

NATIONAL CENTRE FOR TOXIC AND PERSISTENT SUBSTANCES



NRA

BUSINESS CASE



*National Rivers Authority
Anglian Region*

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1) EXECUTIVE SUMMARY

The NRA is tasked to help achieve the requirements of International Agreements from the North Sea Conference, the Paris Commission, and from Directives issued by the European Commission. These commitments overlap because they involve nutrients and Toxic and Persistent Substances. Further duties on these matters stem from the Water Resources Act 1991.

This report was prepared by Anglian Region following a decision by the Executive Group to pursue a recommendation of the Chief Scientist that a National Centre should be set up to meet current and future commitments for Toxic and Persistent Substances.

The Corporate Plan of 1993/4 identifies the development of the Centre in Anglian Region as a key action which will improve the efficiency of the NRA.

The report recommends a Centre which will integrate National and Regional requirements and produce recommendations for strategy. The implementation of strategy and its incorporation into Catchment Management would be monitored by the Centre. The Centre would be run by a Project Board.

In addition the Centre will co-ordinate the identification of the sources of Substances and calculate inputs to the sea. It will implement the Pesticide Strategy and develop national databases on the use of Pesticides and the amounts of Pesticides found in the Environment. It will also establish expertise and a focus for advice. The Centre will develop and help implement strategy for the control of eutrophication.

Such a Centre requires an increase from the existing resource of 5.1 FTE at the current informal facility at Anglian Region to a total of 15.9 FTE. Without the Centre these figures would be 9.1 FTE and 22.7 FTE respectively.

From 1994/5 the £105K per annum currently provided to Anglian Region by National Head Office would need to be increased by £218K per annum. £100K per annum of this increase could be funded from savings in Regional FARMSTAT Budgets. In addition a one-off payment of £240K is required for 1994/5.

The Centre will have an annual operating cost which totals £393K. This is a saving of £281K on doing the same tasks without a Centre (or £381K per annum including the FARMSTAT savings from Regional Budgets).

2) INTRODUCTION

The NRA needs to develop national procedures and national strategies for controlling pollution and meeting our commitments. This involves the co-ordination of Regions, the management of data, the assessment of issues, the identification of action, and reporting.

2.1) Background

Inputs to Coastal Waters

When the first **North Sea Conferences** were held in the mid 1980s, there was concern about the vulnerability of the southern part of the North Sea. The Anglian Region of the NRA, whose entire coastline borders this part of the North Sea, produced an Action Plan to implement the requirements of the Conference which affected the Region.

Our National Head Office and the Department of the Environment welcomed this initiative and asked Anglian to set up the NRA's North Sea Group. This Group was tasked to extend the Action Plan to other Regions and to oversee its implementation.

Later, the North Sea Group was asked to include monitoring programmes required by the **Paris Commission** and to design these so that they produced information which would complement the data collected for the purposes of the North Sea Conference.

These commitments require that the NRA measures the loads of nutrients and **Toxic and Persistent Substances (TAPS)** which are discharged to estuaries and to coastal waters.

The United Kingdom is required to achieve, by 1995, a reduction of 50% in the loads discharged to sea of substances listed in the so-called Annex 1A (Appendix 1).

Data from the surveys undertaken for the Paris Commission and the North Sea Conference are collated in the Anglian Region and placed within a single national database. This database is used to provide information for the Government's reports to the Paris Commission. It is also used for our own reports on the action needed to reduce pollution and meet the requirements for a 50% reduction. In addition, a support service is provided to Regions.

Pesticides¹

The NRA is the **Competent Authority** for a number of the **Directives** issued by the European Commission. We are required to control water quality so as to meet requirements which include target values for some Pesticides. The Directives are those for Dangerous Substances, Surface Water and Groundwater.

In response to the Groundwater Directive and the Hague Declaration on Groundwater, the NRA produced its *Policy and Practice for the Protection of Groundwater*. This includes sections on controlling the inputs of Pesticides.

The NRA is also responsible for setting up a classification for Listed Substances discharged to groundwater. This follows a Direction to the NRA from the Department of the Environment in 1992.

Our monitoring indicates low concentrations in all **Controlled Waters** of a wide range of Pesticides. Although these concentrations are below all the established thresholds for acute toxicity, their longer term significance is largely unknown.

Because of the need to protect water supplies, and the high cost of removing Pesticides at water treatment plants, the NRA is under pressure from Water Companies to take action which will reduce the amounts of Pesticides which enter rivers and groundwaters. This will help the United Kingdom meet the standards in the Drinking Water Directive.

There are over 450 Pesticides which are Approved for use in the United Kingdom. This approval is given under the Pesticide Regulations (1986).

In order to fulfil its commitments under the Water Resources Act and Directives, the NRA must monitor pollution by Pesticides, control the inputs to Controlled Waters, and promote the use of Best Environmental Practice. Anglian Region has a high proportion of arable land and a larger use of Pesticides than in any other Region. As a result it has built up expertise which has been made available to other Regions.

The Region has also provided advice to National Head Office and has been responsible, on behalf of National Head Office, for liaison on Pesticides with Government Departments and other bodies. The Region is therefore well-placed to build on this experience, to provide a facility which will collate and interpret information, and to draft policies for the control of Pesticides.

Nutrients

Nutrients can cause eutrophication. Many of our responsibilities are affected by eutrophication including: Fisheries, Water Quality, Recreation, Conservation and Flood

¹ In this report the term, Pesticides, embraces Pesticide Active Ingredients which are used by agriculture, including Herbicides and sheep-dip. It also covers non-agricultural Pesticides, such as wood preservatives, and additives, co-formulations and breakdown products.

Defence.

Under the agreements for the Paris Commission, the Government monitors the impact of nutrients on the North Sea, and must identify the sources of the nutrients and recommend action where necessary.

The NRA is also involved in:

Toxic Blue-green Algae

In 1989, algal blooms caused the deaths of dogs and sheep at Rutland Water, and the hospitalisation of two soldiers after canoeing exercises at Rudyard Lake in Staffordshire. As a result, the NRA set up the Toxic Algae Task Group. This made recommendations (Water Quality Series Report No.2) and produced guidelines for the development of Action Plans. The Group has also been considering incidents involving marine algal toxins.

Bathing Waters

In addition to the routine monitoring of Bathing Waters, the NRA has introduced a scheme by which algal blooms observed at Bathing Waters are reported to the Department of the Environment.

Urban Waste Water Treatment Directive

This Directive requires that Member States identify areas affected by eutrophication and control the input of nutrients from discharges of sewage effluent.

Classification under the Water Resources Act.

Two aspects involve nutrients. These are Statutory Water Quality Objectives, particularly for Special Ecosystem, and proposals by the NRA for a Nutrient Classification of rivers.

Nitrate Directive

There is scope to designate Nitrate Vulnerable Zones to control the eutrophication caused by run-off from agricultural land.

2.2) Objectives

The objective of the Centre is to provide a framework which will meet the NRA's responsibilities in the most cost effective manner. These responsibilities require:

- monitoring;
- collation and interpretation of data;
- recommending action to reduce pollution;
- reporting data, trends, actions and progress;
- making recommendations for policy;
- liaising with Government and Industry; and,
- informing the media and the Public.

3) JUSTIFICATION FOR A NATIONAL CENTRE

The Centre will permit a planned, national approach to our work on Toxic and Persistent Substances. This will make best use of scarce skills and experience and help to ensure that expertise is developed for the future. It will also produce economies in the management of data, the provision of techniques to assess impacts, and the development of Information Systems.

3.1) Integrated Pollution Control

The Environment Agency will require an interface between our databases and the Chemical Release Inventory of Her Majesty's Inspectorate of Pollution. This need will become more important as details are negotiated of the Directive for Integrated Pollution Prevention and Control. The negotiations and the Directive are likely to require that we know the quantities of Toxic and Persistent Substances which are manufactured, generated, imported, exported, treated and used. It is also likely that we shall need to know the ultimate fate of these compounds.

Industry too, requires more information on its contributions to the quantities of Substances which enter the Environment.

3.2) Inputs to Coastal Waters

The Regions use different systems for managing their data. Special software is used to collate these data into a common format for the requirements of the Paris Commission and the North Sea Conference.

