993	1310	SGMR	2E		51.50	5.00		
261094	1110	SGMR	2E		30.10	7.80		
291294	1140	SGMR	2E		112.10	20.00	67	92.00
30495	1133	SGMR	2E		91.50	30.00	64	92.00
30795	0950	SGMR	2E		120.10	32.00	42	98.10
051095	1140	SGMR	2E		138.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

BOTTOM 4 - NEAR BOTTOM TURN OFF ON A376
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
050194	1025	SDMR	2E		107.10	5.000	120	
0794	1330	SDMR	2E		70.40	5.000		
01094	1350	SDMR	2E		110.50	5.20		
091294	1240	SDMR	2E		142.10	30.000	171	92.00
0595	1520	SPOL	2E		116.50	30.000	104	92.00
0795	1000	SDMR	2E		129.00	30.000	65	92.00

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

BOTTOM 7 - TOP OF FIELD BESIDE BOTTOM LANE
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
0995	1030	SDMR	2E		9.000	5.000		
0794	1210	SDMR	2E		9.000	5.000		
01094	1130	SDMR	2E		9.000	5.000		
091294	1120	SDMR	2E		30.000	30.000	170	92.00
0495	1200	SDMR	2E		31.800	31.800	180	97.50
0795	1015	SDMR	2E		30.000	30.000	170	92.00
051095	1150	SDMR	2E		30.000	30.000		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

GREATWELL 1 - RIGHT SIDE OF B8174 FROM OTTERY BETWEEN BOREHOLES 5 AND
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISDP
					NG/L	NG/L	NG/L	NG/L
1092	1200	SZZZ	2E		16.30	5.00		
280998	1225	SQMR	2E		19.03	5.00		
140794	0911	SQMR	2E		9.00	5.00	17	92.0
1094	1600	SQMR	2E		9.00	5.00		
00795	1250	SQMR	2E		30.00	30.00		92.0
051055	1500	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

GREATWELL 2 - RIGHT SIDE OF B8174 FROM OTTERY BETWEEN BOREHOLES 5 AND
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISDP
					NG/L	NG/L	NG/L	NG/L
1092	1215	SZZZ	2E		10.00	5.00		
280998	1210	SQMR	2E		9.00	5.00		
140794	0924	SQMR	2E		10.80	5.00	17	92.0
1094	1545	SQMR	2E		9.00	5.00		
00795	1240	SQMR	2E		30.00	30.00	17	92.0
051095	1445	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

GREATWELL 3 - OPPOSITE SIDE OF ROAD TO GREATWELL 5 (RIGHT SIDE OF B3174
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
41092	1130	SZZZ	2E		111.90	5.00<		
40794	0851	SQMR	2E		139.50	5.00<	134	92.0<
51094	1530	SQMR	2E		126.70	5.00<	114	
30795	1250	SQMR	2E		192.60	30.00<	95	92.0<
51095	1435	SQMR	2E		143.00	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

GREATWELL 4B - RIGHT SIDE OF B3174 FURTHEST AWAY FROM OTTERY

Date	Time	Type	Purp	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
40794	0946	SQMR	2E		9.00<	5.00<	17<	92.0<
51094	1630	SQMR	2E		9.70<	5.40<		
30795	1305	SQMR	2E		30.00<	30.00<	17<	92.0<
51095	1510	SQMR	2E		20.00<	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

GREATWELL 5P - RIGHT SIDE OF B3174 NEAREST OTTERY - TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
141092	1115	SZZZ	2E		10.70	5.30		
140996	1135	SQMR	2E		9.00	5.00		
140794	0831	SQMR	2E		9.80	5.30	18	98.1
130795	1220	SQMR	2E		30.00	30.00	17	92.0
131095	1430	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()

TYPE

ONLINE

READY

ANALYTICAL SUMMARY OF:-

COLATON RALEIGH 2 - LEFT HAND SIDE OF KINGSTON ROAD FROM COLATON TAP BY BOREHOLE CHAMBER

Date	Time	Type	Pump	Mat	ATRAZI	SIMAZI	ATRZ-E	ATRZ D
					NE	NE	THYL	ESISOP
					NG/L	NG/L	NG/L	NG/L
140998	1100	SQMR	2E		9.00	5.00		
140994	1420	SQMR	2E		9.00	5.00	17	92.0
140794	1125	SQMR	2E		9.00	5.00		
131094	1240	SQMR	2E		9.00	5.00		
141294	1110	SQMR	2E		30.00	30.00	17	92.0
140495	1210	SQMR	2E		32.00	32.00	18	98.2
130795	1100	SQMR	2E		30.00	30.00	17	92.0
131095	1210	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()

TYPE

ONLINE

READY

ANALYTICAL SUMMARY OF:-

OTTERTON 1A - RIGHT SIDE OF ROAD TO COLLIVER CROSS

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
0899	1440	SQMR	2E		9.00<	5.00<		
0794	1105	SQMR	2E		9.00<	5.00<		
094	1200	SQMR	2E		9.00<	5.00<		
0795	1055	SQMR	2E		20.00<	30.00<	17<	92.0<
1095	1010	SQMR	2E		20.00<	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

OTTERTON 4 - RIGHT SIDE OF ROAD TO SOUTH FARM
TAP IN BOX BY BOREHOLE

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
1092	1815	SZZZ	2E		27.10	6.60		
0593	1415	SQMR	2E		40.90<	5.00<		
1094	1215	SQMR	2E		26.20	5.00<		
0795	1045	SQMR	2E		52.10	30.00<	17<	92.0<
1095	1025	SQMR	2E		30.00<	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

