National Rivers Authority

Thames Region

LAND DRAINAGE BYELAWS 1981

made by the Thames Water Authority under Section 34 of the Land Drainage Act 1976 as confirmed by the Minister of Agriculture, Fisheries and Food on 15th August 1983, coming into operation on 15th September 1983.

THE THAMES REGION FLOOD DEFENCE BYELAWS 1991

made by the National Rivers Authority under Section 34 of the Land Drainage Act 1976 as confirmed by the Minister of Agriculture, Fisheries and Food on 21st December 1993, coming into operation on 21st January 1994.

THAMES WATER AUTHORITY LAND DRAINAGE BYELAWS 1981

NATIONAL RIVERS AUTHORITY - THAMES REGION FLOOD DEFENCE BYELAWS 1991

The Thames Water Authority Land Drainage Byelaws 1981 are the Land Drainage Byelaws in force in the Thames Region of the National Rivers Authority (NRA). They were made by the Thames Water Authority under Section 34 of the Land Drainage Act 1976 as confirmed by the Minister of Agriculture, Fisheries and Food on 15th August 1983, and came into operation on 15th September 1983. They are now enforced by the NRA by virtue of the Water Resources Act 1991. Accordingly, all references in these Byelaws to 'the Authority' should now be construed as reference to the NRA whose principal Regional Office is at Kings Meadow House, Kings Meadow Road, Reading RG1 8DQ.

The words in [ ] in byelaws 2 and 3 were inserted by the Thames Region Flood Defence Byelaws 1991, confirmed by the Minister on 21st December 1993 and coming into operation on 21st January 1994. The 1991 Byelaws were made under Section 34 of the Land Drainage Act 1976, now replaced by the Water Resources Act 1991, Section 210.

LAND DRAINAGE BYELAWS 1981

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FLOOD DEFENCE BYELAWS 1991

Thames Water Authority

LAND DRAINAGE BYELAWS 1981

The Thames Water Authority, under and by virtue of the powers and authority vested in them by Section 34 of the Land Drainage Act 1976 and of every other power enabling them in that behalf, hereby make the following Byelaws for securing the efficient working of the drainage system in their area:-

1 Citation and commencement

These Byelaws may be cited as the Thames Water Authority Land Drainage Byelaws 1981 and shall come into operation at the expiration of one month beginning with the day on which they are confirmed by the Minister.

2 Application

These Byelaws shall have effect within the [area of the Thames Regional Flood Defence Committee of the National Rivers Authority] for the purposes of their functions relating to land drainage.

3 Definition and Interpretation

In these Byelaws, unless the context otherwise requires, the following words and expressions shall have the meanings hereby respectively assigned to them, that is to say:-

"Act" means the Water Resources Act 1991 or the Land Drainage Act 1991 as the case may be.

"Area" means the area of the Authority for the purposes of their functions relating to land drainage;

"Authority" means the Thames Water Authority;

"Area liable to flood" means the area shown coloured blue on the maps prepared in quadruplicate signed by the Chairman of the Authority and marked "Thames Water Authority Land Drainage Byelaws 1981 Area Liable to Flood" of which one set is deposited and available for inspection at the offices of the Minister of Agriculture, Fisheries and Food, another set at the Head Office of the Authority and the remaining sets at the offices of the Authority situate at Reading in the County of Berkshire and at Waltham Cross in the County of Hertfordshire.

"Bank" means any bank, wall or embankment adjoining or confining, or constructed for the purpose of or in connection with, any watercourse forming part of the river as hereinafter defined and, in the case of such a watercourse within which tidal waters flow, includes all land between the bank and low water mark of mean spring tides, or in the case of other watercourses forming part of the said river, includes all land between the bank of the river and the water in the watercourse from time to time;

"Consent" means the consent of the Authority in writing signed on behalf of the Authority by any officer authorised by them in that behalf;

"Drainage works" includes works for defence against water (including sea water), irrigation, other than spray irrigation, and warping;

"Flood protection works" means any works constructed or maintained by the Authority for the purpose of mitigating flooding;

"Land" includes water and any interests in land or water and any easement or right in, to, or over land or water; **"Minister"** means the Minister of Agriculture, Fisheries and Food;

"Occupier" means, in the case of land not occupied by any tenant or other person, the person entitled to occupation thereof;

"Person" includes a body corporate;

"Railway" means a railway constructed under the powers of any Act of Parliament and intended for the conveyance of passengers or goods;

"River" means the main river as defined for the time being by the Minister on the main river map of the Authority's area and includes the banks thereof and any structure or appliance for controlling or regulating the flow of water into, in or out of the channel and situate therein, or in any part of the banks thereof (other than any such structure or appliance which is vested in or controlled by an internal drainage board);

"River control work" means any sluice, flood gate, lasher, valve, paddle, penstock, lock, weir, dam, pump, pumping machinery, pipe or any other structure or appliance for controlling, measuring or regulating the level of the water, or the flow of water in, into or out of, the river or for drawing water from, or delivering water into, the river;

"Sea wall" includes any such bank, wall or embankment in connection with any tidal river as is a work in connection with the river [including the walls of any dock which is liable to flooding];

"Vessel" includes any ship, hovercraft (as defined by the Hovercraft Act 1968), aircraft, hydrofoil, lighter, keel, barge, tug, launch, houseboat, pleasure boat, randan, wherry, skiff, dinghy, shallop, punt, canoe, yacht, raft, float of timber, or any other craft whatsoever whether worked, navigated or propelled by steam, petrol, oil, electricity or other mechanical means or otherwise;

"Watercourse" includes all rivers and streams and all ditches, drains, cuts, culverts, dykes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows, and any reference to a watercourse includes a reference to the channel or bed of a watercourse which is for the time being dry;

and other words and expressions shall have the same respective meanings as in the Act.

4 Control of Structures, Pipes and Cables

No person shall, without the previous consent of the Authority:-

(a) erect or construct, or cause or permit to be erected or constructed,

any fence, post, pylon, wall, wharf, jetty, pier, quay, piling, groyne, revetment, or any other building or structure whatsoever in or over the river;
(b) erect or construct, or cause or permit to be erected or constructed, any fence, post, pylon, wall, or any other building or structure within 8 metres measured horizontally from the foot of any bank of the river on the landward side or, where there is no such bank, within 8 metres measured horizontally from the top edge of the batter enclosing the river, or between a line drawn at a distance of 16 metres from the foot of any sea wall measured horizontally on the landward side and low water mark of mean spring tides;
Provided that this sub-paragraph shall not apply to any fence or post if no part of such fence or post exceeds 1.5 metres in height above the level of the adjoining land and, in the case of a fence, it is required for the purpose of agriculture and is constructed only of posts and wire strands or wire netting of not less than 100mm square mesh;
(c) place or affix, or cause or permit to be placed or affixed, any gas or water main or any sewer or any pipe whatsoever, or any telephone wire or electric main or cable, in, under or over the river, or in, under, over or through any bank, drainage works or flood protection works, or within 8 metres measured horizontally from the foot of any bank of the river on the landward side or, where there is no such bank, within 8 metres measured horizontally from the top edge of the batter enclosing the river;
Provided that any person may execute any temporary works as aforesaid in case of emergency but in such event he shall forthwith inform the Authority and comply with any reasonable directions which the Authority may give with regard thereto.

5 Control of Excavations and Removal of Turf, etc.

No person shall, without the previous consent of the Authority -
(a) cut, pare or remove, or cause or permit to be cut, pared or removed, any turf forming part of any bank, drainage works or flood protection works;
(b) make or cut, or cause or permit to be made or cut, any tunnel or any drain, culvert or other passage for water in, into, out of or under the river or in, under or through any bank, drainage works or flood protection works.

6 Control of Dredging and Removal of Shingle, etc.

No person shall, without the previous consent of the Authority, dredge, dig for, search, quarry, raise, take, get away or remove, or cause or permit to be dredged, dug for, searched, quarried, raised, taken, got away or removed, by any means whatsoever, any beach, sand, ballast, shingle, builders' grit, gravel, boulders, stones, earth, clay, chalk, or other materials or substance of any kind or description-
(a) from the bed of the river or from any part of any bank, drainage works or flood protection works;
(b) from any land within 16 metres of any part of the bank;
(c) from any part of the foreshore of the area below high water mark of mean spring tides for the time being or from any deposits or accretions resulting from any works carried out by the Authority or its predecessors;
(d) between high water mark of mean spring tides and the foot of the landward side of any sea wall;
(e) between the foot of the landward side of any sea wall and a line drawn on the landward side of any such sea wall at a distance of 200 metres from and parallel to the foot of the landward side thereof.

7 Endangering Stability of the Bank

No person shall do, or cause or permit to be done, anything in or upon any land adjoining any bank or any drainage works or flood protection works, of such a nature as to cause damage likely to endanger the stability of the bank, drainage works or flood protection works.

8 Interference with Banks etc.

No person shall interfere with, remove or in any way damage, any bank, bridge, building, drainage works, flood protection works, river control work, sea wall, or any structure or appliance, or any other thing whatsoever which is the property of or vested in the Authority.

9 Deposit of Material on Banks

No person shall use, or cause or permit to be used, any bank, drainage works or flood protection works for the purpose of depositing, stacking, storing or keeping any rubbish, goods, vehicles, plant, machinery or any material or things thereon in such manner as by reason of the weight, volume or nature thereof to cause damage to or endanger the stability of the bank, drainage works or flood protection works or interfere with the deposit of spoil on the bank, drainage works or flood protection works by the Authority.

10 Vehicles on Banks

No person shall use or drive, or permit or cause to be used or driven, any cart or vehicle, plant or machinery of any kind whatsoever on, over or along any bank, drainage works or flood protection works in such manner as to cause damage to such bank, drainage works or flood protection works.

11 Damage by Use for Fishing, Grazing etc.

No person shall, after notice has been served upon him by the Authority, use or cause or permit to be used any bank, drainage works or flood protection works -
(a) for the purpose of fishing;
(b) for the purpose of grazing or keeping any animal thereon;
unless he shall have taken such steps as are necessary and reasonably practicable to prevent the bank, drainage works or flood protection works from being damaged by such use:
Provided that nothing in this Byelaw shall be deemed to affect or

prevent the use of any bank, drainage works or flood protection works for the purpose of enabling stock to drink at any place made or to be made or constructed for that purpose as may be approved by the Authority.

12 Destruction of Vermin

The occupier of any bank, drainage works or flood protection works or of any part thereof shall, upon being required by the Authority by notice in writing, within such reasonable time as may therein be specified, take such steps as the Authority consider necessary and practicable for preventing the bank, drainage works or flood protection works from becoming infested by rabbits, rats, coypus, moles, mink and any other vermin in or on the bank, drainage works or flood protection works;
Provided however that in taking such steps as aforesaid he shall not do or cause or permit to be done anything of such a nature as to cause damage to or endanger the stability of the bank, drainage works or flood protection works.

13 Obstructions to Flow

No person shall put, or cause or permit to be put, or wilfully or negligently cause or permit to fall, into the river any tree or trunk or branch or part of a tree or any timber or wreck, debris, willows, shrubs, weeds, grasses, stones, earth, mud, ashes, dirt, soil, rubbish, or any object or matter of any kind whatsoever so as to impede the flow of water in, into or out of the river.

14 Planting of Trees, etc.

No person shall, without the previous consent of the Authority, plant any tree, shrub, willow or other similar growth within 8 metres of any part of the bank.

15 Repairs to Buildings

The owner of any buildings or structures in or over the river or on the banks thereof shall, upon receipt of a notice from the Authority that because of its state of disrepair -
(a) the building or structure is causing or is in imminent danger of causing an obstruction to the flow of the river; or
(b) the building or structure is causing or is in imminent danger of causing damage to the bank of the river;
carry out such reasonably practicable works as are specified in the notice for the purpose of remedying or preventing the obstruction or damage as the case may be within such reasonable time as is specified in the notice.
In this Byelaw, 'owner' means the person for the time being receiving the rack rent of the premises in connection with which the word is used whether on his own account or as agent or trustee for any other person, or the person who would so receive the same if those premises were let at a rack rent.

16 Obstruction of Areas Liable to Flood

No person shall, without the previous consent of the Authority, form or erect, or cause or permit to be formed or erected, on land within the area liable to flood any building or structure or any heap or heaps of any material whatsoever of such a size or character as of itself or in combination with similar acts of the same or any other person to affect the efficient working of the drainage system of the area;
Provided that-
(a) the foregoing provisions of this Byelaw shall not apply to temporary works constructed in an emergency provided that notice of the construction of such works shall forthwith be given in writing to the Authority and such works shall be removed if so requested by and in accordance with the directions of the Authority;
(b) such consent shall not be required where planning permission for that building, structure or heap has been granted by a local planning authority within the meaning of the Local Government Act 1972 or by the Secretary of State for the Environment on an application in that behalf made to a local planning authority and such permission is for the time being in force;
(c) such consent shall not be required for the formation or erection, in accordance with good agricultural practice, of hay or straw stacks, of sugar beet or potato clamps, of manure heaps or of other like heaps.

17 River Control Works

(i) Any person having charge of any river control work shall -
(a) maintain it in a proper state of repair and efficiency to the satisfaction of the Authority;
(b) use it in such manner as not to affect the efficient working of the drainage system of the area; and
(c) comply with such reasonable directions as may from time to time be given by the Authority with a view to the prevention of flooding or any shortage in the flow or supply of water or otherwise to the efficient working of the drainage system of the area
(ii) Unless it is otherwise shown, the occupier of land comprising or abutting on that part of the river in which the river control work is situate, or where there is more than one such occupier, each of such occupiers, shall, for the purposes of these Byelaws, be deemed to have charge of the river control work

18 Discontinuance of and Interference with River Control Works

(i) No person having charge of any river control work shall, without the previous consent of the Authority -
(a) discontinue the use thereof or remove the same; or
(b) carry out any alteration or reconstruction of, or addition or reduction to, the river control work;
Provided that the foregoing shall not apply to any action taken in an emergency if notice in writing of that action is given to the Authority as soon as practicable thereafter.
(ii) No person shall, without lawful authority, operate or interfere with

any river control work.

19 Alteration of Level or Flow

No person shall divert or alter, or cause or permit to be diverted or altered, the level of or direction of the flow of water in, into or out of the river without the previous consent of the Authority, except where necessary in the ordinary course of lawful navigation.

20 Navigation of Vessels

No person shall navigate any vessel in the river in such a manner or at such a speed so as to injure any bank, drainage works, flood protection works or river control work and where the Authority has by notice erected at any place, limited the speed of vessels passing such place, no person shall navigate a vessel at a speed greater than the speed so limited;
Provided that the Authority shall not exercise its powers under this Byelaw to limit the speed of vessels in any tidal waters except after consultation with the Secretary of State, Department of Trade.

21 Vessels not to Obstruct Flow etc.

No person shall moor or leave unattended any vessel without taking due care to prevent such vessel from materially obstructing or impeding the free flow of water in, into or out of the river, or so as to impair the efficiency of any drainage works, flood protection works or river control work.

22 Mooring of Vessels to Bank

No person shall moor or place any vessel to or upon any part of the bank in such manner or by such method as to cause or be likely to cause injury to the bank.

23 Sunken Vessels

No person who is the owner of a vessel sunk, stranded, damaged or adrift in the river shall, after the receipt of notice from the Authority that the vessel is causing obstruction, permit the vessel to remain in the river in such a manner as to impede or harmfully divert the flow of water into, in or out of the river or to endanger the stability of any bank, drainage works or flood protection works.
In this byelaw 'owner' means the owner of the vessel at the time of the sinking, stranding, damage or coming adrift thereof.

24 Flood Warning Systems

No person shall interfere with or cause damage to any flood warning system established and maintained by the Authority.

25 Trespass

No unauthorised person shall enter upon any land belonging to or in the occupation of the Authority if such entry is likely to endanger any person or property and there is displayed on or near the land a notice prohibiting entry.

26 Interference with Notices

No person shall deface or remove any notice board, notice or placard put up by the Authority.

27 Obstruction of Officers

No person shall obstruct, interfere with or resist any officer or agent or servant of the Authority exercising any of his powers or duties under the Act or these Byelaws.

28 Consent not to be unreasonably withheld

Where by these Byelaws any person is required to refrain from doing any act without the consent of the Authority -
(a) in deciding whether to give or withhold their consent, the Authority shall have regard only to the effect (if any) of such act upon the efficient working of the drainage system in their area and the performance by the Authority of their functions under the Act;
(b) such consent shall not be unreasonably withheld but the Authority may attach thereto reasonable conditions;
(c) the provisions of section 110 (3)(b) of the Water Resources Act 1991 or any re-enactment thereof (as the same may from time to time be in force) shall apply with the necessary modification to such consent.

29 Breach of Conditions of Consent

Where the Authority give their consent under these Byelaws to the doing of any act subject to any conditions which they are authorised to impose a breach of any of those conditions shall be deemed, as regards liability to a fine and other consequences, equivalent to the doing of the act without the required consent.

30 Consent of Authority not obtained

Where any act is done for the doing of which the consent of the Authority is, under these Byelaws, required and either the consent of the Authority has not been obtained or, if such consent has been obtained, there is a breach of any condition which was attached thereto the Authority may consent, subject if they see fit to such conditions or such further or alternative conditions as they may reasonably impose, to the continuance of the act or any part of it or the retention of any part or the whole of any work done.

31 Applications for Consent

Any application for the consent of the Authority shall contain such plans and specifications as the Authority may reasonably require.

32 Service of notices

Notices required or authorised to be given to or served on any person under these Byelaws may be given or served in the manner in which notices may be served under Section 220 of the Water Resources Act

1991.
For the purpose of these Byelaws the word 'premises' referred to in Section 220 of the Act shall include a vessel.

33 Savings for Local Authorities, Statutory Undertakers etc.

Nothing in these Byelaws shall -
(a) conflict with or interfere with the operation of any Byelaw made by a navigation, harbour or conservancy authority, but no person shall be liable to more than one penalty, or in the case of a continuing offence more than one daily penalty, in respect of the same offence;
(b) restrict, prevent, interfere with or prejudice the exercise of any statutory rights or powers which are now or hereafter may be vested in or exercised by -
(i) the British Airports Authority;
(ii) the British Gas Corporation;
(iii) the British Railways Board and the London Transport Executive under the Transport (London) Act 1969 with respect to the construction, use or maintenance of any railway bridge or any other work connected with their railways or so as to interfere with the traffic thereon;
(iv) the Central Electricity Generating Board or any Area Board established under the Electricity Acts 1947 and 1957;
(v) the Civil Aviation Authority;
(vi) any local authority;
(vii) any navigation, harbour, pilotage or conservancy authority;
(viii) the Post Office;
(ix) any public utility undertaking carried on by a local authority under any Act or under any order having the force of an Act;
(x) the Lee Valley Regional Park Authority;
(c) affect any liability arising otherwise than under and by reason thereof.

34 Saving for the Crown

Nothing in these Byelaws shall operate to prevent the removal of any substance on, in or under, or the erection of any structure, building or machinery or any cable, wire or pipe on, over or under, lands belonging to her Majesty in right of the Crown by any person thereunto authorised by the Crown Estate Commissioners.

35 Determination of Disputes

(i) Where by or under these Byelaws (except Byelaws 4, 15, 16, 17, and 23) any person is required by a notice given by the Authority to do any work or to comply with any directions of the Authority he may, within 21 days after the service of such notice on him, give to the Authority a counter-notice in writing objecting either to the reasonableness of, or to the necessity for, such requirement or directions and in default of agreement between such person and the Authority the dispute shall be determined as hereinafter provided. Where such a counter-notice has been given to the Authority the operation of the notice shall be suspended until either agreement has been reached or the dispute has been determined by arbitration in accordance with the provisions in this Byelaw.
(ii) Any dispute as to whether the consent of the Authority under these Byelaws to the doing of any act has been unreasonably withheld, or as to whether any conditions subject to which such consent is granted are unreasonable, or as to the satisfactory execution of any work which is required by a notice given by the Authority under these Byelaws to be done, or as to compliance with any directions which the Authority is empowered by these Byelaws to give, shall be determined as hereinafter provided.
(iii) Such a dispute between a drainage authority or a local authority and the Authority shall be referred to the Minister whose decision shall be final. In any other case such dispute shall be referred to the arbitration of a single arbitrator to be appointed in default of agreement by the President of the Institution of Civil Engineers on the application of either party.

36 Revocation of Existing Byelaws

All Byelaws made under the Act, or under corresponding provisions of any enactment repealed by the Act, by the Essex River Board, the Lee Conservancy Catchment Board and the Conservators of the River Thames, are hereby revoked in respect of the area of the Authority for the purposes of their functions relating to land drainage.

THE COMMON SEAL of THAMES WATER AUTHORITY was hereunto affixed in the presence of

L.S

Signed G. EDWARDS
Chairman

Signed HUGH FISH
Appointed Officer

Dated the second day of December, 1981

The Minister of Agriculture, Fisheries and Food, in pursuance of the powers conferred upon him under Section 34 of, and paragraph 6 of Schedule 4 to, the land Drainage Act 1976 HEREBY CONFIRMS these Byelaws. IN WITNESS whereof the Official Seal of the Minister of Agriculture, Fisheries and Food is hereunto affixed on 15th August, 1983.

L.S

Signed R. C. McIVOR
Assistant Secretary

(Note: These Byelaws incorporate modifications made by the Minister with the consent of the Water Authority)

Notes

1 The Land Drainage Act 1976 has been replaced by the Water Resources Act 1991 and the Land Drainage Act 1991.
2 If any person acts in contravention of, or fails to comply with, any of these Byelaws he shall be liable on summary conviction to a fine not exceeding £2000 and, if the contravention or failure is continued after conviction, to a further fine not exceeding £40 for every day on which the contravention or failure is so continued.
In addition the Authority may, without prejudice to the above, take such action as may be necessary to remedy the effect of the contravention or failure, and may recover the expenses reasonably incurred by them in doing so from the person in default. (Water Resources Act 1991, Section 211 (4) and (5)). With reference to Byelaw 28(c), Section 110(3)(b) of the Water Resources Act 1991 provides that any consent or approval required under that section shall, if neither given nor refused within 2 months after application therefor is made, be deemed to have been given.

NATIONAL RIVERS AUTHORITY - THAMES REGION FLOOD DEFENCE BYELAWS 1991

The National Rivers Authority, acting by its Thames Regional Flood Defence Committee, under and by virtue of the powers and authority vested in them by Section 34 of the Land Drainage Act 1976, Schedule 24 to the Water Act 1989 and of every other power enabling them in that behalf, hereby make the following Byelaws for securing the efficient working of the drainage system in their area including the proper defence against sea or tidal water of that part of the area of the Committee which is at risk of flooding therefrom:-

1. Citation and Commencement

These Byelaws may be cited as the Thames Region Flood Defence Byelaws 1991 and shall come into operation at the expiration of one month beginning with the day on which they are confirmed by the Minister.

2. Application

These Byelaws shall have effect within the area of the Thames Regional Flood Defence Committee of the National Rivers Authority (being the area of the former Thames Water Authority, as extended by The Local Government Act 1985 (Land Drainage Functions) Order 1986) for the purposes of the National Rivers Authority's functions relating to land drainage.

3. Amendment of existing Thames Byelaws

Without prejudice to the prior application of the Thames Water Authority Land Drainage Byelaws 1981 in the said area as so extended, the said Byelaws of 1981 shall be amended –

(a) in Byelaw 2 (Application) by substituting for the words "Thames Water Authority area" the following words – "area of the Thames Regional Flood Defence Committee of the National Rivers Authority"

(b) in Byelaw 3 (Definition and Interpretation) by adding, at the end of the definition of "Sea wall", the words "including the walls of any dock which is liable to flooding".

4. Continuation of amended Byelaws

Save as aforesaid the said Byelaws of 1981 shall continue in full force and effect.

THE COMMON SEAL of the National Rivers Authority was hereto affixed in the presence of

L.S

CHRISTOPHER MARTIN
Legal Adviser

Dated the 14th day of October 1991

Confirmation Instrument

The Minister of Agriculture, Fisheries and Food, in pursuance of the powers conferred upon her under Section 210 of, and paragraph 2 of Schedule 26 to, the Water Resources Act 1991, HEREBY CONFIRMS these Byelaws.

