NRA-Water Quality Series 25

WATER POLLUTION INCIDENTS IN ENGLAND & WALES - 1994

NRA

National Rivers Authority

WATER QUALITY SERIES No. 25

WATER POLLUTION INCIDENTS IN ENGLAND AND WALES - 1994

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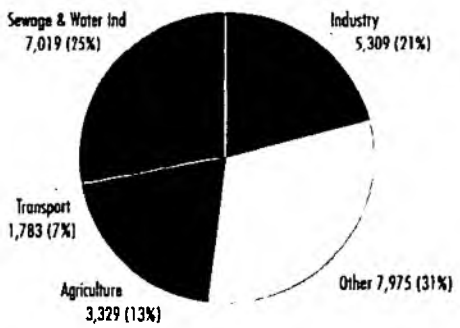
EXECUTIVE SUMMARY

During 1994, 35,291 pollution incidents were reported to the NRA. 25,415 of these were later substantiated. These figures reflect a small increase in the number of incidents, while the most environmentally damaging Category 1 (Major) incidents fell from 331 to 229, a decrease of 31%.

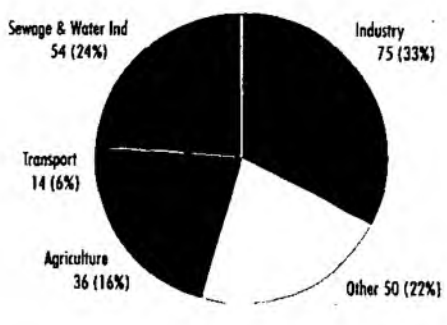
There are several likely reasons for these latest changes. The increase in reporting levels is due to the introduction of the NRA's pollution hotline, which has increased public awareness of pollution incidents and made it easier to report them. The reduction in Major incidents provides strong evidence that the NRA's pollution prevention measures and messages are taking effect. The most dramatic falls in Major incidents were seen in the agricultural (43% fall) and industrial sectors (32% fall), both of which have been directly targeted by NRA pollution prevention initiatives in recent years.

Pollution incidents have been categorised by both source of pollution and type of pollutant. By source, the sewage and water industry accounted for the greatest proportion (28%) of incidents, followed by industrial (21%) agricultural (13%) and transport (7%) incidents. The remaining 31% were from a variety of other sources including premises such as domestic properties, restaurants, hotels and schools. Of the incidents from the sewage and water industry, the privatised Water Company surface water outfalls and combined sewer overflows accounted for the greatest number of incidents. The construction industry, landfill and waste disposal operations were the greatest sources of industrial incidents, whilst dairy farming activities were the biggest source of agricultural pollution.

Distribution of substantiated pollution incidents by source, 1994



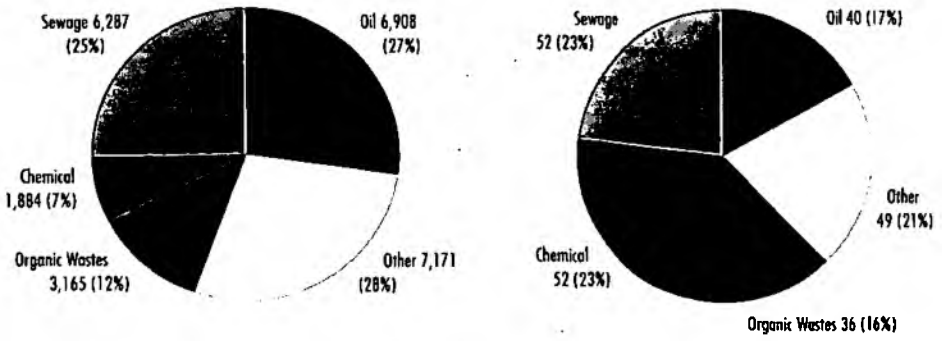
(a) Number of incidents; total 25,415



(b) Category 1 incidents only; total 229

By type of pollutant, oil (27%) accounted for the largest number of incidents. Sewage accounted for 25%, organic waste 12.5% and chemicals for 7.5%. Inert suspended solids were the most common pollutant of the remaining 28% that could not be classified into the above categories. Diesel was the most common oil identified, whilst cattle slurry was the predominant organic waste. Paints and dyes (principally for dye tracing) were the main chemical pollutants.

Distribution of substantiated pollution incidents by type of pollutant, 1994



(a) Number of incidents; total: 25,415

(b) Category 1 incidents only; total: 229

Prosecutions were brought for 237 incidents and 222 were successfully convicted. At 1st April 1995, there were 151 outstanding cases to be brought before the courts. The highest fine awarded against a polluter was £30,000 for an oil pollution incident in Welsh Region.

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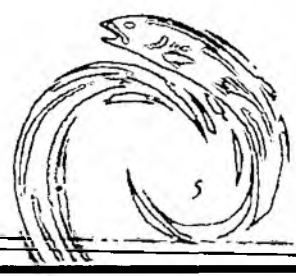

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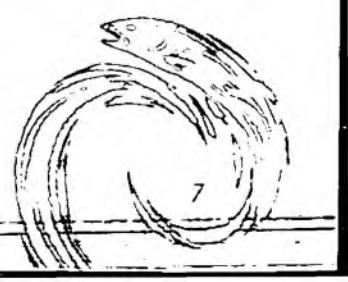


1 INTRODUCTION

1.1 BACKGROUND

This report is the fifth annual analysis of pollution incident statistics for England and Wales issued by the National Rivers Authority. It details the substantiated incidents that occurred in the calendar year 1994, according to both **source** of pollution and **type** of pollutant.

1.2 DEFINITIONS

The NRA uses a common pollution incident classification system throughout its eight Regions. This defines three categories of pollution incident based on actual or potential environmental impact:
Category 1 (major),
Category 2 (significant),
Category 3 (minor).
Appendix A details the criteria upon which these categories are based. In addition, the criteria formerly jointly agreed by the Water Authorities and the Ministry of Agriculture, Fisheries and Food (MAFF) to define a serious incident with respect to agricultural pollution are included for comparative purposes.

Pollution is categorised into five basic sources: agriculture, industry, sewage and water related, transport and other sources. In addition, the nature of the pollutant has been categorised into five basic types: oil, sewage, chemical, organic wastes and other. Both source and type categories have been broken down further to provide a more detailed picture of the nature of pollution incidents in England and Wales.

Whilst records are kept of all reported incidents, only substantiated pollution incidents are examined in detail. In all cases, our staff investigate and take the appropriate steps to substantiate incidents which are reported to us.