COLATON RALEIGH 4 - LEFT SIDE OF POUND LANE - TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
00998	1130	SGMR	2E		9.00<	5.00<		
00794	1145	SGMR	2E		9.00<	5.00<		
261094	1305	SGMR	2E		9.00<	5.00<		
001294	1050	SGMR	2E		30.00<	30.00<	43	92.0<
00495	1205	SGMR	2E		30.00<	30.00<	49	92.0<
00795	1115	SGMR	2E		30.00<	30.00<	37	92.0<
051095	1230	SGMR	2E		30.00<	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit (Q)

TYPE

ONLINE

READY

ANALYTICAL SUMMARY OF:-

HARPFORD 6 - BOREHOLE NEAREST PUMP HOUSE - TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
01092	1330	SZZZ	2E		34.20	10.10		
00998	1045	SGMR	2E		29.04<	5.00<		
220794	1405	SGMR	2E		24.20	8.00		
01094	1430	SGMR	2E		25.70	9.10		
00795	1145	SGMR	2E		30.00<	30.00<	17<	92.0<
051095	1320	SGMR	2E		30.00<	30.00<		

Type "C" to Continue, "P" for previous screen, "Q" to Quit (Q)

TYPE

ONLINE

READY

ANALYTICAL SUMMARY OF:-

HARPFORD 7 - ADJACENT TO HARPFORD 6 (BOREHOLE NEAREST PUMP HOUSE)

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NG/L	NG/L
1-1092	1350	SZZZ	2E		41.10	9.40		
2-0993	1110	SQMR	2E		52.34	5.00		
051095	1335	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

ANALYTICAL SUMMARY OF:-

HARPFORD 8 - RIGHT SIDE OF ROAD FROM HARPFORD AT TOP OF FARM TRACK
TAP BY BOREHOLE CHAMBER

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NG/L	NG/L
1-1092	1445	SZZZ	2E		34.20	6.10		
2-0993	1055	SQMR	2E		35.40	5.80		
220794	1420	SQMR	2E		18.70	7.70		
3-1094	1450	SQMR	2E		18.50	8.40		
1-0795	1200	SQMR	2E		30.00	30.00	17	130.2
051095	1345	SQMR	2E		30.00	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READY

APPENDIX III

	Parameters	Expression of the results	Guide level (GL)	Maximum admissible concentration (MAC)	Comments
52	Antimony	Sb µg/l		10	
53	Selenium	Se µg/l		10	
54	Vanadium	V µg/l			
55	Pesticides and related products — substances considered separately — total	µg/l		0.1 0.5	'Pesticides and related products' means: — insecticides: — persistent organochlorine compounds — organophosphorous compounds — carbamates — herbicides — fungicides — PCBs and PCTs
56	Polycyclic aromatic hydrocarbons	µg/l		0.2	— reference substances: — fluoranthene/benzo 3-4 — fluoranthene/benzo 11-12 — fluoranthene/benzo 3-4 — pyrene/benzo 1-12 — perylene/indeno (1, 2, 3 - cd) pyrene

CAS NUMBER

1912-24-9

CHEMICAL

Atrazine; Atradox; Gesaprim;

WATER USE

Protection of Freshwater Life

TYPE OF STANDARD

Proposed DoE EQS

VALUE

2.0 $\mu\text{g/l}$ (1).

NOTES

The standard is expressed as combined atrazine and simazine (dissolved concentration and annual average) because the two herbicides appear to have similar toxicities and are expected to have additive toxic effects (1).

A corresponding Maximum Allowable Concentration (MAC) has also been defined. This is 10.0 $\mu\text{g/l}$ (as combined dissolved atrazine and simazine).

STATUS

Proposed DoE EQS (1), currently under public consultation.

For the protection of freshwater life.

INFORMATION

Atrazine is a UK Red List substance and as such is controlled by the dual approach of applying the appropriate EQS or a limit value (for prescribed processes only), whichever is the more stringent. Atrazine is also a priority hazardous substance as defined at the Third Ministerial Conference on the North Sea. The UK is committed to reducing, by 1995, the input of these substances via rivers and estuaries to its coastal waters, by approximately 50%, based on 1985 levels. Additionally, under agreements made at the conference, the use of this substance as a pesticide must be strictly limited or banned.