IN WITNESS whereof the official Seal of the Minister of Agriculture, Fisheries and Food is hereunto affixed on 21st December 1993

L.S

R.A. HATHAWAY
Assistant Secretary

[redacted]

NRA

National Rivers Authority
Thames Region

ENVIRONMENT AGENCY

BIOLOGICAL RIVER QUALITY MAP 1994:

Accompanying Report

Tessa Wardley
Biologist

CONTENTS

1.0.0 INTRODUCTION

1.1.0 THE REPORT

This report is written specifically to accompany the water quality map produced annually for the Thames catchment.
The aims are:

1) To clarify the biological status of watercourses in the region as shown in the map and analyse the distribution of water quality.

2) To provide information on the location of the extremes of biological quality at the regional, area, sub-catchment and reach scales.

3) To highlight individual catchments and sites where changes are occurring, where possible with likely reasons.

The report analyses all the data collected as part of the routine biological surveys of the regions rivers and streams. Where more than one sample was taken at a site the highest BMWP score was recorded. For some of the stretches that are represented on the map no sample was taken in 1994, in these cases the results from the 1993 survey were used as an indication of the water quality of the river stretch and data from the previous sampling occasion were used for comparison. Those stretches which exhibited class changes or unusual score value changes over the last two sampling occasions were examined over a longer time scale to observe whether the change was a long term trend rather than relating to sampling error or temporary conditions. The methods for analysis are explained in more detail in sections 1.4.0 to 1.6.0.

Thames region is divided for operational purposes in to three areas. These areas are West, North-East and South-East; for this report the results were analyzed on an area basis. Within each area the biological data were compared on a sub-catchment and reach basis as well as looking at the region as a whole. This demonstrated whether certain factors were more important than others in individual sub-catchments, affect particular reaches or were more general impacts affecting the entire River Thames catchment.

Where there was a change in class or at least a 'significant' BMWP value change (defined in section 1.6.0) at any site between the two maps the reasons or significance of this were discussed. In comparing the two most recent results it is possible that there was an 'insignificant' change over the last two sampling occasions but that a long term improvement or deterioration was in progress. Additionally sites that appear as class changes were sometimes very small score changes and purely artifacts of splitting a continuum into classes. Therefore, for all sites which showed a class or 'significant' change the long term results for the site were examined to assess long term trends and possible reasons for the change. These are all discussed in the catchment reviews and in the appendices for detailed analysis of individual site changes.

1.2.0 BIOLOGICAL MONITORING

Biological monitoring has only recently been adopted into national programs of environmental monitoring, although data have been collected for many years. Data sets of up to 20 years are available for key sites throughout the catchment. Benthic macroinvertebrates offer many advantages in monitoring (as well as some disadvantages) - they are ubiquitous, so they are affected by many environmental perturbations in different habitats and aquatic systems; a large number of species are involved giving a spectrum of responses to environmental stresses; their sedentary nature allows pollutant or disturbance effects; they have long life cycles allowing temporal variation to be examined (Rosenberg & Resh 1993). Using simple, inexpensive equipment, qualitative sampling and analysis can be carried out and macroinvertebrates, acting as continuous monitors of the water they inhabit, can be exploited.

Continuing this routine survey work is important but particularly so in the quinquennial survey years, the next of which will be carried out in 1995 as one of the NRA's statutory responsibilities. The purpose of this five yearly review is both for water management and for the public. It gives a snapshot view of the effectiveness of management procedures and areas where particular problems exist. For this quinquennial survey a new measure of the quality of the rivers in England and Wales will be used. This is GQA (General Quality Assessment). The GQA will give a nationally consistent approach whereby all the data collected nationally are comparable.

The GQA comprises 4 'windows': Chemical, Biological, Nutrient and Aesthetic. Currently the Chemical and Biological components have been finalised and in 1995 all river reaches with chemical sample points will be sampled in two seasons for the Biology 'window'. This is the first time that biological data will be looked at in their own right - rather than as a subsidiary to the chemical data.

1.3.0 DATA COLLECTION

Sites were chosen to represent each GQA reach of uniform water quality. Comparable samples were collected, this involved sampling the available invertebrate habitats with an effort proportional to their cover in the sampling area.
All samples were collected using standard three minute kick-sweep hand net sampling, including a hand search of large boulder and detritus surface dwellers. Each sample was then sorted either directly on the river bank or in the laboratory within two days. All macroinvertebrates were identified to family level to produce a Biological Monitoring Working Party (BMWP) score, estimated abundances were also recorded using a log scale (i.e. A 1-9, B 10-99, C 100-999).
Quality control on the sorting of samples was assured by 10% of samples being re-sorted internally as well as an external audit of 10% by the Institute of Freshwater Ecology (IFE).

1.4.0 WATER QUALITY ASSESSMENT

1.4.1 BMWP:

Water quality was assessed using the BMWP scoring system. This is a simple biotic index which attempts to summarise the macroinvertebrate community by scoring 86 taxa on a scale of one to ten. Taxa scoring one are pollution tolerant while those scoring ten are pollution sensitive, the pollution being monitored is limited to organic pollution and oxygen depletion. High scoring taxa (7-10) would include most mayflies, stoneflies, caddisflies, dragonflies and crayfish. At the most tolerant end of the scale (1-3) families of worms, leeches, snails and midge larvae are typical.

Although BMWP scores were originally designed to examine temporal trends and changes at sites they are also used to make spatial comparisons. The production of Biological quality maps obviously encourages this spatial comparison, this must be taken into consideration when examining water quality using these maps. The maps give a quick indication of the water quality in a watercourse; now that there are extensive historical data, the differences in BMWP score between years are better examined to see how the situation changes in a reach, rather than over the whole catchment.

1.4.2 ASPT:

Another measure of water quality uses the Average Score Per Taxon (ASPT) this is when the scores of the families are summed to give the BMWP and then divided by the number of scoring families found (ASPT = BMWP/No. families found). ASPT gives further analysis of the importance of a change in BMWP. Where the ASPT has fallen this indicates that the community has shifted towards pollution tolerance and water quality may be implicated. If the BMWP falls but the ASPT stays the same, it implies that water quality may not be the primary factor and the cause may be sampling effort, habitat change or other environmental change. This suggests that ASPT is more robust than BMWP, but it does shield much of the information on species diversity and richness which is evident in the BMWP score.

1.4.3 RIVPACS:

BMWP is useful on its own when historical data are available to show long term trends. It would also be useful to estimate the BMWP score for the river site if it were unperturbed. This gives a standard for management to achieve.
Using physical data recorded on each sampling occasion and other unchanging physical characteristics of the river, the IFE has produced a computer classification - **R**iver **I**n**V**ertebrate **P**rediction **A**nd **C**lassification System (RIVPACS). A RIVPACS prediction can therefore be made for the corresponding season or groups of seasons based on the physical characteristics of the site. This predicts the expected BMWP score for an unpolluted river site. From this predicted score a ratio of the observed to predicted BMWP is produced giving a BMWP EQI. Additional predictions of number of taxa and ASPT are possible with their corresponding EQI's. Predicted quality maps can be produced to demonstrate how the Thames catchment should look in its unperturbed state.

The lower 95% confidence limit for a predicted BMWP score is 78%. This limit was desribed from 1000 random permutations in a Monte Carlo simulation of the original data collected in the National River classification scheme. Sites achieving at least 78% of their predicted score (or an EQI of 0.78) are considered to have acceptable levels of perturbation, this is the level at which sites were recorded and commented upon in this report.

1.5.0 THE MAP: BMWP BAND CLASSIFICATION

For the production of the Biological River Quality Map, BMWP scores were divided into five arbitrary score bands identified by different colours. The scores at which these divisions were made do not hold any biological significance, they were produced to allow a visual representation of the years results and comparison with previous years data. Therefore, care must be taken when observing apparent improvements or declines in water quality by a change in biotic class, the change may be an artefact of the division of the scores into bands. Use of this report will allow the significance of a colour change on the map to be validated by examination of the actual score and longer term trends.

The score bands used were:

CLASS	BMWP SCORE	MAP COLOUR	DESCRIPTOR
A	>151	(dark blue)	very good
B	101-150	(light blue)	good
C	51-100	(green)	fair
D	16-50	(orange)	poor
E	0-15	(red)	very poor
F	0	(black)	DRY

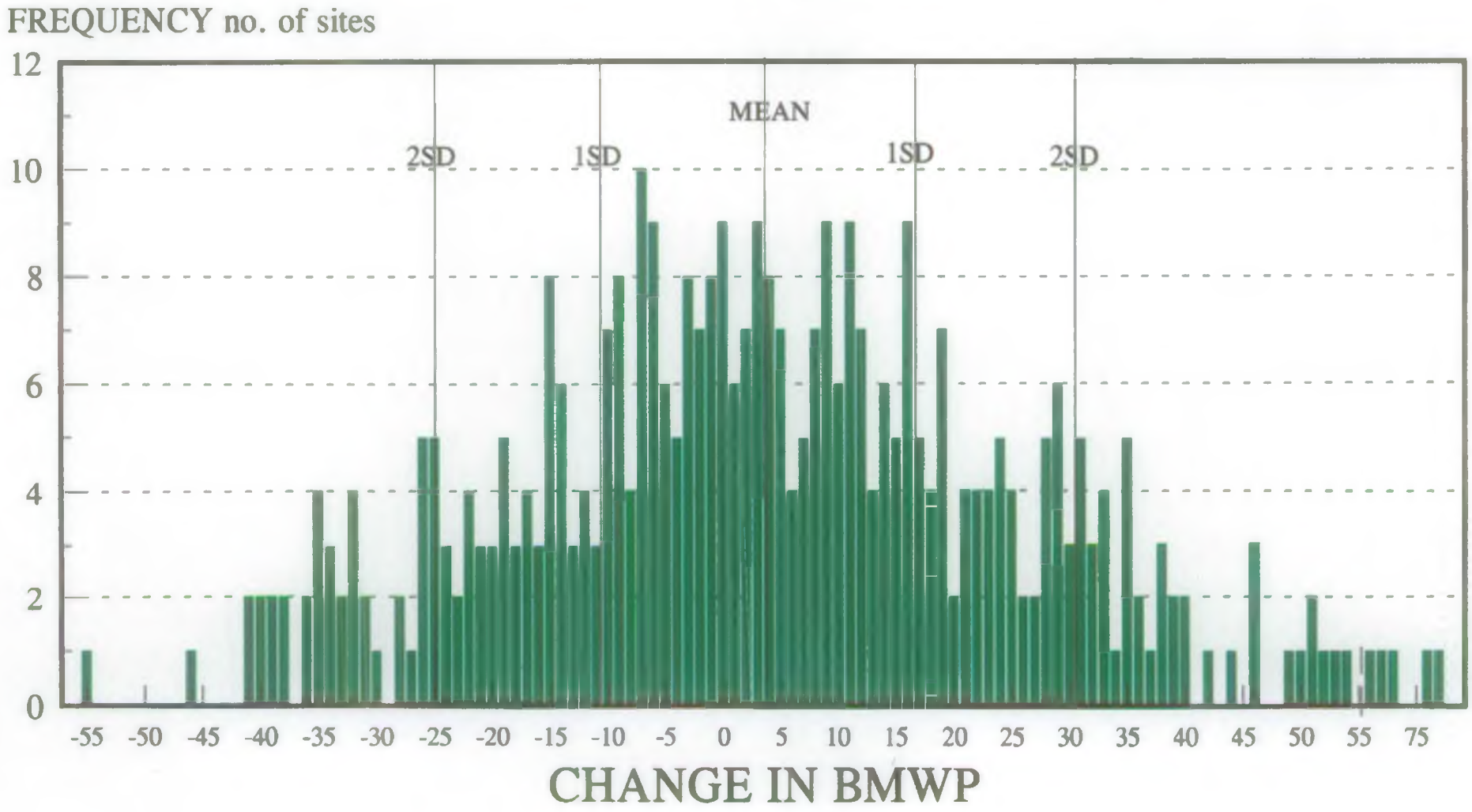
1.6.0 BMWP VALUE CHANGE CLASSIFICATION:

For each catchment a value changed map was drawn. The frequency of the actual BMWP score change between the last two samples was plotted and found to be normally distributed (see Figure 1). From this the standard deviation was calculated and used to split the score change into bands. This assists with identifying where a change is meaningful or just within normal biological, environmental or sampling variation. From this it was decided that within 1 standard deviation (1SD) the change would be judged insignificant. Between 1SD and 2SD the change was judged 'significant' and greater than 2SD 'exceptional'. In this way a map for each catchment was plotted with the value change to show the score change (either positive or negative) as well as the regional class map which indicates the score class from year to year.

FIGURE 1 FREQUENCY OF BMWP CHANGES

BETWEEN LAST TWO SAMPLING OCCASIONS

THAMES REGION



2.0.0 REGIONAL OVERVIEW

Results from 418 samples were collated to produce the 1994 biological water quality map of which 294 sites were sampled in 1994 (188 originated in the Western Office - Fobney Mead and 106 in the East office - Waltham Cross).

The overall class distribution of sites in the region is shown below and in Figure 2, comparisons being made with the previous sampling occasion at each site.

1994	MAP	PAST	SAMPLE
CLASS	FREQUENCY	CLASS	FREQUENCY
A	65	A	68
B	114	B	107
C	141	C	135
D	94	D	100
E	5	E	9

This indicates that there had been very little change in the overall distribution of classes throughout the region. The changes there were indicated movement from the extremes towards the fair and good classes.

There were still many reaches under-achieving their potential and comparing the observed with the predicted scores a total of 188 (45%) fell below 78% of the predicted BMWP scores. These poor quality sites were more common in the highly urbanised North-East and South-East Areas. Here 55% and 60% of the sites respectively were unacceptably perturbed, compared with 32% in the Western area (See Figure 3).

The different distributions of sites between the classes in each of the areas is also clearly represented in Figure 4. In the North-Eastern and South-Eastern areas the vast majority of sites fell in the BCD classes. By comparison the Western area sites were more evenly spread over ABC & D. Examination of the map illustrates another pattern whereby the Western Area biological quality was restricted in the smaller tributaries and improved in the main rivers. In the far east of the North-Eastern area it appeared that water quality in the tributaries was often good but deteriorated in the main river. From this it was clear that many of the water problems in the Eastern end of the Thames catchment were related to extensive urbanisation of the sub-catchments - particular problems were related to urban run-off, industrial effluents as well as STW. In addition, problems in urban areas were often related to channelised rivers providing poor habitats for the in river flora and fauna as well as difficult sampling conditions.

In contrast to this the water quality problems in the Western Area/Upper Thames catchment were more commonly related to STW effluents, agricultural pollution and, were still recovering from the early 1990's, low flows.

Despite the net movement shown above there were many underlying changes between the last two sampling occasions. In total 152 (36%) sites changed class. Many of these class changes were insignificant and there were many changes within class which may have been 'significant' or displayed long-term changes in water quality or habitat provision. The significance at individual sites is commented upon in the appendices with possible reasons.

FIGURE 2

CLASS DISTRIBUTION REGIONALLY

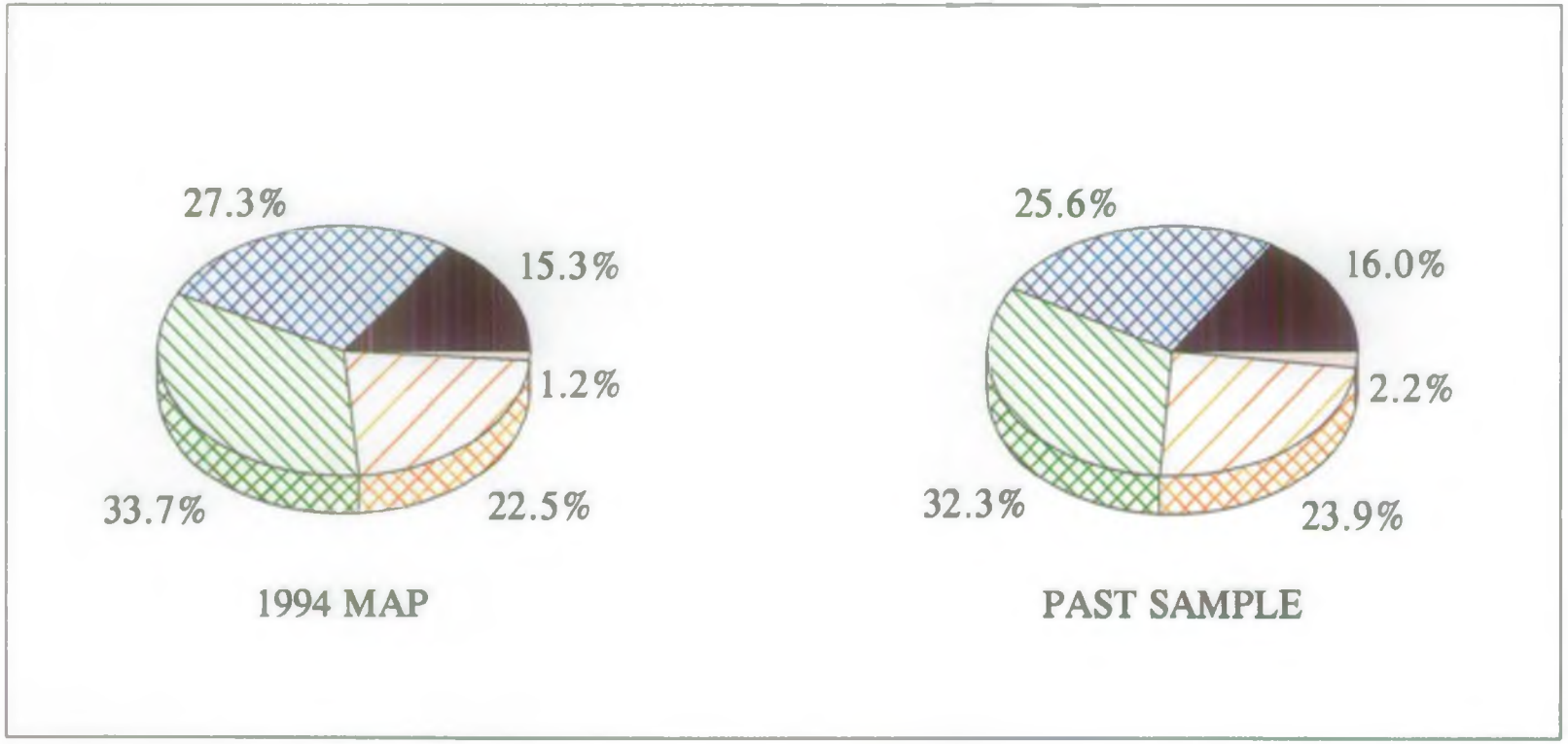


FIGURE 3 SITES FALLING BELOW 78% OF RIVPACS PREDICTED BMWP

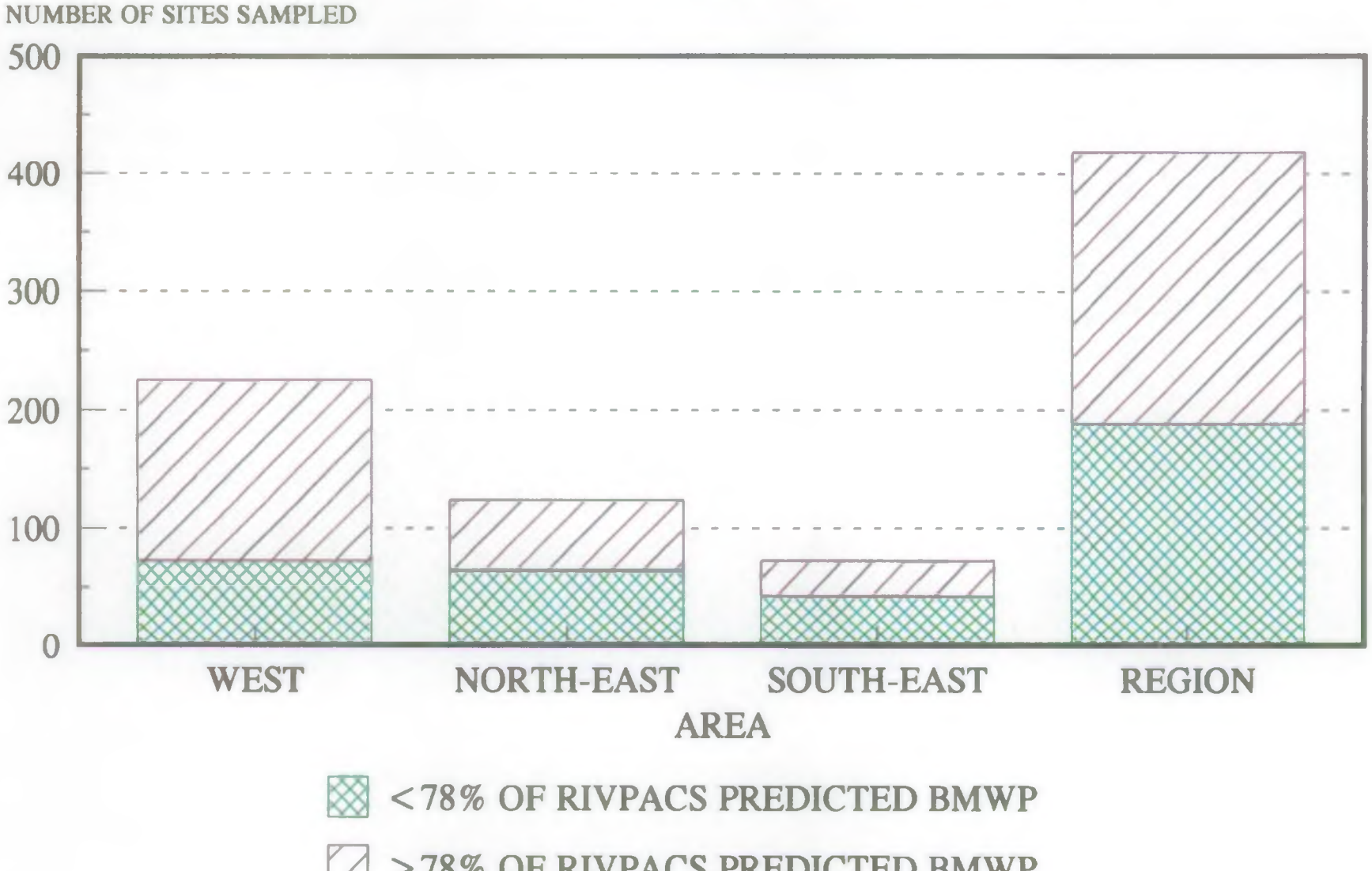
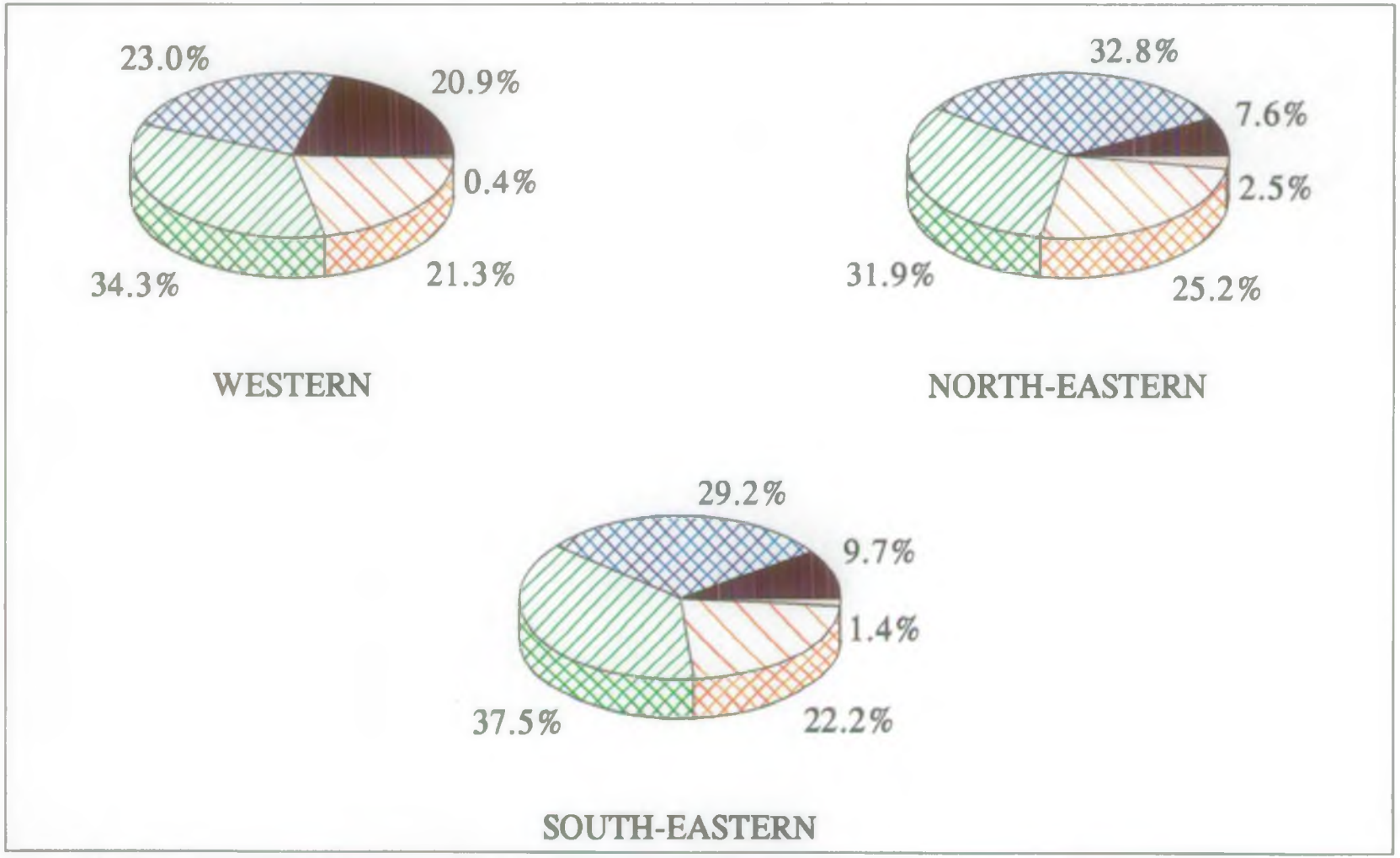


FIGURE 4

COMPARISON OF DISTRIBUTION IN THE AREAS



3.0.0 WESTERN AREA BIOLOGICAL WATER QUALITY

3.1.0 AREA OVERVIEW

A total of 225 site surveys were recorded on the Biological Water Quality map (136 of which were collected in 1994) giving the class distribution over the whole area, shown below and in Figure 5 (comparison with the previous sampling occasion is also included):

1994 MAP		PAST SAMPLE	
CLASS	FREQUENCY	CLASS	FREQUENCY
A	49	A	48
B	53	B	56
C	79	C	68
D	49	D	56
E	1	E	3

The reaches were split almost evenly between the top four classes with encouraging movement out of the lower score bands. As with the regional trend the greatest movement was in to class C - fair biological quality.