1.3 CURRENT AND FUTURE DEVELOPMENTS

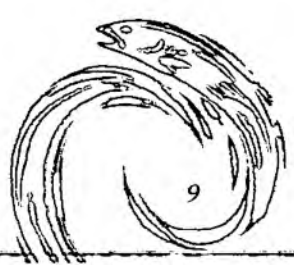
It is important that the NRA deals consistently with pollution incidents and on the 1st January 1995 a revised classification scheme was introduced. The scheme has a four tier categorisation system and tightens up on the definitions for each category, reducing the scope for subjectivity. Levels of service are defined for dealing with pollution incidents and are related to the actual or potential environmental impact of the incident.

1994 was the first full year of operation of the NRA's national freephone number which aims to simplify contacting the NRA in an emergency. The freephone number, 0800 80 70 60, can be used for the reporting of all environmental incidents, including pollution, poaching, flooding or any sign of damage or danger to the water environment. The line is manned 24 hours a day at the eight regional control rooms and received some 30,000 calls in 1994.

Review of pollution incident response as a result of an incident on the River Severn

A major incident on the River Severn in April 1994 has resulted in the NRA reviewing the response to pollution incidents and its relationship with the water service companies. At about 8am on Friday 15th April, Severn Trent Water received complaints from consumers in the Worcester area served by its Barbourne water treatment works. The works, which abstracts water from the River Severn, was closed down and more than 100,000 people in the area warned not to drink the tap water. Abstractions at other treatment plants downstream were also interrupted.

Investigation by NRA pollution control staff traced the contamination, (using a slight smell as the only indicator), up river from Worcestershire, into Shropshire,



and along two tributaries, the River Tern and then the River Roden. Just after midnight on Friday the discharge from Severn Trent's sewage work at Wem (125 km upstream of Worcester) was found to be the point where the pollutants were entering the river. Further investigation traced the source to the Wem Industrial Estate and a company reprocessing chemicals. This company dewaters waste solvents received from chemical manufacturers and sells the reclaimed solvent to other chemical companies.

The analytical results of waste held by the company showed the presence of xylene, ethyl benzene, trimethyl benzenes and a compound identified as 2- ethyl, 4- methyl 1,3 dioxolane. This latter compound which was found in the Worcester drinking water was also found in the sewer leading from the premises, in the discharge from the sewage works and in the river at various points between Wem and Worcester.

The incident has important implications, not only with regard to the exploitation of the River Severn as a water supply river but also for the NRA and water companies. Revised monitoring procedures have been adopted by Severn Trent Water and emergency communication procedures between the company and the NRA have been improved. All NRA regions have looked closely at their own emergency procedures following the incident and are refining them where necessary

2 POLLUTION INCIDENT MANAGEMENT

The aim of this section of the report is to illustrate by examples the type of pollution incident that our staff are called upon to investigate and the actions they take to both minimise the impact and to investigate the cause. On average, our locally based pollution officers responded to over 95 reports of pollution every day in 1994. These incidents often required patient and time consuming investigations, particularly when the pollution was intermittent. In addition to trying to trace the source they must also take action to contain the pollution, counter its effect and notify river users. By learning from what has happened in such incidents we can be better prepared for those which may occur in the future.

2.1 MAJOR INCIDENTS

There were 229 major incidents in England and Wales in 1994. In each case NRA pollution control staff responded to a reported pollution, took the necessary steps to reduce or eliminate the effect of the pollution and investigated the cause. Many of these incidents will result in some form of legal action being taken where pollution has occurred. A selection of photographs illustrating some of these incidents are shown on pages 13 to 16.

2.1.1 Agricultural incidents

Pesticide contamination of the Eastern Yar River, Isle of Wight

During the latter part of March 1994 the local water company reported the closure of a drinking water intake as a result of unacceptable levels of pesticides Isoproturon and Chlorotoluron in the River Eastern Yar, Isle of Wight. Pollution of the Eastern Yar in March/April 1994 was caused by spraying of these chemicals on land at the top end of sub-catchments. The level of pollution exceeded the EC drinking water limits for pesticides by approximately 50-100 times during the period. A particularly high level of 10,000 times the EC limit was reported by the water company on the 8th of April 1994.

Application of the pesticides by the farmers was within MAFF's and manufacturers' guidelines with no evidence of improper use. Nevertheless, one of the major processes for pesticide transport on land is known to be via soil erosion and in this case the cause of pollution was probably due to the spraying of pesticide in a period of wet weather when the soil was already saturated. Research indicated that less than 1% of the pesticide applied was sufficient to cause closure of the drinking water intake.

In the light of the above it is clear that in all the very substantial advice which is offered to farmers upon their use of pesticides, far greater emphasis is needed upon the risks to environmental waters posed by application in wet weather conditions coupled with the potential of the soil for erosion.

No legal action will be taken against farmers as a result of this incident but the NRA will work with MAFF, NFU and manufacturers to provide improved advice on the avoidance of pesticide application in wet weather conditions. The NRA will pursue with MAFF the possibility for the use of buffer zones in the Eastern Yar catchment. The NRA will be holding joint meetings with farmers and the local water company to discuss the best means of preventing the recurrence of this pollution.

Farm waste spillage near Buxton, Derbyshire

A message was received from Derbyshire police regarding a "flood of farm waste" which was discharging onto the main A6 trunk road near Buxton.

An above ground prefabricated storage tank had lost its contents of 40,000 gallons of slurry through a

faulty valve. The farm is elevated above the valley of the River Wye and the slurry had flowed down the hillside, over the farm access road and was pouring onto the highway. The access road actually crossed the river. Prompt action was taken by NRA staff to seal the road drains in order to prevent the slurry draining into the Wye, which is a major tributary of the River Derwent, an important water supply river. The road remained closed for a day whilst the clean-up operation was carried out. (See plate 1) As a result of the actions taken to control the incident, pollution of the river was averted.

Slurry spreading, Burlescombe, Devon

A number of complaints from the public resulted in a NRA officer tracing pollution to slurry spreading activities on the 15th November. Use of land rented for the growing of maize for slurry disposal resulted in gross pollution of a nearby watercourse. Although the land was sandy, it had become heavily compacted as the result of the use of heavy harvesting machinery and was close to saturation following a prolonged period of heavy rain. As a result slurry was running across the surface of the fields (see plate 2) and into a small stream. This emphasises the care required to ensure that slurry spreading is only undertaken when and where the conditions are appropriate. It also reinforces the need for farm waste management plans to ensure that pollution does not occur.

