SURVEY OF THE NON - AGRICULTURAL USE OF PESTICIDES WITHIN THE THAMES REGION.

DECEMBER 1993

FOREWORD

This report is the result of a survey carried out by Ms. N. Donelan as part of her industrial placement in 1992/93, under the supervision of Mr. S. Killeen (Principal Scientist, Regional Scientific Department, NRA-Thames Region). For further information please contact Mr. Killeen at:-

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1. INTRODUCTION

The National Rivers Authority (NRA) has a duty to maintain and improve the quality of both surface and groundwater (controlled waters). It is essential that the use or discharge of chemicals, which have the potential to affect the quality of these controlled waters, are carefully assessed and regulated in an appropriate manner.

In the case of pesticides there are over 450 active ingredients approved for use in the UK and these are related to a variety of agricultural and non-agricultural uses. Pesticides comprise a wide range of mainly organic chemicals which are used to kill particular organisms. The generic term pesticide includes herbicides, insecticides, fungicides and a range of other biocidal agents. They are marketed as formulated products which contain a series of one or more active ingredients which are pesticidal in nature.

Pesticides are used by, amongst others :-

- farmers in agriculture
- householders in domestic situations
- local authorities, for highway and park maintenance etc.
- other organisations (eg. Water Companies, Airports, British Rail)
- industry (eg. timber treatment works)

Their varied and widespread use poses an obvious threat to the water environment.

2. PROBLEMS ASSOCIATED WITH THE USE OF PESTICIDES

Pesticide residues may enter controlled waters through a variety of point and diffuse sources. The former may be controlled through existing legislation (eg. Water Resources Act 1991), the use of discharge consents or in the case of specific pollution incidents, via enforcement action. However, the control of diffuse sources is very difficult due to the numerous routes of entry into the aquatic environment. These include:-

- agricultural run-off
- urban run-off
- leaching from soil
- spray drift
- atmospheric input

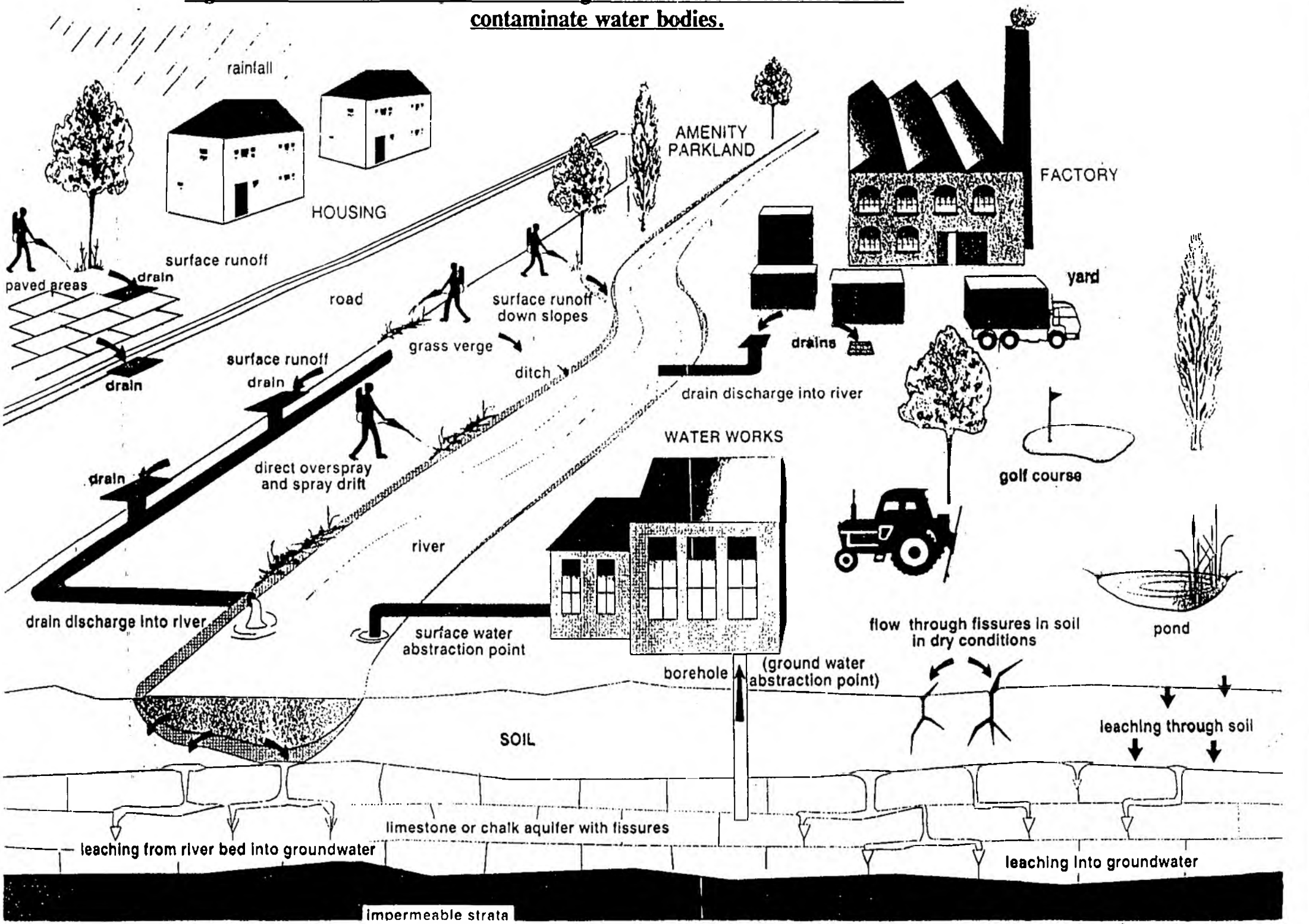
Figure 1 illustrates routes by which non-agricultural use of herbicides can contaminate water bodies.