Of all the sites represented on the map 72 achieved less than 78% of the predicted score. This equated to 32% of the reaches on the Biological Water Quality map in the Western Area being unacceptably perturbed.

The net movement in classes is shown below:

A +1
B -3
C +11
D -7
E -2

The distribution of classes had changed between the previous sampling occasions with slight overall improvements in water quality. There was a large increase in the number of sites in class C with a decline in the number of sites in the poor and very poor biological quality classes.

Despite the net changes shown above there were 78 class changes in the Western area; this meant 35% of the sites changed class between the last two sampling occasions, although many of these could have been insignificant it showed that there was considerable movement in biological scores.

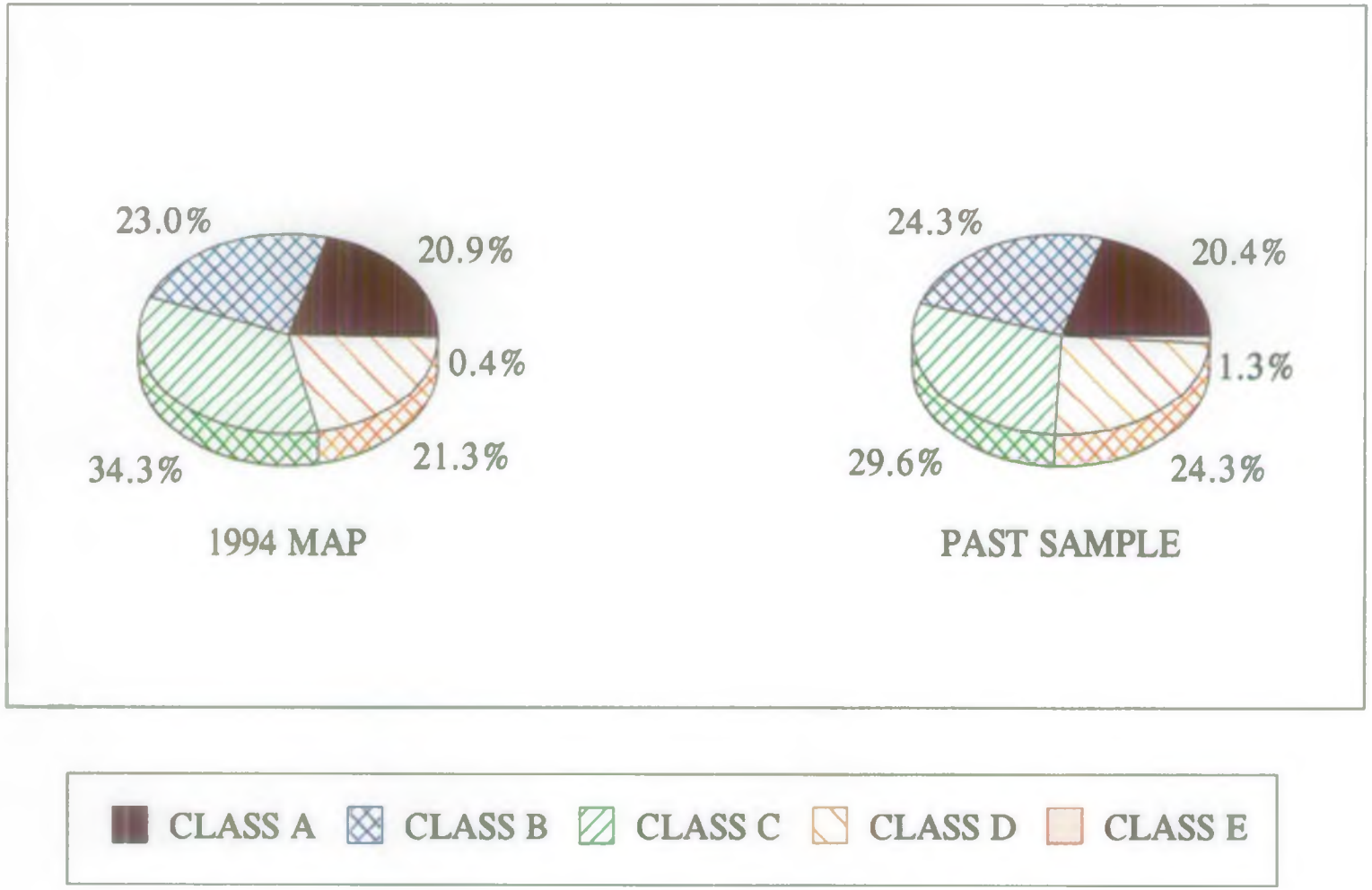
The Western Area generally displayed some very good biological quality, overall the best in the region. This was due to its largely rural aspect and less channelised river corridors. There were still catchments with generally impoverished fauna including the Swindon Ray and the Oxon Ray. The Thame and the Wye were also variable in their quality. Other than these sub-catchments poor biological quality was mainly limited to minor tributaries within the sub-catchments.

Overall there was a small net improvement in the quality in this area particularly in the Ock, Pang, Evenlode and Cole sub-catchments.

FIGURE 5

CLASS DISTRIBUTION

WESTERN AREA



3.2.0 CATCHMENT REVIEW

3.2.1 UPPER THAMES

(MAP 1)

23 sites were sampled routinely in the Upper Thames catchment the class distribution is shown below:

1994 MAP	PAST SAMPLES
A 6	A 4
B 6	B 9
C 5	C 2
D 6	D 7
E 0	E 0

This showed a large range in water quality at the upper end of the Thames catchment, this situation was fairly static with just 7 class changes and 7 'significant' value changes. In addition there were 7 sites which scored less than 78% of the predicted BMWP. These were all small tributaries generally affected by STW effluents and in many cases farm effluents. Of the 'significant' changes 4 were declining scores and 3 improvements. The overall view of this section of the catchment was one of variable quality but no obvious trend of improvement or deterioration.

There was variable biological quality in the **Upper Thames** with some very good biology and some poor. The **Upper Thames** itself was generally of good to very good biological quality and had largely improved where there was any change at all. One section downstream of **Swill** and **Derry Brooks** showed a decline in BMWP. However, the ASPT was higher than in previous samples suggesting poor water quality was not the cause.

Of the tributaries flowing directly into the Upper Thames BMWP scores generally remained the same. 'Exceptional' improvements had occurred in **Marston Meysey Brook** and **Bydemill Brook**. This was particularly encouraging in **Bydemill Brook** which had a very restricted fauna in the preceeding years, possibly due to drought. **Marston Meysey** was also recovering following its dry period in the early 1990's.

Sites that supported only an impoverished biology and were unchanged between the two samples were **Blunsdon Brook**, **Faringdon Brook**, **Black Bourton Brook** and **Highmoor brook**.

An additional three reaches suffered 'exceptional' deteriorations in score, these were **Derry Brook**, **River Key** and **Shill Brook**. These rivers normally support fair to good biological fauna. The **River Key** and **Shill Brook** have both exhibited scores within this range in the past and exceeded the predicted BMWP. They should be monitored for long-term

deterioration. **Derry brook** although usually low scoring had deteriorated further. The substrate was poor and dominated by silt and *Cladophora spp*. The presence of local free range pig farming and a silage leakage into an influent ditch suggested the brook could have been displaying long-term problems associated with agricultural erosion and enrichment. There is much scope for improvement in the Upper Thames particularly in the smaller tributaries.

3.2.2 COLE

(MAP 1)

8 sites were sampled routinely in the Cole catchment the class distribution is shown below:

1994 MAP		PAST SAMPLES	
A	0	A	1
B	3	B	1
C	4	C	1
D	1	D	5
E	0	E	0

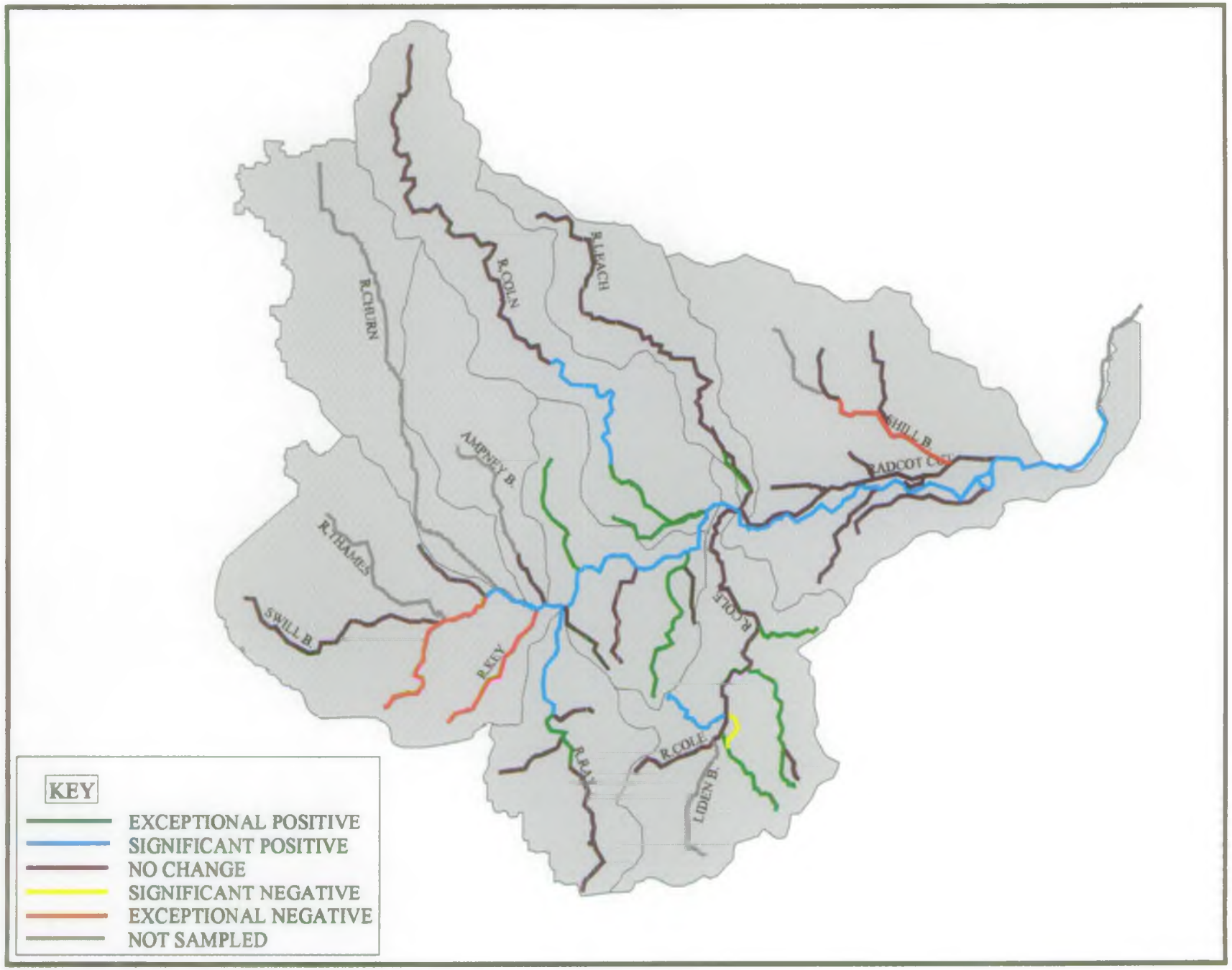
Of these sites 7 showed class changes, 3 of these were 'significant' and 2 'exceptional' value changes of which 4 improved and only one declined. The remaining 2 class changes were insignificant. 3 sites scored less than 78% of the predicted BMWP these were on tributaries affected by both STW and possible farm effluents. The class distribution on this catchment suggested that biological quality was of intermediate standard but the general trend was shown to be an improvement by the movement of significant results to higher scores.

The **Cole** showed the main river displaying good biological quality and the smaller tributaries varying from poor to fair. The main river maintained its scores with no significant class changes.

All the tributaries had 'significant' or 'exceptional' score improvements. Where changes had occurred it was largely following recovery from a previous pollution or from low flows. Despite the encouraging improvements scores were still depressed in the Brooks and Ditches mostly falling below 78% of the predicted and all could be targets for improvements.

MAP 1

UPPER THAMES, COLE, RAY, CHURN, COLN & LEACH CATCHMENTS VALUE CHANGE CLASSIFICATION



3.2.3 RAY

(MAP 1)

7 sites were sampled routinely in the Ray catchment the class distribution is shown below:

1994 MAP		PAST SAMPLES	
A	0	A	0
B	1	B	0
C	3	C	4
D	3	D	3
E	0	E	0

As can be seen by the classes represented and their relative frequencies this catchment does not have good water quality, this was borne out by the fact that 5 of the 7 reaches scored less than 78% of the predicted BMWP. There was not much change in the conditions in the catchment only one site changed class and this was insignificant. One site showed a 'significant' value change which was an improvement.

The **River Ray** was characterised as a catchment of, at best, fair biological quality. Reasons for the low scores were very low flows in the upper Ray catchment and urban run off and lack of habitats in the mid catchment. In addition, tip leachate and STW discharges into small tributaries compounded the effects of low flows. There had been signs of improvement at Cricklade since the late 80's as a result of improvements at Swindon STW. In this reach BMWP scores had improved from 20-30 in the 80's to 102.

While the upper reaches and **Lydiard Brook** were unchanged there was an 'exceptional' improvement in scores in the mid-reach which was tempered to a 'significant' improvement in the lower reach. These were encouraging trends for a stream which had been of consistently poor quality.

Haydon Wick Brook with its characteristic poor quality had deteriorated showing an even more impoverished fauna than previously. The particularly low score could have been attributed to flooding in the week prior to sampling - the usually low score was partly due to deep silty substrate limiting habitats for the flora and fauna.

3.2.4 CHURN

(MAP 1)

2 sites were sampled routinely on the Churn, one class A and one class B. Both exceeded their predicted BMWP and ASPT suggesting water quality was good. Both also declined over the last sampling period by an 'exceptional' value change. This trend was likely to have been caused by the fact that the 1993 scores were unusually high. The 1994 scores were in the range of the normal sampling variation. Therefore while the next results should be watched for long term deterioration this was unlikely to be a real water quality problem.

3.2.5 COLN

(MAP 1)

4 sites were sampled routinely in the Coln catchment the distribution of classes is shown below:

1994 MAP	PAST SAMPLES
A 2	A 1
B 1	B 2
C 1	C 0
D 0	D 1
E 0	E 0

All of these sites had changed class one going down which was not a 'significant' value change; the other three improved and were also 'significant' value changes.

The **Coln** was represented as a good quality river which tended to deteriorate slightly towards its confluence with the Thames. Its tributary - **Dudgrove Stream** was of only fair biological quality. 1994 saw a return of the main stream to its normal high biological quality; 1993 appeared to have been a bad year for biology in this catchment with no apparent reasons or long term effects. **Dudgrove stream** showed an 'exceptional' improvement in score, but the ASPT was still lower than that predicted suggesting the RAF STW's were still having some impact on water quality.

3.2.6 LEACH

(MAP 1)

There were 2 routine sampling sites on the Leach both with good water quality; one being in class A and the other in class B. Both exceeded predicted BMWP and ASPT scores. One changed class and was also a 'significant' improvement -possibly due to improved effluent from the fish farm or greater dilution following the end of the drought.

The **Leach** was of very good biological quality with the main stream being unchanged, **Veneymore Stream** flowing in just above its confluence with the Thames generally had poorer water quality but showed an 'exceptional' increase in score possibly attributable to restored flows.

3.2.7 WINDRUSH

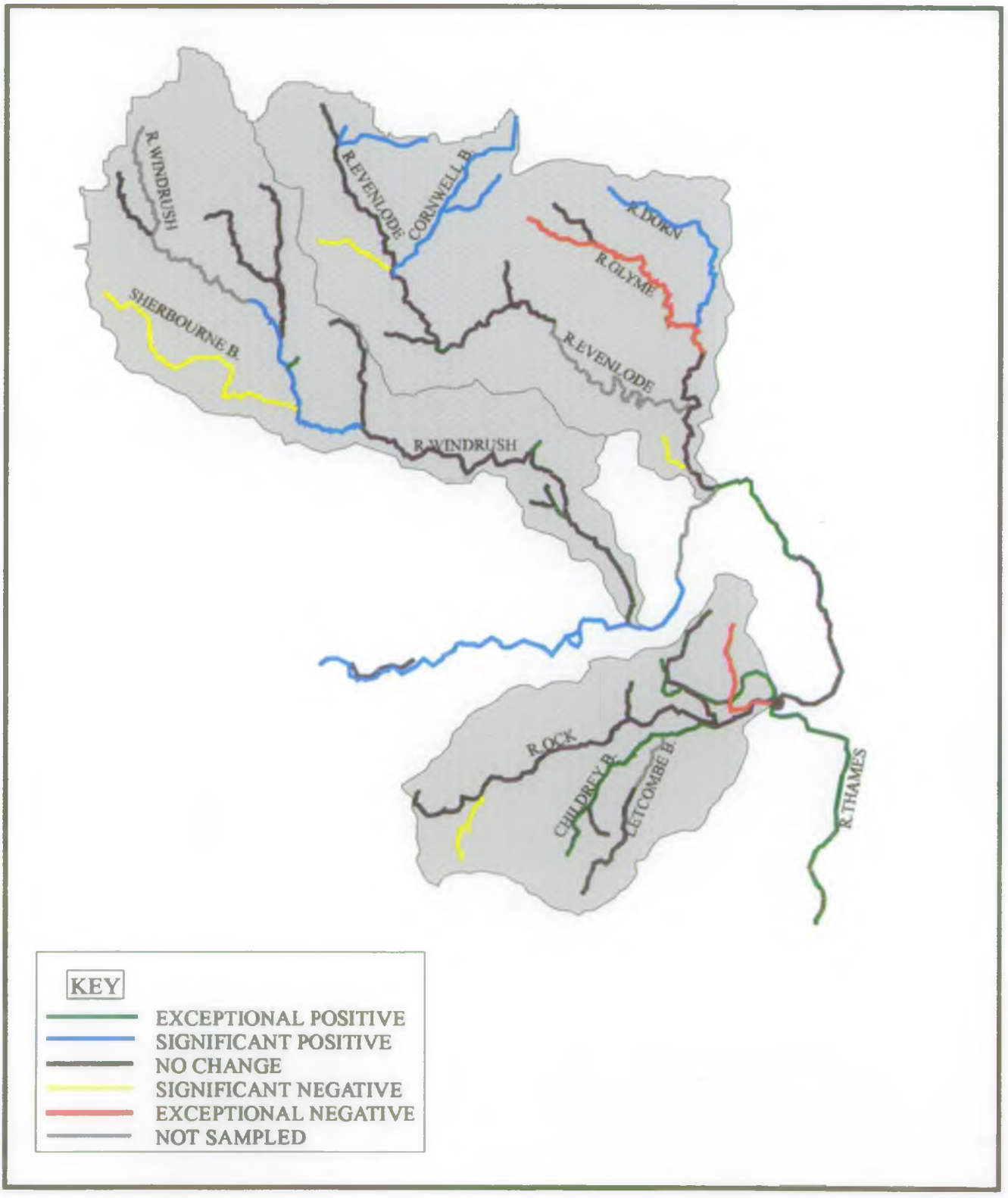
(MAP 2)

12 sites were sampled routinely in the Windrush catchment the class distribution of these is shown in the table below.

Three reaches fell below 78% of the predicted BMWP score of which three showed class changes improving from the 1993 map score; these were also the only significant value changes. On the whole water quality in this catchment was consistently very good with many

MAP 2

WINDRUSH, EVENLODE & OCK CATCHMENTS
VALUE CHANGE CLASSIFICATION



of the sites far exceeding their predicted scores.

1994 MAP	PAST SAMPLE
A 6	A 6
B 2	B 2
C 2	C 0
D 2	D 3
E 0	E 1

This was another catchment of generally very good quality. The **Windrush** and its main tributaries, the **Eye** and **Dikler** maintained high scores without 'significant' score or class changes.
There were several improvements to scores in the catchment, these were in the smaller tributaries which have been areas of poor biological quality in the past. This was primarily due to STW effluents and an industrial estate around **Emmas Dyke**. **Rissington Ditch**, **Showells Brook**, **Colwell Brook** and **Emmas Dyke** all showed 'exceptional' score improvements; they were still impoverished and scored well below their RIVPACS predictions. These tributaries appeared to have benefitted from increased flows. A pollution incident earlier in the year had not had any apparent long term effect but may have some impact on future samples taken in Colwell Brook. Witney STW discharging low quality effluent had caused depressed scores in Colwell Brook and Emma's Dyke - despite significant improvements since the 80's. With maintained flow all these tributaries should continue to improve.

The only 'significant' decline in score occured in **Sherbourne Brook**. This very high scoring reach still supported a rich fauna as well as some high scoring families. The decline may just have been natural variation or sampling error but it should be kept under observation to ensure a deteriorating trend does not develop.

3.2.8 EVENLODE

(MAP 2)
15 sites were sampled routinely in the Evenlode catchment the class distribution is shown in the table below.