PRIORITY LISTS

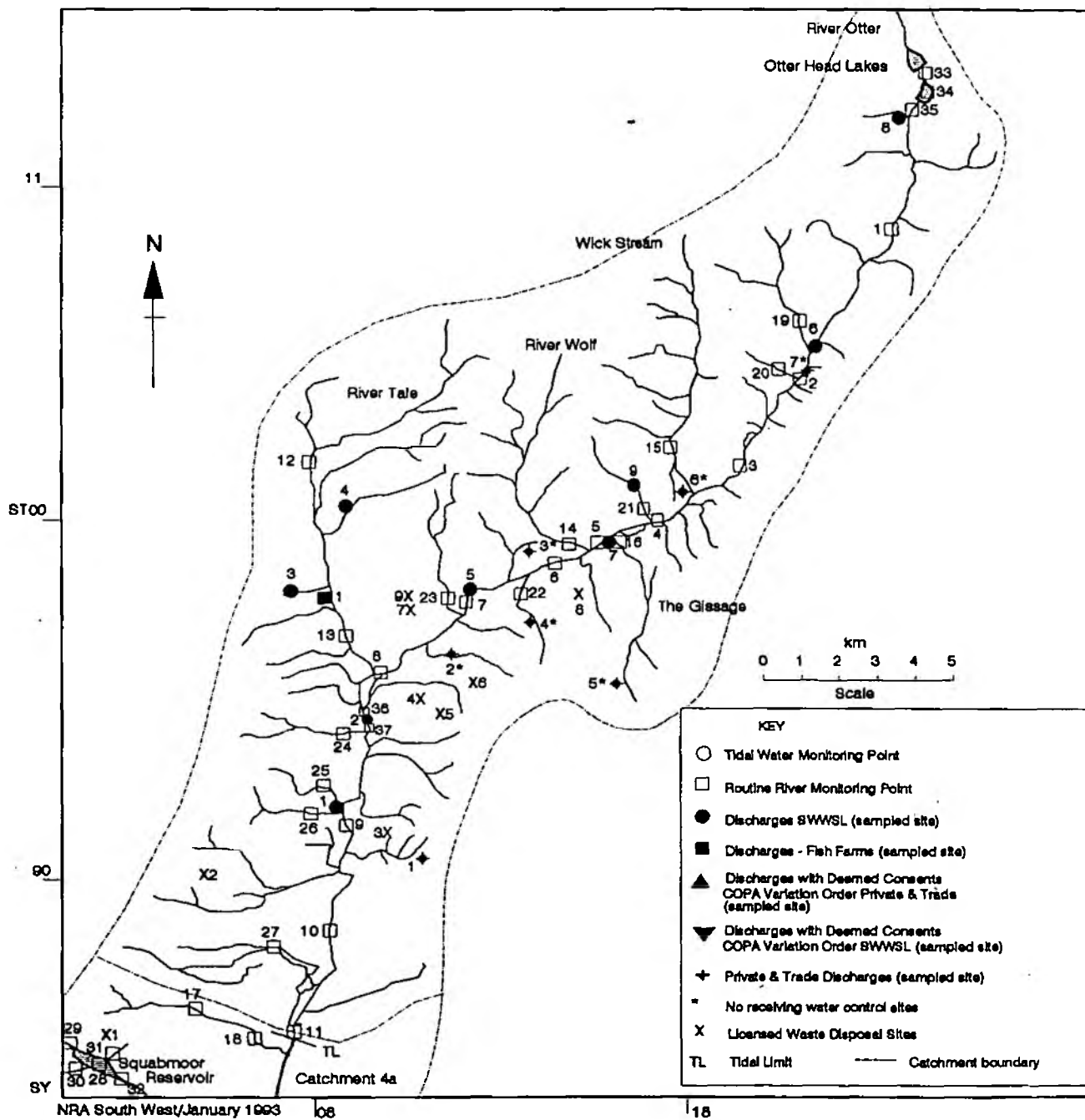
UK Red List INFO LIST
North Sea Conference - priority hazardous substances INFO LIST
North Sea Conference - limits on use of pesticides INFO LIST
List of 129 (priority candidate black list) INFO LIST

REFERENCES

1) Hedgecott, S. Proposed environmental quality standards for atrazine and simazine in water (DWE 9378). Report No DoE 2316-M/1. WRC, February (1991).

APPENDIX IV

Otter Catchment 4B



OTTER CATCHMENT 4B

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
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PRIVATE AND TRADE DISCHARGES

1	PO4B/P/3	SY10509020	Bowd Inn	Public House STW
2*	PO4B/P/2	SY10809680	Redhills Cottages	Domestic STW
3*	PO4B/P/20	ST13000030	Deer Park Hotel	Hotel STW
4*	PO4B/P/5	SY13819791	Combe House Hotel	Hotel STW
5*	PO4B/P/6	SY15319678	Faraway Farm	
6*	PO4B/P/9	ST16760209	Higher Crook Farm	
	PO4B/P/7	ST16760209	Plot 1	
	PO4B/P/8	ST16760209	Plot2	
7*	PO4B/P/11	SY19850623	Ottervale Close	

DISCHARGES SWWSL

1	WSTW7706FE	SY08809260	Fluxton, Ottery	Sewage treatment works
2	WSTW7704FE	SY09409490	Ottery St Mary	Sewage treatment works
3	WSTW7778FE	SY07509880	Talaton	Sewage treatment works
4	WSTW7714FE	ST08720124	Payhembury	Sewage treatment works
5	WSTW7610FE	SY11409900	Feniton	Sewage treatment works
6	WSTW7804FE	ST20400760	Upottery	Sewage treatment works
7	WSTW7646FE	ST15200094	Honiton	Sewage treatment works
8	WSTW7548FE	ST21901250	Churchingford	Sewage treatment works
9	WSTW7556FE	WY16100225	Combe Raleigh	Sewage treatment works

FISH FARMS

1	PO4B/P/1	SY08209810	Escot Aquaculture, Ottery St Mary
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WASTE DISPOSAL SITES

1	11AAEMAL	SY03308410	Withycombe Raleigh Common, Exmouth
2	11AABAAL	SY05509000	Aylesbeare Common, Aylesbeare
3	11AAFVAL	SY10409080	Woods Farm, Sidmouth
4	11AAAXAL	SY11609580	Old Brickworks, Chineway
5	11AAEBAL	SY12009580	Chineway Hill, Ottery St Mary
6	11AABOAL	SY11709640	Holcombe Lane, Ottery St Mary
7	11AACGAL	SY10109800	Ash Farm, Feniton
8	11AAGPAL	SY14509960	Heathpark Industrial Estate, Honiton
9	11AAHYAL	SY09000900	Guest Brothers, Feniton