In a recent Department of the Environment (DoE) report on the use of herbicides in non-agricultural situations in England and Wales it was stated that 21% of total use (550 tonnes) was within the Thames Region. This figure is consistent with the high population density and associated urban areas.

Pesticide residues have the potential to cause adverse effects in terms of both water quality and resources. Many of the compounds are acutely toxic to aquatic organisms at low levels and may persist in the environment for long periods of time. Their presence in drinking water is rigorously controlled through appropriate legislation. The EC Drinking Water Directive (80/778/EEC) is implemented in the UK by means of the Water Supply (Water Quality) Regulations 1989. The limits specified are 0.1ug/l for individual pesticides and 0.5ug/l for total pesticides. Water undertakers are required to notify the NRA if this so called Parameter 55 (P55) of the EC Directive is exceeded. Details of reported P55 failures are included in Appendix 1.

Due to the risk of contaminating public and private water supplies, and the expense involved in removing pesticides from raw waters, the NRA is commited to a series of actions aimed at reducing concentrations in both surface and groundwater. This requires the full co-operation of a wide range of organisations including other government departments, water supply companies and of course the users themselves. An outline of the NRA national and regional initiatives, in this area, are given overleaf.

Figure 1. Some routes by which non-agricultural use of herbicides can contaminate water bodies.



2a. National Initiatives

As many of the pesiticide issues are common throughout the NRA there is a requirement to develop a consistent national approach. Key activities in this area may be summarised as follows.

1. Establishment of a national pesticide centre to co-ordinate specific work and reporting requirements relating to pesticides.

2. Development of an NRA national pesticide strategy.

3. National policy on NRA use of pesticides.

4. Groundwater Protection Policy (Protection Zones)

5. R & D projects which consider the routes of entry, toxicity, fate and behaviour of specific pesticides.

6. Development of Environmental Quality Standards (EQSs) for pesticides of concern to the NRA.

7. Liaison with government departments, manufacturers and major users of pesticides.

8. Promotion of non-chemical methods for weed control.

9. Water Quality Series report on pesticides (anticipated April 1994).

2b. Regional Initiatives

1. Non-agricultural pesticides survey

2. Regional seminar (December 1993)

3. Pollution Prevention campaigns (eg. timber treatment facilities)

4. Assessment of specific local authority and County Council weed control programmes.

5. Formal liaison with water companies regarding water quality and water resource issues.

6. Extensive monitoring for 'non-statutory' pesticides (1994).

7. Assessment of agricultural inputs (1994)

8. Development of coherent regional pesticide policy (1994)

3. THAMES REGION NON-AGRICULTURAL PESTICIDES SURVEY

As mentioned previously a significant amount of pesticides (primarily herbicides) are known to be used in the Thames Region. However the precise nature, range and geographical use patterns had not previously been evaluated.

The main objectives of the survey were as follows:-

1. Identify the nature and range of pesticides used in non-agricultural situations.

2. Quantify present and indicate future usage of pesticides (eg. following the Simazine and Atrazine ban).

In addition as a consequence of carrying out the survey it was also hoped to:-

- Correlate use patterns with observed water quality problems or failure to comply with standards.

- Generate and maintain environmental awareness.

- Offer advice/guidance where possible to minimise overall risk to the water environment.

3a. PESTICIDE SURVEY

A questionnaire (Appendix 2) was sent out to 143 organisations operating within the Thames Region. The majority of contact names and addresses were taken from the Region's emergency planning database whilst other contacts, including British Rail and the electricity boards, were obtained from local directories.

The questionnaires sent to local authorities and county councils were addressed to the chief executives and it was anticipated that a collated response from various departments would be returned.