Of these there were 3 class changes 2 improving and one deteriorating. One of the improvements was 'significant' while the other two changes were insignificant. There were a further two significant value changes one improvement and one decrease in score. 3 reach scores fell below 78% of the predicted BMWP score none of which showed class or value changes. The reaches involved are permanently impoverished by STW discharge and resist improvement.

1994 MAP		PAST SAMPLE	
A	6	A	5
B	1	B	3
C	7	C	5
D	1	D	2
E	0	E	0

The **Evenlode** catchment was generally of very good biological quality and again the main stream, with its main tributary, the **River Glyme**, supported a rich fauna. As with many of the Western Area catchments the problems occured in the smaller tributaries with restricted flow and polluting effluents.

One particularly worrying deterioration in score was in the **Glyme**. This had generally been a very high scoring river which showed a large drop in BMWP score. The ASPT scores were higher than previously and the BMWP was one of the highest recorded. This suggested that sampling variation may have caused an unusually high score in 1993, with no increased ASPT, indicating water quality was not implicated.
Encouraging improvements in score were in evidence in the eastern headwaters of the Evenlode with low scoring reaches on the **Blue Brook**, **Four Shire Stream** and **Little Compton Stream** all improving 'significantly'. **Four Shire Stream** was still very low scoring which was attributed to poor water quality. The stream was subjected to another pollution incident from Moreton in Marsh STW after the 1994 sample had been collected.
Blue Brook and **Little Compton Stream** exceeded 78% of their predicted BMWP -**Blue Brook** appeared to be overcoming its past water quality problems with its good habitats supporting a top scoring mayfly. **Little Compton Stream** had benefitted from increased flows. Hopefully these score improvements will be retained.
In contrast to these improvements there was deterioration or no change on the tributaries flowing in from the west. **Littlestock Brook** retained its low score, while both **Bleddington Brook** and **Hanborough Stream** had declined 'significantly'. Both were affected by STW and agricultural inputs which may have caused worse than normal conditions. These reaches should be targeted to complete the good biological quality in this catchment.

Despite these small tributaries being below standard the remaining catchment was of very good quality as can be seen by the large number of class A reaches.

3.2.9 OCK

(MAP 2)

9 sites were routinely sampled on the Ock catchment for which the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	4	A	4
B	1	B	2
C	2	C	1
D	2	D	2
E	0	E	0

Of these, two changed class while two had 'significant' changes. Only three of the sites fell below 78% of their predicted BMWP score while most of the others exceeded their expected value. The Ock had been constant over the previous year; the majority of significant changes had been improvements which could generally be attributed to increased flows and consequent habitat recovery following the drought. The short-falls below predicted scores could be attributed to STW effluents. This is a good catchment which is improving in the long term.

The main stream of the **Ock** was of very good quality and had remained so in 1994. The two main streams enhancing the flow - **Childery** and **Letcombe Brooks** were very different. **Childery Brook** had good biological quality and showed an 'exceptional' score improvement this year. In contrast **Letcombe Brook** was of only fair quality with little change this year.

The greatest biological quality problems in this catchment were posed by **Sandford**, **Uffington** and **Woodhill Brooks**. **Woodhill Brook** flowing into Childery Brook had generally been low scoring and showed no changes in 1994. Conversely both **Uffington** and **Sandford Brooks** had both achieved good scores in the past with mid and high scoring families, however, between the last two sampling occasions there had been 'significant' and 'exceptional' score declines. **Sandford Brooks** change was attributed to a higher than normal score in 1993 while **Uffington Brook** may have been affected by STW effluent.
Bagpuize Brook was another reach which scored well below predicted probably affected by Bagpuize STW; however, the Brook had been showing a steady increase in scores over the previous 3 years and in 1994 supported a fair fauna, while still scoring well below predicted scores.

3.2.10 CHERWELL & OXON RAY

(MAP 3)

There were 36 sites routinely sampled in the Cherwell catchment for which the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	4	A	3
B	7	B	9
C	15	C	15
D	10	D	9
E	0	E	0

Of these sites there were 13 with class changes; 7 improvements and 6 deteriorations. 7 of these were 'significant' value changes with a further 3 'exceptional' changes. There were 16 reaches which fell below 78% of the predicted BMWP. Water quality problems in this catchment were evident from the number of class C and class D stretches. The majority of these fell below the predicted BMWP and were largely due to being downstream of STW on small catchments they were all constant sites and had shown little change either short or long term over the last 5 years.

These catchments displayed variable biological quality while many of the tributaries supported a restricted fauna. In particular the Ray had reaches scoring from poor to good. The majority of reaches were stable with many of the class changes being insignificant; nevertheless, on the **Cherwell** itself there were two stretches displaying score deteriorations - these still exceeded predicted scores and supported a rich fauna. The falls in BMWP scores were not supported by such extreme falls in ASPT and were largely attributed to spate flows. The results from these stretches should be watched carefully for deteriorating trends.

In the headwaters, changes where they occurred were largely deteriorations. E.g. **Byfield Brook, Boddington Canal Feeder, Farnborough Stream, Hornton Stream** and **Blowham Brook**.

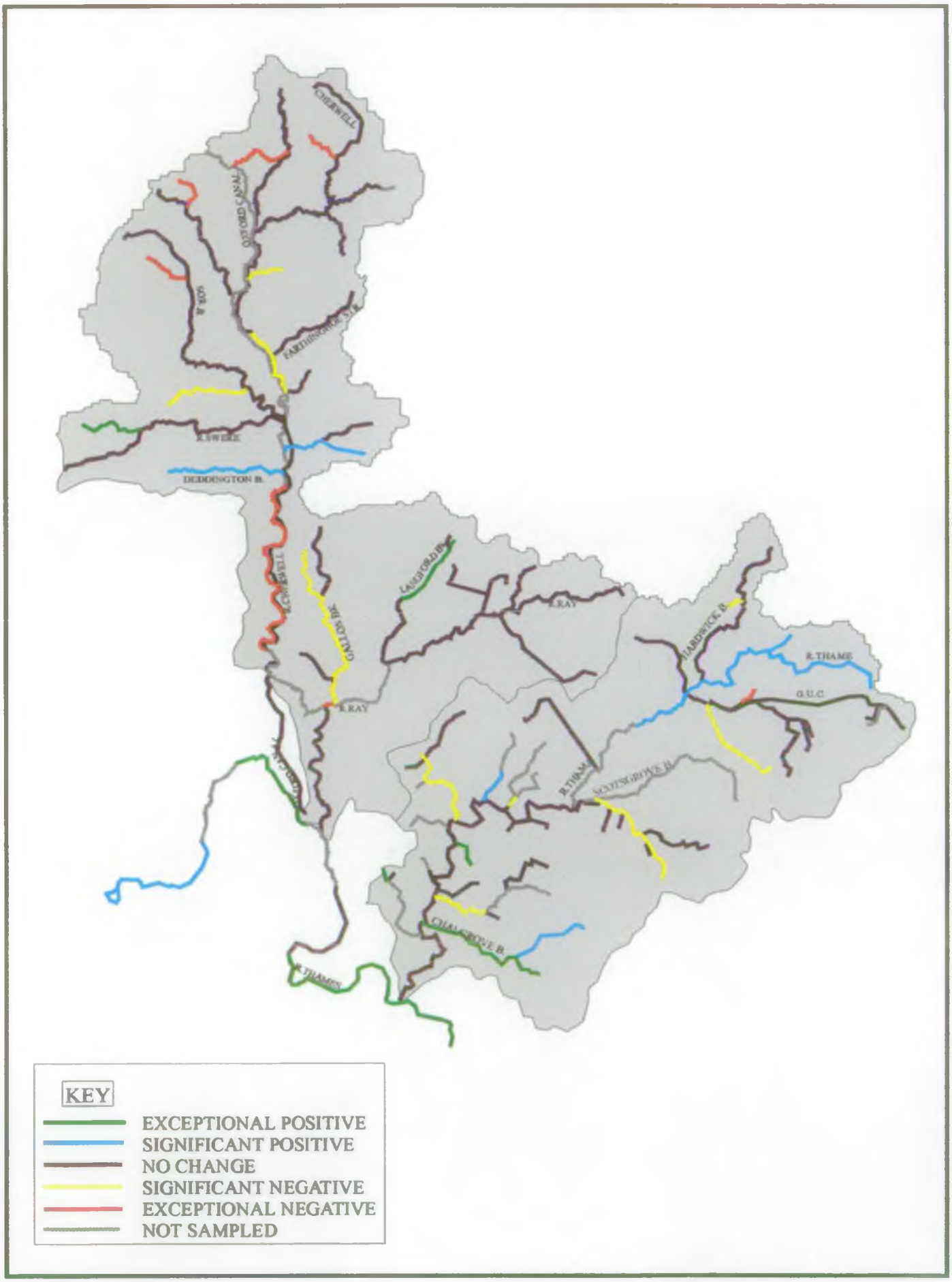
Byfield Brook and **Boddington Canal Feeder** have been consistently low scoring reaches. The flow in **Byfield Brook** was dominated by Byfield STW effluent and a very silty substrate dominated by chironomids. **Boddington Canal Feeder** has had very variable scores being prone to high flows and related problems of sampling access.

By contrast **Farnborough Stream, Hornton Stream** and **Bloxham Brook** achieved reasonable scores in the past, the 1994 low scores were attributed to seasonal changes and sampling error although water quality may also have been implicated. These streams could benefit from targeting to improve biological quality.

Deddington Brook was one of the few reaches showing a sustained trend of improvement. This had been occurring since it was first sampled in 1990, reasons for this may have been in part due to improved sampling or volume of water. **Hook Norton Brook** also showed an

MAP 3

CHERWELL & THAME CATCHMENTS
VALUE CHANGE CLASSIFICATION



'exceptional' score improvement, exceeding predicted scores for the first time since 1988; this may have been due to increased discharge.

The **Oxon Ray** exhibited very variable biological quality with little change in 1994. The lower reach of the Ray showed an 'exceptional' decline in score where it had typically been high scoring. The ASPT was high with the mid-scoring animals being absent - this suggested habitat provision or sampler error was to blame rather than water quality.
The **Gallos Brook** discharging just upstream of this point had also deteriorated. This was previously one of the higher scoring reaches in the subcatchment and the reasons for this decline were unclear.
Of the other reaches **Langford Brook** showed an exceptional improvement above Bicester STW - this was 100% greater than any previous score. Until this sample the Brook had been on a downward trend attributed to urban run-off from Bicester, the 1994 improvement may have been due to better flows or sampler variation.

3.2.11 THAME

(MAP 3)
32 sites were sampled routinely in the Thame catchment giving the class distribution shown below:

1994 MAP		PAST SAMPLE	
A	1	A	1
B	9	B	8
C	14	C	14
D	8	D	9
E	0	E	0

Of these 32 eleven showed class changes of which only 4 were improvements. Of the eleven class changes 5 were 'significant' and one 'exceptional'. There were a further 3 'significant' value changes. 14 reaches fell below 78% of the predicted BMWP, coupled with the class distribution this indicated that there were some water quality problems in the Thame catchment. Nearly all the sites falling below 78% of the predicted score were on small tributaries of the Thame downstream of STW. Other impoverished streams were very small with limited habitats. The majority of main river sites scored above 78% of the predicted score. The main river appeared to be able to cope with the low quality of some of the inputs due to additional dilution.

The main stream **Thame** in the **upper reaches** showed a 'significant' improvement. This was slightly surprising since many of the tributaries joining at this point were of poor quality.

Tributaries leading into the Thame were only of fair to poor biological quality which had not changed greatly between the last two sampling occasions. Some of those flowing into the

upper reaches had deteriorated further with no obvious reasons. E.g. **Creslow Brook**, **Stocklake Brook** and **Stoke Brook**.
In the mid and lower catchment more tributaries had declined in score. E.g. **Kingsy Cuttle Brook**, **Shabbington Brook**, **Holton Brook** and **Hasely Brook**. There were no obvious reasons for these declines although some had higher than average scores when last sampled. These deteriorations were on reaches of generally good biological quality (except for Shabbington Brook).
Some tributaries at the lower end of the river displayed improvements. E.g. **Worminghall Brook**, **Milton Ditch**, **Chalgrove Brook** and **Baldon Brook**. These were all encouragingly good scores; in particular **Milton Ditch** which is a small ditch, overgrown and hard to sample. They may in part have been due to increased flows.

3.2.12 KENNET (+ GUC + KENNET & AVON CANAL)

(MAP 4)
30 sample results were used to routinely classify the Kennet catchment.
The class distribution is shown in the table below:

1994 MAP		PAST SAMPLE	
A	11	A	12
B	11	B	10
C	6	C	4
D	2	D	4
E	0	E	0

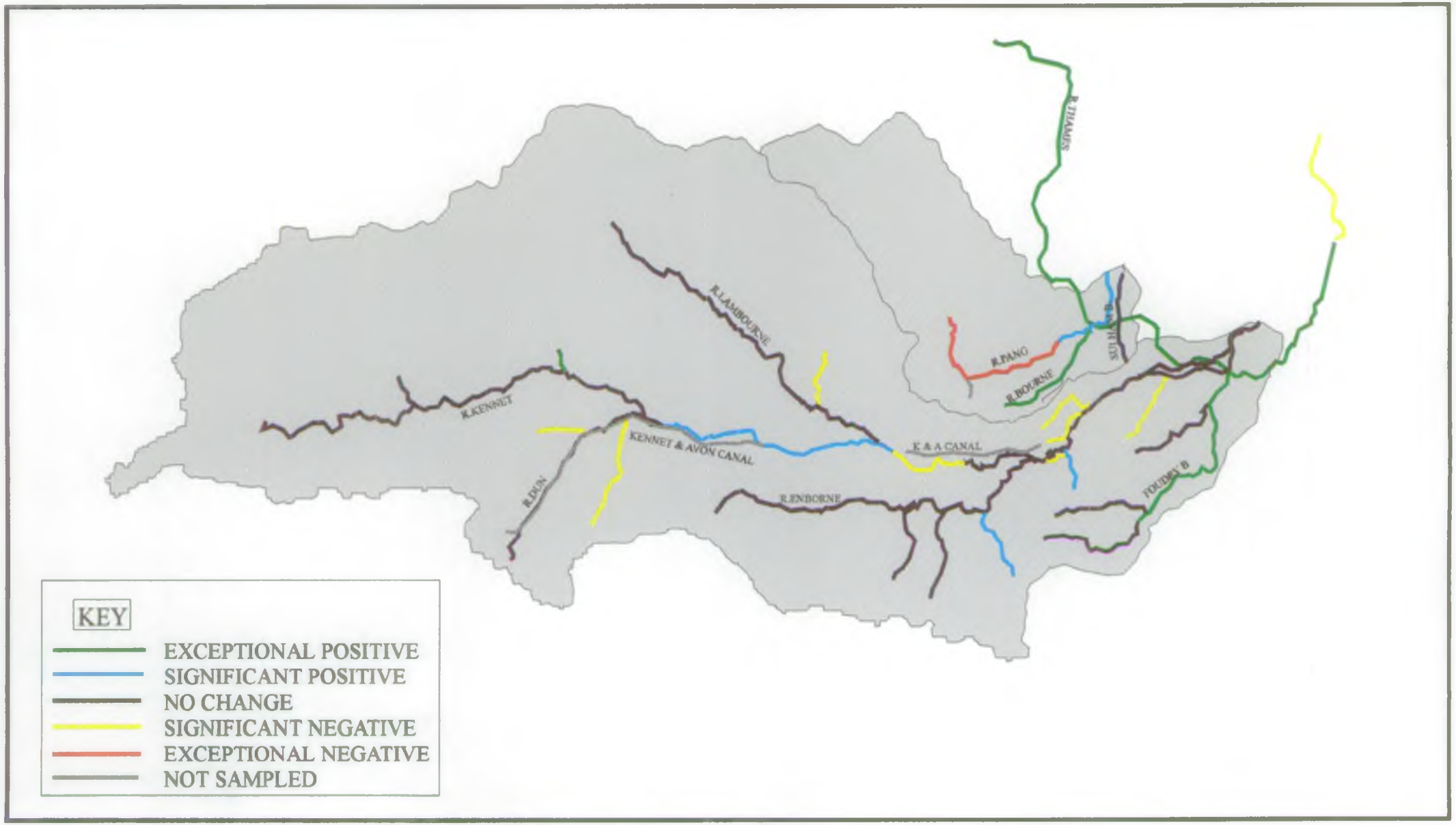
This indicates no real net change in quality with one less reach in class A but also fewer in class D. Looking at the class changes it can be seen that while there were 7 class changes in the catchment 3 of these were insignificant. There were 6 'significant' value changes 4 deteriorating and 2 improving. Improvements that appeared to be significant could still be attributed to recovery to pre-drought conditions.

The **Kennet** catchment scored highly with many of the sites exceeding predicted scores and only 5 falling below 78% of the predicted BMWP. The majority of the main river and its 3 main tributaries - the **Enborne**, **Lambourne** and **Foudry Brook** - helped to maintain this good quality.
The only value changes in the main stream were a score improvement in one stretch and a decline in another. The scores in these reaches still exceeded the RIVPACS predictions and should not cause great concern unless the decline is repeated in 1995.
Foudry Brook improved scores greatly in two reaches and otherwise retained a rich fauna as did the **Enborne**. Both rivers displayed a net improvement in scores and retained good biological quality.

Problem areas in this catchment were limited to small tributaries leading directly into the

MAP 4

KENNET, PANG & SULHAM BROOK CATCHMENTS VALUE CHANGE CLASSIFICATION



Kennet. Particular problems were the **Clay Hill Brook** and **Beenham Stream**; these consistently supported an impoverished biology and declined 'significantly' in 1994. **Froxfield Stream** and the **River Shalbourne** leading into the **Dun** at the head of the catchment were presenting poorer biology; both had deteriorated 'significantly' between the last two sampling occasions.

Despite these small tributaries which should be targeted for improvements the Kennet scored well - the main river seeming to be little affected by its few poor quality tributaries.

The **Kennet & Avon canal** which runs in and out of the River Kennet was mostly unsampled. One small stretch by the Kennet showed a deterioration in score.

3.2.13 PANG & SULHAM BROOK (SUL)

(MAP 4)

There were 5 routine sites in the Pang catchment, the class distribution of which is shown below:

1994 MAP		PAST SAMPLE	
A	2	A	2
B	1	B	1
C	2	C	1
D	0	D	1
E	0	E	0

Of these sites only one had changed class in the two sampling occasions from D to C , while there had been considerable value changes.

The Pang was shown to be a good quality river while Sulham Brook was only of mediochre quality, both had changed quite considerably between the last two samples. There had been a net improvement in class and in score changes.

Sulham Brook was unchanged while the **Bourne** had shown a good improvement. The **Pang** had deteriorated in the upper reaches (while retaining a rich fauna well above predicted scores) but improved in the lower reaches. This decline may have been natural variation but following samples should be observed carefully.

These sub-catchments were of good quality with only **Webbs Lane Stream** and **Sulham Brook** being affected deleteriously by Beenham and Pangbourne STW's respectively. **Webbs Lane Stream** possibly suffered additional pollution from Beenham Tip. Both of these reaches fell below 78% of their predicted BMWP's and neither had changed significantly since the previous sample. Improvements may be targeted here in this catchment.

3.2.14 THAMES (+ CUT)

(MAP 5)

44 sites were sampled routinely in the lower Thames catchment the overall class distribution is shown below:

1994 MAP		PAST SAMPLES	
A	4	A	5
B	9	B	10
C	17	C	17
D	13	D	11
E	1	E	1

There was a lot of movement in classes with 16 sites changing class. 12 of the class moves were to better biological quality. Of these class changes 5 were 'significant' value changes with a further 5 'exceptional' value changes. 13 sites fell below 78% of the predicted BMWP of which all were small tributaries of the Thames with STW or trade effluents discharging upstream causing water quality problems. Of the large number of class changes and 'significant' value changes the majority were improvements.

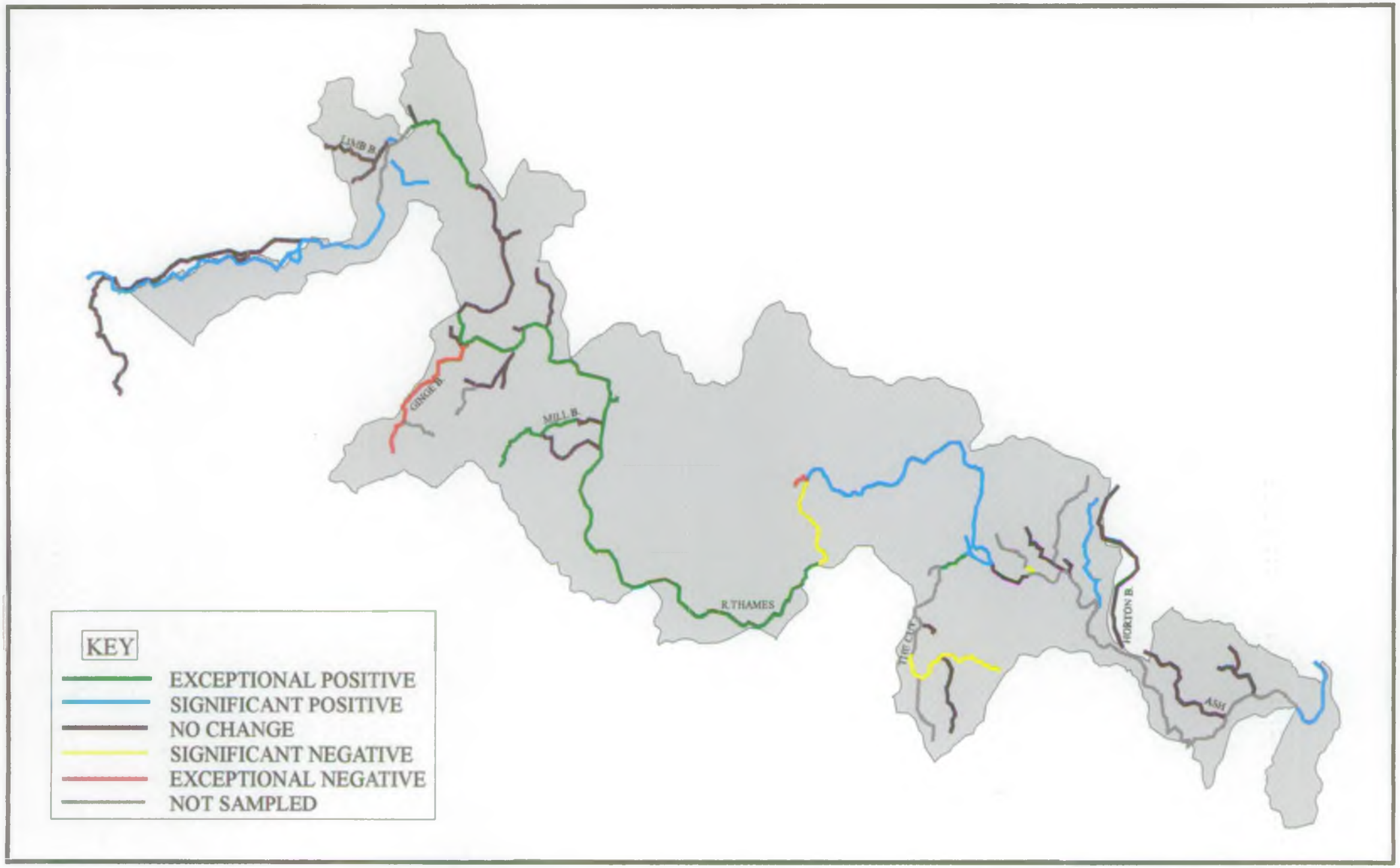
The **Lower Thames** itself was of very good biological quality and any significant score changes showed further improvements. The condition of the small tributaries discharging directly into the Thames was variable with biological quality ranging from very poor to good. Many of these reaches had remained unchanged since the previous sample while some had changed considerably. These were generally improvements such as **Eynesham Wharf Stream**, **Filchampstead Brook**, **Howberry Ditch**, **Mill Brook** and **Datchets Common Brook** and the **Lower Cut**. These now displayed a reasonable fauna and achieved 78% of their predicted scores with the exception of **Howberry Ditch** which was considerably affected by STW; sewage fungus was growing along its length. In such urbanised areas the improved scores may have been due to improved river flows.