By summarising the data on a national basis, targets and priorities can be identified for Regional programmes of pollution control.

The software must also assemble the data for different types of geographical boundaries and present them as maps, tables and reports. These facilities are best provided by a National Centre.

Regions need to be kept aware of our commitments for the Paris Commission and the North Sea Conference and how these duties are best discharged. This is best done through a single point of reference.

In addition, the NRA has to prepare for extra work which has been requested by the Department of the Environment. The Paris and Oslo Commissions are to be combined and this will require a better interface between our databases, particularly those for point and diffuse inputs of pollution.

3.3) Pesticides

The NRA has developed a strategy which addresses concerns about Pesticides. This will also fulfil our obligations for the Directives and our national legislation, and it will promote a consistent approach. The implementation of the strategy raises the following issues. All these can be better tackled through a National Centre:

Diffuse Sources

The control of Pesticides from diffuse sources is virtually non-existent. We need to quantify the extent of diffuse pollution so that controls can be recommended where necessary. With better information, we could influence the Government's Advisory Committee on Pesticides and be better placed to obtain a review of the Approval for the use of certain Pesticides.

Monitoring

A different programme is carried out in each Region. We need to review our data and set up a co-ordinated programme so that the full extent of each issue is recognised. This will help us lobby for action.

Much of our present effort is targeted at Pesticides which are no longer used and whose levels in the Environment are declining. Many of the Pesticides now found in drinking water are the more recent products, particularly herbicides, and in most cases these are not on Annex 1A. We need to obtain better information about the Pesticides which are in current use, and we need to target our monitoring at these. Analytical methods can then be developed to detect the many Pesticides which are not monitored because the existing techniques are inadequate.

Ecotoxicology

Pesticides are the major group of chemicals which pose questions about toxic effects in the Environment. We need to formulate standards for Statutory Water Quality Objectives and to classify Listed Substances for the Groundwater Directive.

The Centre would be well placed to promote the Research and Development needed to produce standards for individual Pesticides. It would also make best use of scarce expertise by providing advice on ecotoxicology.

Advice

The legislation governing Pesticides is complex and there is a great deal of information about. This includes publications by the Government, Codes of Practice and guides. There is a need for a central point which Regions can contact for advice.

National Database

At present, when the Ministry of Agriculture Fisheries and Food (MAFF) reviews a Pesticide, each Region provides its data independently. A national database would allow the data to be provided nationally, saving time and effort, and this would provide opportunities for a more forceful comment on the issues. The database would also allow information to be provided to other parties.

3.4) Eutrophication

As discussed in Section 2.1, initiatives on nutrients and eutrophication are being progressed within work on Toxic Algae, Marine Waters, three different Directives and Water Quality Objectives.

Without co-ordination, both across these initiatives and between Regions, there are risks of inappropriate investment. The development of a strategy for the control of eutrophication will provide a framework for targeting investment. It will also reduce the effort required by individual Regions.

The strategy would involve tasks which will be completed most effectively through a

Centre. These include:

- the precise specification of our commitments;
- the integration of activities aimed at achieving these requirements;
- an assessment of the need to control eutrophication;
- an assessment of whether the current legislation can meet this need;
- an evaluation of techniques for the control of eutrophication;
- cost benefit analysis; and,
- a plan of action and reviews of progress.

4) PLANS

Six Plans are discussed. Plan 1 scraps the facility currently provided by Anglian Region and develops no National Centre. This Plan looks at the cost and other implications of assembling data for national commitments by getting Regions to pass their data direct to the Department of the Environment. Plan 1 is not considered to be realistic because it achieves less than our current activities and implies, in effect, that the Department would collate the data from our own Regions. Plan 1 is discussed in order to bring out the costs of having no Centre. These costs are used in the discussions of Plans 2 to 6.

Plans 2 to 5 involve programmes of work which could be done with or without a National Centre. In each case the work is best done by a Centre. Plan 6 covers extra items which would not normally be done in Regions.

The Plans are:

- Plan 1: do nothing (allow current facilities to lapse and develop no replacement);
- Plan 2: carry out only those basic tasks of co-ordination and collation which are required for our present commitments and which are already being carried out in Anglian Region;
- Plan 3: as Plan 2 but with the extra required work for the identification of the sources of Substances monitored for Annex 1A and the Paris Commission (Appendix 1);
- Plan 4: as Plan 3 plus the identification of sources of Pesticides and the implementation of the Pesticides Strategy;

Plan 5: as Plan 4 plus the production and implementation of the Eutrophication Strategy; and,

Plan 6: as Plan 5 plus a better understanding of distribution and fate of Toxic and Persistent Substances.

Plans 4, 5 and 6 are available only if Plan 3 is in place. The extra work defined for Plan 5 does not require that the extra work of Plan 4 is done.

Costs are September 1993 prices. All salaries and associated costs are based on 1.2 times the mid-grade salaries. No allowance is made for the costs of Support Services and accommodation since no increase in budgets is sought for these. They would normally be calculated as 25% of salaries.

The details of each Plan are now discussed in turn.

4.1) Plan 1 - Do Nothing (no National Centre)

We must assume that the United Kingdom would wish to meet its commitments under the Paris Commission, the North Sea Conference and other statutory requirements. This means that we cannot abandon the monitoring which has been set up to meet these duties.

Plan 1 would terminate the data management facility currently set up in Anglian Region. This would mean that individual Regions would send their data direct to Government. These data would be in a variety of formats. There would be a cost to the Regions of abstracting the data from the Registers, and a cost to Government in collating them.

The NRA would lose the opportunity for an assessment of patterns, trends and issues before sending its data to the Department of the Environment. We should also lose the chance of a preliminary check for anomalies between Regions. This would paint a picture in which we might appear to be out-of-touch and prone to inconsistency and error.

There is also a risk that Pressure Groups would compile data (from our own Registers) and highlight issues that we had not identified. (With our own database, we can identify the issues, set the agenda, plan action, and respond promptly to the questions raised by others).

Without the Centre, there would be no focal point for Toxic and Persistent Substances and this would lead to additional work as each Region researched and set up its own procedures.

The current work carried out in Anglian Region would be discontinued. This involves liaison with outside bodies, the identification of issues, reporting, the promotion of Best Practice, and giving advice to Regions. The loss of these facilities would lead to a risk of inconsistency and inappropriate investment.

Plan 1 would waste the investment made already on the development of skills and software.

Financial Appraisal for Plan 1

Plan 1 requires the following staff in each Region to replace the data management facility at Anglian:

0.2 FTE Grade 11; 0.3 FTE Grade 8; and, 0.5 FTE Grade 6

Over the eight Regions, this would cost a total of £198K per annum.

The four Regions currently using FARMSTAT would continue to do so at a cost of £100K per annum from Regional budgets for Hired & Contracted Services. (FARMSTAT provides information on the use of Pesticides).

The total costs to the NRA under Plan 1 are:

Salaries:	£198K
Hired & Contracted Services	£100K
Total:	£298K per annum

Manpower

8 FTE are required in Regions.

Research and Development

The cost of Research and Development is £185K per annum. This covers the existing programme and established future projects. This would be met from the National R&D Budget.

4.2) Plan 2 - Establish a Centre to Co-ordinate Current Work

Plan 2 continues the work currently being undertaken in Anglian Region:

- the collation of data on Pesticides, Substances associated with the North Sea Conference (Annex 1A: see Appendix 1), and Substances associated with the Paris Commission;
- maintenance of a national database on the concentrations of Substances found in Controlled Waters and on the inputs of Substances to those waters;
- the calculation of loads, and the identification of the main contributors;
- monitoring of algal blooms, reviewing the significance of marine algal toxins and

providing guidance;

- liaison with outside organisations and producing reports on the control of Toxic and Persistent Substances and related issues;
- providing reports to National Head Office and the Department of the Environment; preparing or commissioning reports in the Water Quality Series;
- identifying issues which require the development of policy and recommending that policy;
- providing Regions with guidance on the control of Toxic and Persistent Substances and on the collection and processing of data;
- making recommendations for Research and Development and co-ordinating the resulting programme with other organisations;
- promoting Best Practice for the transport, storage, use and disposal of Pesticides; and,
- a support service in the use of special software.