The questionnaires were sent out on the 9th November 1992 and by Christmas 50% of the organisations had responded. A second copy of the survey was sent out on the 3rd March 1993 to those organisations which had not yet replied. In May, the remaining organisations from which a reply had not been recieved were contacted by telephone and this resulted in futher returns.

The organisations contacted for this survey included:

- Local Authorities
- County Councils
- British Rail
- Heathrow Airport
- Gatwick Airport
- Stanstead Airport
- Luton Airport
- Electricity Boards
- Water Companies
- British Telecom
- National Rivers Authority - Thames Region

These organisations were chosen because they were perceived to be the major users of pesticides within the Thames region and their use covered large areas of land.

3b. SURVEY RESULTS

The overall response to the survey was most encouraging with 89% of the 143 organisations contacted completing the questionnaire. Of the 127 organisations that replied, 105 used pesticides, 16 indicated that they did not use pesticides and 5 were outside the Thames Region boundary (Appendix 3a,b and c). A total of 16 organisations did not respond.

The majority of the replies were from the local authorities and county councils. All the airports within the Region replied in full as did the electricity boards. There was also a good response from the water companies and other users such as British Rail and British Waterways.

The active ingredients of the pesticides in use were broken down into herbicides, fungicides, and insecticides and the number of organisations using each active noted. The results are shown below.

Herbicide Use

The most commonly used herbicide active, within the Thames Region, was Glyphosate which was used by 92 organisations (Figure 2). Dichlobenil was the second most widespread active, being used by 50 organisations.

Atrazine and Simazine were not among the 10 most commonly used herbicides and this indicated that many organisations were switching to products containing alternative actives as a result of the ban on the non-agricultural use of these substances which came into force in August 1993.

Of the five most commonly used herbicide actives in use within the Thames Region three have approval from MAFF for use in or near water. This was encouraging since it showed that a major proportion of herbicide actives used within the Thames Region were of a contact rather than residual nature.

However, the survey also indicated that Diuron was in widespread use within the Thames Region. It is used as a replacement for Atrazine and Simazine and is of environmental concern due to its high persistence. Many companies had switched to Diuron well in advance of the ban on Atrazine and Simazine.

Insecticide Use

The most common insecticide actives in use within the Thames Region were Permethrin which was used by 36 organisations and Gamma-HCH (Lindane) (21 organisations) (Figure 3).

These results are cause for concern since both Permethrin and Gamma-HCH which have national environmental quality standards are very toxic to aquatic organisms. Gamma-HCH (Lindane) is an organochlorine insecticide that is both highly toxic and persistent.

Of the ten most commonly used insecticide actives, four (Cypermethrin, Permethrin,

Deltamethrin, Resmethrin) are from the chemical group pyrethroids, which are all highly toxic to aquatic life.

Fungicide Use

Iprodione, which was used by 38 organisations (Figure 4), was the most widely used fungicide active within the Thames Region. Thiabendazole was the second most common (16 organisations). The results clearly showed that, of the major groups of pesticides, fungicides are subject to limited use in the Thames Region.

Company Policy

The survey asked organisations to specify any policies they may have for pesticide use. Of 143 organisations, only 17 had any formal policy. This shows a direct requirement for universal policy making within these organisations. The NRA has a Regional policy on its own use of herbicides.