Potato washings pollution averted, Little Snoring, Norfolk

A potentially serious pollution incident was averted in November at a potato storage area at a disused airfield in Little Snoring. Several thousand tonnes of potatoes stored in a hanger had started to rot, so the company washed them to salvage the sound ones. The wash water from this activity is extremely polluting, 10 to 100 times more so than untreated sewage, and was forming a pond from where it was gaining access to the airfield drainage system. Fortunately, the gulley into which this liquor was draining was partially blocked so only a small volume was escaping to the river. At the NRA's request the manager of the company ceased the activity and removed the polluting liquid for safe off-site disposal.

2.1.2 Industrial incidents

Chromic acid pollution of Albert Edward Dock, North Shields

On 23rd March 1994 the NRA were informed of a spillage of 7,000 litres of Chromic Acid solution at the premises of Diesel Marine International UK Ltd on the West Chirton Industrial Estate, North Shields.

Investigations showed that the spillage occurred when the acid solution was being transferred from an outside holding tank to an ion-exchange unit within the factory. At some point, (it is not clear how), the tap on the holding tank fractured, allowing the contents to be discharged onto the yard area. (See plate 3) The solution entered a nearby surface water gully which eventually discharges via a Public Surface Water Sewer into the Albert Edward Dock.

The impact of the discharge on the water in the dock was immediately visible as a marked orange coloration which spread quickly. There was also a localised drop in the pH levels. The long term impact is difficult to assess at this stage. The chromium and other metals present will have settled into the sediment on the bed of the dock. There are future proposals to dredge and fill part of the dock. It is not yet clear if the chromium levels in the sludge will be so high as to make future disposal more difficult. Diesel Marine UK Ltd was subsequently convicted and fined £5,000.

PLATE 1
Farm waste spillage
near Buxton

PLATE 2
Slurry spreading,
Burlescombe, Devon

PLATE 3
Chromic acid pollution of Albert Edward Dock, North Shields

PLATE 4
Red diesel from oil distribution company, near Broadclyst, Devon

PLATE 5
Asbestos bags,
Ottery St Mary, Devon

PLATE 6
Fly tipping in a
Cardiff Rhine, Wales

PLATE 7
Aeration of water as a result of low dissolved oxygen concentrations causing distress to fish, Anglian Region

PLATE 8
Major fish kill as a result of a swimming pool discharge on a tributary of the River Bourne, Essex

Oil Pollution of the River Medway, Kent

Oil was noticed discharging from a surface water pipe into the River Medway at Maidstone on 27th April 1994. Investigation revealed that the discharge was an emulsified oil product so the downstream drinking water abstraction point was closed down and an industrial downstream abstractor was informed of the event. The source of the oil was traced to a Bus Company depot where the parking area had been cleaned with a degreaser. The chemical had entered the surface water system and had contaminated. and blocked the oil interceptor. The drains were jetted that morning. Formal samples were taken and served on the local water company (responsible for the surface water system), downstream samples were taken and NRA biologists carried out a local survey. The local water company agreed to flush the system and tanker out the contents of the surface water system.

The bus company had believed the yard drains to be connected to the foul sewer and have since made changes to the drainage system to prevent any repetition. The case came to court on the 13th March 1995, when they pleaded guilty and were fined £5,000.

Diesel pollution at Bere, Devon

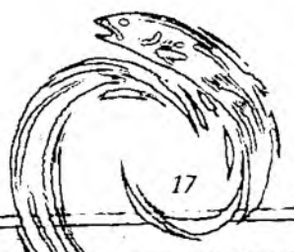
On Monday 31 October Watson Petroleum, an oil distribution company with a small distribution depot adjacent to the M5 motorway reported the loss of 4000 litres of red diesel from a tank at their site at Bere, near Broadclyst. A tanker driver preparing for the day's deliveries noticed a strong diesel smell and discovered the oil siphoning from one of the tanks. The prompt notification by the company enabled NRA staff to deploy booms (see plate 4) to prevent the oil entering the nearby River Culm. Most of the oil was retained in a motorway drainage ditch and subsequently recovered. In order to speed up the oil removal, specialist contractors were called in by the company to remove contaminated soil from the site. Investigation of the circumstances revealed that a break-in had occured at the site. Not only had money and property been stolen, but the filter cap from which the oil escaped had been removed using considerable force. In this case the prompt action of the company in notifying the NRA allowed our staff to take steps to contain the spill and minimise its impact. The company itself took all the necessary actions to clean up the spillage.

Contamination of boreholes at Sittingbourne, Kent

On the 1st September 1994 oily streaks were noticed in a supply pipe from boreholes supplying a paper mill factory and the domestic needs of the mill workers' homes. Examination of the substance revealed it to be tar-like. A survey of the boreholes revealed the presence of a tarry plume in the groundwater which was moving through the base flow as water was abstracted. Detailed analysis showed the presence of persistent pesticides, in particular DDT. Further investigations indicated the most probable source to be a contaminated land site which had been used for pesticide manufacture before the Second World War. The movement of the contaminants is believed to be related to unusually heavy rainfall. The level of oil and tar dropped within four weeks. However, DDT is still being detected and additional treatment has been installed for the potable supply to remove it. The mill is continuing to monitor the abstracted water and in the long term it is hoped that redevelopment of the contaminated site will be linked to remedial action to reduce the risk of further pollution.

Fire at warehouse, Harlow, Essex

Essex Fire Service notified the NRA at 6.45pm on the 23rd February 1994 of a serious fire at a warehouse



in Harlow involving as many as 15 fire engines. It was believed that the site was used for the storage of plastic granules and film, but there was some concern that chemicals might also be stored on site.
The local NRA pollution officer instigated investigations to discover how the site was drained and the Council staff attending confirmed that, although the drainage did pass to the River Stort, it passed through a flushing tank with the facility to divert the flow to the foul sewer. Contact was made with the water utility's trade effluent staff who agreed that flow from the site could be diverted to the foul sewer. The fire continued to burn the next day and the diversion of the highly polluting run-off to the foul sewer remained operational for two days. As a consequence there was no pollution of the river, although NRA staff expended considerable time in managing and monitoring the incident.

2.1.3 Transport incidents

Air crash

Prompt action by NRA staff following a Midlands air tragedy averted a major pollution incident. Following the crash of a Viscount aircraft at Stowe-by-Chartley, between Stafford and Uttoxeter, a NRA pollution control officer arrived at the scene at 11.45pm. The crash occurred only 3km upstream of a major potable water supply reservoir serving parts of the Black Country. The officer called upon the resources of the NRA's in house emergency workforce who worked through the night to install an oil boom to prevent the oil entering the nearby Stoney Brook. Due to the boggy nature of the area the boom had to be left in place for several months as the oil seeped through the ground, but no significant river pollution occurred.