Many of the smaller tributaries that had not improved or even deteriorated over the last few years could be targeted for improvements; particularly poor urban run-off affected sites were **Feltham Hill Brook**, **Northfield Brook** and **Bull Brook**. **Northfield Brook** is the recieving water for urban run-off (despite its rural position) and Oxford STW. Other poor quality rural watercourses were: **Jealotts Hill Stream**, **Harwell Stream**, **Burcott Brook** and **Odhay Hill Ditches.**

Sites that showed deterioration were most notably **Ginge Brook** and the upper **Cut**. The upper **Cut**, generally of poor quality, may have been affected by Bull Brook, Jealotts Hill Stream, Bracknell STW and Maidenhead STW. By contrast **Ginge Brook** is normally of reasonable quality and still scored greater than 78% of the predicted score despite the 'exceptional' fall in score; it is in fact a very variable reach and appeared to be within the

MAP 5

RIVER THAMES - WINDRUSH TO TEDDINGTON LOCK
VALUE CHANGE CLASSIFICATION



normal variation. Targets for the catchment should be to halt the deteriorations (which may be no more than sampling variation) and to sustain improvements into long term trends.

3.2.15 WYE

(MAP 6)

5 sites were sampled routinely on the River Wye the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	0
C	3	C	4
D	2	D	0
E	0	E	1

This catchment, always of poor to fair biological quality, showed little change between the last two samples. Three of the five sites fell below 78% of the predicted BMWP score. Three sites had class changes in the past year and three sites showed 'significant' value changes in score. The net change in the catchment was one of deterioration. Toxic pollution had been suspected in this catchment for years and was unlikely to have been helped by the recent large spill of cyanide.

The lower stretch on the **Wye** showed a fair biological quality in the past. This deteriorated 'significantly' in 1994 but still supported a richer fauna than upstream.

Two encouraging signs in this catchment were improvements in the two small tributaries - **Hughendon Stream** and **Glory Mill Backwater** - both had been improved by increased river discharge; particularly Hughendon Stream which had been dry for the previous few years.

4.0.0 NORTH EASTERN AREA BIOLOGICAL WATER QUALITY

Many of the observations relating to this areas biology were taken from:
Leeming D. (1994) - Biological River Quality: NE Area Review of Data 1991-93 Internal report - this should be consulted for a more detailed assessment of the biology in the North-East area.

4.1.0 AREA OVERVIEW

124 sites were sampled in the North-Eastern Area (100 actually sampled in 1994) for the biological water quality map. The class distribution when compared with the last sample is shown below and in Figure 6:

1994 MAP		PAST SAMPLE	
CLASS	FREQUENCY	CLASS	FREQUENCY
A	9	A	11
B	39	B	34
C	38	C	41
D	30	D	29
E	3	E	4

This shows that biological water quality had improved for the worst sites but that better sites had deteriorated.

There was a net change in classes of:
A -2
B +5
C -3
D +1
E -1

This indicated no real overall improvement or deterioration, however, the worst and best sites had tended towards the mid-scoring classes. There was an encouraging fall in E class reaches which when coupled with the increase in B suggested some small overall improvement. Despite the small net movement in classes there had actually been quite a large number of class changes. In total 41 (35%) reaches changed class throughout the year.

Of the 1994 map results 64 reaches (55%) in the North-Eastern area fell below 78% of the RIVPACS predicted scores and were therefore considered unacceptably perturbed.
This poor quality was more obvious in the mainstreams of the Eastern rivers than the

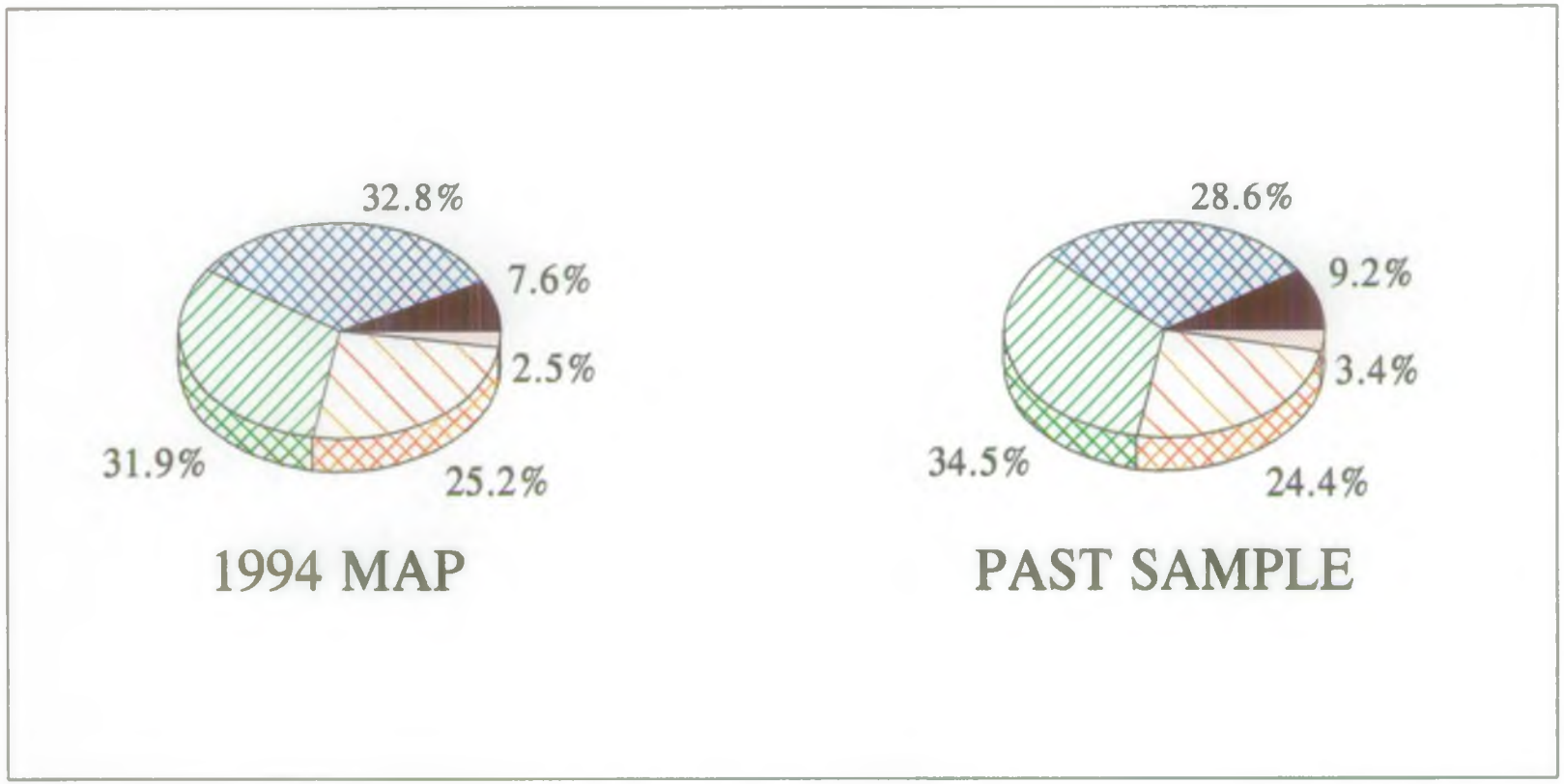
outlying tributaries. The poor biological quality was largely related to the extensive urbanisation of the North-Eastern catchments. This results in polluting urban run-off, as well as STW and industrial effluents, affecting water quality. In addition channelisation of many of the river basins affected the availability of habitats for flora and fauna, further affecting biological diversity.

Particular problem sub-catchments in the Area with consistently impoverished biology were the Rom/Beam, Ingrebourne and Brent Rivers. Other catchments combined good and poor reaches. Overall there had been no net improvement or deterioration in the area. Some catchments displayed overall improvements. E.g. Stort, Mimram and Ash Rivers. Conversely, some of the catchments appeared to have deteriorated; in particular the Colne and Crane Rivers.

FIGURE 6

CLASS DISTRIBUTION

NORTH-EASTERN AREA



4.2.0 CATCHMENT REVIEW

4.2.1 COLNE

(MAP 6)

46 sites were sampled routinely on the Colne for which the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	2	A	6
B	21	B	16
C	13	C	15
D	8	D	7
E	2	E	2

This catchment displayed a variable biological quality with most sites in the mid-score range. 24 sites (more than half) fell below their predicted BMWP. The variation at the sites was high with 20 sites changing class. Only 11 of these sites showed at least 'significant' value changes. A further 5 non-class change sites had 'significant' value changes.

The net change was towards poorer biological quality with the majority of improvements within the GUC and tributaries. The **upper Colne** and tributaries were largely of poor quality associated with urban run-off and agricultural pollution (Leeming 1994). The **GUC** traditionally of poor quality and having an impact where it joins the streams showed improvements where it joins the **Gade**. Habitats are always likely to be limiting in the GUC due to its artificial structure. Much of the Colne is also canalised and this contributed to the lack of habitats available for biology and was often the reason for low scores. The **River Chess** displayed good water quality and good biology - coming from the Chilterns it was one of the better tributaries in the Colne catchment.

There were some welcome improvements; the **Misbourne** improved in its upper reaches where biology had often been limited by dry periods. The **River Ver** is a major tributary and did show some improvement in its upper reaches this was probably due to increased flows as it suffered from low flows between 1990-93. There were also improvements in **Tykes Water** and **Catherine Bourne** which may also have been related to increased flow.

As well as improvements there were falls in score both in the main river **Colne** - upper and lower reaches as well as the **lower Ver**, **Alderbourne** and **lower Pinn**. Other than the Pinn these reaches had been some of the richer sites biologically within the Colne catchment. Some attention should be taken that this downward trend is not maintained. The **Pinn**, always biologically impoverished, had deteriorated even further in the lower reaches.

4.2.2 CRANE

(MAP 6)

7 sites were sampled routinely on the River Crane the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	1
C	5	C	4
D	2	D	2
E	0	E	0

This was another poor quality river with 6 of the 7 sites scoring less than 78% of the predicted score. There had been little change since 1993 with only one site changing class and also having a 'significant' value change.

The **Crane** itself had deteriorated along most of its length and the **upper Duke of Northumberlands** score had dropped 'exceptionally' since the previous sampling occasion. The BMWP score was still reasonable for this reach and was in fact the only site to reach 78% of the predicted BMWP. The Duke of Northumberlands actually supported the best biological quality in this subcatchment with all other reaches being of poor quality due to urbanisation and poor habitat provision.

The **Yeading** always supported a poor biological quality, 1994 was no exception.

4.2.3 BRENT

(MAP 6)

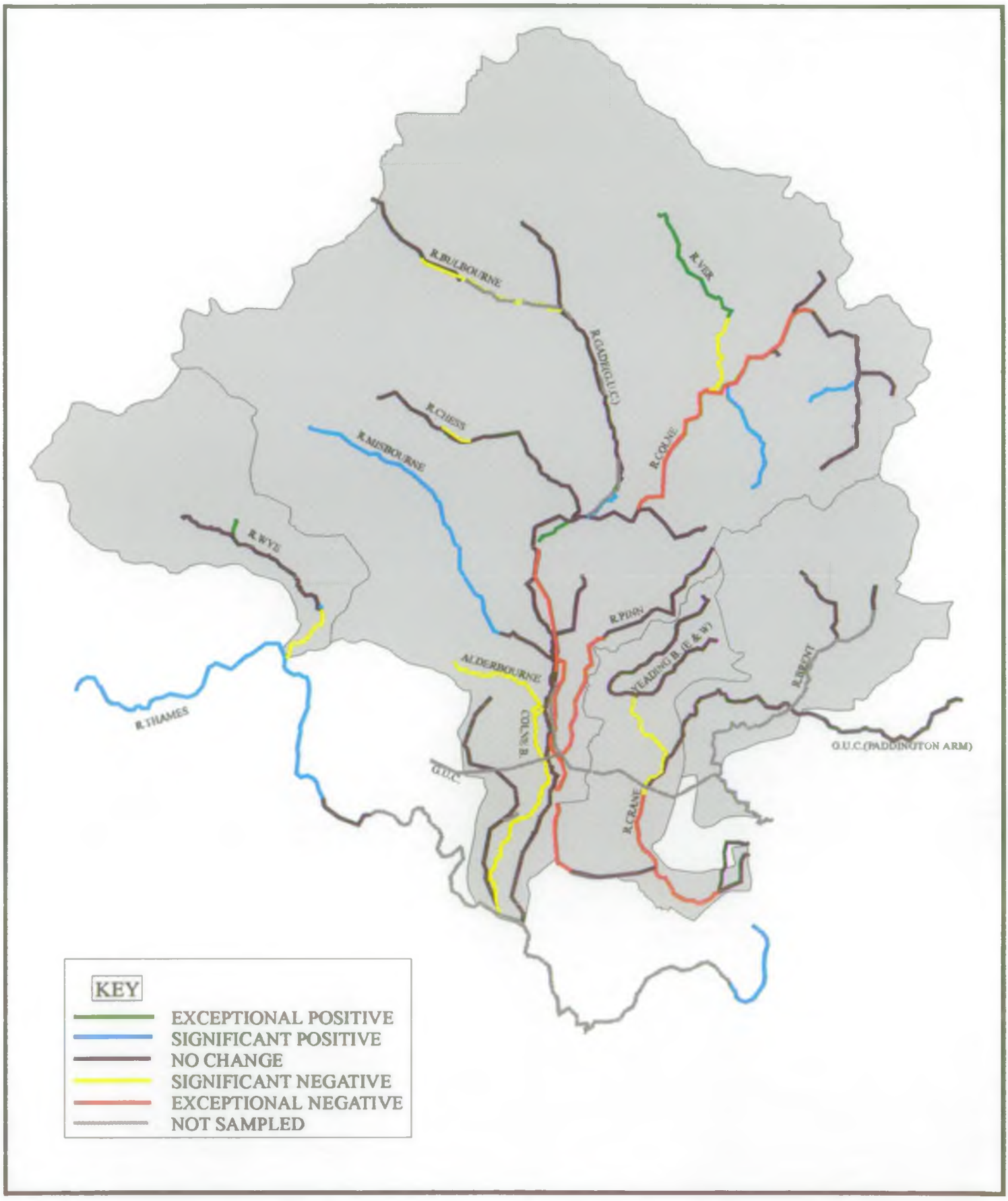
7 sites should have been sampled routinely for the Biological Water Quality map; due to high flows creating dangerous conditions the main river had not been sampled for 2 years.

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	0
C	0	C	0
D	2	D	2
E	0	E	0

2 tributaries were sampled: **Dollis Brook** and **Silk Stream**, both of which scored less than 78% of the predicted score - no change from previous years. When last fully sampled and

MAP 6

COLNE, WYE, CRANE & BRENT
VALUE CHANGE CLASSIFICATION



analysed it was observed that: 'the River Brent and tributaries were almost entirely of a poor biological quality with macroinvertebrate assemblages restricted to pollution-tolerant families.' This was attributed to 'diffuse episodic pollution associated with stormwater discharges, domestic sewer misconnections to surface water systems and other aspects related to urban run-off in a highly urbanised catchment' (Leeming '94).

The sub-catchment was of consistently poor quality, the 1994 results suggested there was no change in the upper reaches and none was expected in the lower reaches.

4.2.4 LEE

(MAP 7)

21 sites were sampled routinely in the Lee catchment with a class distribution shown below:

1994 MAP		PAST SAMPLE	
A	2	A	2
B	4	B	3
C	8	C	9
D	7	D	5
E	0	E	2

The Lee supported rather variable biological quality. Changes over the previous year had been to improve the very worst sites with some deterioration in the mid-range of classes. The poor biological quality was reflected in the fact that 15 of the sites fell below 78% of the predicted BMWP scores. There was no rapid change in the condition of this river with only 5 sites changing class of which only 2 were 'significant' value changes.

The **upper Lee** had poor biological quality due to urban run-off from Luton, further downstream quality was again affected by the Mill Green STW. Downstream of the confluence with the Mimram biological quality improved.

In the **middle reaches** of the Lee biological quality was more affected by the channel than water quality, where better habitats existed the scores were higher.

In the **lower Lee** there was very variable water quality due to a mixture of urban run-off and channelisation. The stretch of the Lee running parallel with the Lee Navigational was generally of good quality but had deteriorated in 1994. The Rye Meads STW appeared to be having a negative effect on the downstream biological quality. Water quality improved increasingly downstream but biological quality was limited by the condition of the river channel.

Pymmes Brook was of poor quality, carrying the effluent from Deephams STW, having a significant effect on the quality of the Lee below the confluence.

The Lee Navigation Canal had a restricted biology due to the habitat limitations of a canalised river and the poor quality associated with Pymmes Brook. The poor quality in **Pymmes** and **Salmon Brooks** had not changed over the previous year still having a negative

impact on the lower Lee and Lee Navigation.

Many of the tributaries of the Lee were also of poor quality due to urbanisation, STW inputs and the limitations of poor habitat availability.
Despite the improvements in its larger tributaries the Lee itself had changed very little over the last few years. There were still areas of poor quality some of which had deteriorated further in 1994.

4.2.5 MIMRAM

(MAP 7)
Two sites were sampled on the Mimram with the class distribution shown below:

1994 MAP		PAST SAMPLE	
A	1	A	2
B	1	B	0
C	0	C	0
D	0	D	0
E	0	E	0

This showed that this small catchment had very good biological water quality -both sites exceeded their predicted BMWP. This was the best example of clean water flora and fauna in the Lee catchment and in the whole North-East Area.

A good quality river, there had been an exceptional score increase in the lower reaches. The upper reaches had dropped class, however, the score change was minimal. In all a very high scoring river which was showing improvement.

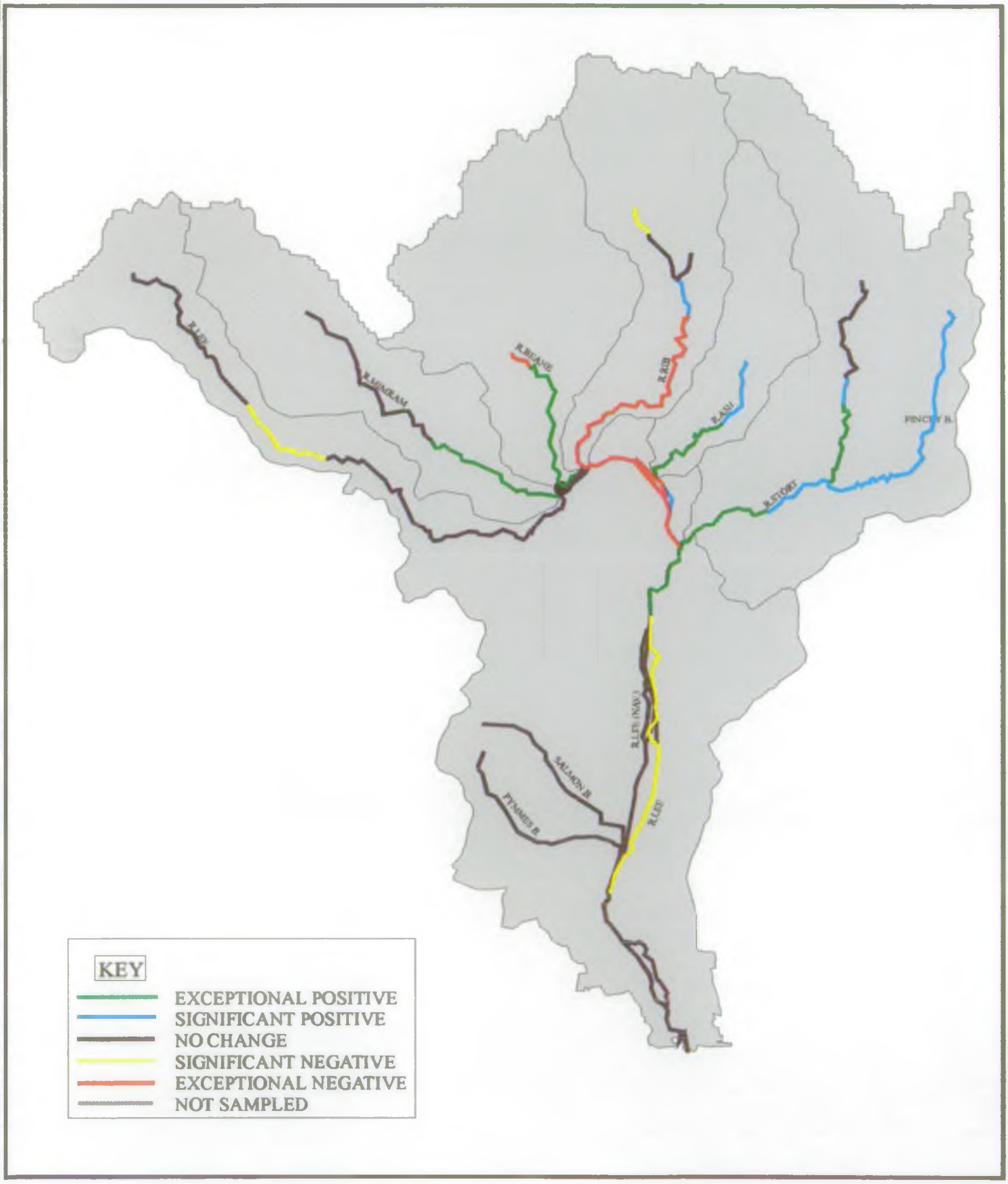
4.2.6 BEANE

(MAP 7)
2 sites were sampled routinely on the river Beane the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	1
B	1	B	0
C	0	C	1
D	1	D	0
E	0	E	0

MAP 7

LEE, MIMRAM ,BEANE ,RIB, ASH & STORT CATCHMENTS VALUE CHANGE CLASSIFICATION



This displays that there was some evidence of biological quality problems in this catchment which was also fluctuating. Both sites had moved class in 1994 showing an 'exceptional' improvement and deterioration in scores. In addition one of the sites fell below 78% of the predicted score.

The water quality problems occured just below the confluence with Stevenage Brook which was likely to be due to the fact that the Upper Reaches of the Beane were dry between 1991-93, additionally Stevenage Brook was of poor quality which had been attributed to episodic urban run-off (Leeming 1994).

There were signs of an 'exceptional' drop in score in the consistently poor upper reach while further downstream in the biologically richer lower reaches the Beane showed good water quality which was attributed to greater discharge as it flowed towards the Lee.

4.2.7 RIB

(MAP 7)

5 sites were sampled routinely on the River Rib, the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	1	A	1
B	3	B	3
C	1	C	1
D	0	D	0
E	0	E	0

The **Rib** displayed good water quality and had been very constant over the previous year. No sites had changed class and only one site fell below 78% of the predicted BMWP score, which was right at the top of the catchment.

There were disappointing falls in score below Bengeo Hall and in the very upper reaches which frequently suffer low scores. Bengeo Hall has had a long history of variable scores all very high and well above the predicted BMWP. The ASPT was one of the highest recorded and the impact was unlikely to have been water quality related. The high scores on the **Quin** showed recovery from low flows in its upper reaches. The main **River Rib** suffered low scores due to low flows. Evidence of nutrient enrichment had been found in the Rib below The Quin (Leeming 1994) which should be kept under observation. Directly below the confluence with the Quin in 1994 there was an improvement in scores - if enrichment was a problem in this stream it is obviously not affecting the benthic macroinvertebrates.

4.2.8 ASH

(MAP 7)

2 sites were sampled routinely on the Ash the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	1	A	0
B	1	B	2
C	0	C	0
D	0	D	0
E	0	E	0

This was a very high scoring river with both sites scoring well above the predicted scores. The upper reaches had suffered from low flows and being dry throughout 1991-93 (Leeming 1994). The quality in the lower reaches appeared to have been unaffected by this and scores were some of the highest in this area representing one of the best tributaries of the Thames. One site at Easneye had changed class going from class B to A, this was also a 'significant' value change, however, this was largely due to the fact that the 1993 score was rather depressed in comparison with previous results.

Again a high scoring sub-catchment with significant score changes being improvements.