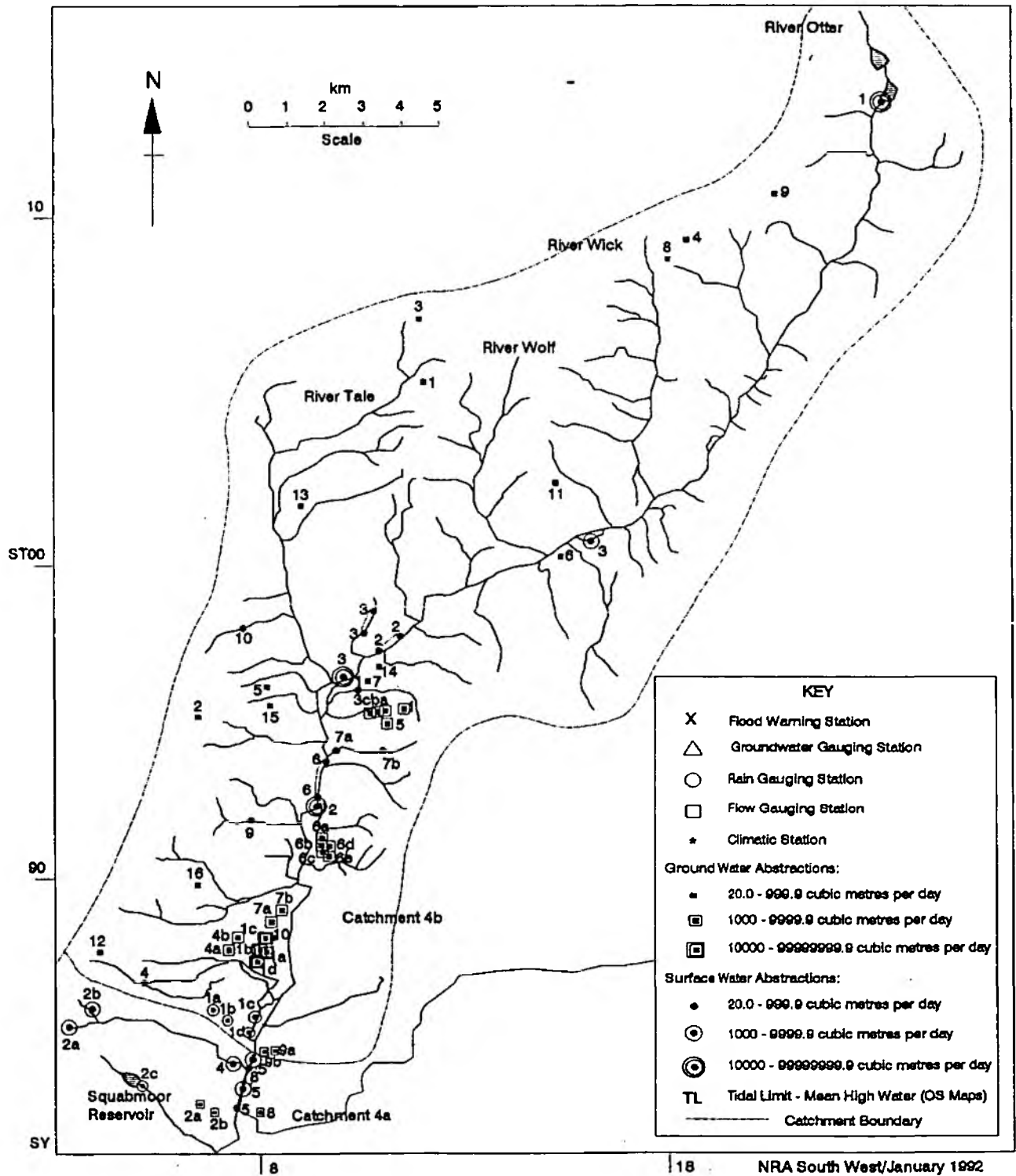
ROUTINE RIVER MONITORING

1	R04B001	ST22101035	Hoemore Farm	Chemical site
	0401	ST22121040		Biological site
2	R04B042	ST19830625	Rawridge	Chemical site
	0412	ST19830627		Biological site
3	R04B035	ST18360306	Monkton	Chemical site
	0402	ST18500310		Biological site
4	R04B002	ST16330120	Clapperlane Bridge	Chemical site
	0413	ST16380123		EC dangerous substances site
5	R04B014	ST14800075	Cottarson Farm	Biological site
				Chemical site
				Freshwater Fish Directive
				EC dangerous substances site
6	R04B003	ST14300009	Weston	Chemical site
	0403	ST14220006		Biological site
7	R04B019	SY11489858	Fenny Bridges	Chemical site
	0414	ST11459870		Biological site
8	R04B004	SY09359606	Ottery St Mary	Chemical site
	0404	SY09379607		Biological site