Chemical lorry fire

In the early hours of the 30th March 1994 a lorry carrying 3,600 kg of an Azo dye, 10,000 kg of a water based vinyl emulsion and 2,000 kg of a non-hazardous fluorescent orange pigment caught fire on the M25 at South Mimms. The Fire Brigade extinguished the fire with water and a cocktail of chemicals, including combustion products, flowed into the Mimmshall Brook immediately beneath the lorry. About 2 km of the brook was discoloured off-white and a large number of distressed sticklebacks were evident. The brook flows into swallow holes in an area where groundwater is used for drinking water supply. In order to avoid pollution of the groundwater and the closing down of boreholes, NRA staff negotiated an agreement with Thames Water Utilities Ltd (TWUL) for the diversion of the flow in the brook to the foul sewer. A dam was constructed and the contaminated flow pumped to the foul sewer. The abstraction boreholes were shut down for a limited period as a precaution, but the prompt action of NRA and TWUL staff averted any major problem.

2.1.4 Other incidents

Asbestos bags, Ottery St Mary, Devon

On the 5th February a member of the public rang the NRA to express concern at having seen red plastic bags, with the words "Asbestos" emblazoned on them, floating on the River Otter (see plate 5). The investigating pollution officer found that the bags were being used by a contractor removing asbestos from a building adjacent to the river. Fortunately the bags on the river were empty, having been blown from the site. As a precaution the local Waste Regulation Officer was notified to ensure all regulations

regarding the handling of asbestos were being observed. Litter is offensive and is a common cause of complaint (see plate 6). The NRA has highlighted this problem in guidance on pollution prevention at industrial sites and in a number of local initiatives.

Distressed fish due to naturally occurring low levels of dissolved oxygen

At the end of June reports were received of dead and distressed fish in several rivers in Anglian Region. The problem was due to naturally occurring low dissolved oxygen levels, and aeration equipment had to be brought into action. On the River Colne at Halstead, the Fire Brigade also helped out in aerating the water (see plate 7).

Swimming pool drain down at Colchester

On the 22nd December 1994 nearly 5,000 fish were killed in a stream feeding Bourne Pond, Colchester, see plate 8. It was traced to an MOD military barracks where a swimming pool had been drained down and the contents disposed of to the surface water sewer.

3 POLLUTION PREVENTION

3.1 PARTNERSHIPS FOR THE ENVIRONMENT

1994 saw a number of major pollution prevention initiatives which involved the NRA working with industrial and commercial companies and trade associations. The most significant of these was the Oil Care Campaign, which was launched in January 1995. Work on this campaign started early in 1994 in an effort to reduce oil pollution, which accounted for 25% of all incidents in 1993.

Following an initial meeting in May 1994 with the United Kingdom Oil Industry Association (UKPIA), who represent the major oil refining and marketing companies in the UK, meetings were held with almost all of the member companies. These discussions helped to shape the approach to be adopted in the campaign, which is based on co-operation between the oil supply industry and the NRA. The first result was an agreement by Gulf Oil to distribute NRA information on oil storage and dealing with oil spillages directly to its own commercial and industrial customers and to its network of distributors. Other oil companies have since agreed to support the campaign in a number of different ways.

The Oil Care Campaign was launched in January 1995 and aims to educate the end users of oil – industry and the general public. An Oil Care Code has been drawn up to give simple advice on the delivery, storage, handling and disposal of oil. A database listing waste oil banks available to the general public has been set up, together with a freephone service, the Oil Bank Line on 0800 663366, which members of the public can ring to find the location of their nearest oil bank. The campaign is being publicised by ourselves, the oil industry and other oil distributors such as supermarkets and motor part shops. Local authority recycling officers have been involved both in providing details of local oil recycling facilities and in distributing campaign literature. The first two months of the campaign have resulted in considerable media interest and more than 1000 calls to the Oil Bank Line.

A further example of a joint initiative came about in an effort to highlight the pollution risks at major retail sites. A Pollution Prevention Guidance Note dealing with such sites was drawn up and sent directly to all the major retail companies in England and Wales. One company, J Sainsbury plc. not only provided valuable comments based on their design and practical experience, but have now amended their new store specification, surveyed their existing stores and started a programme of upgrading. An additional benefit from the contact between the NRA and Sainsbury's has been the company's involvement in the Oil Care Campaign, which they have promoted both through the distribution of leaflets and by the siting of an oil bank on a trial basis at one of their own stores.

3.2 OTHER INITIATIVES

3.2.1 Agricultural Pollution Prevention – National Audit Office Report (published 1995)

The work of the NRA in dealing with agricultural pollution came under scrutiny in 1994 when the National Audit Office undertook a survey of River Pollution from Farms in England. The report noted the significant reduction in the number of farm pollution incidents between 1985 and 1993 and commented that the "Authority had generally performed well in responding to farm pollution incidents". With regard to pollution prevention the NAO found evidence that targeted campaigns had been "beneficial in identifying polluting farms, and encouraging farmers to minimise risk."

A national farm visit inspection programme is being developed and will help to target limited resources as effectively as possible. The report concludes from the NRA work examined that "preventative work on farms has contributed to the overall improvement in water quality recorded between 1990 and 1993." Although this is a welcome recognition of the value of pollution prevention, the Authority recognises the need to sustain this work in a systematic, economic and effective way.

3.2.2 Sewage Pollution

Sewage pollution accounts for 25% of all incidents. Throughout the first half of 1994, the NRA was heavily committed to negotiations with the water service PLC's (WSPLC's) and the office of Water Services (OFWAT) on the future spending plans of the WSPLC's. These plans include a significant programme of investment to improve the quality of discharges from sewage treatment works and the sewerage network. The main impetus for this investment is to meet the requirements of the European Urban Waste Water Treatment Directive. Other expenditure has been allowed under the national environmental programme.

3.2.3 'Pollution Prevention Pays' Video

Early in 1994 work was started on the production of a short video on pollution prevention, aimed at small to medium sized companies. This video, and the accompanying leaflet and poster, were launched in September and publicised through press releases, a direct mailing campaign and by NRA pollution control staff. Over 6,000 copies of the video have been distributed and are being used in a wide range of companies for everything from staff training to briefings for management. Feedback from users has been very positive and demand for the video remains high.