The Region is also developing methods of graphical presentation to enable the data to be interpreted more efficiently and used more effectively.

The Region has provided a focus for the management of problems associated with Toxic Algae since 1989 through the Toxic Algae Task Group and it has pioneered work on the control of eutrophication since the 1970s through projects in the Norfolk Broads.

The Toxic Algae Task Group has provided recommendations for the management of toxic Blue-green algal blooms. Recently the Group has produced guidance on the development of Action Plans for resolving problems according to priority. It is also developing advice on the significance and management of toxic algae living on the bottom of lakes. These have caused the deaths of dogs in Scotland and Wales in 1992 and 1993.

The baseline service is under strain due to constraints on resources. It relies heavily on temporary staff and consultants. It does not meet all the objectives and deadlines for the North Sea and the Paris Commission and progress on the development of the Action Plan has been slow.

Under Plan 2 this baseline work would continue but there would be none of the enhancements or extensions which are needed for our new requirements, other than making four existing temporary posts permanent.

Financial Appraisal for Plan 2

Option Y: With the Centre:

1.1 FTE from seven senior staff at Anglian Region are currently used. This costs £39K per annum and supplements the four temporary posts funded by National Head Office at £80K per annum. National Head Office has also provided £25K for reports in the Water Quality Series.

The four Regions which use FARMSTAT would continue to do so at a cost of £100K per annum.

The total annual costs to the NRA for Option Y under Plan 2 are:

Salaries	£119K (£39K plus £80K)
Hired & Contracted Services	£100K (as Plan 1)
Materials	£ 25K
Total	£244K per annum

Option N: Without the Centre:

It would require the following staff in each Region to replace the data management facility at Anglian Region (as identified in Plan 1):

0.2 FTE Grade 11; 0.3 FTE Grade 8; and, 0.5 FTE Grade 6

Over the eight Regions, this would cost a total of £198K per annum.

We assume that co-ordination and management would require the equivalent of the 1.1 FTE of senior staff at Anglian Region that are currently used. Without the Centre these might be located at National Head Office or in various Regions.

The four Regions currently using FARMSTAT would continue to do so at a cost of £100K per annum from Regional budgets for Hired & Contracted Services.

The total costs to the NRA for Option N under Plan 2 are:

Salaries:	£237K (£39K plus £198K)
Hired & Contracted Services	£100K (as Plan 1)
Materials	£ 25K
Total:	£362K per annum

Manpower for Plan 2

5.1 FTE for Option Y; 9.1 FTE for Option N.

Preferred Option for Plan 2

Under Plan 2, the Centre costs £118K per annum less the other option and requires 4 less staff.

Research and Development

The cost of Research and Development is £185K per annum. This is common to Options Y and N and covers the existing programme and established future projects. This would be met from the National R&D Budget.

Funding

Under Option Y of Plan 2, National Head Office would contribute £105K per annum to the budget of the Centre. This is for salaries (£80K) and materials (£25K). This is the same as the allocation to Anglian Region in 1993/4 for work on Toxic and Persistent Substances. The remainder of the budget, £39K per annum, would come from existing Regional funding as part of the required proportion of staff-time in the Region which is applied to national work.

4.3) Plan 3 - Plan 2 plus the Identification of Annex 1A Sources

Under Plan 3 the baseline work would continue and additional work done to meet established future requirements:

- increase the reporting framework for the Paris Commission and Annex 1A and so meet the enhancements requested recently by Government;
- improve the geographical coverage of the national database;
- identify sources and inputs; and,
- establish the pathways from source to sea.

These items are now discussed in turn.

Reporting

The annual reports for the Paris Commission are based only on the estimates of load first requested by the Commission for 1990. The Commission has now asked that extra information be provided on concentrations and statistics. These will be required each year. The Commission has also requested statements on changes and trends for the period from 1990 to 1992.

When the reporting facility is increased to meet these extra demands, it would be sensible to take account of requests for future enhancements. These include options to report on the Substances listed in Annex 1A in the detail required for the Substances specified by the Paris Commission. It also includes new ways in which the Government wishes to see the data presented. These are being discussed with the Department of the Environment. It would also be prudent to provide procedures for a proper statistical estimate of the significance of change.

Coverage

The monitoring programme for Plan 2 identifies only the main sources of the Substances associated with Annex 1A and the Paris Commission. It concentrates on discharges to estuaries, and does not consider freshwaters and the discharges to them. In a number of cases, the programme can do no more than to identify that a river carries a significant load. The sources within the catchment are not identified. This means we cannot target action to reduce pollution.

For these rivers, data are likely to be provided by the monitoring programmes for discharges, rivers and groundwaters. These data could help identify the sources of pollution. In Plan 3 the Centre will merge these data with the marine data.

Sources

Sometimes the data will fail to indicate the sources of pollution. For these, additional data will need to be gathered, either by extending our monitoring, or by turning to other agencies for data they may hold. These other agencies include MAFF and Her Majesty's Inspectorate of Pollution.

For other cases, the sources will be diffuse. For these we shall need to study the way the Substance is used and identify the patterns of release into the Environment.

For the above reasons, and given the imminence of the Environment Agency, it is necessary to interface the NRA's database with those set up by the Department of the Environment, MAFF, the Health and Safety Executive, and for the Chemical Release Inventory of Her Majesty's Inspectorate of Pollution.

As the details are negotiated for the Directive on Integrated Pollution Prevention and Control, it is likely that we shall also need access to European databases. These links will help identify diffuse sources. The extent to which we could link to external databases will be investigated and implemented, as appropriate, as a part of Plan 3.

Source-to-sea Pathway

Nutrients and Toxic and Persistent Substances can cause a variety of concerns. In some cases this will reflect issues which are close to the source of the pollution. This could include pollution which affects the use of a water for abstractions or fisheries. At the other extreme the concern may be associated with the end of the catchment. In this case it may relate to the load which discharges to the sea. In between there could be concern about accumulations in sediments and wildlife.

To address all these issues, we need to account for the fate of Substance starting from the amounts which are manufactured and used. We need to trace the fate of these amounts through the various pathways of use and waste-disposal which may apply to each Substance. In this way we determine the amounts which reach our rivers, groundwaters and the sea.

Using the enhanced database described above, mapping techniques would be used to collate the data from all the monitoring programmes. This would help define the path from source to sea.

The United Kingdom is committed by the North Sea Declaration to reduce by 1995 the loads of Substances listed in Annex 1A which are discharged to the North Sea. To deliver this, and to minimise the risk of imposing unnecessary controls, we have to improve our identification of the key sources. Extending the database (as proposed above) will help achieve this. This extended coverage, when combined with the above proposals, would provide, on a single database, data on all the Toxic and Persistent Substances which are monitored for the aquatic environment over the whole of the England and Wales.

Financial Appraisal for Plan 3

Option Y: With the Centre:

Under this Plan the existing arrangement at Anglian Region would continue (as for Plan 2) and three additional staff (Grades 2, 3 and 4 adding £41K per annum to the £80K for Plan 2) would handle the additional requirements.

An extra 0.2 FTE of the senior staff-time in Anglian Region would be necessary (adding £6K per annum to the £39K for Plan 2).

The total annual costs are:

Salaries	£166K (£45K plus £121K)
Hired & Contracted Services	£100K (as Plan 1)
Materials	£25K (as Plan 2)
Total	£291K per annum.

An additional one-off capital cost of £50K would be required in 1994/5 for improved facilities for the production of maps.

Option N: Without the Centre:

Without the Centre, the work would have to be handled individually in each Region. This would require 0.4 FTE (Grade 3) per Region and cost a total of £48K per annum. It still would not be possible for National Head Office to collate and report without an additional Grade 3 post to update the database. This would cost £15K.

In addition it will be necessary to match at National Head Office or elsewhere the 0.2 FTE of management time identified for Option Y. This would cost £6K per annum.

The cost of Option N for Plan 3 is **£431K per annum**. This is made up from Option N for Plan 2 (£362K per annum) and the above three items £48K, £15K

and £6K.

Manpower for Plan 3

8.3 FTE for Option Y; 13.5 FTE for Option N.

Preferred Option for Plan 3

Under Option Y for Plan 3, the Centre costs £140K per annum less than the other option and requires 5.2 less staff.