OTTER CATCHMENT 4B (cont)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
ROUTINE RIVER MONITORING				
9	R04B005	SY09019180	Tipton St John	Chemical site
	0405	SY08959196		Biological site
10	R04B006	SY08748857	Dotton Mill	Chemical site
				Freshwater Fish Directive
				EC dangerous substances site
				Harmonised monitoring site
	0415	SY08738853		Biological site
11	R04B007	SY07918529	Otterton	Chemical site
				Red List site
	0406	SY07908524		Biological site
12	R04B008	ST07620329	Danes Mill	Chemical site
	0426	ST07580340		Biological site
13	R04B009	SY08929692	Taleford	Chemical site
	0411	SY08959689		Biological site
14	R04B011	ST14330059	Winniford Farm	Chemical site
	0409	ST14320060		Biological site
15	R04B010	ST16900284	Mill House Nursery	Chemical site
	0407	ST16850293		Biological site
16	R04B023	ST15330115	River Gissage	Chemical site
	0408	ST15280117		Biological site
17	0425	SY05278570	Budleigh Brook	Biological site
18	R04A001	SY07328418	Budleigh Brook	EC surface water abstraction
				directive monitoring site
19	0416	ST19940778	Fairoak Stream	Biological site
20	0427	ST19770619	Odle Brook	Biological site
21	0418	ST16300175	Coombe Raleigh Str	Biological site
22	0419	SY13439913	River Git	Biological site
23	0420	SY11089914	Vine Water	Biological site
24	0421	SY08839455	West Hill Stream	Biological site
25	0422	SY08639283	Fluxton Stream	Biological site
26	0423	SY07979197	Metcombe Brook	Biological site
27	0424	SY07188767	Colaton Raleigh Str	Biological site
28	R04A007	SY04008390	Squabmoor Reservoir	Chemical site
				Enclosed waters programme
				Freshwater Fish Directive
	R04B045	SY04008385	Squabmoor Reservoir	EC surface water abstraction
				directive monitoring site
	R04A006	SY04008390	Squabmoor Reservoir	Enclosed waters programme
	R04A008	SY04008390		Enclosed waters programme
29	R04A004	SY03908430	Inflow to Squabmoor	Enclosed waters programme
30	R04A003	SY03908410	Dalditch plantation	Enclosed waters programme
			inflow	Enclosed waters programme
31	R04A002		Budleigh Common	Enclosed waters programme
			inflow	Enclosed waters programme
32	R04A005	SY04108380	Outflow/Squabmoor	Enclosed waters programme
33	R04B048	ST22601350	Inflow to Otterhead	Enclosed waters programme
34	R04B051	ST22601320	Otterhead	Enclosed waters programme
	R04B052	ST22601320	Otterhead	EC surface water abstraction
			Reservoir	directive monitoring site
35	R04B050	ST22601320	Outflow/Otterhead	Enclosed waters programme
36	WSTW7704A	SY09609470	U/S Ottery St Mary	EC dangerous substances site
37	WSTW7704B	SY09609470	D/S Ottery St Mary	EC dangerous substances site

Otter Catchment 4A & 4B (1)



OTTER CATCHMENT 4A & 4B (1)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
SURFACE WATER ABSTRACTION SITES (20.0 - 999.9 cubic metres per day)				
1	01/0335	SY10109610	Woodcote Farm, Ottery St Mary	Spray Irrigation (Summer) Agriculture
2	01/0391	SY10509740- SY10009680	Woodford Barton, Gosford Road, Ottery St Mary	Spray Irrigation (Summer)
3	01/0392	SY09809700- SY10209750	Gosford Pines, Gosford, Ottery St Mary	Spray Irrigation (Summer)
4	01/0433	SY05208680	Selwoods Leat, Bicton	Private: Amenity Fountains
5	01/0487	SY07108300	South Farm, Otterton	Spray Irrigation (Summer)
6	01/0515	SY09409380- SY09109310	Higher Cotley Farm, Tipton Vale, Ottery St Mary	Spray Irrigation (Summer)
7	01/0536	SY07409730	Escot Estate, Talatton	Pisciculture
8	01/0528	SY07808500- SY07608400	Otterton Barton	Spray Irrigation (Summer)
9	01/0533	SY07309190	Halls Farm, Ottery St Mary	Spray Irrigation (Summer)

SURFACE WATER ABSTRACTION SITES (1000.0 - 9999.9 cubic metres per day)				
1a	01/0389	SY06908610	Bicton Agricultural	Spray Irrigation (Summer)
1b	01/0389	SY07108610	College and Colaton	
1c	01/0389	SY07708550	Raleigh	
1d	01/0389	SY07708540- SY07908570		
2a	01/0422	SY03708570	Yettington Intake	South West Water Services Ltd
2b	01/0422	SY03908590	Yettington Intake	
2c	01/0422	SY03908390	Squabmoor Reservoir	
3	01/0464	ST15600110	Tracey Mill, Tracey, Honiton	Pisciculture
4	01/0494	SY07308410	Budleigh Brook Intake	South West Water Services Ltd
5	01/0516	SY07508430- SY07108300	Pullhayes Farm, Budleigh Road	Spray Irrigation (Summer)

SURFACE WATER ABSTRACTION SITES (10000.0 - 99999999.9 cubic metres per day)				
1	01/0002	ST22601300	Otterhead (Royston Water)	Wessex Water PLC
2	01/0440	SY09109260	46 Tipton St John Sidmouth	Industrial Processing: Water Power
3	01/0484	SY09509610	The Mill Stream, Ottery St Mary	Private: Amenity Leat

OTTER CATCHMENT 4A & 4B (1) (cont)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
GROUND WATER ABSTRACTION SITES (20.0 - 999.9 cubic metres per day)				
1	01/0041	ST11000550	Lane End Farm, Broadhembury, Honiton	Agriculture
2	01/0063	SY06209490	Rockbeare Hill	Industrial Processing:Quarrying
3	01/0104	ST11200690	Quarry, Rockbeare Droughtwell Farm, Sheldon, Honiton.	Agriculture
4	01/0229	ST18600950	Chapelhayes Farm, Upottery, Honiton	Agriculture
5	01/0308	SY07509590	Cadhay House, Cadhay Barton and 1 & 2 Cadhay Bungalows, Ottery St Mary	Agriculture Private: Domestic
6	01/0311	ST14800010	Roebuck Farm and East Devon Dairies, Honiton	Agriculture Industrial Processing: Food & Drink
7	01/0334	SY10109620	Woodcote Farm, Ottery St Mary	Agriculture Spray Irrigation (Summer)
8	01/0344	ST18400920	Riggles Farm and Caravan site, Upottery	Agriculture Private: Holiday/Recreation
9	01/367	ST20400970	Moonhayes Farm Upottery	Agriculture Agriculture Water Power
10	01/0373	SY08008910	Owls Hatch, Warren House and Ely Bungalow, Newton Poppleford	Agriculture Private: Domestic Spray Irrigation (Summer)
11	01/0417	ST15100240	St Cyres Spring	Agriculture
12	01/0435	SY04108760	Bicton House and 4 other properties Bicton	South West Water Services Ltd Agriculture Private: Domestic/Miscellaneous Spray Irrigation (Summer & Winter)
13	01/0443	ST09100200	Slade Barton, Payhembury	Agriculture
14	01/0471	ST10209650	Otter Nurseries, Ottery St Mary	Spray Irrigation (Summer)
15	01/0530	SY07609510	Taylor Catering Foods, Exeter Road, Ottery St Mary	Spray Irrigation (Summer)
16	01/0537	SY06508950	Hillside, Newton Poppleford	Spray Irrigation (Summer)
17	01/0556	ST22600850	Newcott Farm Upottery	Agriculture
18	01/0551	ST09100200	Slade Barton Payhembury	Agriculture