FIGURE 2. THE 10 MOST COMMONLY USED HERBICIDE ACTIVES WITHIN NRA-THAMES REGION

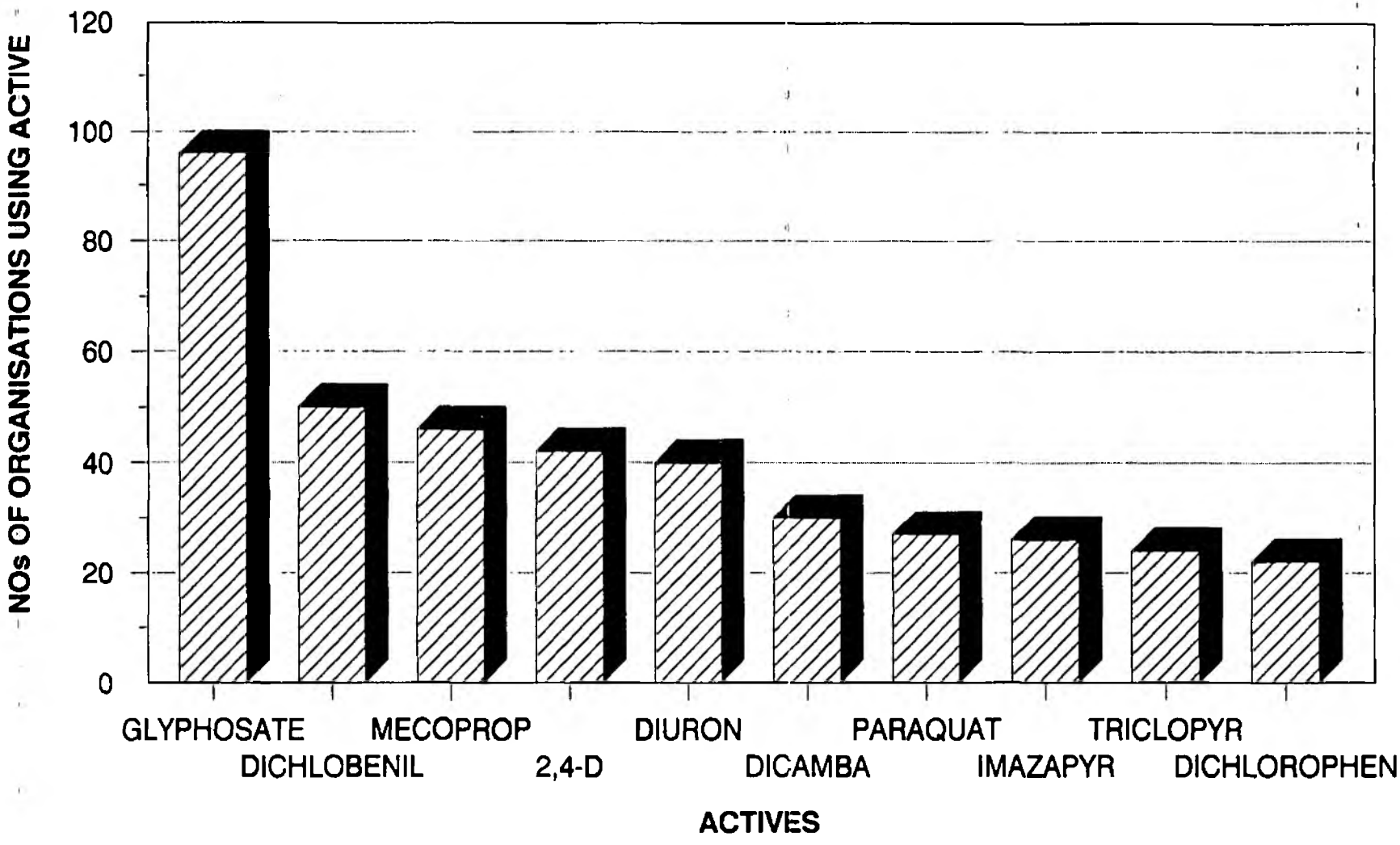


FIGURE 3. THE 10 MOST