Research and Development

The cost of Research and Development is £185K per annum and the same as for Plan 2. This is common to Options Y and N and covers the existing programme and established future projects. This would be met from the National R&D Budget.

Funding

Under Option Y of Plan 3, National Head Office would contribute £146K per annum to the budget of the Centre for salaries (£121K) and materials (£25K). This is £41K per annum more than as the allocation for 1993/4. The remainder of the budget, £45K per annum, would come from existing Regional funding as part of the required proportion of staff-time in the Region which is applied to national work. An additional one-off capital cost of £50K would be required in 1994/5.

4.4) Plan 4 - Plan 3 plus the Pesticides Strategy

Plan 4 would formalise the limited amount of national work on Pesticides now being carried out in Anglian Region. It would also implement the Pesticide Strategy approved by the Chief Scientist and Environmental Quality Committee and monitor its incorporation into Catchment Management. The Centre would act as a focal point. It would draft policy for the Chief Scientist, and produce reports in the Water Quality Series, and Procedural Manuals and other guidance.

The Centre would promote a consistent approach by advising on the implementation of Policy Instructions and Procedural Manuals and on the action to be taken when Water Companies report exceedences of the Drinking Water Directive.

The Centre would also advise on the regulation of discharges from Pesticide waste treatment systems, issue guidelines on the investigation and reporting of Pollution Incidents, and develop further advice for use by the Regions for reducing problems with Pesticides.

The Pesticide Strategy requires:

- enhancement of our capability to collect data;
- a national database;
- improvements in risk assessments and in the targeting of monitoring;
- development of toxicological expertise;
- better liaison with outside organisations; and,
- Research and Development.

National Database

Our monitoring programmes for Pesticides have to be more extensive than those associated with Annex 1A and the Paris Commission and produce more data than currently collated by Anglian Region for the national database. With a little extra effort from Regions, the national database could be made more comprehensive.

The facilities at Anglian process data from Regions into loads, compare these loads and report the comparisons as tables, maps or graphics. The data can be presented in any way that Regions, the NRA, Government or international agencies might wish. The boundaries within which the data are reported can be catchments or sub-catchments, Regions or Sub-regions, coastal seas or the whole of the England and Wales.

In Plan 4, the Anglian facility would be extended and used to collect from Regions all the data they currently generate on Pesticides. In addition, data from the Water Companies would also be collected, as appropriate. The resulting database would be used to advise MAFF, the Department of the Environment and other bodies, and for reports in the Water Quality Series.

Risk assessment

Under Plan 4, the Centre would establish a database on the use of agricultural Pesticides in England and Wales. This would be based on FARMSTAT and would be updated annually. It would provide information for the assessment of risk, for monitoring and for planning. The database would be used by Regions to provide loadings of Pesticides, estimates of possible concentrations in rivers, and likely peak months for maximum leaching to rivers.

Plan 4 would develop a procedure for the assessment of risks to aquifers. It would use information on soil coverage, rainfall and aquifer characteristics. A model would be used to predict the Pesticides likely to reach groundwaters.

This Plan would also improve the catchment-scale model developed for the study of *Pesticides in Major Aquifers*. This will be used to assess risks, predict trends and assess the impact of new products. Using our Groundwater Protection Zones, it will be possible to provide advice on the need for any restrictions in the use of specific Pesticides. If necessary, we can then make recommendations to the Secretary of State for the Environment for the introduction of Statutory Water Protection Zones, or for Regulations which require precautions to be taken in the storage, mixing, use and disposal of Pesticides.

The Pesticide Use Database would be used to develop future strategies for monitoring by identifying the Pesticides likely to be present in catchments. It would also minimise the monitoring of Pesticides which are no longer used, or which are unlikely to be present in significant concentrations. A Procedural Manual on monitoring would be one of the outputs from Plan 4.

Advice on Toxicology

The long term impact of most Pesticides is largely unknown. The history of Pesticide pollution is that it has usually been found long after it has occurred and not until it has caused obvious damage.

Under Plan 4, the Centre will establish close links with the Environmental Toxicology Advisory Service (ETAS) operated by the Water Research Centre (WRC). This is part of our Technical Contract with WRC.

ETAS, and other databases, will be used by the Centre to provide and research information on the toxicity of individual Pesticides and combinations of Pesticides, their transformation products, their persistence and the possibility of Bio-accumulation.

In addition, the Centre will consider the need for Environmental Quality Standards for Pesticides and propose Research and Development. The information gathered will be used to alert Regions of potential problems, to lobby MAFF and the Department of the Environment on the control of Substances identified as environmental hazards, and to press for their inclusion as List I or List II Substances.

The expertise acquired in this work will permit the Centre to provide ecotoxicological advice more widely than for the concerns of the Centre for the Paris Commission and the North Sea Conference. This will include new Pesticides.,

Liaison

A number of organisations have responsibilities for the approval, manufacture, storage, transport, use and disposal of Pesticides. The principal bodies involved are MAFF, the Health and Safety Executive, Local Authorities and the Department of the Environment. The Centre will liaise with and influence these bodies.

The assessment of the environmental impact of new or reviewed Pesticides is carried out by the Environment Panel of the Government's Advisory Committee on Pesticides. The NRA has the opportunity to influence the Panel by providing information on any problems from the use of Pesticides. Under Plan 4, the Centre would collate and process data and toxicological information in order to be able to give evidence to the Panel to support any proposal for a review of Approval.

On behalf of National Head Office, the Centre will also liaise with Government departments on such issues as:

- the development of policy on the disposal of Pesticides;
- a review of Codes of Practice;
- action on the recommendations of the 16th Report of the Royal Commission on Environmental Pollution (listed in Appendix 2); and,
- the introduction of Statutory Water Protection Zones.

In addition, the Centre will liaise with organisations which influence the development and use of Pesticides. These include the manufacturers, the British Agrochemicals Association, the National Farmers Union and the Water Companies. It will improve liaison with other users including British Rail, Local Authorities and the timber treatment trade, and it will promote public awareness.

The Centre will produce reports and publicity material. It will also produce advice to users on how to minimise the risk of pollution. The opportunity will be taken to promote new techniques.

Research and Development

The Centre will assess and co-ordinate our needs for Research and Development and liaise with Government departments, other agencies and the Pesticide Industry to ensure their research complements ours.

The Centre will make recommendations for projects to:

- improve our understanding of the fate and distribution of Pesticides;
- promote analytical techniques for Pesticides identified as high priority;
- develop toxicologically based standards;
- develop procedures for determining the environmental impact of Pesticides;
- develop mathematical models to predict trends, assess the impact of new products and estimate the results of restrictions; and,
- develop a systematic approach for the evaluation of the significance of Transformation Products including non pesticidal additives.

Financial Appraisal for Plan 4

Option Y: With the Centre:

Plan 4 requires the resources of Plan 3 (Option Y) with the addition of 4 posts. These posts are Senior Scientist, Grade 10, Toxicologist, Grade 6, Pesticides Scientist, Grade 5 and Data Analyst, Grade 4. These will add £87K per annum to the £121K for Option Y of Plan 3. As well as this, 0.4 FTE is required of additional senior staff-time in Anglian Region. This will add £16K per annum to the £45K for Plan 3.

The four Regions currently using FARMSTAT would not need to continue to do so because the Centre would provide more detailed information to all Regions by way of a new Pesticide Use Database. This would save a total of £100K per annum from Regional Budgets.

Against this, this new database would cost £120K to develop and £30K per annum to maintain and update. A further £10K per annum would be required for maintenance of the extended national database.

The £50K capital requirement from Plan 3 would still be necessary, together with an additional £10K for Computers and Software making a total one-off cost of £180K.

The total annual cost is:

Salaries	£269K (£61K plus £208K)
Hired & Contracted Services:	£ 40K (£30K plus £10K)
Materials	£ 25K (as Plan 1)
Total	£334K per annum

Option N: Without the Centre:

If Option Y is not adopted then Regions would need to develop their own systems. Costs per Region would be £25K per annum for Hired and Contracted Services for the 4 Regions who do not possess FARMSTAT and £82K for 0.5 FTE at Grade 6 for each Region. This gives a total of £141K per annum.