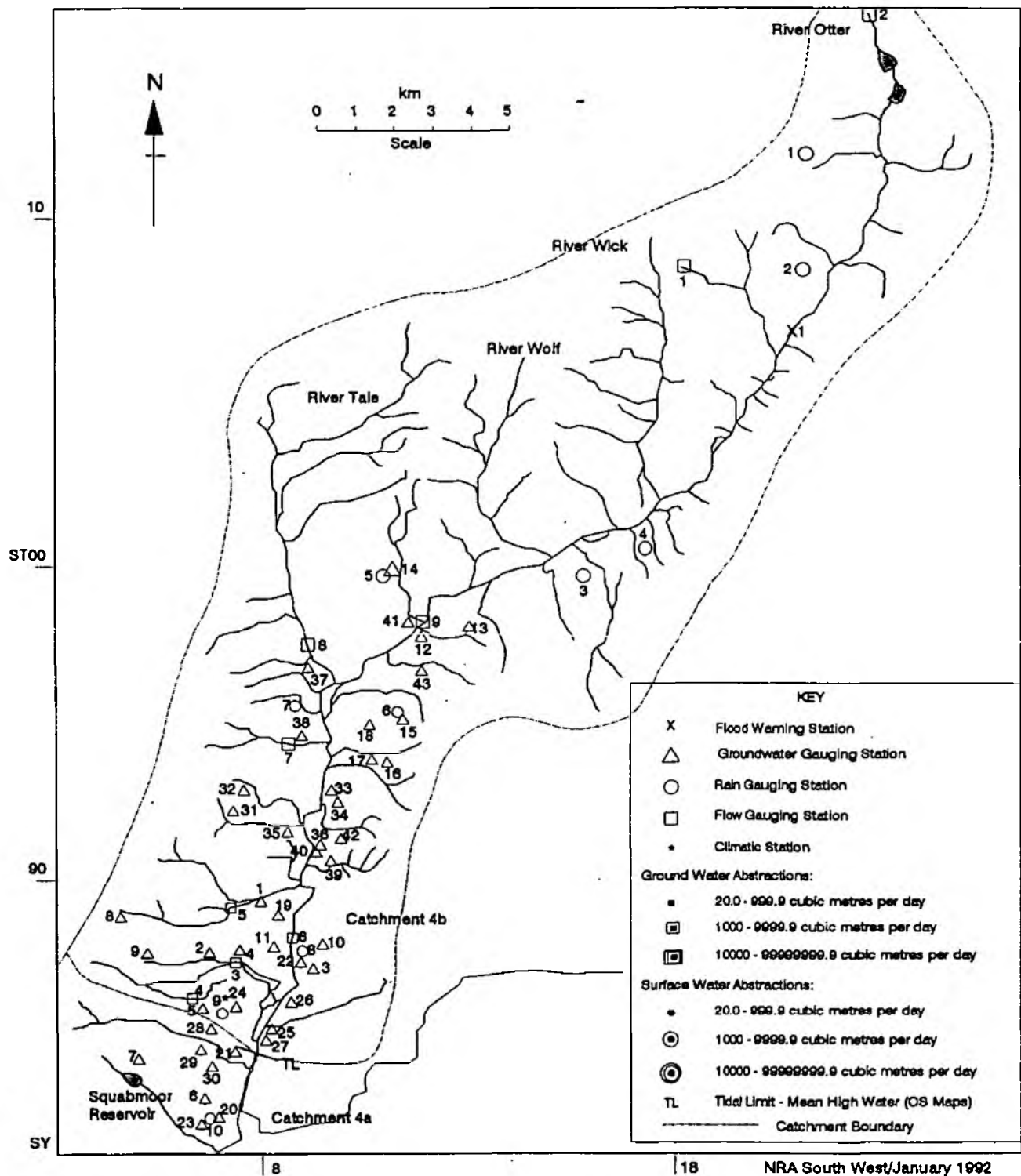
OTTER CATCHMENT 4A & 4B (1) (cont)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
GROUND WATER ABSTRACTION SITES (1000.0 - 9999.9 cubic metres per day)				
1	01/0414	SY11409550	Greatwell 4B Borehole	South West Water Services Ltd
2a	01/0425	SY06108320	Tidwell &	South West Water Services Ltd
2b	01/0425	SY06408300	Kersbrook Springs	South West Water Services Ltd
3a	01/0426	SY11009550	Greatwell Borehole No1	South West Water Services Ltd
3b	01/0426	SY10909550	Greatwell Borehole No2	South West Water Services Ltd
3c	01/0426	SY10809550	Greatwell Borehole No3	South West Water Services Ltd
4a	01/0478	SY07008770	Colaton Raleigh Borehole No2	South West Water Services Ltd
4b	01/0478	SY07508790	Colaton Raleigh Borehole No4	South West Water Services Ltd
5	01/0505	SY11009510	Greatwell Borehole No5	South West Water Services Ltd
6a	01/0518	SY09109100	Harpford Borehole No5	South West Water Services Ltd
6b	01/0518	SY09109080	Harpford Borehole No6	South West Water Services Ltd
6c	01/0518	SY09109060	Harpford Borehole No7	South West Water Services Ltd
6d	01/0518	SY09309080	Harpford Borehole No8	South West Water Services Ltd
6e	01/0518	SY09309040	Harpford Borehole No9P	South West Water Services Ltd
7a	01/0520	SY08508880	Dotton Borehole No4	South West Water Services Ltd
7b	01/0520	SY08708910	Dotton Borehole No5	South West Water Services Ltd
8	01/0527	SY07808270	South Farm, Otterton	Industrial Processing: Food & Drink
9a	01/0544	SY08308440	Otterton Borehole No1A	Spray Irrigation (Summer) South West Water Services Ltd
9b	01/0544	SY07808460	Otterton Borehole No4	South West Water Services Ltd