COMMONLY USED INSECTICIDE ACTIVES WITHIN THE NRA-THAMES REGION

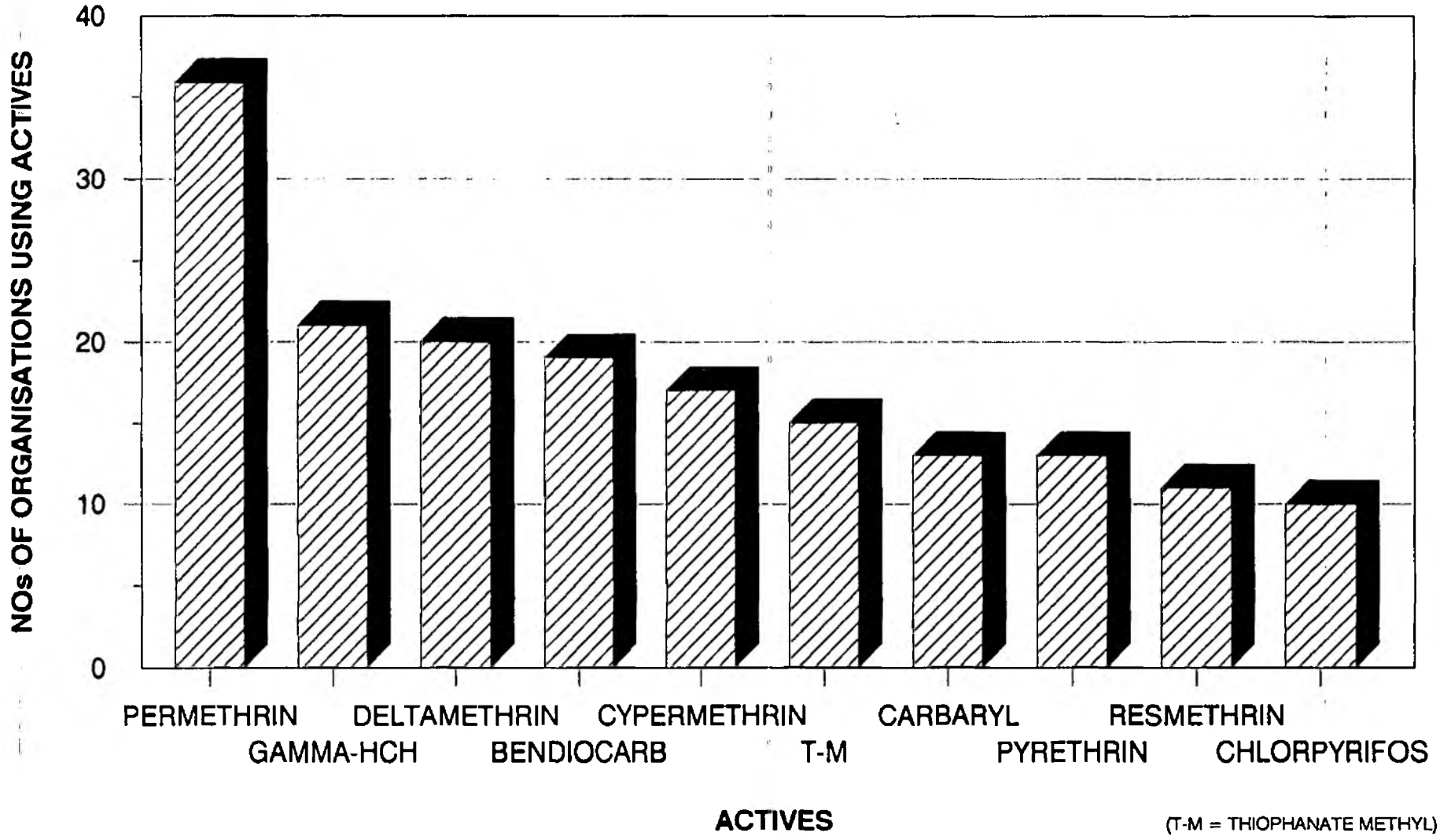
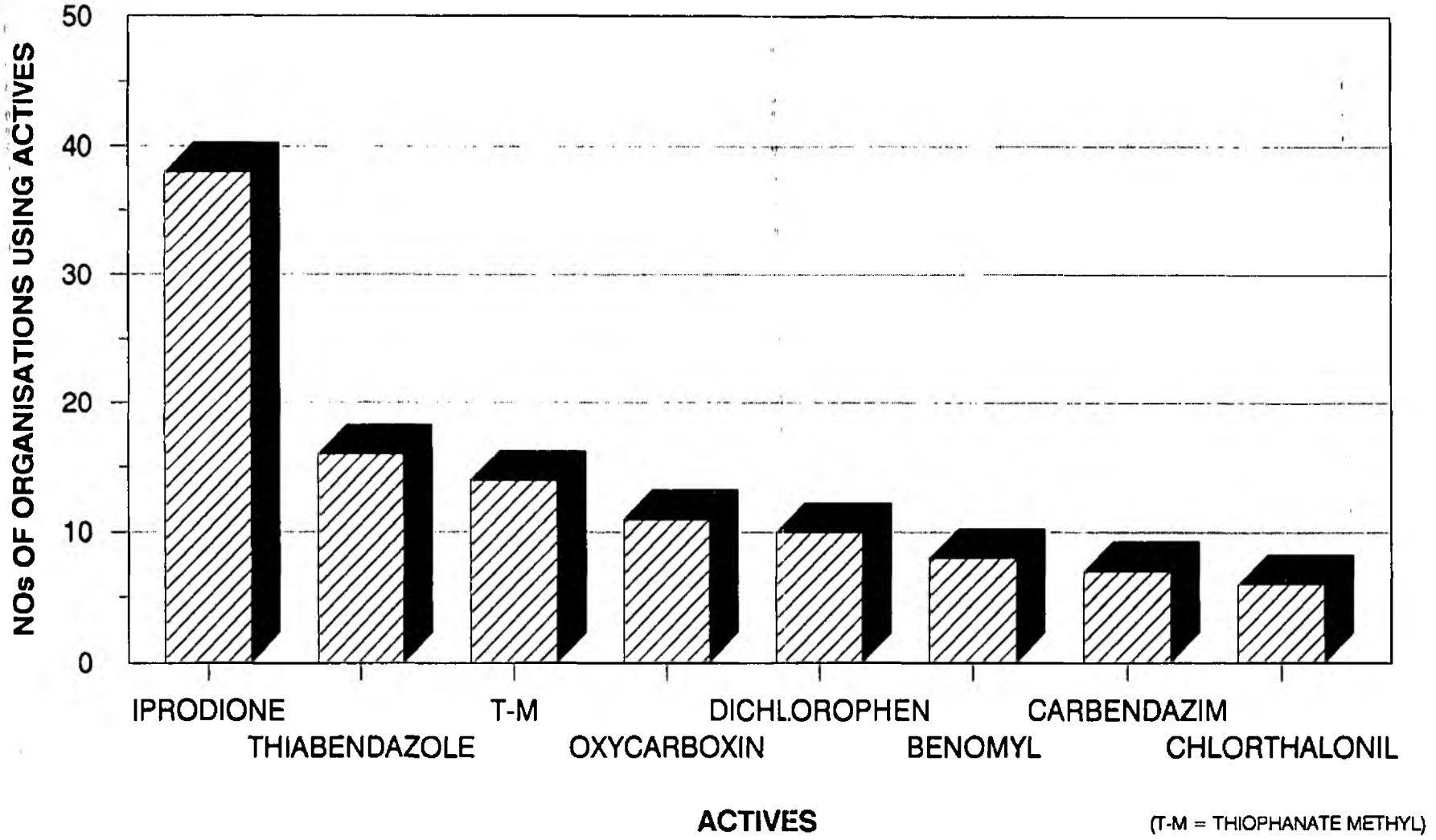