This resource could not handle all the tasks done by the four extra posts at the Centre. We estimate that 0.6 FTE (Grade 10) would be required at National Head Office or at a Region. This would cost £18K per annum.

In addition, there would be a requirement to match at National Head Office or elsewhere the 0.4 FTE of management time for Option Y. We expect that this would increase by 0.1 FTE because of the extra co-ordination required without the Centre. This total of 0.5 FTE would cost £20K per annum.

The total cost of Option N for Plan 4 is **£590K per annum**. This is made up from £431K for Option N for Plan 3 with the above items (which total £159K).

Manpower for Plan 4

12.7 FTE for Option Y; 18.6 FTE for Option N.

Preferred Option for Plan 4

Under Plan 4, the Centre costs £256K per annum less than other options and requires 5.9 less staff.

Research and Development

The cost of Research and Development on Pesticides would be £200K per annum. This is common to Options Y and N. This would be met from the National R&D Budget.

Funding

Under Option Y of Plan 4, National Head Office would contribute £273K per annum to the budget of the Centre. This covers salaries (£208K), Hired and Contracted Services (£40K) and materials (£25K). This is £168K per annum more than as the allocation for 1993/4. The saving of £100K per annum in the Regions can be discounted from this cost.

The remainder of the budget, £61K per annum, would come from existing Regional funding as part of the required proportion of staff-time in the Region which is applied to national work. An additional one-off capital cost of £180K would be required for 1994/5.

4.5) Plan 5 - Plan 4 plus a Strategy on Eutrophication

Under Plan 5 the baseline work would continue as for Plan 2, the extra work for Plans 3 and 4 would be done as would the following:

- the preparation of a strategy for the control of eutrophication;
- the review of information on the nutrient status of Controlled Waters;
- a review of methods of controlling eutrophication and a cost benefit analysis of such control; and,
- the development of a nutrient classification.

These items are now discussed in term. Section 2 of this report described the increasing pressures on the NRA to reduce problems associated with eutrophication. It also emphasised the need for co-ordination.

Eutrophication Strategy

The Centre will produce a national strategy for the control of eutrophication. This would incorporate all the elements in the different legislation. The Centre would also monitor the implementation of the strategy and co-ordinate operational activities in the Regions. The Strategy would develop in three phases:

Phase I - Investigation

A number of stages would be required:

Review the Nutrient Status of Controlled Waters

This review would provide information for a classification of lakes, rivers, estuaries and coastal waters. One of the aims of this classification would be to provide realistic targets. These targets, which may be use-related, may need to differ in different parts of England and Wales, for example because of climate.

Methods of control

A range of possibilities is available for tackling the problems caused by algal blooms and aquatic weeds. These include methods of reducing the amounts of nutrient, physical and chemical controls, and Bio-manipulation. An evaluation is required of these techniques. Some work has already been carried out through the Action Plans for Blue-green Algae. However, assessments have not been started for rivers.

Cost-benefit Analysis

There is little information on the costs of control or on the financial benefits of reducing eutrophication. There is little doubt that costs are incurred, particularly in the treatment of water for public supply and or for industry, for land drainage, fisheries, conservation and recreation. Plan 5 would quantify the effects of eutrophication.

Phase II - Development of the Strategy

The initial stages of Phase II could take place in parallel with Phase I, but they could be completed only in the light of the results from Phase I. It is important, however, that most of the strategy is complete by 1995, prior to the National Survey and any further submissions of candidates for Sensitive Areas under the Directive on Urban Waste Water Treatment.

Phase III - Implementation

Although there are already a number of commitments which require immediate action, such as those for the Paris Commission and Blue-green Algae, full implementation of the strategy could take place only after the completion of the first two Phases. In Phase III, much of the work would be operational and associated with Catchment Management Plans. However, we would need to review the Strategy and modify parts which should be improved on the basis of evidence from experience or from research.

A number of initiatives is under way already, including Research and Development on Classification Schemes for nutrients. The role of the Centre would include the co-ordination of this work, on behalf of National Head Office, to produce a national classification. This would build on work done for the River Quality Surveys of 1990 and 1992 .

Financial Appraisal for Plan 5

Option Y: With the Centre:

Plan 5 uses the resources listed in Plan 4 (Plan 4 includes Plans 2 and 3) together with a Eutrophication Scientist (Grade 6), a Mathematical Modeller (Grade 4) and a Technician (Grade 2). This would add £50K per annum to the £208K for Plan 4. An additional 0.2 FTE is required of senior staff-time in Anglian Region which would add £9K per annum to the £61K for Plan 4.

The total annual costs are:

Salaries:	£328K (£70K plus £258K)
Hired & Contracted Services	£ 40K (as Plan 4)
Materials	£ 25K (as Plan 2)
Total	£393K per annum

A one-off payment of £240K is required in 1994/5 (£180K from Plan 4 and £60K for investigations for the Eutrophication Strategy).

Option N: Without a Centre:

The additional tasks which transform Plan 4 into Plan 5, could be done in Regions with 0.2 FTE (Grade 8) and 0.3 FTE (Grade 2) per Region. This would cost a total of £71K per annum. An extra 0.1 FTE of senior staff-time would be required for co-ordination. This would cost £4K per annum. This would mean that £84K per annum (£71K, £9K plus £4K) would be added to the cost of £590K per annum for Option N for Plan 4 giving a total of **£674K per annum**.

Manpower for Plan 5

15.9 FTE for Option Y; 22.7 for Option N.

Preferred Option for Plan 5

Option Y costs £281K per annum less than Option N and requires 6.8 less staff.

Research and Development

The cost of Research and Development is likely to be £250K per annum, which is made up from £50K per annum on eutrophication and £200K from Plan 4.

Funding

Under Option Y of Plan 5, National Head Office would contribute £323K per annum to the budget of the Centre for salaries (£258K), Hired and Contracted Services (£40K) and materials (£25K). This is £218K per annum more than the allocation for 1993/4. The saving of £100K per annum in the Regions can be discounted from this cost.

The remainder of the budget, £70K per annum, would come from existing Regional funding as part of the required proportion of staff-time in the Region which is applied to national work. An additional one-off capital cost of £240K would be required for 1994/5.

4.6) Plan 6 - Plan 5 plus Work on Fate of Substances

Under Plan 6 the baseline work would continue as in Plan 2 and the extra tasks in Plans 3, 4 and 5 would be done. The following extra items are unique to Plan 6:

- improved estimates of load;
- the use of mathematical modelling to obtain a better estimate of the fate and behaviour of Toxic and Persistent Substances;
- improved techniques of chemical analysis;
- programmes for Integrated Pollution Control through the development of Expert Systems;
- work on Buffer Zones and Bio-manipulation for the control of eutrophication; and,
- work on reducing the input of Pesticides by Integrated Pest Control.

These are discussed below.

Estimates of Load

Usually we take one sample per month and the data from these are used to estimate the annual load. In the long run this gives an unbiased estimate of the true annual load but the statistical error on the estimate for a single year is large.

Most of the load of Pesticide enters rivers when it is washed off the land by heavy rain. River samples which chance to be taken immediately after such weather will pick up these peaks and the estimate of the annual load will be much bigger than an estimate based on samples collected in drier weather.

The Paris Commission has asked that samples collected for their annual surveys are biased towards high flow events. This will lead to estimates of the annual load which are higher than the true load.

Under Plan 6, we would provide the Paris Commission with the type of estimates that it wants. We would also work out and implement procedures for sampling which will give more precise estimates of load.

Fate and Behaviour

Plan 2 includes no work on fate of Substances. Loads are calculated and the assumption made that the whole of this load will find its way to the sea. Other agencies are trying to model the extent to which nutrient load is trapped or removed within estuaries, but there is no comparable effort to find whether Substances are lost in rivers, estuaries or groundwater. Such losses, if they occur, and if they can be demonstrated, will have a bearing on where we should place our effort when we seek the reductions in load required by International Agreements.

Under Plan 6, research would be carried out to improve our understanding of the fate and behaviour of Substances. Models would track the movement of Substances through rivers and estuaries in order to assess the extent to which Substances are accumulated, degraded or lost before they reach the sea. Where Substances are trapped within sediments then further work would be necessary to quantify any likely impact on biota.