3.2.4 Publications

Two new additions to the NRA's series of pollution prevention guidance notes have been produced. These are *Dairies and other milk handling operations* (PPG17) and *The Control of Spillages and Fire Fighting Run-off* (PPG18). Three new leaflets promoting the Oil Care Campaign have been produced, *Oil Care at Home, Oil Care at Work* and the *Oil Care Code*. All of these are freely available from the NRA. A full list of pollution prevention guidance notes is given in Appendix C.

3.2.5 River Dee Water Protection Zone Application

The River Dee in North East Wales supplies more than 2 million people with water, mostly in Liverpool, the Wirral, Chester, Wrexham and North Wales. For much of the year some 70% of the total flow of the river is abstracted. The river has also suffered from pollution incidents which cause the intakes to be closed. Despite a very sophisticated and intensive monitoring regime and the efforts of Pollution Control staff, the lack of any means to insist on improvements to the way that

industry handles its raw materials means that pollution incidents continue to occur at an unacceptable frequency.

Welsh Region has taken advantage of the provisions of S.93 of the Water Resources Act 1991 to seek a Water Protection Zone for the whole of the freshwater Dee catchment. Within this zone, industry would require the consent of the NRA to store and use a wide range of materials. Consent would only be granted if the type of material and the quantity stored taken, together with the way it was stored or used, did not give rise to an unacceptable risk. The risk assessment would normally be undertaken using a computer model known as PRAIRIE, developed jointly between the NRA, HSE and DoE with significant funding from the NRA R&D budget.

A public inquiry was held in Wrexham in March 1995 at which the NRA put its case and the decision of the Secretaries of State is now awaited. The granting of protection zone status should enable the NRA to make a real reduction in the number of pollution incidents in the strategically vital catchment.

The vulnerability of the river was again highlighted in October 1994 following a fire at a plastics factory in Wrexham, Clwyd. This gave rise to concentrations of up to 40μgl^{-1} of phenol in the River Dee, at which level severe taste and odour problems would have occurred in potable supplies and it was therefore necessary to close down water intakes for some hours. The factory neither stored nor used phenols and had no fire water containment facilities. It is assumed that phenols were generated in the combustion of the plastics and other materials on the site. It is estimated that as little as 18kg of phenol may have given rise to the concentrations experienced in the river.

3.3 THE FUTURE

Pollution prevention is a theme which all of the partners in the proposed Environment Agency share. The effectiveness of pollution prevention is difficult to quantify precisely but the benefits are potentially very significant. The results of the National Audit Office study indicate that pollution prevention does have a positive impact on the most important indicator of environmental well being: water quality. The NRA is committed to co-operating with industry, agriculture, other regulators and the public in its efforts to prevent and control the pollution of our rivers, estuaries, coastal waters and ground waters, and will carry this positive approach forward into the new Environment Agency. The concepts of sustainable development, recycling and re-use of materials, waste minimisation and clean technology must be grasped by both industry and regulators if the potential for economic growth and environmental improvement is to be fully realised.

The NRA also realises that perceptions must change if water quality is not to deteriorate as a result of long term social and economic pressures. It can regulate to protect water quality, but often there are issues that do not lend themselves to regulation and enforcement. In such cases the NRA attempts to provide information and advice to those interested in preventing pollution, and has a strong commitment to communicating these issues to schools and colleges. The key to improving and sustaining good water quality in the future must ultimately be through education.

4 ANALYSIS OF INCIDENTS

4.1 ALL REPORTED INCIDENTS

During the calendar year of 1994, a total of 35,291 pollution incidents were reported to the NRA, an increase of 3% on 1993. In all cases, efforts are made to substantiate reports received from the public, to filter out multiple reports of the same incident, and to identify the cause and nature of the incident. In 1994, 25,415 incidents (72% of those reported) were substantiated as having occurred. Of these, only 229 incidents were classified as Category 1.

To maintain continuity with previous reports, both reported and substantiated incidents for 1990-1994 are illustrated in figures 1 and 2; the former illustrates the trend since 1985 for England and Wales and the latter the trend since 1985 by NRA Region. The remainder of the report analyses only those incidents that were substantiated.