FIGURE 4. THE 8 MOST COMMONLY USED FUNGICIDE ACTIVES WITHIN THE NRA-THAMES REGION



3c. PROBLEMS ENCOUNTERED DURING THE SURVEY

A number of problems were encountered in the survey and these are summarised below.

1. There was a lack of understanding of the term pesticide.

2. Lack of awareness of what active ingredients were present in the pesticide products used.

3. Use of pesticides by contractors made data gathering more difficult.

4. Specific user groups within certain organisations (eg. local authorities) did not contribute.

5. Records were variable and data on quantities used was of limited value.

6. Concern over the use of survey findings, ie with respect to confidentiality etc.

4. CONCLUSIONS

The following conclusions may be drawn from the results of the survey.

1. The survey was a major success with an overall response of 89%.

2. The survey replies were variable in nature and hence it was only possible to make qualitative assessments.

3. Many organisations had switched to less persistent herbicides in advance of the ban on Simazine/Atrazine. Glyphosate is now used extensively within the Region.

4. Some organisations indicated that they did not use pesticides.

5. RECOMMENDATIONS

This survey was the first step in trying to define the pesticide 'problem' within Thames Region and to establish a baseline for further investigations. The specific recommendations for this report may be summarised as follows:-

- Dissemination of the report (excluding specific company data) to all contributors and other interested parties.

- Organise regional seminar involving major users. This would enable NRA staff to promote a better awareness of the effects of non-agricultural pesticide use within the Region.

- Establish a suitable pesticide monitoring programme for both surface and groundwater which reflects current usage patterns throughout the Region. This is particularly important with respect to the protection of drinking water supplies.

- Ongoing pollution prevention inspections. This is essential to assess the risk of pollution resulting from the use of certain pesticides such as Permethrin and Lindane.

- Liaise with those organisations who indicated that they do not use pesticides.

- Consider the relevance of agricultural inputs through subscription to a commercial service (FARMSTAT).

- Establish a Regional action plan which major non-agricultural users could consider adopting. This would enable a quantitative use survey to be carried out by NRA at a later date.

- Formal liaison with water companies regarding the survey results and relevance to pesticide exceedances in drinking water.

- Develop a Regional pesticide strategy.

APPENDICES

APPENDIX 1

NRA - THAMES REGION
REPORTED FAILURES OF PARAMETER 55 (1990/91)

THAMES WATER

Atrazine	2,4 - D
Simazine	Mecoprop
Chlorotoluron	MCPA
Isoproturon	Diuron

NORTH SURREY

Atrazine	Chlorotoluron
Simazine	Mecoprop
Isoproturon	

LEE VALLEY (Three Valleys Water Co.)

Atrazine	Isoproturon
Simazine	MCPA
Chlorotoluron	Carbetamide
Mecoprop	

MID SOUTHERN

Atrazine	Linuron
Simazine	2,4 - D
Chlorotoluron	Flutriafol
Isoproturon	Propyzamide

RICKMANSWORTH (Three Valleys Water Co)

Atrazine	Chlorotoluron
Simazine	Triadimeform
Isoproturon	

SUTTON DISTRICT

Atrazine

APPENDIX 2

NRA

National Rivers Authority
Thames Region

NATIONAL RIVERS AUTHORITY (THAMES REGION)
SURVEY OF NON-AGRICULTURAL PESTICIDE USE.

QUESTIONNAIRE: NOVEMBER 1992

NAME OF ORGANISATION: NRA REFERENCE:

ADDRESS :

CONTACT :

TELEPHONE NUMBER :

Please complete the following :

1. Does your organisation use or store pesticides within the Thames region?(map attached). Y/N
   (Pesticides include -herbicides,fungicides and insecticides)

2. Do contractors working on your behalf,use or store pesticides within the Thames region? Y/N

3. If the answer to **both** of the above questions is **NO**,please return this form as soon as possible.Otherwise please complete the rest of the questionnaire.