Analytical Techniques

Our sampling programme produces some analytical results which are less than the Limit of Detection of current methods of analysis. This introduces error and uncertainty in the estimates of load and these errors could have important consequences for the users of Toxic and Persistent Substances. We need analytical techniques which have lower Limits of Detection. These would be developed under Plan 6.

Integrated Pollution Control and Expert Systems

The methods of reducing the loads of Substances discharged to the North Sea will depend on the types of sources. For some Substances, the reductions may be made either by tightening the controls on the discharges from point sources or by reducing the use of the Substances. For Substances where most of the load originates from diffuse sources, it is usual that only the latter plan would be effective. Currently, the options are assessed on a case-by-case basis.

Under Integrated Pollution Control, all aspects of the use of a Substance will be investigated prior to deciding the most acceptable medium for the disposal of excess or waste. This would be aided by the development of Expert Systems in which the knowledge gained by successful decisions is made available, as appropriate, to new cases and to the people not involved in those decisions.

Models are required which describe the fate of chemicals in the Environment and which assess the risks of discharging the Substances to air, land and water.

Buffer Zones and Bio-manipulation

Research on the diffuse sources of nutrients indicates that the major pathway involves phosphorus which is bound up with particulate matter. There is little input of dissolved phosphorus. In order to assess options to control these inputs, we need to study the use of **Buffer Zones**. In Plan 6 these would be studied on a pilot scale and then, where appropriate, incorporated into our Strategy.

Currently, efforts are being made on the Norfolk Broads to use **Bio-manipulation**. If these methods are to be used on a wider scale, the work on the Broads will require review. The co-ordination and supervision of this work would be carried out as part of Plan 6.

Integrated Pest Control

Because of pressure to reduce the use of Pesticides there is a trend towards:

- o the development of highly active and increasingly specific Pesticides;
- o the use of computer-based systems for targeting the use of Pesticides; and,
- o the development of Integrated Pest Control which uses natural controls as well as Pesticides.

The last two items should reduce the need to use Pesticides. The development of compounds which are more active does, however, present a potential risk to the Environment. We need to examine this risk and compare this with the risks for compounds in current use .

Although Plans 3 to 5 move towards Risk Assessment, the methods used are unlikely to be able to predict the effects of the new compounds. In Plan 6, our capabilities would be developed so that they could be used to support recommendations to chemical companies and to MAFF.

Financial Appraisal for Plan 6

Option Y: With the Centre:

In addition to the resources required for Plan 5, an extra 0.6 FTE would be required of senior staff-time in Anglian Region. This would add £18K per annum to the £70K for Plan 5.

The Centre would also need an additional Grade 5 to model nutrients and the fate of Pesticides, a further Research and Development Scientist (Grade 6), and administrative support (Grade 1). These would add £52K per annum to the £258K for Plan 5.

An extra £15K per annum would be required for Hired & Contracted Services

(for the management of data) in addition to the £40K required for Plan 5.

In the National Laboratory Service an additional total of 4 FTE (Grade 5) would be required for analytical work together with 2 FTE (Grade 2) in the Regions for sampling. The total annual cost of these is £100K.

The total annual costs to the NRA for Plan 6 are :

Salaries:	£498K (£88K plus £310K plus £100K)
Hired & Contracted Services:	£ 55K (£40K from Plan 5)
Materials:	£ 25K (as Plan 1)
Total	£578K per annum.

Option N: Without a Centre:

The additional tasks which transform Plan 5 into Plan 6, could be done with similar resources as for Option Y. An extra 0.1 FTE of senior staff-time would be required for co-ordination. This would cost £4K per annum. This would add £189K per annum (£100K, £52K, £18K, £15K plus £4K) to the cost of £674K per annum for Option N for Plan 5 giving a total of £863K per annum.

Manpower for Plan 6

25.5 FTE for Option Y; 32.4 FTE for Option N.

Preferred Option for Plan 6

Option Y costs £285K per annum less than Option N and requires 6.9 less staff.

Research and Development

This would cost £400K per annum.

Funding

Under Option Y of Plan 6, National Head Office would contribute £390K per annum to the budget of the Centre for salaries (£310K), Hired and Contracted Services (£55K) and materials (£25K). This is £285K per annum more than the allocation for 1993/4. The saving of £100K per annum in the Regions can be discounted from this cost.

£100K of the total cost of the Centre would be required by the National Laboratory Service and Regions.

The remainder of the budget, £88K per annum, would come from existing Regional funding as part of the required proportion of staff-time in the Region which is applied to national work. An additional one-off capital cost of £240K would be required for 1994/5.

4.7) Comparison of Costs

Plan 2 is a bid to formalise the status-quo and reflects current expenditure. Plan 1 is the cost of disbanding the current facility at Anglian Region and doing some of the work in Regions. Plans 3 to 6 build on Plan 2. Plans 4, 5 and 6 are available only if Plan 3 is in place.

Table 1 summarises the requirements for manpower and Table 2 gives a summary of the annual operating costs. Table 3 lists the one-off costs required by the Centre in 1994/5 and Table 4 gives the budget required by the Centre.

Under Plans 4, 5 and 6, savings of £100K per annum to the NRA will occur as a result of replacing the FARMSTAT scheme by the Pesticide Use Database. These would be savings in the revenue budgets of four Regions, and are therefore not reflected in the budget required by the Centre from National Head Office. However the savings could be used to help fund the scheme if this was directed by National Head Office.

4.8) Finance

Expenditure on Research and Development would come from the National R&D Budget.

The budget required for the Centre from National Head Office excludes the salaries and associated costs for staff in Anglian Region who work part-time on the project. These are assumed to be funded by Anglian Region.

National Head Office would meet the remainder of the costs of the Centre. These are shown in Table 4.

TABLE 1: Requirements for Manpower

Plan	Manpower (FTE)		
	No Centre	With the Centre	New Staff
1	8	-	-
2	9.1	5.1	-
3	13.5	8.3	3
4	18.6	12.7	7
5	22.7	15.9	10
6	32.4	25.5	19

TABLE 2: Annual Cost of the Plans

Plan	Costs (£K)					
	With the Centre				Total Annual Cost without Centre	Saving with the Centre
	Salaries & associated Costs	Hired & Contracted Services	Materials	Total Annual Operating Cost		
1	-	-	-	-	298	-
2	119	100 °	25	244	362	118
3	166	100 °	25	291	431	140
4	269	40	25	334	590	256 ⁺
5	328	40	25	393	674	281 ⁺
6	498	55	25	578	863	285 ⁺

° expenditure in Regions on FARMSTAT.

+ a saving of £100K per annum on FARMSTAT could be made in four Regional Budgets.

TABLE 3: One-off Costs of the Centre

Plan	Cost (£K in 1994/5)
1	0
2	0
3	50
4	180
5	240
6	240

TABLE 4: Annual Budget Required by Centre

Plan	Annual Budget	Increase over 1993/4
	£K	
2	105	0
3	146	41
4	273 ⁺	168 ⁺
5	323 ⁺	218 ⁺
6	490 ⁺	385 ⁺

+ a saving of £100K per annum on PARMSTAT could be made in four Regional Budgets.

• this includes £100K required by the National Laboratory Service and Regions

5) INTANGIBLE BENEFITS

5.1) A Focus for Outside Organisations

The development of NRA policy, and commenting on the policy of others, involves consultation with a number of organisations. This is most effectively carried out by experienced staff based in one location. The Centre would meet this need. Many organisations would not wish to consult Regions separately (and some would seek out and exploit perceived inconsistencies).

5.2) Integrated Strategies

The provision of strategies for putting policy into effect is an important purpose of the Centre. This requires specialist knowledge of the legislation and science.

5.3) Consistency and Efficiency

We need to ensure consistency in the Regions in the implementation of strategies. Although this is the responsibility of the operational staff, the Centre would provide advice on the application of the strategies to meet local conditions. This would improve efficiency and provide a mechanism for feedback for the development of future policy.