4.2.9 STORT

(MAP 7)

8 sites were sampled routinely on the River Stort of which the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	1	A	0
B	6	B	6
C	1	C	2
D	0	D	0
E	0	E	0

There had been some improvement over the previous year in this catchment which was generally of good water quality - none of the scores were less than 78% of the predicted score. Four of the sites changed class with three improving and one declining, the only 'significant' value changes were two of the improvements.

Covering a large proportion of the Middle Lee catchment the **upper Stort** had been affected

by low flows previously. The river is navigable and hence canalization tended to affect habitats, however, the margins were well vegetated and allowed for good biological quality to be maintained, which gave a good indication of the water quality (Leeming 1994).

Just upstream of **Pincey Brook** on the **Stort** generally supported poorer biology than the rest of the catchment, following the 1994 improvement the whole catchment displayed good biological quality.

4.2.10 RODING

(MAP 8)

17 sites were sampled routinely on the Roding catchment, the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	1	A	0
B	2	B	1
C	5	C	10
D	8	D	5
E	1	E	1

This catchment was of only fair to poor quality and of the 17 sites sampled 15 fell well below 78% of the predicted BMWP score. Encouragingly 4 of the 6 class changes in 1994 were 'exceptional' value changes (2 improvements and 2 deteriorations), the other 2 were 'significant' falls in score.

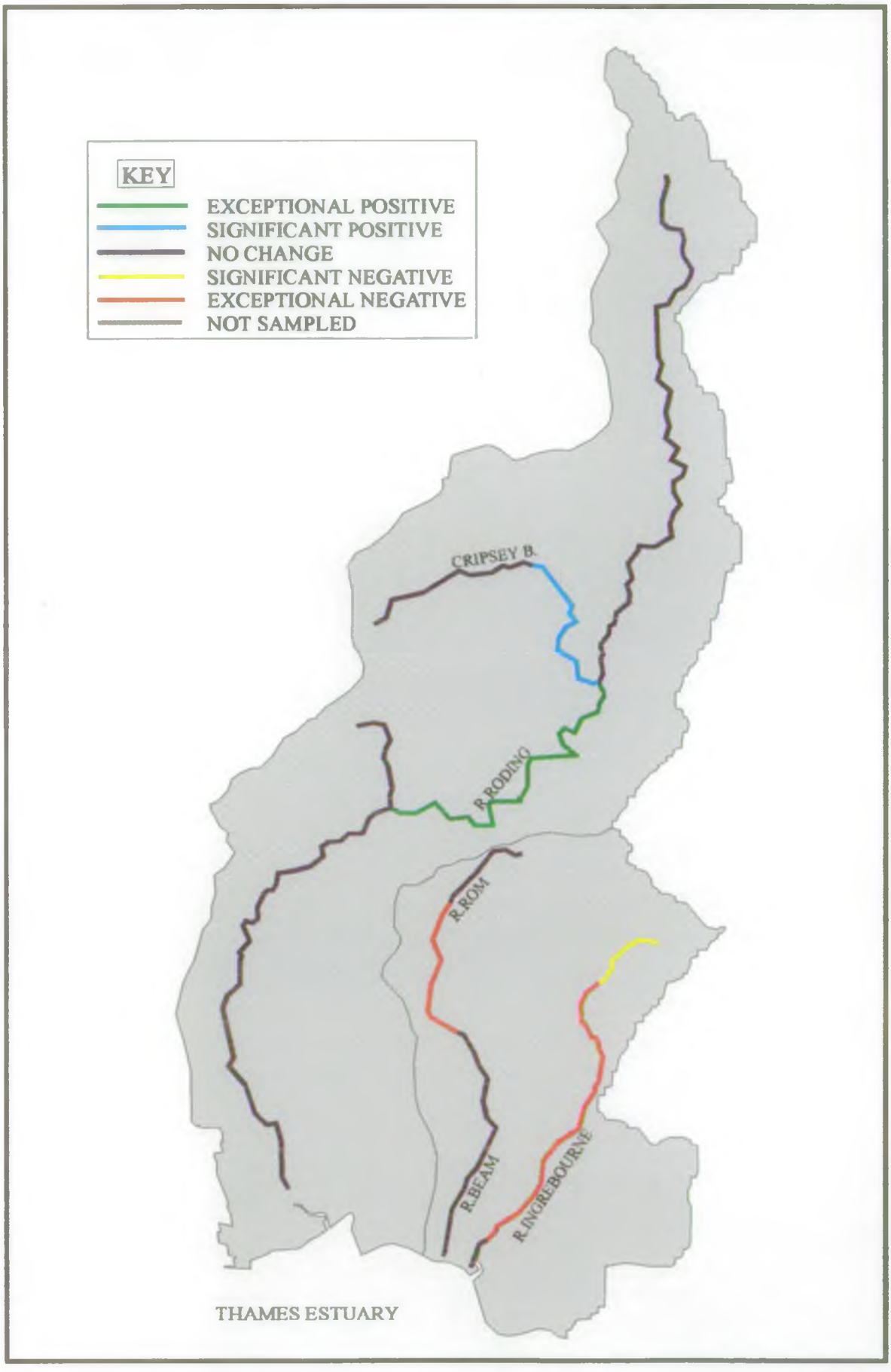
In a catchment ranging from poor to good biological scores, the **Roding** main stream was only of fair biological quality. There had been a decline in quality above Fiddlers Hamlet STW so that the impact of the STW was less obvious. Conversely there had been huge increases in score between **Cripsey Brook** and **Brookhouse Brook**, these reaches scored consistently higher than the rest of the river and exhibited a further 'exceptional' score improvement. In the past High Ongar Bridge and Abridge sites had exhibited clear evidence of organic enrichment attributed to Rhone Poulenc STW and deterioration attributed to urbanisation and channel modification (Leeming 1994). These problems appeared to have been overcome in 1994 with huge increases in score.

The lower end of **Cripsey Brook** just above its confluence with the Roding also showed an improvement while the upper reach remained at its usual poor biological quality.

Both the **Rom/Beam** and **Ingrebourne** were poor quality rivers which only seemed to be getting worse, both had reaches which had declined 'exceptionally' and obviously require some attention.

MAP 8

RODING & BEAM CATCHMENTS
VALUE CHANGE CLASSIFICATION



5.0.0 SOUTH-EASTERN AREA BIOLOGICAL WATER QUALITY

5.1.0 AREA OVERVIEW

A total of 72 sites were sampled routinely in the South-Eastern area (58 actually sampled in 1994) for the Biological Water Quality map. The class distribution in comparison with the previous sampling occasion is shown below and in Figure 7:

1994 MAP		PAST SAMPLE	
CLASS	FREQUENCY	CLASS	FREQUENCY
A	7	A	8
B	21	B	18
C	27	C	23
D	16	D	22
E	1	E	1

This suggested that water quality in this area could be poor in many catchments. 43 sites scored less than 78% of the predicted BMWP; this equated to 60% of the sites in the South Eastern Area being unacceptably perturbed.
The main reason for this was extensive urbanisation of the area; the associated large population equivalents of STW as well as channelised river basins and piled river banks limiting available habitats.

The class changes suggested there had been some overall improvement in the area with a considerable movement out of class D and into B and C. Net changes were:

A -1
B +3
C +4
D -6
E 0

These were the net changes, there were obviously very many more class changes totalling 35 which means 49% of the sites actually changed class between the last two sampling occasions, this made the area much more mobile in its biological quality in comparison with the other two areas.

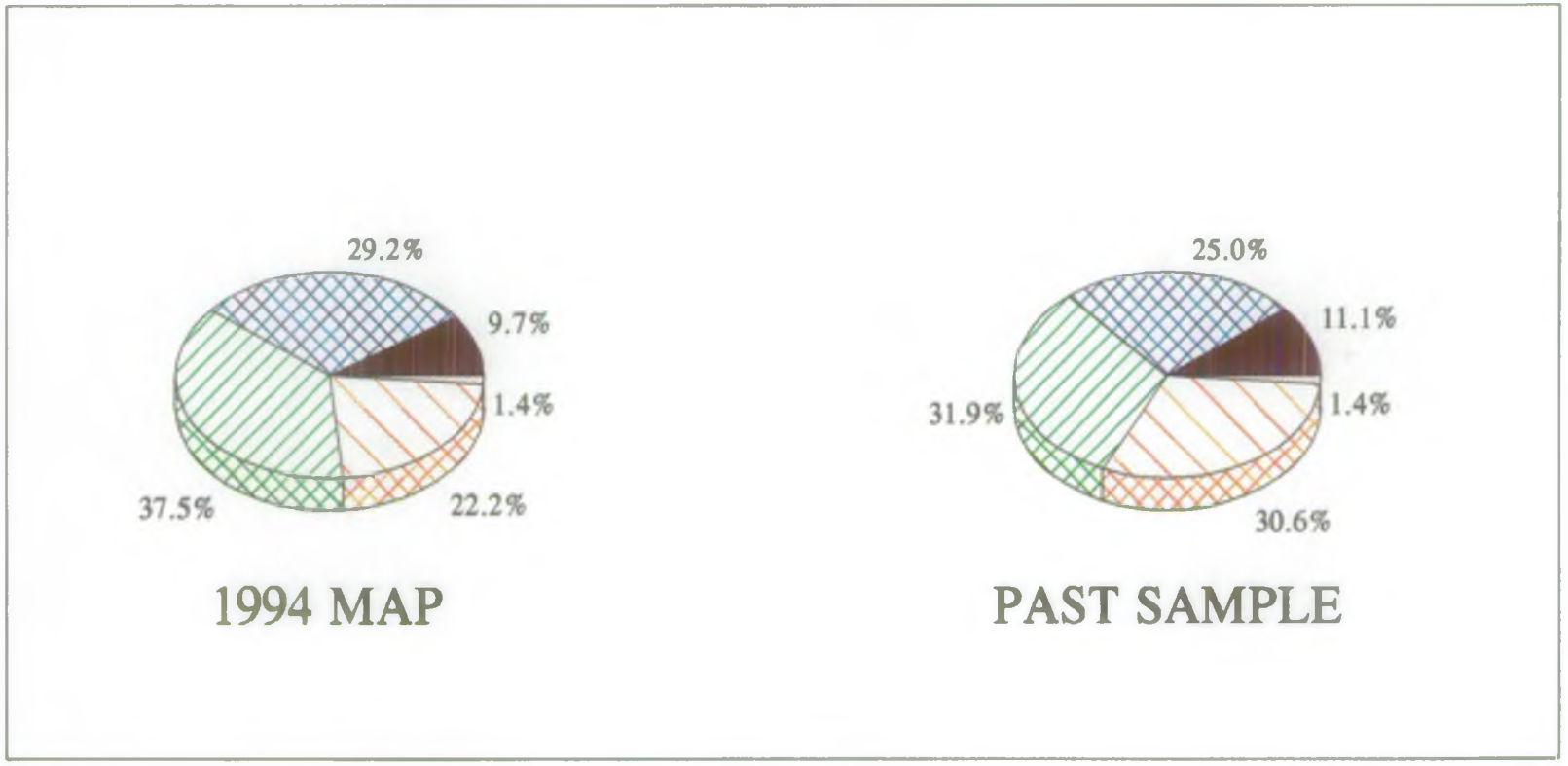
The particularly poor catchments in the Area were towards the east, notably the Ravensbourne, Wandle and Beverley; the better catchments such as the Loddon and Wey being in the far west of the Area. This was again related to the greater urbanisation of the catchments towards the East with the problems mentioned above.

None of the sub-catchments showed particular trends of improvement or deterioration throughout, the changes appeared to be much more localised within the catchment to particular streams or even reaches.

FIGURE 7

CLASS DISTRIBUTION

SOUTH-EASTERN AREA



5.2.0 CATCHMENT REVIEW

5.2.1 LODDON

(MAP 9)

21 sites were sampled routinely on the Loddon catchment, the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	6	A	6
B	8	B	5
C	4	C	6
D	2	D	4
E	1	E	0

This catchment was variable in biological quality, several sites were seriously perturbed which was confirmed by the fact that 11 of the scores fell below 78% of the predicted BMWP scores. There was quite a lot of movement between classes, 11 sites change class, 7 of which were class improvements. Only 6 of the class changes had 'significant' value changes of which three were improvements. A further two sites showed 'significant' value changes giving a total of 8 value changes.

This catchment was almost split in two with regards to biological quality. The main river and the western end of the tributaries were of very good quality. The further to the east in the catchment, the poorer the biological quality. This mirrored the problems of the region within one catchment. As the catchment became more urbanised and the river with it, so the biology too became more impoverished.

In the **Loddon** main stream the biology was rich and the condition had remained largely unchanged. Some tributaries had shown 'significant' improvements these were: **Bow Brook, Ashridge Stream** as well as the **River Hart**. While **Bow Brook** and the **River Hart** were generally of good quality it appeared that in the Hart particularly there had been some long-term improvement. With regard to **Ashridge Stream** a tributary of Emm Brook, quality had been poor in the past and had undergone recovery due to an increased volume of water.

By contrast there had been 'exceptional' score drops in the **Lyde**, **Whitewater** and **Emm Brook**. While the **Whitewater** had retained a high ASPT both the **Lyde** and **Emm Brook** have had declining ASPT which suggested water quality may have been implicated.
The only other 'significant' decline in score was **Fleet Brook** which was not likely to be a real change as it was within the normal range for the reach.

There were 'significant' improvements on the **Hart** downstream of Fleet Brook and on **Cove Brook** above the Blackwater. While **Cove Brook** was within its normal range it appeared that the **Hart** was displaying the effects of some long term improvements.

Some particularly poor reaches had not changed significantly in 1994, most notably **Minley Brook**, which consistently supported only a very impoverished biology - not helped by very low flows.

5.2.2 CHERTSEY BOURNE & ADDLESTONE BOURNE

(MAP 9)

4 sites were sampled routinely in this catchment, the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	1
C	4	C	2
D	0	D	1
E	0	E	0

This shows clearly that the catchment was of poor quality with all sites falling below 78% of the predicted BMWP. There had been relatively little change over the past year with one class improvement and one deterioration. Only the deterioration was a 'significant' value change. Significant value changes included another 'significant' value change improvement with another 'exceptional' deterioration showing an overall decline in biological water quality in the catchment.

This small catchment appeared to have deteriorating biology. The upper reach of the **Chertsey Bourne** in the past had had quite a rich fauna but in 1994 declined by an 'exceptional' amount, it was recorded that habitats were limiting which must compound any water quality problems. The lower reach BMWP also showed a significant decline. The ASPT remained at normal levels suggesting that water quality at least was unlikely to be the cause - limited habitats may have been having an effect here too.

The Rivers **Bourne** and **Halebourne** were of even poorer quality than the Chertsey Bourne and had shown little change over the last year. The Halebourne had improved slightly following worse than normal results at the previous sampling occasion.

5.2.3 WEY

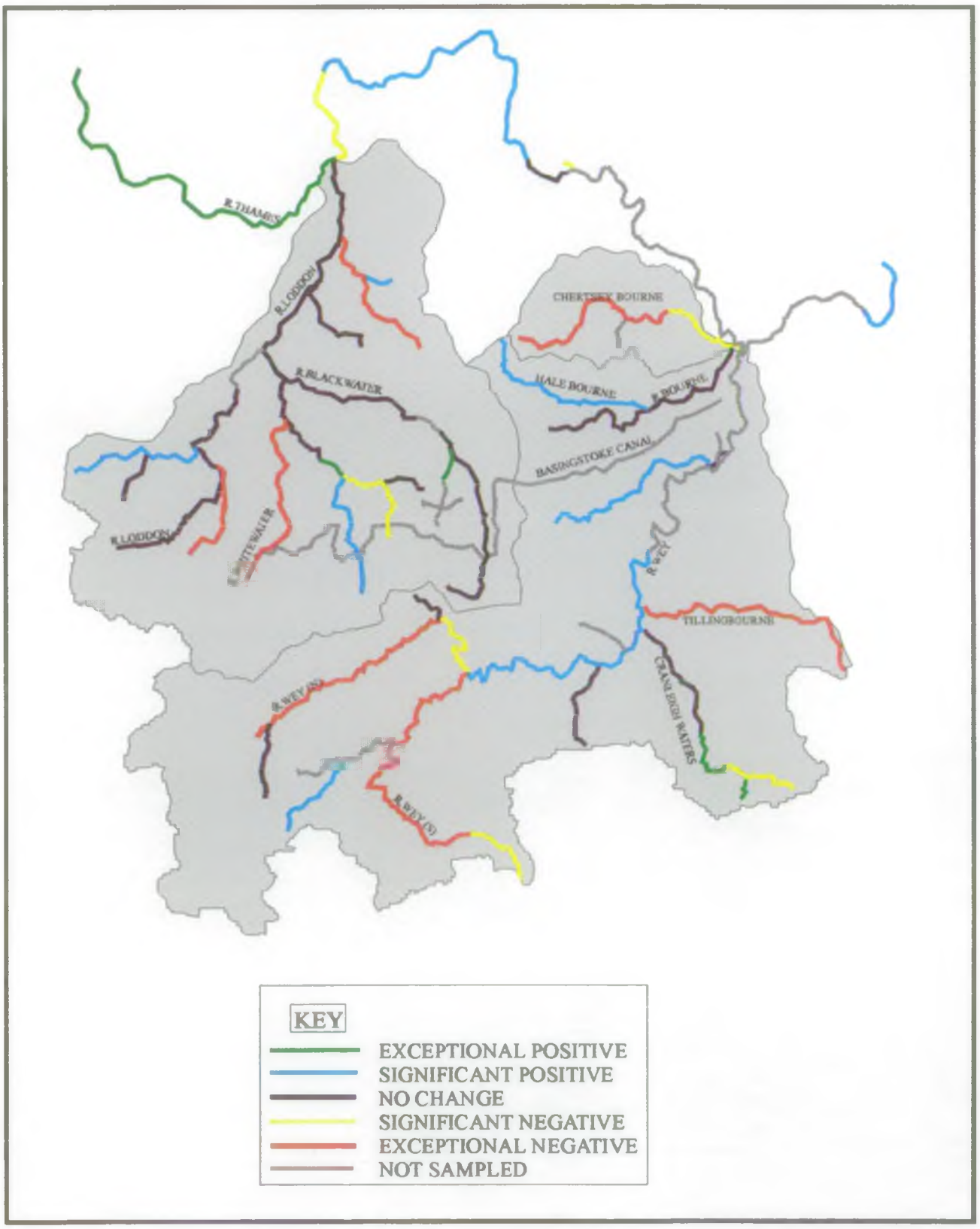
(MAP 9)

17 sites were sampled routinely on this catchment for which the class distribution is shown below.

This was one of the better catchments in this area, but still with some variable quality. Nevertheless only 5 of the sites scored less than 78% of the predicted BMWP suggesting on the whole the quality was quite good. There had been many class changes this year with 11

MAP 9

LODDON, CHERTSY BOURNE, ADDLESTONE BOURNE & WEY CATCHMENTS VALUE CHANGE CLASSIFICATION



sites changing class, of which 6 were also 'significant' value changes. Unfortunately the net movement of classes was a deterioration.

1994 MAP		PAST SAMPLE	
A	1	A	2
B	8	B	7
C	6	C	5
D	2	D	3
E	0	E	0

A catchment of better quality in this urban area only a few reaches displayed poor biological quality. A particular problem spot on **Cranleigh Waters** improved 'exceptionally' in 1994 which may have been related to the higher flows recorded.
There were also improvements in the mid-reaches of the **Wey**, **Oakhanger Stream** and **Stanford Brook**. The Wey in particular seemed to be benefiting from long-term improvement.

There had been a few sites deteriorating in 1994 also. Most notably in the two arms of the upper **Wey** and the **Tillingbourne**. These were previously of good or very good biological quality. The **Tillingbourne** and **Wey (S)** scores were within the normal range, however, the **Wey (N)** appeared to have suffered a pollution as it did in 1992. Possible sources needed identifying from between the large number of STW and various trade effluents which discharge in to the River to halt a problem which is becoming repetitive.

More positively, **Caker Stream** above the Wey (N) although not having a 'significant' increase in BMWP score in 1994 did have large improvement in ASPT suggesting water quality there was improving.

5.2.4 MOLE

(MAP 10)
17 sites were sampled routinely in this catchment for which the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	4	B	5
C	7	C	6
D	6	D	5
E	0	E	1

This showed that the Mole catchment had variable biological quality with 11 of the sites falling below 78% of the predicted BMWP. There had been just 5 sites actually changing class of which all were also 'significant' value changes. Another site showed a 'significant' value change with no class change.

The Mole catchment suffered from poor biological quality particularly in its headwaters, there was a rapid improvement in biological quality related to an influx of clean groundwater from the chalk outcrop midway through its length. In 1994 while the picture had not changed greatly overall there had been some improvements - downstream of Salfords Stream and upstream of Burstow Stream on the main **Mole** River, and in the upper reaches.

In addition **Salfords Stream**, **Gatwick Stream** and **Leigh Brook** had all improved in 1994. **Leigh Brook** had been scoring higher every year it was sampled and finally exceeded predicted BMWP's. By contrast both the other streams were of consistently poor quality and in 1994 recovered to their usual poor scores from their exceptionally low scores of 1993.

'Exceptional' score deteriorations had occurred in **Holmwood Stream** and **Redhill Brook**. The score in **Holmwood Stream** was nearer normal scores, the previously inflated results being due to drift in periods of high flow; the invertebrates obviously had not been sustained. The poor score in **Redhill Brook** was again in the normal range following the previous years much higher result which may have been due to sampling variation.

On the whole biological quality in this catchment had been returning both through its improvements and deteriorations to its normal range of scores. It still displayed a wide range of scores and classes throughout the sub-catchment.

5.2.5 HOGSMILL

(MAP 10)

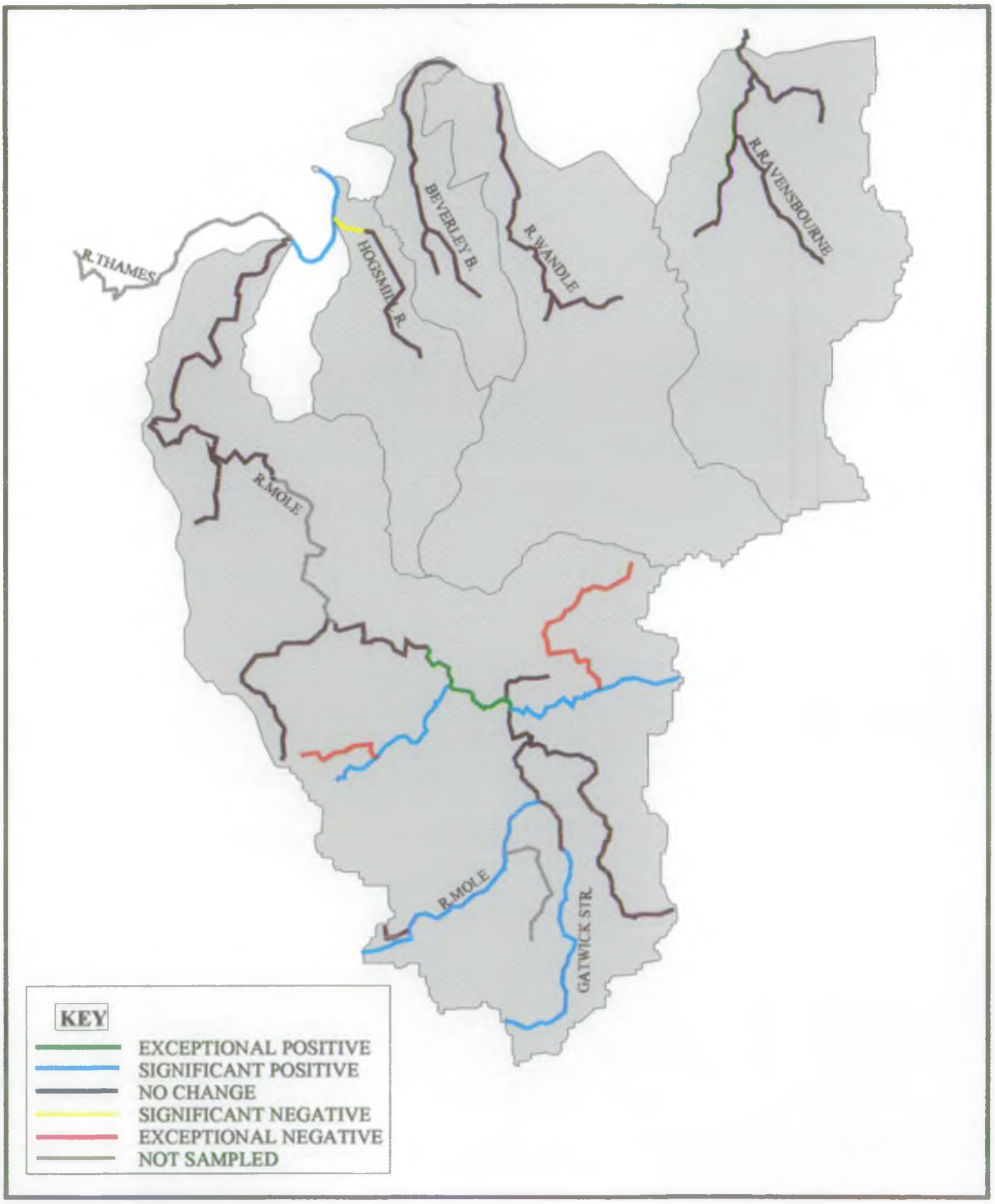
2 sites were sampled routinely in this small catchment the class distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	0
C	1	C	2
D	1	D	0
E	0	E	0

This showed that biological quality was fair to poor with both sites scoring less than 78% of the predicted score. The only change was of a negative nature which was, however, not a 'significant' value change. The poor quality in the catchment was likely to be due to STW in the catchment as well as urbanisation and poor habitat provision.