4. Please attach details of any policy relating to your current or proposed use of pesticides.

5. The following tables require data on pesticide use by your organisation.Please complete as fully as possible: Continue on a separate sheet if required.

Kings Meadow House
Kings Meadow Road
Reading
Berks
RG1 8DQ.
Tel: Reading (0734) 535000
Telex: 849614 NRATHA G
Fax: (0734) 596755

A) HERBICIDES:

PRODUCT NAME	ACTIVE(S)	QUANTITY STORED/USED IN THE THAMES REGION. (specify units).	NATURE OF STORAGE OR USE.

B) FUNGICIDES

PRODUCT NAME	ACTIVE(S)	QUANTITY STORED/USED IN THE THAMES REGION. (specify units).	NATURE OF STORAGE OR USE.

C) INSECTICIDES

PRODUCT NAME	ACTIVE(S)	QUANTITY USED/STORED IN THE THAMES REGION. (SPECIFY UNITS).	NATURE OF STORAGE OR USE.

6. **WATER COMPANES SHOULD INCLUDE DETAILS OF PERMETHRIN USE IN 5 (C).**

7. Is there any other information which you feel is relevant to this survey? Y/N.If YES,please attach details.

Thankyou for your co-operation in completing this questionnaire on the non-agricultural use of pesticides within the Thames Region.The information you have provided,will assist the NRA in maintaining and improving the quality of surface and groundwater for all their intended uses.

Please return your completed questionnaire,together with any supporting information in the prepaid envelope BEFORE 31st December 1992.

Any queries should be referred to:

Mr. Steve Killeen (Senior Scientist)
Tel. (0734) 535385

6 November 1992

NRA

National Rivers Authority
Thames Region

Our Ref: CQC/PESTICIDES/SURVEY
Please reply to: S Killeen
Direct Line: 0734 535385

Dear Sir/Madam

WATER RESOURCES ACT 1991
SURVEY OF NON-AGRICULTURAL PESTICIDE USE

The National Rivers Authority have a duty to maintain and improve the quality of controlled waters under the provisions of the above legislation.

As part of our ongoing strategy on the protection of water quality and resources within the Thames Region (map enclosed) it is essential that we have up to date information on the nature and range of pesticides used within our Region. This is particularly important with respect to pesticides which may enter rivers and groundwater via a range of point and diffuse routes.

The attached questionnaire is designed to assist with both current and future catchment management and protection and will enable us to utilise our resources effectively.

If you have any queries about this letter or the questionnaire please discuss with our Senior Scientist, Mr Steve Killeen, on the above number.

Thank you for your co-operation.

Yours faithfully

Leslie D Jones

L D Jones
Regional General Manager
/pm

Kings Meadow House
Kings Meadow Road
Reading
Berks
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Tel: Reading (0734) 535000
Telex: 849614 NRATHA G

APPENDIX 3a

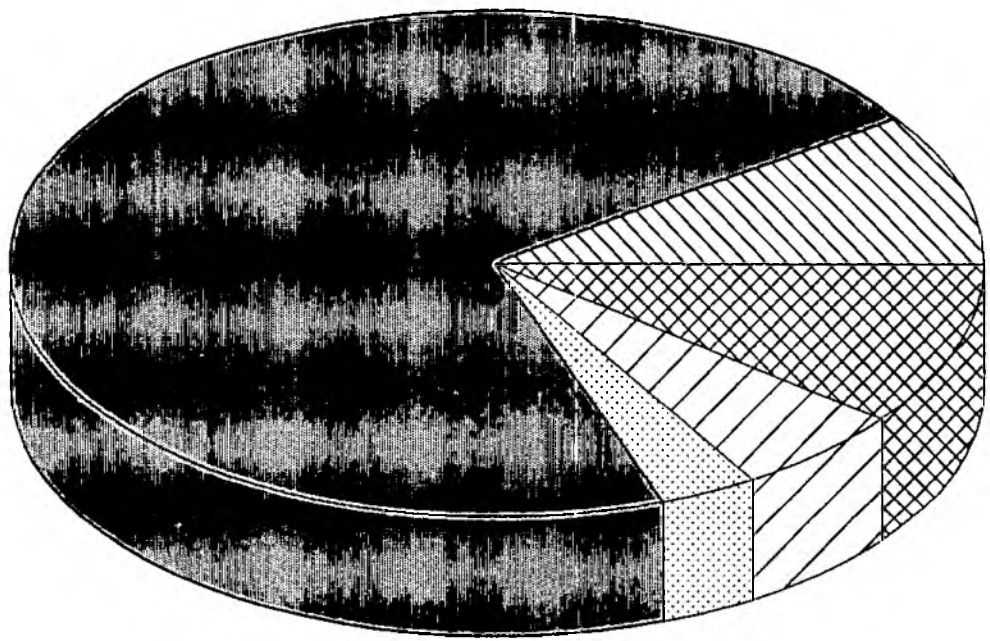
SUMMARY OF RESPONSE TO SURVEY

Total number of pesticide questionnaires sent out	143
Total number of returned questionnaires	127
Number of organisations that use pesticides	105
Number of organisations that do not use pesticides	16
Nunber of organisations outside the Thames catchment	5
Number of organisations that did not reply	16