5.4) Public Relations

Our customers are sensitive to real and perceived inconsistencies between Regions. The Centre would provide recommendations for publicity material and suggest how this is used. The Centre would also guide National and Regional Public Relations Departments on a response to press enquiries and the issue of Press Releases.

5.5) The Environment Agency

We need to prepare for the Environmental Agency, particularly for Integrated Pollution Control. This will have implications for policy on Toxic Substances and the Centre would be well placed to assist with this process.

5.6) Better Decisions

The Centre would be able to "get a grip" of the issues and place the United Kingdom in a strong position in negotiations on future International Agreements and Directives. This would reduce the risk of wasted investment.

6) CONCLUSIONS

6.1) Summary

The report looks at six Plans and whether the work is best done with or without a National Centre. In each case the Centre provides a more efficient way forward in terms of cost and manpower.

The costs are summarised in Tables 1 to 4 in Section 4.7 and the intangible benefits are described in Section 5.

Plan 1: This Plan would not establish the National Centre. It would dismantle the current facility at Anglian and rely on unco-ordinated action from Regions to meet our commitments. This would not achieve current commitments unless resources were made available for co-ordination either at National Head Office or by the Department of the Environment. It would be inefficient to operate, would waste the investment made already on the development of skills and software, and it would risk damage to our image.

Plan 2: Continues at its present level the work currently being undertaken in Anglian Region. Plan 2 does not achieve future commitments or optimise the benefits of the Centre. It integrates the various National and Regional requirements and initiatives on Toxic and Persistent Substances, and provides a minimum resource for current essential tasks.

Plan 3: This includes the tasks in Plan 2 and adds work to identify the sources of Substances monitored for the North Sea Conference and the Paris Commission. The Centre provides the cheapest way to do this work.

Plan 4: This includes Plans 2 and 3. In addition it implements the Pesticide Strategy and monitors its incorporation into Catchment Management. Plan 4 develops databases on the use of Pesticides and the amounts of Pesticides found in the Environment. It also establishes toxicological expertise and a focus for advice.

Plan 5: This includes Plans 2, 3 and 4. In addition it implements a Eutrophication Strategy and monitors its incorporation into Catchment Management. It would create a Centre that could accommodate peak workloads more effectively than Plans 2, 3 and 4.

Plan 6: This includes Plan 2, 3, 4 and 5 and adds work to identify the fate and behaviour of Toxic and Persistent Substances, including improved estimates of load, modelling, and the integration of NRA and external databases.

6.2) Preferred Plan

We recommend **Plan 5**. Figure 1 shows the proposed management structure and Figure 2 gives the proposed links between the Centre and existing committees and groups.

Plan 5 requires an increase from today's resource of 5.1 FTE to a total of 15.9 FTE. Without the Centre these figures would be 9.1 FTE and 20.9 FTE respectively. The Centre will have an annual operating cost of £393K. This is a saving of £281K on doing the same tasks without a Centre.

6.3) Timetable and Projected Costs

The existing facility in Anglian Region is in a position to develop immediately. Key staff are in place and new appointments could be advertised forthwith. A plan is shown in Figure 3.

Costs for the remainder of 1993/4 would be absorbed by Anglian Region. From 1994/5 the £105K per annum provided by National Head Office would be increased by £218K per annum to a total of £323K. In addition a one-off payment of £240K is required for 1994/5.

Savings of £100k per annum would be found because four Regions would no longer require to use FARMSTAT. This would reduce the net additional cost to £118K per annum.

The cost of Research and Development is £250K per annum over the next 4 years. This would be met from the National R&D Budget.

7) RECOMMENDATIONS

- ▣ Adopt Plan 5 and establish a National Centre in Anglian Region;
- ▣ Implement immediately in accordance with the plan (Figure 3);
- ▣ Allocate a budget for the Centre of £323K per annum from 1994/5 and provide for a one-off expenditure of £240K in 1994/5;

(New procedures may be introduced in 1994/5 in which the costs of accommodation and Support Services are charged to Functions. If this happens the salary element in the above costs will need to be increased by 25%. This would add £82K to the £323K per annum).

- ▣ Add to the approved structures for Anglian Region the 14 posts shown in Figure 1 but include these posts within the limit on manpower for National Head Office;
- ▣ Establish a Project Board to manage the work of the Centre and a Pesticide Group to complement the groups for the North Sea and Toxic Algae; and,
- ▣ Hold a review in 1995 of the first year of operation.

Appendix 1: Determinands for Annex 1A and the Paris Commission

Metals	PCP
Mercury	Pentachlorophenol (PCP)
Cadmium	Organophosphorus Pesticides
Copper	Dichlorvos
Zinc	Fenitrothion
Lead	Fenthion
Organotins	Malathion
Chromium	Parathion
Nickel	Parathion-methyl
Arsenic	Azinphos-ethyl
Nutrients	Azinphos-methyl
Ammonia	Triazine Pesticides
Nitrate	Atrazine
Orthophosphate	Simazine
PCBs	Volatiles and other Organics
PCB 28	Trichloroethylene (TRI)
PCB 52	Tetrachloroethylene (PER)
PCB 101	Carbon tetrachloride (CTC /CCL4)
PCB 118	Chloroform
PCB 138	1,2, Dichloroethane (DCE/EDC)
PCB 153	Trichloroethane (TCE)
PCB 180	Trichlorobenzene (TCB)
Organochlorine Pesticides	Hexachlorobenzene (HCB)
HCH	Hexachlorobutadiene (HCBD)
G-HCH	Miscellaneous
DDT	SPM
DDT(pp)	Salinity
Aldrin	
Dieldrin	
Endrin	
Trifluralin	
Endosulfan	

**APPENDIX 2: Recommendations from the 16th Report of the Royal
Commission on Environmental Pollution**

Pesticides

- 1) Recommend further research be carried out in the United Kingdom to assess to what extent the long-range transport of Pesticides present an environmental hazard.
- 2) Recommend that regulatory authorities and the water undertakers should extend and improve their monitoring programmes for Pesticides in surface and groundwaters and should periodically analyse and publish the results.
- 3) Recommend that Local Authorities seek to reduce their application and to use less environmentally harmful formulations.
- 4) Recommend that periodic surveys of the non-agricultural uses of Pesticides should be commissioned by the Government and the results published.
- 5) Recommend that research on ecotoxicology and the mechanisms governing the distribution and fate of Pesticides in the environment should continue.
- 6) Recommend that manufacturers of Pesticides progressively improve their recovery and treatment processes until no effluent leaves their works without having been rendered effectively inert.
- 7) Recommend that MAFF's guidance on the disposal of Pesticides by farmers be further revised.
- 8) Recommend that the Government seek ways of encouraging the use of systems for treating Pesticide waste on farms.
- 9) Recommend that the merits of establishing a similar scheme for non-agricultural Pesticides and animal health products containing Pesticides should be evaluated.
- 10) Recommend that those non-agricultural employees who apply Pesticides (or supervise their application) should be required to hold a certificate of competence.
- 11) Recommend that a national strategy (including a timetable) for reducing Pesticide use should form part of the UK's water quality plan. Targets should be related to individual Pesticides taking particular account of their toxicity and persistence in the environment as well as of the results of research aimed at reducing Pesticide usage.
- 12) Recommend that the national strategy should encourage further Research and Development on Pesticides which are specific in their effect, and which degrade rapidly in the environment which they are not intended to control.

Eutrophication

- 1) Recommend that the NRA's consultation paper on Statutory Quality Objectives should be implemented.
- 2) Recommend that in implementing these proposals, the NRA should ensure that the objectives are defined in ways which enable the ecological impact of nutrient enrichment to receive attention.
- 3) Recommend that the trophic state before significant enrichment should form the long term target for flowing and standing waters.
- 4) In cases where it will not be practical to achieve this target in the foreseeable future, or where such a baseline state cannot be identified, recommend that quality objectives are set to secure conditions achieving an acceptable level of both species diversity and amenity.
- 5) Recommend that the Government should take these views into account in considering the criteria to adopt for designing sensitive areas under the EC's urban waste water treatment directive.
- 6) Recommend that the Government work with the water industry and regulatory bodies to ensure that promising methods for phosphate removal are developed.
- 7) Recommend that caution should be exercised in replacing phosphate in detergents until the environmental effects have been fully evaluated and found to be acceptable.
- 8) Recommend that the Government consider with detergent and washing machine manufacturers whether it could be made easier for consumers to take advantage of the fact that less detergent is required for washing in soft water than in hard to reduce their use of phosphate.
- 9) Endorse the conclusion of the House of Lords Select Committee that "integrated strategies....be established on a site by site basis."