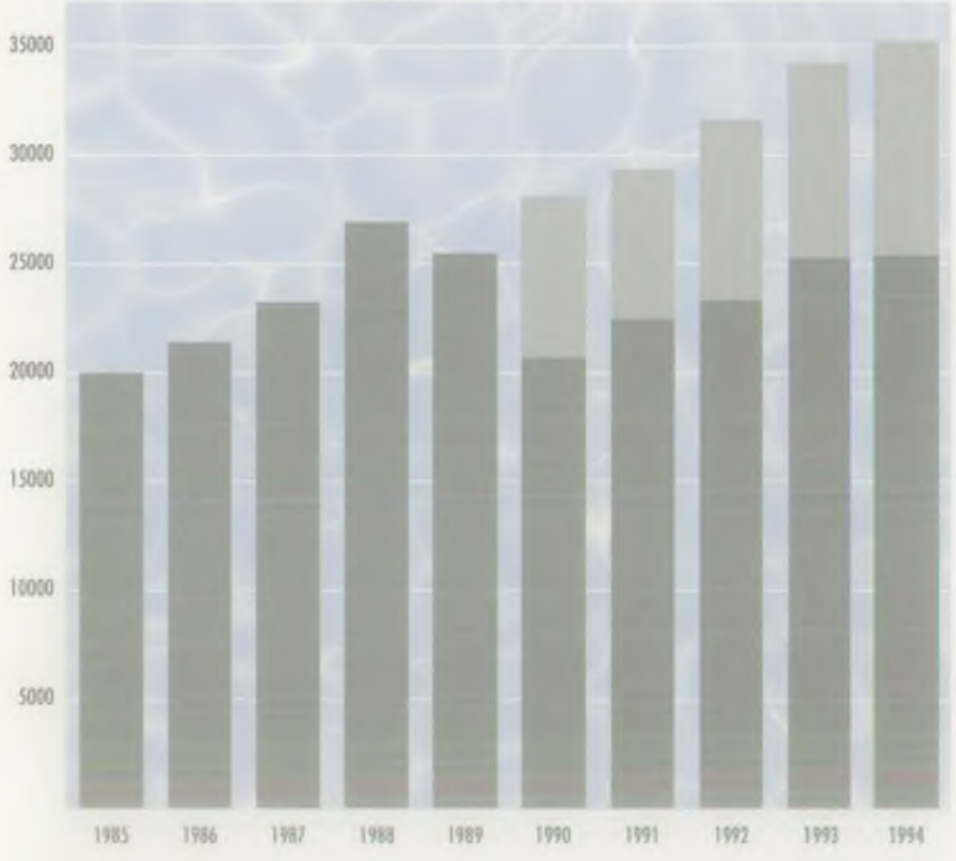


FIGURE 1
Total number of pollution incidents in England and Wales, 1985-1994

FIGURE 2
Total number of pollution incidents by NRA Region, 1985-1994

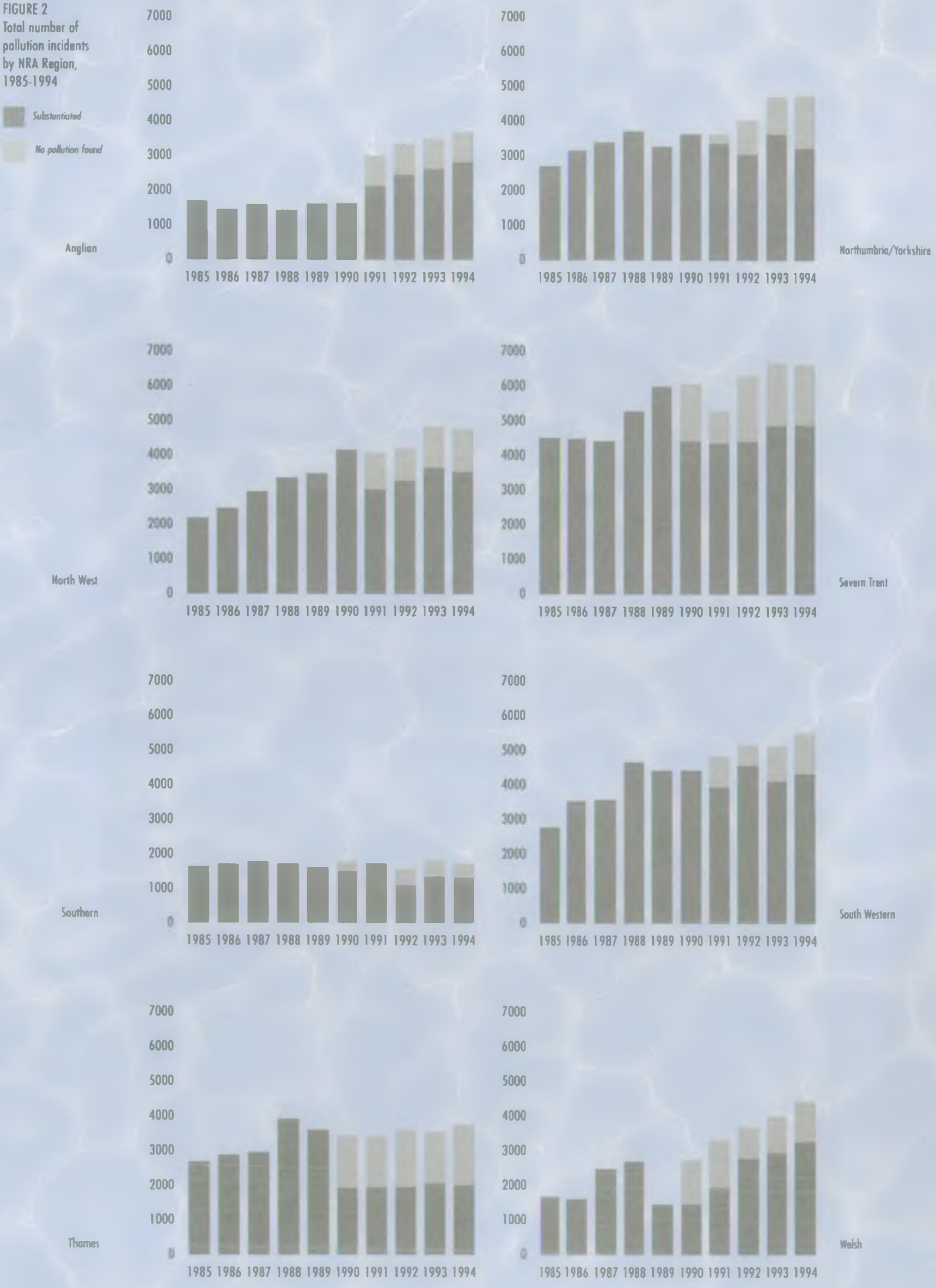
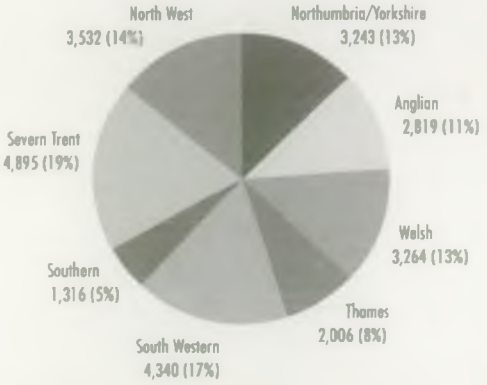


TABLE 1
Total number of reported pollution incidents in 1994 by incident category

NRA Region	Substantiated			Total substantiated	Unsubstantiated
	Category 1	Category 2	Category 3		
Anglian	12	603	2,204	2,819	874
Northumbria & Yorkshire	38	485	2,720	3,243	1,518
North West	45	1,048	2,439	3,532	1,244
Severn-Trent	63	2,084	2,748	4,895	1,738
Southern	5	91	1,220	1,316	403
South Western	37	546	3,757	4,340	1,168
Thames	5	161	1,840	2,006	1,757
Welsh	24	1,549	1,691	3,264	1,174
TOTAL	229	6,567	18,619	25,415	9,876

FIGURE 3
Total number of substantiated pollution incidents by NRA Region, 1994
Total: 25,415



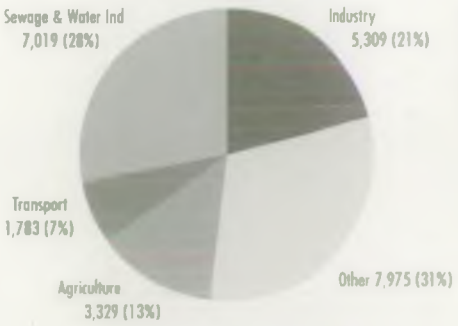
4.1.1 Regional distribution

The regional distribution of the 25,415 substantiated pollution incidents that occurred in 1994 is illustrated in figure 3. The greatest proportion (19%) of these was seen in Severn-Trent Region and the smallest (5%) was seen in Southern Region. This distribution does not, however necessarily reflect the relative impact of pollution on controlled waters across England and Wales. This depends on both the nature of the pollutant(s) and the receiving watercourse together with the size, nature and population density of the different Regions.