GROUND WATER ABSTRACTION SITES
(10000.0 - 99999999.9 cubic metres per day)

1a	01/0519	SY08308820	Dotton Borehole No1	South West Water Services Ltd
1b	01/0519	SY08208820	Dotton Borehole No2	South West Water Services Ltd
1c	01/0519	SY08408830	Dotton Borehole No3	South West Water Services Ltd
1d	01/0519	SY07908800	Dotton Borehole No7	South West Water Services Ltd

Otter Catchment 4A & 4B (2)



OTTER CATCHMENT 4A & 4B (2)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
RAIN GAUGING STATIONS				
1	RF353907	ST21301250	Churchingford	
2	RF353965	ST20700890	Yew Tree, Upottery	
3	RF354167	ST15800000	Rosemount, Honiton	
4	RF354170	ST17100040	C. Castle, Honiton	
5	RF354295	SY10909940	Feniton Court	
6	RF354492	SY11009550	Ottery St Mary	
7	RF354497	SY09009530	Kings School, Ottery St Mary	
8	RF354658	SY08308820	Dotton Pumping Station	
9*	RF354697	SY07108670	Bicton Agricultural College, Bicton	Climate station
10	RF354778	SY06408310	Kersbrook	
FLOW GAUGING STATIONS (SURFACE)				
1	ST10F041	ST18400940	Riggles Farm	
2	ST21F003	ST21901500	Yalham Farm	
3	SY08F051	SY07228767	Pophams Farm	
4	SY08F052	SY05888669	Stowford	
5	SY08F053	SY06968925	Goosemoor	
6	SY08F055	SY08708850	Dotton	Telemetry Flood Warning Station
7	SY09F051	SY08819454	Salston	
8	SY09F073	SY08809710	Fairmile	
9	SY19F052	SY11509860	Fenny Bridges	Telemetry Flood Warning Station
GROUNDWATER GAUGING STATIONS				
1	SY08G016	SY07718973	Burrow	
2	SY08G021	SY06528785	Kingston Farm, Colaton Raleigh	
3	SY08G026	SY09058766	Passaford Farm	
4	SY08G030	SY07508794	Colaton Raleigh 4A	
	SY08G031	SY07028765	Colaton Raleigh 2A	
5	SY08G033	SY05118473	Hayes Wood	
6	SY08G034	SY06078332	Tidwell Farm	
7	SY08G038	SY04148434	Woodbury ED	
8	SY08G062	SY04638897	Canterbury Green	
9	SY08G065	SY05338782	Woodbury Common No2	
10	SY08G077	SY09338846	Northmostown No4	
11	SY08G081	SY07878910	Warren House	
12	SY19G049	SY11129744	Alfington No2	
13	SY19G051	SY12219743	Alfington No4	
14	SY19G052	SY10909937	Feniton Court	
15	SY19G059	SY11029514	Greatwell No5A	
16	SY19G063	SY10689410	Greatwell No8	
17	SY19G064	SY10239397	Greatwell No9	
18	SY19G065	SY10799518	Two Acre	
19	SY08G122	SY08638930	Dotton No6	
20	SY08G138	SY06388309	Kersbrook No1A	
	SY08G139	SY06408308	Kersbrook No1B	
21	SY08G142	SY07358466	East Budleigh No1	
22	SY08G144	SY09028803	Houghton Farm No2	
23	SY08G146	SY06098287	Tidwell No1	
24	SY08G149	SY07788605	Bicton No1	
25	SY08G150	SY08478598	Ottertton No2	
26	SY08G151	SY09418650	Ottertton No3	
27	SY08G152	SY07808466	Ottertton No4	
28	SY08G157	SY06618544	Bicton No3	
29	SY08G154	SY06238445	East Budleigh No4	

OTTER CATCHMENT 4A & 4B (2) (cont)

NO	REFERENCE	NGR	LOCATION	ADDITIONAL DETAILS
GROUNDWATER GAUGING STATIONS				
30	SY08G155	SY06798379	East Budleigh No5	
31	SY09G021	SY06659234	Heathfields	
32	SY09G040	SY07179324	Longmeads	
33	SY09G054	SY09329357	Wiggaton No4	
34	SY09G088	SY09519259	Lancercombe	
35	SY09G095	SY08509146	Woodley No1	
36	SY09G098	SY09129078	Harpford No1	
37	SY09G099	SY08769659	Higher Pitt Cottage	
38	SY09G100	SY08909475	Salston Cottages	
39	SY09G102	SY09329043	Harpford No9A	
40	SY09G173	SY09089080	Harpford No2	
41	SY19G001	SY11459803	Berry House	
42	SY19G044	SY10109200	Highercoombe	
43	SY19G048	SY11199660	Alfington No1	