% RESPONSE :- 89%

APPENDIX 3b

BREAKDOWN OF THE ORGANISATIONS THAT REPLIED



- COUNTY COUNCILS
- LOCAL AUTHORITIES
- OTHER
- AIRPORTS
- WATER COMPANIES

TOTAL RESPONSE : 127

APPENDIX 3c

SUMMARY OF PESTICIDE RETURNS

DO USE PESTICIDES

Bedfordshire County Council
Royal County of Berkshire
Buckinghamshire County Council
Essex County Council
Hertfordshire County Council
Northamptonshire County Council
Oxfordshire County Council
Surrey County Council
Warwickshire County Council
West Sussex County Council
Wiltshire County Council

L.B. of Barnet
L.B. of Bexley
L.B. of Bromley
L.B. of Camden
City of London
L.B. of Croydon
L.B. of Ealing
L.B. of Enfield
L.B. of Greenwich
L.B. of Hackney
L.B. of Hammersmith and Fulham
L.B. of Haringey
L.B. of Harrow
L.B. of Hillingdon
L.B. of Hounslow
L.B. of Islington
Royal Borough of Kensington and Chelsea
Royal Borough of Kingston Upon Thames
L.B. of Lambeth
L.B. of Lewisham
L.B. of Merton
L.B. of Newham
L.B. of Richmond Upon Thames
L.B. of Southwark
L.B. of Sutton
L.B. of Waltham Forest
L.B. of Westminster

Aylesbury Vale District Council
Basingstoke and Deane Borough Council
Bracknell Forest Borough Council
Brentwood District Council
Broxbourne Borough Council

Castle Point District Council
Cherwell District Council
Dacorum Borough Council
East Hampshire District Council
East Hertfordshire District Council
Epping Forest District Council
Epsom and Ewell Borough Council
Guildford Borough Council
Harlow District Council
Hart District Council
Luton Borough Council
Mid Sussex District Council
Mole Valley District Council
Newbury District Council
North Hertfordshire District Council
Oxford City Council
Reigate and Banstead Borough Council
Runnymede Borough Council
Rushmoor Borough Council
St. Albans District Council
Sevenoaks District Council
South Bucks District Council
South Northamptonshire District Council
South Oxfordshire District Council
Spelthorne Borough Council
Stevenage Borough Council
Stratford-upon-Avon District Council
Surrey Heath Borough Council
Tandridge District Council
Thamesdown Borough Council
Three Rivers District Council
Thurrock Borough Council
Uttlesford District Council
Vale of White House District Council
Watford Borough Council
Waverley Borough Council
Welwyn Hatfield District Council
West Oxfordshire District Council
Wokingham District Council
Woking Borough Council
Wycombe District Council

British Rail
British Telecom
PSA, South and West
British Waterways
Forestry Commission

Heathrow Airport
Gatwick Airport
Luton Airport
Stanstead Airport

Powergen
National Power
Eastern Electricity
Midlands Electricity
London Electricity
Seeboard plc

North Surrey Water Company
Rickmansworth Water Company
Mid Southern Water Company
Colne Valley Water Company
Lee Valley Water Ltd
Thames Water Utilities

DO NOT USE PESTICIDES

L.B. of Brent

Chelmsford Borough Council
Cotswold District Council
Dartford Planning Council
Gravesham Borough Council
Hertsmere Borough Council
Horsham District Council
South Bedfordshire District Council
Swale Borough Council

British Gas
PSA, Noreast

East Surrey Water Company
Sutton District Water Company

OUTSIDE THAMES CATCHMENT

Chichester District Council
Kent County Council
City of Rochester upon Medway
Rochford District Council
South Cambridgeshire District Council
Southend on Sea
Twekesbury Borough Council
Winchester City Council

DID NOT REPLY

Gloucestershire County Council
Hampshire County Council

L.B. of Barking & Dagenham
L.B. of Havering
L.B. of Redbridge
L.B. of Tower Hamlets
L.B. of Wandsworth

Chiltern District Council
Crawley Borough Council
Elmbridge Borough Council
Reading Borough Council
Slough Borough Council
Windsor and Maidenhead Council

National Grid
Southern Electricity
Three Valleys Water Service