MAP 10

MOLE, HOGSMILL, BEVERLEY, WANDLE & RAVENSBOURNE CATCHMENTS
VALUE CHANGE CLASSIFICATION



5.2.6 BEVERLEY

(MAP 10)

3 sites were sampled on this catchment all of them being in class D. This suggested it was a poor quality river with all three sites scoring well below the predicted scores. It was also very stable with no class changes and no 'significant' value changes. The poor quality could have been attributed to extensive urbanisation, poor habitat provision and STW effluents.

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	0
C	0	C	0
D	3	D	3
E	0	E	0

5.2.7 WANDLE

(MAP 10)

4 sites were sampled routinely in this catchment of which the distribution is shown below:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	1	B	0
C	3	C	2
D	0	D	2
E	0	E	0

This showed that the biological quality was fair to good and appeared to have improved since the previous sample. Biological quality was still low with 3 of the 4 sites scoring lower than 78% of the predicted score. Three sites had changed class all of which were improvements, however, none of the three were 'significant' value changes and showed no real difference from any of the previous samples.

5.2.8 RAVENSBOURNE

(MAP 10)

4 sites were sampled routinely in this catchment with a class distribution of:

1994 MAP		PAST SAMPLE	
A	0	A	0
B	0	B	0
C	2	C	0
D	2	D	4
E	0	E	0

This showed a catchment of poor quality with all sites scoring well below 78% of the predicted score. 2 sites had changed class which were both improvements, neither were 'significant' value changes or showed long term trends suggesting that water quality may not have been improving in the catchment. This was another river with extensive urbanisation and lacking natural habitats which affected the biology supported.

The three catchments above were of consistently poor quality which showed no significant changes between the most recent two sampling occasions. There were no discernable trends of improvement either to give any encouragement for these impoverished water courses.

APPENDIX 1

No comments are made for sites at which a class change is recorded but there is only a very small change in score. i.e. where the class change is purely an artefact of arbitrary class boundaries.

WESTERN AREA SITE ANALYSIS

KENNET (+ GUC)

PKER.0016 Enbourne - at gauging station,. Brimpton
Improvement from class B - 142 to class A - 155.

PKER.0005 Baughurst Brook - Below Ashford Hill Tip
Improvement from class C 94 '92 to class B 115 '93 above predicted BMWP 95.

PKER.0150 Froxfield Stream - above Dun
Fall from class B 116 in '92 to class C 97 in '93 below BMWP predicted 123.

PKER.0007 Burghfield Brook - above Foudry Brook
Improvement from class C 71 in 1992 to class B 101 in '93, this is now within 78% of the RIVPACS predicted BMWP score of 111. This site was actually sampled later in the year and fell back down to its normal range of scores which suggests sampler error may be responsible in part for this variation.

PKER.0006 Beenham stream - below Beenham Tip
Fall from class C 51 in '92 to class D 30 in '93 the reason for this variation look like being seasonal as the other winter sampling occasions have scored similarly. All results have been well below the RIVPACS predicted BMWP score of 89 this may be due to water quality as this site is directly below Beenham Tip.

PKER.0099 Clayhill Brook - below Burghfield STW
Fall from class C 66 in 1992 to class D 47 in 1993. This fall in score is unlikely to be due to water quality as the ASPT falls very little between the two sampling occasions. Additionally although it falls since 1992 the 1993 sample is higher than all other previous samples. The reason for poor quality in this Brook is probably due to Burghfield STW which discharges just upstream the improvement in score since 1992 may be due to improved effluent or improved dilution in the Brook. There have been several reports of oil in the Brook which have not been confirmed, if whatever the problem is long term this could account for the long term poor quality of this brook.

PKER.0002 Aldbourne - G.S Ramsbury
This site does show some improvement but this is likely to be due to the 1993 scores being lower than normal. The score has always exceeded the RIVPACS prediction and is now returning to pre-drought scores.

PKER.0019 Foudry Brook - at Hartley Court Farm, Grazely.
This improvement at this high scoring site is still within the range of the predicted scores; the extra score comes from mid-scoring families largely beetles.

PKER.0192 Fishermans Brook - above Padworth Stream
Although scoring lower than the last sample, crayfish and Phryganidae were seen for the first time. This means the ASPT is still as high as ever suggesting water quality has not deteriorated. However, this score is still well below the predicted BMWP which may be due to habitat or in part affected by the difficulty of sampling at this deep site.

PANG & SULHAM BROOK (SUL)

PPSR.0007 Sul - at Salteney Mead, Pangbourne.
At Salteney Mead this site has shown an improvement from class C to D.

OCK

POCR.0018 Sandford Brook - at A415 Marcham
Fall from band B 101 to band D 48. This appears a very large fall in score and in fact drops below 78% of the RIVPACS predicted BMWP score of 98, however, the score is within the normal range of this extensively sampled site. The 1993 sample just went into class B and was considerably higher than previous scores due to the presence of for top scoring families which have never been represented previously and were not this year. Other than this the taxa list was much as expected. The score at this site may be being affected by Gozzards Ford STW which discharges upstream.

POCR.0033 Bagpuize Brook - at Swanny Brook
Improvement from class D 38 in 1992 to class C 51 in '93 this is still way below the RIVPACS predicted BMWP score of 108. However, the scores for this site have shown a considerable improvement over the past 3 years both in BMWP and ASPT scores. The fall below predicted scores is likely to be due to the presence of Bagpuize STW upstream of this site.

POCR.0001 Childrey Brook - at Mill Road Marcham
There has been a significant improvement this year in the scores both BMWP and ASPT at this site. The score is well in excess of the predicted BMWP as it always is. Scores in the past have been within this range so it may not be significant in the long term

POCR.0034 Woodhill Brook - above Childrey
This site shows some improvement both in BMWP and ASPT from previously very low scores but it is still well below 78% of the predicted BMWP. The improvement in scores apparent since sampling began in 1990 may be due to increased river discharge or improvements in the quality of the discharge from BNF ltd STW (which in turn probably accounts for the generally low score).

WINDRUSH

PWRR.0007 Emmas Dyke - at the Moors Ducklington
Improvement from class E 15 '92 to class D 48 in '93; this is a consistently low scoring site and despite the improvement is still less than 78% of the RIVPACS predicted BMWP score of 94. There is no apparent reason for this although Colwell Brook which joins upstream of this site also shows a slight improvement, this combined with the increased volume of water following the drought may have caused this improved score.

PWRR.0002 Colwell Brook - at A415 Witney
This Brook flows in to Emmas Dyke and has shown 'significant improvement this year and has slowly been improving since it was first sampled in 1991. There is no obvious reason for this improvement but the combined improvement with Emma's Dyke suggests the two may be linked to improved discharge and habitat availability following the drought.

PWRR.0010 Rissington Ditch - above Windrush Loop
This site just above the Windrush Loop improves in score by a 'significant' value change as well as improving in class from D to C the last time scores were in this range was in 1987 suggesting the improvement may be due to increased flows following the drought.

PWRR.0039 Showells Brook - Crawley
This site also improves from class D to C it is again a recovery to pre-drought scores.

EVENLODE

PEVR.0002 Cornwell Brook - at Kingham
Improvement from class B - 131 to class A - 159.

PEVR.0001 Blue Brook - at Swailsford Brook
Improvement within class C from 56 to 80 this lifts the score to within the acceptable deviation from the RIVPACS predicted BMWP score of 104. Over the last 3 years scores have been very low despite good availability of habitats this suggests water quality may have been to blame. The appearance of a top-scoring mayfly may suggest water quality is improving.

PEVR.0016 Four Shire Stream - at Common Bridge
Improvement within class D from 17 to 35 this is consistently a low scoring site and is still well below the RIVPACS predicted BMWP score of 90. This sites low scores have always been attributed to poor water quality and this year is no different.

PEVR.0041 Chadlington Stream - abov Evenlode
Fall from class B 107 in '92 to class C 98 in '94

PEVR.0043 Little Compton Stream - at Health End Bridge
Improvement from class D 50 in 1992 to class C 79 in '93 this now just reaches 78% of its RIVPACS predicted BMWP score of 102. An improved discharge is likely to have attributed towards this improved score.

PEVR.0002 Cornwell Brook - at Kingham
This site showed a 'significant' improvement this year; additionally on examination of the longer timescale this is the highest score recorded for this site both in BMWP and ASPT, nevertheless several previous samples come close and while this may be a true improvement it is also likely to be just related to variation in sampling, season etc

PEVR.0019 Glyme - at Wooton
This site showed a significant decline in score since 1993, however it still exceeds the predicted BMWP comfortably as well as being the second highest score ever in addition the ASPT exceeds all previous scores which suggests that water quality is not a problem.

CHERWELL & OXON RAY

PCHR.0029 Gallos Brook - above Oxon Ray at Islip
Fall from class B - 110 to class C - 86.

PCHR.0022 Cherwell - at water intake Grimsbury
Improvement from class B - 146 to class A - 155.

PCHR.0155 Audley Brook - at Stratton Audley
improvement from class D - 46 to class C - 53.

PCHR.0040 Oxon Ray - at B4207 Islip
Fall from class B 136 to class C 100 this is very close to the RIVPACS predicted BMWP score of 101. The 1993 score was much higher than previous scores and while this years is much lower it equals the predicted and is much the same as in previous years, in addition the absence of middle scoring taxa has pushed the ASPT higher suggesting the problem is unlikely to be related to water quality.

PCHR.0031 Langford Brook - at A41 Bicester
Improvement from class C 52 to class B 102. This sampling occasion scored in excess of 100% more than most previous sampling occasions. There was an extensive growth of Cladophora agg. in addition Limnephilidae were recorded for the first time since 1985 plus Astacidae (native) and Simulidae for the first time. This was also the first occasion that the score exceeded its RIVPACS prediction of 92.

PCHR.0150 Ludgershall Brook - above Ray
Improvement from class D 47 in '91 to class C 52 in '94

PCHR.0055 Kings Sutton Stream - below STW, Kings Sutton
Improvement from class D 49 in '92 to class c 61 in '94 below predicted BMWP 98.

PCHR.0163 Launton Brook - above Cutters Brook
Fall within class D 40 in '92 to 27 in '94 this is still well below the RIVPACS predicted BMWP score of 90. This score is fairly normal for this site and does not necessarily indicate a real change in biology at the site. Sialidae and Hydrobiidae were recorded for the first time.

PCHR.0093 Farnborough Ditch - College Farm Track
Fall from class C 73 in '92 to class D 45 in '94 at none of the sampling occasions have the scores exceeded the RIVPACS predicted BMWP of 89 but the score has previously been within the accepted 78% of the predicted score. The sampler observed that Hanwell Brook upstream of this site was dry which could account for the Leptophlebiidae and Rhyacophilidae being absent.

PCHR.0096 Byfield Brook - above confluence with Cherwell
This site displays an 'exceptional' decline in score, it has always been well below the accepted 78% of its RIVPACS predicted BMWP of 84. This low score is attributed to the fact that the site is below Byfield STW which is subject to minimal dilution and in fact forms the majority of the flow at this site. The substrate is also dominated by silt which supports a high number of chironomids which dominate the fauna.

PCHR.0094 Chacombe Brook - A41 roadbridge
Fall from class C 65 in '92 to class D 47 in '94. This site has only once reached more than 78% of its RIVPACS predicted BMWP score of 80 which was on its last sampling occasion. This score is in fact not much different from its normal low score which can be attributed to its low flow ditch style system. On an encouraging note Haliplidae were present for the first time since 1989.

PCHR.0097 Boddington Canal Feeder - Claydon - Boddington Road
Fall from class C 73 in '92 to class D 38 in '94 to a score that is now less than 78% of the RIVPACS predicted BMWP score of 87. This site has had very variable scores with no particular trend although this is the lowest recorded score so far. The site is prone to high flows which make sampling from the steep sided channel difficult which could account for the large variation.

PCHR.0092 Hornton Stream - Horley
Fall from class B 109 in '92 to class C 76 this is now below 78% of the RIVPACS predicted BMWP score of 102. Although the score is much lower than the last sampling occasion it is within the range of all previous samples (1992's was if anything exceptionally high. The late sampling in November could account for the lower scores in comparison with March in 1992. Native crayfish were found for the first time while the middle scoring taxa were somewhat lacking.

PCHR.0070 Hook Norton Brook - at Wiggington
Improvement in class C from 61 in '92 to 100 in '94 and now achieving a score above the predicted BMWP score of 98. This site had a falling trend in score from 1988 to 1992 which has now recovered to above the 1988 score. This may be as a result of the intermediate years being during drought and the result of low discharge. Agriidae, Ryacophyliidae and Gyrinidae were reported for the first time.

PCHR.0159 Deddington Brook - at Cold Harbour Farm
Improvement from class C to class B this is the highest score ever recorded at this site and now exceeds predicted BMWP score. The score has been improving every year since it was first sampled in 1990; four top scoring families were present with Phryganiidae and Goeridae

recorded for the first time.

PCHR.0014 Cherwell - at Heyford Bridge
Although this site shows a 'significant' decrease in score it still exceeds the predicted BMWP by a considerable value the ASPT score is the second highest ever recorded confirming the suggestion that water quality is not a problem at this site. The fall may be due to seasonal variation and spate flows.

THAME

PTAR.0014 Holton Brook - above River Thame
Fall from class B - 108 to class C - 88.

PTAR.0036 Stoke Brook - above Bear Brook
Decrease within class C from 80 to 56 this is still well below the RIVPACS predicted BMWP score of 107. This years result is in fact more typical of this site than the 1993 sample with all the expected fauna present, the site is obviously depressed below its potential this may be a result of poor water quality due to the Hall End Farm STW upstream.

PTAR.0007 Fleet Marston Brook - above River Thame
Fall from class B 103 in '92 to class C 92 in '94.

PTAR.0064 Latchford Brook - Peggs Farm
Fall from class C 53 in '92 to class D 47 in '94 below predicted BMWP 91.

PTAR.0100 Denton Brook - at Chippinghurst Manor
Improvement from class D 47 in '92 to class C 55 in '94 below predicted BMWP 93.

PTAR.0099 Dorton Brook - above Cheasley Brook Dorton
Fall from class C 57 in '92 to class D 50 in '93 below BMWP 130

PTAR.0038 Wendover Brook - at Brook End
Fall from class B 101 in '92 to class C 97 in '93 below BMWP 99

PTAR.0002 Baldon Brook - above River Thame
Improvement from class C 63 in '92 to class B 112 in '94. This sample suggests a recovery of the site to scores achieved in 1990 while scores in 1991 -1992 were on average 35% lower. It is now exceeding the predicted BMWP of 87. The sampler did however observe dead shrimps and caddisfly along with the very rich live fauna. No inputs have been discovered in the area to account for these deaths. The recovery of high scores in '94 may be attributed to the return of higher flows following the early '90's drought years.

PTAR.0063 Milton Ditch - Wheatley, Gt Milton Road
Improvement from class C 53 in '92 to class B 109 in '94 to exceed its RIVPACS predicted BMWP score of 88. This site has shown an overall trend of improvement from 1987 and displays an exceptionally good fauna for a small ditch which is overgrown and difficult to sample.

PTAR.0117 Lewknor Brook - at roadbridge nr Pyrton
Improvement within class C this is above 78% of the RIVPACS predicted BMWP score of 105. The low score in 1992 was more of a deviation from the norm; top scoring families were present possibly washed down in the recorded fast flows. This sample in 1993 is more within the normal range for this site.

PTAR.0120 Stocklake Brook - above Bear Brook
Fall from class C to D although never a high scoring site this score is well below the RIVPACS predicted BMWP score of 90. There is no obvious cause for this significant loss of fauna, many families were missing that have been observed on most previous sampling occasions.

PTAR.0010 Halton Brook - at A41 above Bear Brook
Improvement from class D 39 in '92 to class C 53 in '94 but still well below the RIVPACS predicted BMWP score of 104. This improvement probably is not significant as it falls within the range of scores observed previously as does the ASPT. Significant previously unrecorded families are Ancylidae and Hydrophilidae.

PTAR.0052 Chalgrove Brook - at Chislehampton Bridge
This site shows a significant improvement both in BMWP and ASPT scores the site is normally high scoring and exceeding 78% of the predicted score but this year is well in excess of the predicted score, the reason for this encouraging improvement is unknown.

PTAR.0013 Hasely Brook - above Thame
Although a 'significant' decline in score since 1993 this is well within the normal range (1993 was significantly higher than previously) so does not appear to be a problem.

PTAR.0028 Thame - at Stone Bridge Aylesbury
This site also shows significant improvement both in BMWP and ASPT which is encouraging, the reason for this improvement is unclear.

THAMES (+ CUT)

PTHR.0088 Thames - Henley Bridge
Fall from class A - 154 to class B - 138.

PTHR.0029 Ginge Brook - at B4016 Sutton Courtenay
Fall from class B 134 to class C 96. Despite this fall in score it still exceeds 78% of the RIVPACS predicted score of 106, it is also within its usual range; 1993's score having been the highest score ever. this is one of the most biologically variable sites sampled and was lacking top scoring families which were present in the last sample.

PTHR.0015 Cholsey Brook - 500m above Cholsey STW
increase in score from class C 98 in '92 to class B 116 in '94

PTHR.0221 Clifton Hampden Ditch - above Thames

Improved from class D 44 in '92 to class C 54 in'94.

PTHR.0151 Burcot Brook - at Abingdon Road Burcot
Improvement from class D 47 in '92 to class C 58 in '94 below predicted BMWP 86.

PTHR.0216 Harcourt Brook - above limb Brook
Fall in class from C 59 in 1992 to D 44 in '94.

PTHR.0137 Mill Brook - above STW South Moreton
Change within class C from 56 in '92 to 88 in'94; this is now achieving more than 78% of the RIVPACS predicted BMWP score of 104. The generally low score may be attributable to South Moreton STW which is just upstream, this improved score may be due to the drought breaking and providing increased dilution of the effluent or actual improvements in the quality of the effluent.

PTHR.0036 Howberry Ditch - at A329 Benson
Improvement from class E 8 in 1991 to class D 46 in '93 this is still well below the RIVPACS predicted BMWP score of 90. This site is consistently low scoring but this is the highest score so far; in contrast the 1991 was the lowest score by far which could have been related to the fast flows and high turbidity observed - the ASPT was also very low which suggests the suspended solids may have had an organic source. Whatever the incident the Ditch has recovered at least to its former situation; the poor quality is obviously caused by the STW as sewage fungus has been recorded along the entire stretch.

PTHR.0026 Filchampstead Brook - above Thames
Improvement within class C from 56 in 1992 to 87 in 1994 this score is now within the accepted 78% of the RIVPACS predicted score of 91 for the first time since 1985. It was also recorded that the previously observed white benthic sediment was no longer apparent. The top scoring family leptoceridae were also recorded for the first time.

PTHR.0115 Thames - Whitchurch Weir
This site shows a 'significant' improvement but has always been a high scoring site. Some scores in the past have equalled this one and the ASPT is no higher than last year, this suggests there is no significant change in water quality.

PTHR.0110 Thames - at Trout Inn Godstow
This is another high scoring site which has improved still further above its predicted BMWP. The BMWP and ASPT score have been nearly equalled in the past suggesting this score is in fact within sampling variation for this site.

PTHR.0043 Moor Ditch - at A4016 Appleford
Improvement from class D 39 in '92 to class C 55 in '94. Despite this improved fauna which included limpets for the first time the water quality at this site is generally poor and the score still falls well below its RIVPACS predicted BMWP of 96.

PTHR.0124 The Cut - above Thames
Above the Thames this site improves from class D to B - this is an 'exceptional' score change. While this is a large increase in score the site is quite variable and fluctuates quite considerably. In the past BMWP scores have never been this high but the ASPT has in fact been higher it may be that habitats may be increasing as the cut ages.

PTHR.0126 The Cut - at Cannon Hill, Bray Wick
At Cannon Hill this site show an improvement from class D to C, while this is a 'significant' value change the variation is in line with previous observed scores at this site. Since 1990 scores have fluctuated quite regularly between 32 - 60, in addition to this last years ASPT was in fact higher than this years suggesting water quality has not improved significantly but that other factors have prevailed.

PTHR.0128 The Cut - at Pitts Bridge Binfield
This has shown a deterioration from class C to D this is also a 'significant' value change, it appears however that this score drop may be due to water quality problems; since 1991 there have been none of the higher scoring families such as the caddis larvae. The fauna is in fact typical of an enriched river with none of the families scoring above 6 and dominated by chironomids, erpobdelids, asellids and oligocheats.

PTHR.0008 Boveney Ditch - above Thames
Above the Thames has deteriorated from class C to D which is also a 'significant' value change, however this site has very large fluctuations in score with last years being one of the highest. The sampler observed a typical foul smelling silt and a fauna dominated by red chironomids, this appears to be a long term water quality problem at this reach.

PTHR.0022 Datchet Common Brook - above Thames
Above the Thames this reach shows a large improvement from class C to B which is also a 'significant' value change. The ASPT score however is no higher than achieved in the past suggesting water quality may not have improved considerably but that habitat provision has improved.

PTHR.0254 Eynsham Wharf Stream - above Thames
Above the Thames the class improves from B to A this is a return to normal high scores at this site which showed a slight decline when last sampled - this was attributed to higher flows present when sampling.

COLE

PUTR.0025 Cole - at B4019 Coleshill
Fall from class A - 153 to class B - 147.

PUTR.0191 Lertwell Brook - near Zulu Buildings
Improvement from class D 40 in '92 to class C 52 in '93 below BmWP predicted 91

PUTR.0117 Tuckmill Brook - at a420 Shrivenham
Improved from class C 79 in '92 to class B 133 in '94. While the score achieved in 1992 was exceptionally poor for this site the score in 1994 is still the highest recorded yet (while not significantly higher than in previous years). Leptophlebiidae and Goeridae were recorded for the first time

PUTR.0116 Tuckmill Brook - 75m below Shrivenham STW
Improved from class D 48 in '92 to class B 130 in '94. Despite being downstream of the STW this site still achieves a very high score and doesn't appear to be suffering unnecessarily from the effluent. The impact is characterised by a change in fauna such as; the presence of leeches, Psychomyiidae and Zygopterans and the absence of crayfish, saucer bugs and Goeridae.
Whatever the reason for the lower scores in 1992 the Brook seems to have more than recovered by 1994.