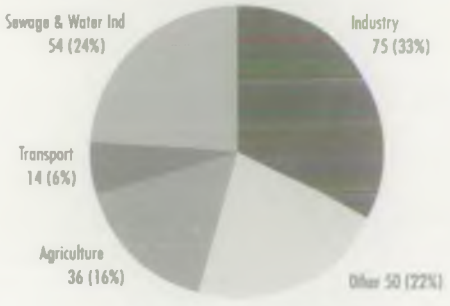
Table 1 gives a regional breakdown by incident category and includes figures for unsubstantiated incidents.

4.1.2 Distribution by source of pollution

Pollution sources (figure 4a) have been assigned to five basic categories: agriculture, industrial, sewage and water related, transport and other sources. Any incidents that could not be attributed to the first four sources are categorised as other pollution events; these include pollution arising from hospitals, domestic/residential premises, schools and hotels. Of the four identified pollution sources (Table 2), the greatest proportion (28%) of incidents were related to water and sewage sources; this was closely followed by incidents arising from industrial sources (21%). The least number of incidents (7%) arose from transport related sources, whilst agriculture accounted for 13% of incident sources. The largest proportion (31%) of incidents could not be categorised into any of the identified sources and fell into the other category.



(a) Number of incidents; total: 25,415



(b) Category 1 incidents only; total 229

FIGURE 4a and b
Distribution of substantiated pollution incidents by source, 1994

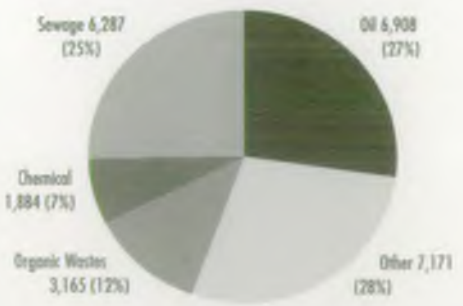
TABLE 2
Total number of substantiated pollution incidents in 1994 by pollution source

NRA Region	Agricultural	Industrial	Sewage & water	Transport	Other	Total	Percent
Anglian	326	635	714	394	750	2,819	11
Northumbria & Yorkshire	396	745	1,032	166	904	3,243	13
North West	403	821	1028	122	1158	3,532	14
Severn-Trent	409	769	1,337	214	2,166	4,895	19
Southern	126	262	393	120	415	1,316	5
South Western	1,025	663	1,209	355	1,088	4,340	17
Thames	100	388	414	195	909	2,006	8
Welsh	544	1,026	892	217	585	3,264	13
TOTAL	3,329	5,309	7,019	1,783	7,975	25,415	100
Percent	13	21	28	7	31	100	

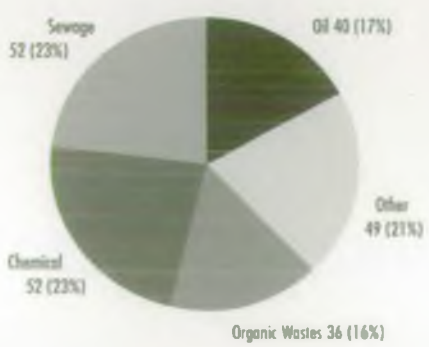
4.1.3 Distribution by type of pollutant

Pollutant types have been categorised into four groupings: oil, sewage, chemicals and organic wastes, together with an other category for those incidents where the pollutant did not fit into the above types. Other includes inert suspended solids, vehicle washings, foam and litter. The greatest proportion (figure 5a and Table 3) of incidents that could be defined by type of pollutant were oil pollution incidents (27%), followed by sewage (25%), organic wastes (12.5%) and lastly chemicals (7.5%). In the other category the largest single type was silt which was the pollutant in 6.5% of all incidents. The remainder were from a variety of sources.

FIGURE 5a and b
Distribution of substantiated pollution incidents by type of pollutant, 1994



(a) Number of incidents; total: 25,415



(b) Category 1 incidents only; total 229

4.1.4 Category 1 incidents

Of the 25,415 pollution incidents substantiated by the NRA during 1994, only 229 (less than 1%) were classified as Category 1 incidents. This represents a significant decrease (31% reduction) compared to 1993. It also continues the downward trend since 1990 when 658 incidents were recorded. Some of the decrease may be due to improved categorisation. However, since 1989, the NRA has increased awareness of pollution risks, through a rigorous prosecution policy combined with active promotion of pollution prevention. As a result, many companies have reviewed their operations and taken steps to reduce the risk of pollution in order to minimise their exposure to prosecution, clean-up costs and lost production.

The largest proportion (33%) of Category 1 incidents in 1994 arose from industrial sources (Table 4), with sewage and water related incidents (24%), agricultural sources (16%) and transport sources (6%) comprising the remainder of those that could be identified. Other sources that could

NRA Region	Organic wastes	Oil	Sewage	Chemicals	Other	Total	Percent
Anglian	311	1,023	596	301	588	2,819	11
Northumbria & Yorkshire	291	705	992	251	1,004	3,243	13
North West	479	895	894	383	881	3,532	14
Severn-Trent	368	1,519	1,320	299	1,389	4,895	19
Southern	102	488	322	129	275	1,316	5
South Western	938	865	930	209	1,398	4,340	17
Thames	92	896	403	178	437	2,006	8
Welsh	584	517	830	134	1,199	3,264	13
TOTAL	3,165	6,908	6,287	1,884	7,171	25,415	100
Percent	12.5	27	25	7.5	28	100	

TABLE 3
Total number of substantiated pollution incidents in 1994 by type of pollutant

NRA Region	Agriculture		Industrial		Sewage and water		Transport		Other		Total		Percent	
	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94
Anglian	0	1	6	2	1	2	0	0	3	7	10	12	3	5
Northumbria & Yorkshire	7	5	24	10	19	13	0	2	11	8	61	38	18	17
North West	11	8	26	17	25	13	3	1	12	6	77	45	23	20
Severn-Trent	15	8	29	20	16	15	6	2	27	18	93	63	28	28
Southern	0	2	3	1	0	0	1	0	3	2	7	5	2	2
South Western	24	9	12	9	5	6	4	6	3	7	48	37	15	16
Thames	2	1	1	1	0	2	0	1	2	0	5	5	2	2
Welsh	4	2	10	15	9	3	2	2	5	2	30	24	9	10
TOTAL	63	36	111	75	75	54	16	14	66	50	331	229	100	100
Percent	19	16	34	33	23	24	5	6	20	22	100	100		