FLOOD WARNING STATIONS

1	160	ST20400750	Upottery
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ANALYTICAL SUMMARY OF:-

RIVER TALE AT TALEFORD

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NG/L	NG/L
050495	1050	SQMR	2F		30.00	30.00		
020595	1125	SQMR	2F		32.40	32.40		
070695	1049	SQMR	2F		55.50	32.30		
040795	1045	SQMR	2F		31.90	31.90		
030895	1220	SQMR	2F		30.00	30.00		
060995	1140	SQMR	2F		34.80	54.40		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()

TYPE

ONLINE

REAL

ANALYTICAL SUMMARY OF:-

RIVER OTTER AT CLAPPERLANE BRIDGE

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NG/L	NG/L
270395	1500	SQMR	2F		32.40	32.40		
020595	1135	SQMR	2F		30.00	30.00		
070695	1400	SQMR	2F		27.40	27.40		
050795	1235	SQMR	2F		30.00	30.00		
150895	1305	SQMR	2F		30.00	30.00		
060995	1305	SQMR	2F		31.20	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()

TYPE

ONLINE

REAL

ANALYTICAL SUMMARY OF:-

RIVER OTTER AT BOTTON MILL

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NS/L	NS/L
050495	1425	SQMR	2F		31.60	31.60		
020595	1650	SQMR	2F		34.00	34.00		
070595	1610	SQMR	2F		67.10	30.00		
040795	1540	SQMR	2F		30.00	30.00		
030895	1350	SQMR	2F		30.00	30.00		
060995	1515	SQMR	2F		32.00	33.50		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READ

ANALYTICAL SUMMARY OF:-

RIVER OTTER AT B3176 BRIDGE OTTERY ST MARY

Date	Time	Type	Purp	Mat	ATRAZI NE	SIMAZI NE	ATRZ-E THYL	ATRZ D ESISOP
					NG/L	NG/L	NG/L	NG/L
050495	1110	SQMR	2F		30.00	30.00		
020595	1140	SQMR	2F		33.00	33.00		
070695	1122	SQMR	2F		54.60	32.90		
040795	1105	SQMR	2F		37.70	32.80		
030895	1035	SQMR	2F		27.80	27.80		
060995	1125	SQMR	2F		35.50	30.00		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READ

ANALYTICAL SUMMARY OF:-

RIVER OTTER AT OTTERTON

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
180191	1110	SQMS	2F		40.00	40.00		
080291	1320	SQMS	2F		40.00	20.00		
270391	1145	SQMS	2F		40.00	40.00		
130591	1206	SQMS	2F		40.00	40.00		
040691	1041	SQMS	2F		40.00	40.00		
120791	1440	SQMS	2F		40.00	43.00		
310791	1631	SQMS	2F		40.00	40.00		
160991	1316	SQMS	2F		40.00	40.00		
291091	1225	SQMS			40.00	40.00		
201191	1300	SQMS	2F		40.00	40.00		
050495	1450	SQMS	2F		27.20	27.20		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READ

ANALYTICAL SUMMARY OF:-

RIVER OTTER AT OTTERTON

Date	Time	Type	Purp	Mat	ATRAZI NE NG/L	SIMAZI NE NG/L	ATRZ-E THYL NG/L	ATRZ D ESISOP NG/L
020595	1600	SQMS	2F		33.60	33.60		
070695	1500	SQMS	2F		53.90	31.70		
040795	1455	SQMS	2F		33.80	33.80		
030895	1415	SQMS	2F		30.00	30.00		
060995	0915	SQMS	2F		34.50	40.90		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()
 TYPE ONLINE READ

ANALYTICAL SUMMARY OF:--

OTTERHEAD RESERVOIR WATER ABSTRACTION
AT CURRENT DRAW-OFF LEVEL

Date	Time	Type	Purp	Mat	ATRAZI		SIMAZI		ATRZ-E		ATRZ D	
					NE	NG/L	NE	NG/L	THYL	NG/L	ESISOP	NG/L
180493	1615	SQMR	SD		10.00	5.00			10	20.0		
070593	0645	SQMR	2H		10.00	5.00			10	20.0		
271093	1040	SQMR	2H		9.00	5.00			17	92.0		
090394	1420	SQMR	2H		9.00	5.00			17			
210494	0955	SQMR	2F		9.00	5.00			17	92.0		
200694	0745	SQMR	2H		800.00				350			
260394	0750	SQMR	2H		9.00	5.00			17	92.0		
151194	1345	SQMR	2H		8.50	4.70			16	87.2		

Type "C" to Continue, "P" for previous screen, "Q" to Quit ()

TYPE

ONLINE

READ

ANALYTICAL SUMMARY OF:--

RIVER OTTER AT TIPTON ST JOHN

Date	Time	Type	Purp	Mat	ATRAZI		SIMAZI		ATRZ-E		ATRZ D	
					NE	NG/L	NE	NG/L	THYL	NG/L	ESISOP	NG/L
050495	1330	SQMR	2F		30.00	30.00						
020595	1335	SQMR	2F		33.20	33.20						
070695	1242	SQMR	2F		63.40	32.20						
040795	1315	SQMR	2F		35.10	30.00						
030895	0845	SQMR	2F		30.00	20.00						
060995	0935	SQMR	2F		37.70	36.00						

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TYPE

ONLINE

READ