PUTR.0135 South Marston Brook - at Nightingale Lane
Improvement within class D from 24 in '92 to 47 in '94 this is still well below the RIVPACS predicted BMWP score of 109. The score appears to be improving from 3 years of low scores since its last high of 1990, this may be due to an interruption in flow during the drought or an unrecorded pollution event in early 1991.

PUTR.0249 Lenta Brook - at Hinton marsh farm
Improvement from class D 41 in '92 to class C 74 in '93, despite this improvement the score is still well below the RIVPACS predicted BMWP score of 93. Nevertheless Goeridae and Nemouridae were recorded for the first time.

PUTR.0255 Liden Brook
Fall from class B 103 in '92 to class C 63 in '93 well below the RIVPACS predicted BMWP score of 93. Previous BMWP scores have fluctuated widely according to season and due to sampling difficulties and the deterioration reflects this as well as real biological variation.

PUTR.0121 Waterloo Ditch - at Coleshill
Improvement from class D 49 in '92 to class C 82 in '93. The score is now above 78% of the RIVPACS predicted score of 89. Several mid scoring and high scoring families were present on this occasion which raise the ASPT and suggest that water quality may have improved slightly, there is no obvious reason why this should have occurred

RAY

PUTR.0071 Ray - at Seven Bridges, Cricklade
Improvement from class C 80 to class B 102

PUTR.0150 Haydon Wick Brook - above Ray
Fall within class D from 42 in 1992 to 29 in 1994 this site has never been within 78% of the RIVPACS predicted BMWP of 90. This drop in score may be due to the surrounding land and river being flooded with 1m of water for the previous week. The usual low score is due to the site being very deep and silty and therefore hard to sample with limited habitats for

flora and fauna.

PUTR.0069 Ray - at Moredon Bridge Swindon
This site has shown a 'significant' improvement both in BMWP and ASPT scores the reasons for this apparent improvement in water quality are unclear but may be attributable to improved effluents from Swindon STW.

CHURN

PUTR.0013 Churn - at Gauging Stn
Fall from class A 192 to class B 141 but still within the range of previous samples.

PUTR.0014 Churn - North Cerney
Deterioration by significant value change but still well above predicted BMWP and ASPT therefore not likely to be a water quality problem fits in with normal sampling variation at this site.

COLN

PUTR.0036 Coln - at Fossebridge
Fall from class A - 160 to class B - 150.

PUTR.0037 Coln - at gauging stn
Improvement from class B - 135 to class A - 166.
This was a 'significant' value change but over the long term has just returned the site to its normal high score from a disappointing 1993.

PUTR.0039 Coln - at Roundhouse Lechlade
Improvement from class B 104 to class A 155 this returns the site to its normal high score exceeding the RIVPACS predicted BMWP score of 115. previous scores have all been high class B or low class A with 1993's score being the only one falling to a very low class B.

PUTR.0048 Dudgrove Stream - at Gate 7 RAF Fairford
Improvement from class D (38) in 1992 to class C (89) in 1993 this is now above the RIVPACS predicted BMWP score of 87 and in fact the first time that the score has even been within the acceptable range. This is a significant improvement with the appearance of 3 top scoring families but still below the predicted ASPT suggesting the RAF STW's are still having some impact. Some of the improvement may again be attributable to increasing discharge.

LEACH

PUTR.0119 Veneymore Stream - 50m below Little Faringdon Trout Farm
Improvement from class C 96 in '92 to class B 132 in '94 to even higher above the RIVPACS predicted BMWP score of 89. Since the end of 1991 scores at this site have been

lower than previously and this sampling occasion suggests they may be returning to their former very high level. Four top scoring families were recorded and Psychomiidae for the first time. There has been some observation of increased siltation (possibly from the trout farm) in the area of this site which may be having some impact on the fauna.

UPPER THAMES

PUTR.0107 Thames - at Water Intake Buscot
Improvement from class B - 127 to class A - 155.

PUTR.0002 Ampney Brook - at Sheepen Bridge
Improvement from class B - 146 to class A - 161.

PUTR.0080 Shill Brook - at Roadbridge Black Bourton
Fall from class B 111 to class C 84; this score is greater than 78% of the RIVPACS predicted BMWP score of 100. Although the score has dropped since 1993 it is within the range reported in previous years at this site with typical fauna found.

PUTR.0043 Derry Brook - at road bridge Ashton Keynes
Fall from C 81 to C 51 which is well below the RIVPACS predicted BMWP score of 95. This is the lowest score observed yet with several taxa missing compared with past samples. The substrate was dominated by silt and cladophora formed 5% cover. This suggests agricultural erosion may be occurring in the area and may contribute to higher nutrient loads.

PUTR.0057 Key - at A419 roadbridge Crocklade
Although there is decline in score within class B from 149 to 101 both exceed their RIVPACS predicted BMWP score of 93. This site is sampled extensively and the 1994 result is within the normal range of scores for this site with a very typical taxa list. This suggests that this low score is just an artefact of variation.

PUTR.0238 Bydemill Brook - above Thames
Improvement from class D 43 in '92 to class C 95 in '94. This is the first time this site has returned to the level of its RIVPACS predicted BMWP score of 92 since 1990. Top scoring Goeridae, Rhyacophilidae and Baetidae were recorded for the first time, the low scores in 1991 and 1992 may have been an artefact of low discharge during the drought.

PUTR.0227 Marston Meysey Brook - at road bridge below Marston Meysey
Improvement from class D 37 in'92 to class C 90 in '93 this is now greater than 78% of the RIVPACS predicted BMWP score of 96. The BMWP score and the ASPT is now of a similar magnitude to the last high in 1988, this site has now fully recovered since it was dry in 1990.

PUTR.0247 Kencot Brook - at B4020 Alvesect
This site has been dry when visited in the past 4 years. Therefore the score has shown some improvement and is now recovering a limited ephemeral fauna. Some of the longer term groups are slow in returning such as the snails. assuming the flow is retained over the next

few years recovery should be complete allowing a full analysis of water quality.

PUTR.0093 Thames - at Eysey
This site shows a 'significant' improvement in score both BMWP and ASPT, however over the longer term there is similar variation throughout the sampling history at this site suggesting this may not be a long term improvement.

PUTR.0108 Thames - Waterhay Bridge
This site shows a 'significant' decline in BMWP, however, the ASPT is much higher than on previous samples. This shows that high scoring families are present and hence that water quality can not be implicated.

APPENDIX 2

No comments are made for sites at which a class change is recorded but there is only a very small change in score. i.e. where the class change is purely an artefact of arbitrary class boundaries.

NORTH-EAST AREA SITE REVIEW

WYE

PWYR.0026 Hughendon Stream - at Hughendon Car Park
This site has shown a class change simply because it has been dry for the last 5 years. When it last had some water in it the score was identical to this occasion. This is well below the predicted BMWP, however, this is as expected as RIVPACS is unable to predict scores for ephemeral streams.

PWYR.0044 Glory Mill Backwater - above Wye
This site has shown a 'significant' value change over the last year and has also reached its predicted BMWP score. This has always been a very low scoring site and the ASPT is still well below predicted, reasons for this improvement may be due to increased discharge but show a welcome improvement in this poor catchment.

PWYR.0012 Wye - Bassetbury Lane, High Wycombe
At Bassetbury Lane this site is generally quite variable although this is still the lowest score recorded. Both the BMWP and ASPT are well below the predicted BMWP but in the range of several scores in the past.

PWYR.0011 Wye - above Wycombe Marsh Mill
This is the site downstream of the STW which shows very little difference from the upstream site even following the cyanide spill. This score is much lower than the previous one but very similar to the normal range at this site the last score being an improvement on normal. Both the BMWP and ASPT are well below their predicted values.

RODING

PRGR.0028 Roding - at High Ongar Bridge
This site at High Ongar Bridge and shows a class change and 'exceptional' value change now exceeding its predicted BMWP score although still rather low on the ASPT. This site has scored within this range between 1977 and 1983 but has been very depressed since. The reason for this improvement is unclear.

PRGR.0027 Roding - below bridge Abridge
This site at Abridge has shown an 'exceptional' value change and a class change in the last year. The ASPT as well as the BMWP score have improved both the scores are considerably higher than ever before, the scores have been improving since 1975, however, this years improvement is quite extreme. The reason may be related to improved quality with improved

flow as the last improvement of this magnitude was in 197 following the last drought.

PRGR.0040 Rom/Beam - above A12 road bridge
Decline in class from C to D the is an 'exceptional' value change and scores well below the predicted BMWP score. This is in fact in line with normal scores following last years dramatic increase in BMWP and ASPT scores.

PRGR.0021 Ingrebourne - at Harold Court Road
At Harold court road declines in class from C to D this is a 'significant' value change again well below the predicted BMWP score. However the scores are the second highest recorded for this reach only exceeded by last years higher scores suggesting that this site may actually be displaying some water quality improvements.

PRGR.0018 Ingrebourne - above A13 road bridge
Decline in class from C to D this is an 'exceptional' value change again well below the predicted BMWP score. Although a decline in score this is a return to normal scores following last years much higher scores attributed to animals being washed down in the spate.

BEANE

PLER.0012 Beane - at Watton at Stone
This site has declined in the last year despite being of consistently poor quality, the quality in this reach is affected both by the low flows in the upper catchment but also on the poor quality in the water coming from Stevenage brook. However, this site actually shows a considerable improvement so can not be held responsible for the further decline in water quality in the Beane.

PLER.0226 Beane - at Hartham Common
Just upstream of the confluence with the Lee the Beane has recovered water quality although this year the improvement is not a great as it was last year nevertheless the BMWP and ASPT are both greater than many previous scores and still exceeds the predicted scores.

COLNE

PCNR.0001 Alderbourne - above Colne Brook
this is a class change from A to B but is insignificant being within the normal range and still exceeding predicted BMWP.

PCNR.0014 Chess - at Bois Mill
This sites showed a class change from C to B again this is not significantly different from last year, however, it does extend an improvement of scores which has been occurring since this site was first sampled in 1990 this is likely to be due to the improvements made in the capacity of the STW at Chesham.

PCNR.0019 Chess - below Latimer Bridge
This shows a class change from A to B, however, this is only a score change of 14 points and high for the normal range so not significant.

PCNR.0189 Colne - at London Colney
The class at this site has dropped from B to C with a 'significant' value change also. This site has shown considerable variation over the years but has not been within this range since 1989. the reasons for this change are not immediately obvious at this moment.

PCNR.0026 Colne - at Bushey Mill Lane
This site shows a 'significant' decline in scores since 1993 however it is still high for the site and in the range of the last few years. However the ASPT is somewhat depressed for this value of BMWP suggesting that water quality may be somewhat compromised.

PCNR.0140 Colne Brook - at Wraysbury BR Station
This site has shown a drop in class from A to B this year however this is well within the normal range and only a score change of 15 in scores. In addition both the BMWP and ASPT are within the acceptable range of the predicted scores.

PCNR.0043 Colne/GUC - above Maple Lodge STW
This site is above Maple Lodge STW and has dropped from class B to class c, however the score drop was minimal for both BMWP and ASPT suggesting this was not significant.

PCNR.0186 Colne/GUC - at Coppermill Lane, Harefield
The class drops from C to D and is also a 'significant' value change. This is however largely attributable to the fact that the 1993 score was particularly high for this site - this years score was the second highest. Nevertheless this site scores very lowly and is well below predicted BMWP's and ASPT's.

PCNR.0193 Frays River - at packet Boat Lane
this site drops from a class B to a class C it also has an 'exceptional' value change. This is the first time that this site has dropped below 100 and the ASPT is 0.5 below the mean of all past ASPT's, this suggests that water quality at this site could be a problem and should be watched carefully in the future.

PCNR.0046 Frays River - above Colne
This is a 'significant' value change, however on closer examination it is within the normal range of this site; 1993 being much higher than normal and is unlikely to be showing any real changes in water quality.

PCNR.0153 Gade - below Cassiobury Park
This site shows a class change from C to B. the score in 1993 was much lower than the scores achieved since 1990 so it appears that there was something affecting water quality last year that has been rectified this year.

PCNR.0054 Gade - at Croxley Centre
Croxley centre This site again shows a 'significant' improvement since 1993 which was again lower that normal for the site. This reconfirms the conclusions made above and suggests

there may have been some thing affecting water quality last year that has been overcome.

PCNR.0205 GUC - above Springwell Lock
Batchworth improvement from class D to C

PCNR.0184 GUC - at A40 Denham
Denham reach significant' value change within class C

PCNR.0171 Misbourne - below Old Amersham at A 416
This is in the upper reaches of this tributary and has suffered dry periods in the early 90's, this score is within the normal range as is the ASPT - one very high scoring sample was collected last year making this one look unusually poor.

PCNR.0072 Misbourne - below Gerrards Cross STW
Downstream of Gerrards Cross STW this site has changed class from B to C however this type of fluctuation seems to be typical for this site the ASPT is still high suggesting water quality is not implicated.

PCNR.0206 New Denham Stream - Lime Walk New Denham
This site has fallen from class B to class C, the score difference between the two sampling occasions is minimal and the ASPT is higher than in 1993 suggesting water quality changes are insignificant.

PCNR.0083 Potters Bar Brook - above Mimmshall Brook
This site has improved from class D to Class C but the score change is quite small the quality of this site is generally low falling well below the predicted scores. However there has been a significant but slow improvement over the years from just 23 in 1990 to 53 this year indicating a long term improvement.

PCNR.0086 Tykeswater - above Colne
This site shows a class change from C to B and although the BMWP has improved the ASPT has declined; the changes are also small suggesting this is due to natural variation.

PCNR.0097 Ver - at Sopwell
This site has improved from class C to class B, this site appears to be quite variable over its long sampling history, nevertheless these are the highest scores since 1987 but not greatly above the normal range of scores.

PCNR.0088 Ver - above Colne
This site has fallen from class A to class B, this is one of the highest scoring sites in the catchment and even with this decline still exceeds the predicted BMWP and retains a good ASPT suggesting water quality has not changed significantly since last year.

STORT

PLER.0147 Stort - Hazel End
This site shows a drop in class from B to C the actual drop in score is very small and this

years score is one of the highest ever with the highest ASPT score for the site.

PLER.0323 Stort (Navigation) - Above Spell Brook lock
This improves class from C to B, the score only changes a small amount over the class boundary so may not be significant.

PLER.151 Stort (Navigation) - below Sawbridgeworth Lock
This site changes class from C to B, this is also a 'significant' value change, the score has improved quite rapidly with the highest ASPT since 1982 and the highest recorded BMWP. The lower scores appear to coincide with the drought years and were poor around the late 70's as well suggesting this years improvement is linked to improved water quantity as much as water quality.

PLER.257 Stort - above Roydon at Briggens
This site has changed class from B to A it is also a 'significant' value change. This site has in fact shown these kind of scores in the past and the 1993 score was rather lower than other recent years, however, the ASPT score in 1993 was much the same as this year suggesting the improvement is not significant.

LEE

PLER.0294 Lee - below Osborne Road
In the upper Lee this has changed class from E to D this is not a 'significant' value change and is not likely to reflect any long term improvement as this site has varied around these scores over its long sampling history.

PLER.0220 Lee - at Hartham Common
This site is below the confluence with the Mimram and shows a change in class from B to A this is not a 'significant' value change and has had comparable scores in most recent samples. The improvement as a result of the Mimram is quite evident here.

PLER.0060 Lee - at Dobbs Weir
This site shows a class change from C to B which is also a 'significant' value change although similar to scores that have been recorded in the last four years.

PLER.0208 Lee - below Enfield Weir
Although the class change from A to B is also a 'significant' value change it is still within the range of scores recorded at this site over the long sampling history. The score has been variable over the sampling history but more consistently high over the last four years.

PLER.0291 Pymmes Brook - at Tottenham Hale
This site has shown a class change from E to D nearly doubling its score over the last two years. Nevertheless the score is still well below the predicted value and may be just reflecting a slight dilution of the STW effluent with improved flows.

APPENDIX 3

No comments were made for sites at which a class change was recorded but there was only a very small change in score. i.e. where the class change is purely an artefact of arbitrary class boundaries.

SOUTH-EAST AREA SITE REVIEW

LODDON

PLDR.0101 Ashridge Stream - above Emm Brook
This site appears to be recovering from the drought years with a class improvement from D to C, but also more long term than this as the pre 1989 years were even lower scoring than the drought years. This may be an indication of improved output from Ashridge STW.

PLDR.0003 Blackwater - above Aldershot Town STW
This site in the upper reaches also improved from D to C and appears to be a recovery to predrought scores as the lower scores were recorded between 1991-93.

PLDR.0009 Blackwater - at Frimley Bridges
At Frimley Bridges this site is displaying long term improvement and is now achieving BMWP predicted scores. This must in part be due to recolonisation of the channel which was moved in the early '80's.

PLDR.0012 Blackwater - below Sandhurst STW
This site below Sandhurst STW improved from class C to B. This is quite a variable site which has shown a significant improvement over the last three years this is a welcome trend and may be due to a more consistent effluent from the STW.

PLDR.0013 Cove Brook - above Blackwater
Above the Blackwater this site has improved from class D to C, this is however, within the range of BMWP and ASPT scores that have been recorded at this site previously and unlikely to be of any great note.

PLDR.0118 Emm Brook - at Toutley Bridge, Winnersh
At Toutley Bridge this years score has dropped from class C to D; the site was sampled in March (its lowest scoring month in the past) and the 1993 score was higher than normal. Nevertheless the BMWP and the ASPT are much lower than normal range and are a 'significant' value change. Pollution sensitive families are absent suggesting a significant decline in water quality, no reasons for this have been recorded.

PLDR.0017 Fleet Brook - above River Hart
Above the river Hart this site has deteriorated from class C to D with a 'significant' value change. However, both the BMWP and the ASPT are within the normal range of scores for this site 1993 being much higher scoring than in the past.

PLDR.0018 Hart - at Elvetham Park Bridge
At Elvetham Park Bridge this very high scoring site has improved from class B to A with a 'significant' value change. Both BMWP and ASPT's have improved considerably in the past 3 years suggesting there has been some long term quality improvements in this section.

PLDR.0019 Hart - at Hartford Bridge
At Hartford Bridge this site has improved from class C to B, although this is a 'significant' improvement from 1993 in the long term it is within the long-term variation for this site which has fluctuated quite considerably since first sampled in 1980.

PLDR.0039 Lyde - at Deanlands Farm
At Deanlands Farm this site has fall from class A to B,this site appears to fluctuate almost annually between classes A and B and long-term this is unlikely to be a major change, however, the ASPT has fallen lower than before so water quality should be kept under observation.

PLDR.0145 Minley Brook - at B3013 Fleet
At Fleet this site has fallen to class E from class D, this is a very poor site which has deteriorated even further. It appears that pollution is unavoidable at this site with odourous black sediments and white bacterial growths - reflected in the scores. That more of the catchment is not affected is quite amazing.

PLDR.0051 Vyne Stream - below the Vyne
Following a poor score in 1992 (class C) this site has returned to its normal high scores exceeding predicted BMWP's (class B).

PLDR.0048 Whitewater - at Heckfield
At Heckfield this site shows a 'significant' decline in BMWP score although within the normal range. In addition the ASPT the ASpt has been very constant and this year there is no deviation from this.

CHERTSEY/BOURNE

PBNR.0003 Bourne (N) - at Thorpegreen Bridge
At Thorpegreen Bridge there is a class change from B to C which is also a 'significant' value change. Since a pollution event in '92 the site had been recovering but has again deteriorated, it was also recorded that there is a lack of habitats with no vegetation and pool sites absent, possibly contributing to this decline.

PBNR.0019 Bourne (S) - below Dunford Bridge
Below Dunford Bridge this has a class change from D to C but not a significant score increase. However, the ASPT is the highest inthelast four yeas suggesting there may actually be some improvement.

PBNR.0006 Halebourne - at Halebourne Lane, Chobham
At Halebourne Lane this site shows a 'significant' deterioration in BMWP score, this is infact the lowest score recorded since 1990, the ASPT is also lower than in recent years. Although

much lower than previously there was a non-routine sample collected later in the year which was at normal levels. The very low score was recorded in March and all other samples have been collected later in the years which may account for this drop although the possiblity of water quality problems can not be ruled out.

WEY & ADDLESTONE BOURNE

PWER.0090 Caker Stream - below Alton STW
This changed class from D to C but with a small actual score change, however, the ASPT score improves a more significant amount suggesting water quality may be improving at this site.

PWER.0044 Cranleigh Waters - at Collins Farm, Cranleigh
At Collins Farm the class has dropped from C to D and with a 'significant' value change. Although there has been quite a score drop in both ASPT and BMWP, the last score was much higher than all previous samples suggesting that this years result is not due to a sudden change in conditions.

PWER.0004 Cranleigh Waters - at Elmbridge, Cranleigh
At Elmbridge there is an improvement in class from D to C, this is also a 'significant' value change. Scores both BMWP and ASPT have not been as high as this since 1987 and are now greater than 78% of the predicted scores. Higher flows have been recorded on the last two years which amy account for the improvement in scores.

PWER.0128 Ock (Surrey) - above Wey
Above the Wey the Ock has recovered to its previously high class of B from C although it is not a 'significant' value change.

PWER.0020 Tillingbourne - at Water Intake, Shalford
At Shalford water intake there has been a class deterioration from A to B this is also a 'significant' value change. However, it is in the range of normal variation at this site which is of good quality - exceeding its predicted score.

PWER.0031 Wey - above Tillingbourne
Above the Tillingbourne there has been a class change from B to A which is not a significant value change, however, the ASPT has improved quite significantly to even higher than the 1990 scores. There does appear to have been some long term quality improvment in this stretch since 1986 with just a slowing down of the improvement over the drought years.

PWER.0030 Wey - above Thames
Just above the Thames the Wey has improved from class C to B and a 'significant' value change. This is infact a return to normal high scores after an unusually low score in 1993 which was unexplained.

PWER.0024 Wey (N) - at moor Park Bridge, Farnham
At Moor Park Bridge there has been a class change from B to C, this is a 'significant' value change. In '92 there was also a very low score which was attributed to pollution the 1993

sampleshowed a recovery in BMWP but still with a low ASPT suggesting that recovery was not complete, this years scores suggest that another pollution has occurred affecting water quality, knocking the BMWP and ASPT as low as the 1992 scores.

PWER.0026 Wey (S) - at Hammer Vale Bridge, Haslemere
At Hammer Vale Bridge there has been a class change from B to C, this is not a significant value change and well within the normal range of scores for this site.

PWER.0027 Wey (S) - at Lindford Bridge, Bordon
At Lindford Bridge there has been a class change from A to B, this is also a 'significant' value change. Nevertheless this is a very high scoring site well above the predicted scores, this years scores particularly the ASPT are well within the normal range of variation at this site.

MOLE

PMLR.0013 Gatwick Stream - at Tinsley Bridge
This has changed class from E to D which is a 'significant' value change. The low score in 1993 suggested a pollution from which the stream has now recovered to its normal poor quality. It was also observed that past poor quality and oil pollution has resulted in snails with oiled shells.

PMLR.0053 Holmwood Stream - below Holmwood STW
Below Holmwood STW this score has dropped from an all time high in 1992 from class B to D which is more typical for this site. The low scores are generally attributable to the STW and the high score in 1992 was as a result of invertebrate drift from upstream sites following high flows - these pollution sensitive animals have obviously not prevailed.

PMLR.0014 Leigh Brook - at Leigh Bridge, Leigh
At Leigh bridge although not a class change there has been a 'significant' score improvement. at this site ovr the last 3 years there has been some evidence of long term quality improvement - both BMWP and ASPT. This year seems to be another extension of this pushing the scores even higher above the predicted BMWP.

PMLR.0022 Mole - above Thames
Above the Thames there has been a class change from C to B as well as a 'significant' improvement in value change. The BMWP is much higher than in previous years and while 1993 was a particularly low scoring year it had a high ASPT score - higher than in 1994. this suggests that the improved BMWP may not be as a result of improved water quality but other factors such as habitats improvements.

PMLR.0042 Salfords Stream - above Mole
Above the Mole this site has shown a class change from D to C with a 'significant' value change. This is another site that appears to have suffered an unusually poor score in 1993 - which may be attributed to operator effects and has now recovered to well within the normal range for this site.