Figure 1

TAPS MANAGEMENT STRUCTURE

% = % of Existing FTE

V = Vacant

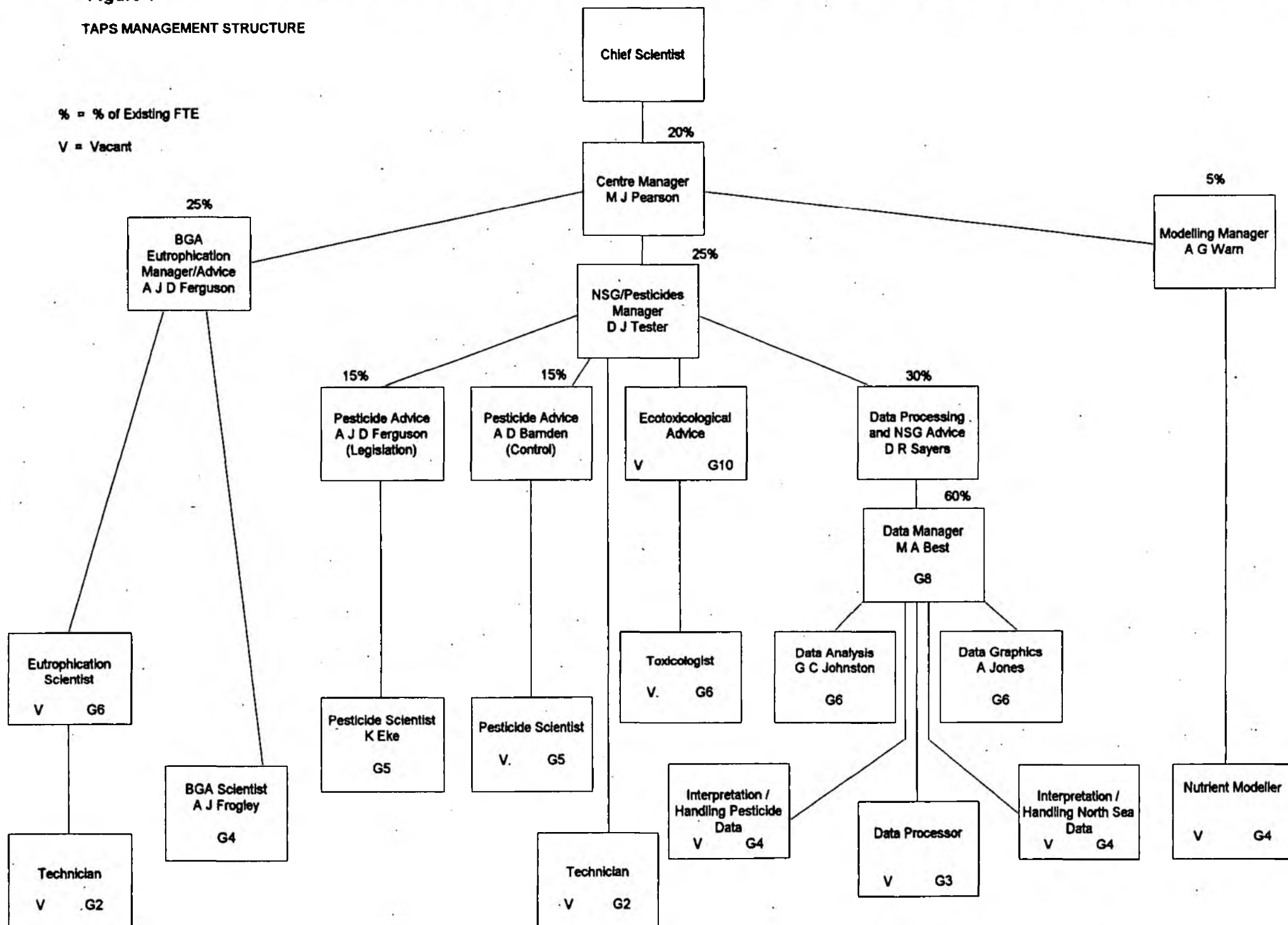


Figure 2

PROJECT STRUCTURE

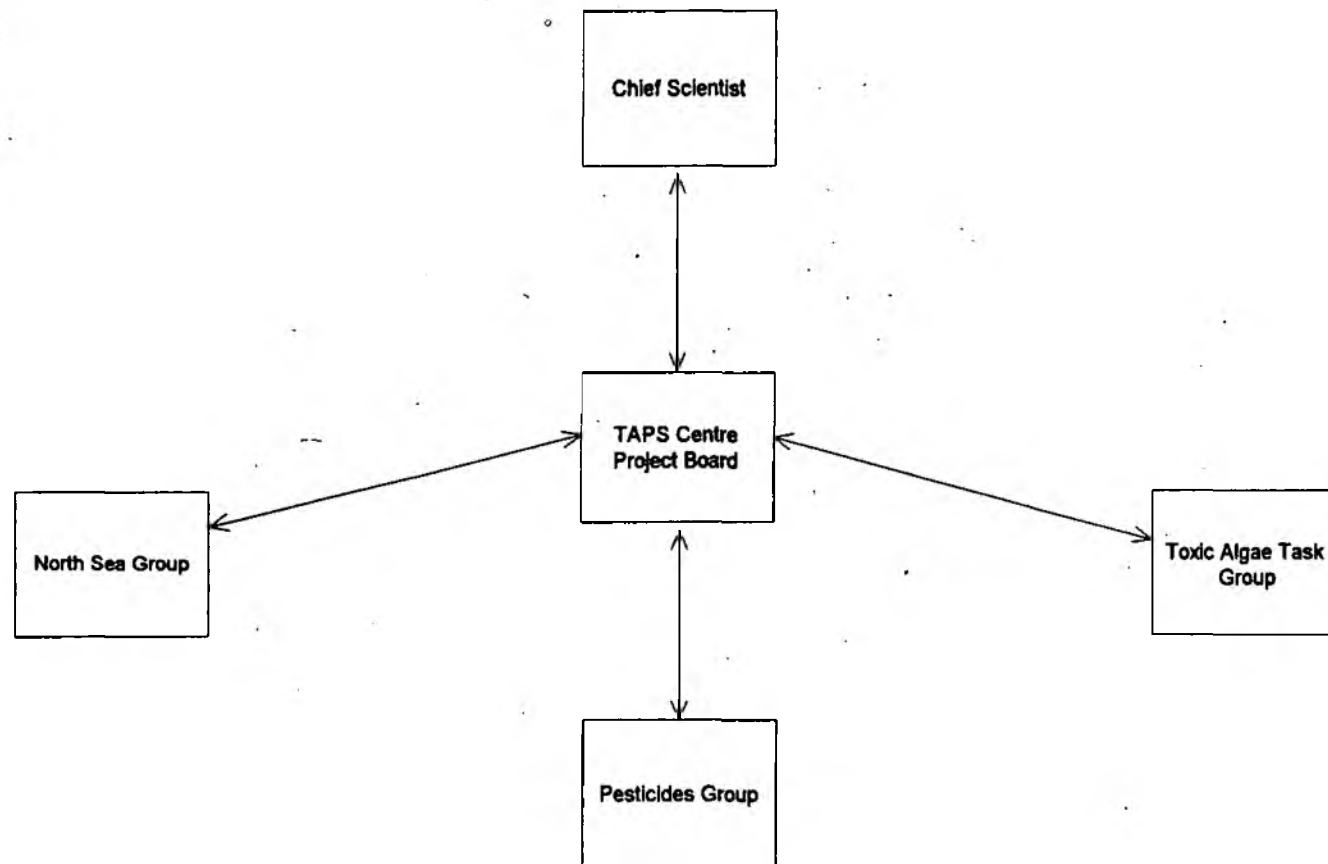


Figure 3
TAPS Centre - Option 5 - Implementation Plan