TABLE 4
Total number of Category 1 (Major) substantiated pollution incidents by pollution source, 1993 and 1994

NRA Region	Organic wastes		Oil		Sewage		Chemicals		Other		Total		Percent	
	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94	'93	'94
Anglian	0	2	3	1	1	2	3	4	3	3	10	12	3	5
Northumbria & Yorkshire	9	5	6	4	21	11	18	7	7	11	61	38	18	17
North West	11	9	7	9	25	10	20	10	14	7	77	45	23	20
Severn-Trent	13	4	26	10	16	22	23	16	15	11	93	63	28	28
Southern	0	0	3	1	0	0	2	3	2	1	7	5	2	2
South Western	24	12	5	8	5	5	4	7	10	5	48	37	15	16
Thames	0	1	2	1	0	1	1	2	2	0	5	5	2	2
Welsh	4	3	2	6	8	1	4	3	12	11	30	24	9	10
TOTAL	61	36	54	40	76	52	75	52	65	49	331	229	100	100
Percent	18	16	16	17	23	23	23	23	20	21	100	100		

TABLE 5
Total number of Category 1 (Major) substantiated pollution incidents by type of pollutant, 1993 and 1994

not be categorised into any of the above groups accounted for 22% of incidents.

By type of pollutant, sewage (23%) and chemicals (23%) were the principal contaminants involved in Category 1 incidents (see Table 5). Pollution from oil (17%) organic wastes (16%) and inert suspended solids (5%) were also significant.

5 ANALYSIS OF INCIDENTS BY SOURCE

5.1 AGRICULTURAL POLLUTION INCIDENTS

5.1.1 Total incidents

In 1994, a total of 3,329 substantiated pollution incidents were found to arise from agricultural sources. These accounted for 13% of all incidents.

5.1.2 Sources of agricultural pollution

The distribution of agricultural incidents by source is given in figure 6. The greatest proportion were related to dairy farming (55%) followed by pollution from pig farming (7%), arable (6%), mixed (4%), poultry (2%) and sheep farming (2%).

5.1.3 Regional distribution

The regional distribution of agricultural pollution incidents is shown in figure 7. As in 1993, the largest share of agricultural incidents occurred in South Western Region (31%) where incidents from dairy farming accounted for 57% of the total. Similarly in North West Region (83%), Welsh (72%) and Severn-Trent (71%), the majority of agricultural incidents originated from dairy farming. In Anglian Region, incidents arising from arable, pig and poultry farming accounted for 46%, 35% and 29%

FIGURE 6
Substantiated agricultural pollution incidents by source, 1994

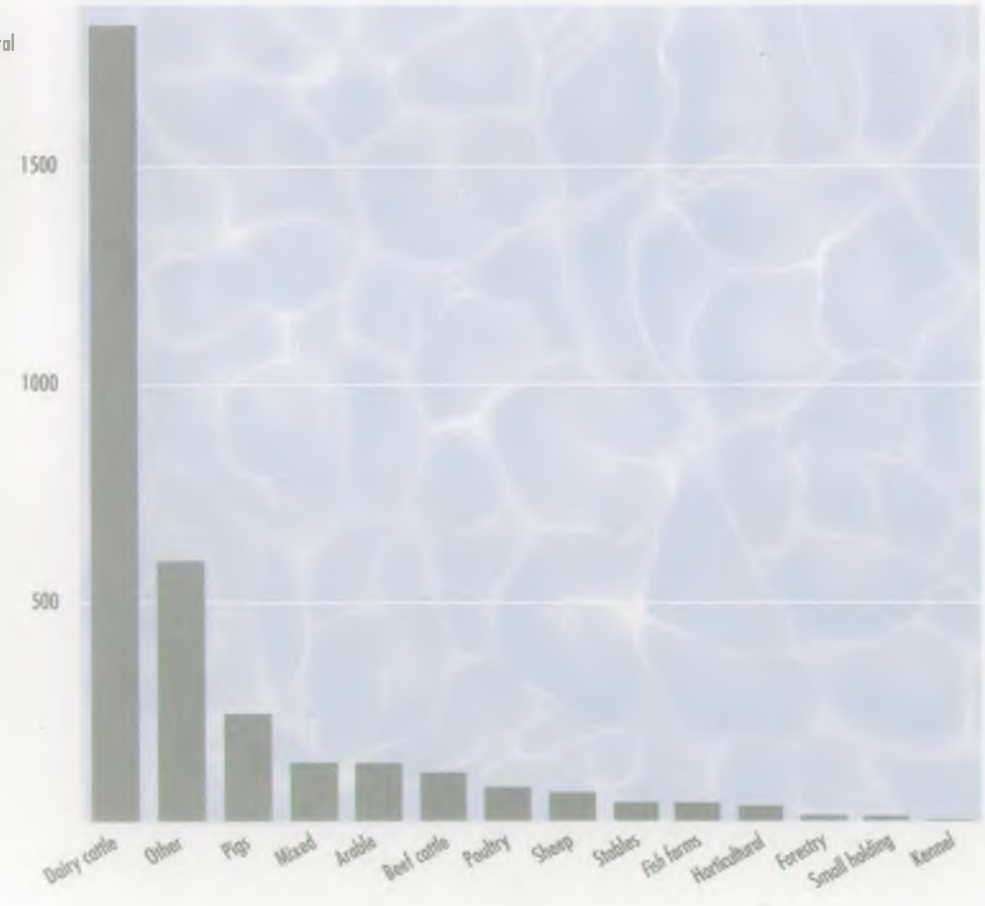
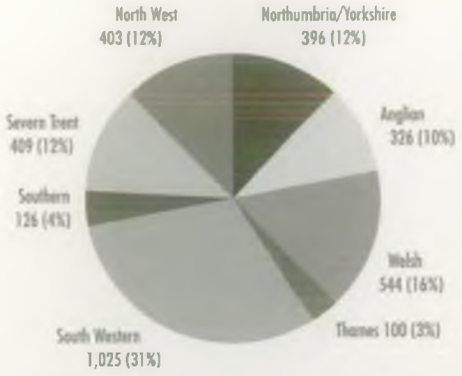


FIGURE 7
Total substantiated agricultural pollution incidents by NRA region, 1994
Total: 3,329



of the national totals respectively. This clearly demonstrates the variation in agricultural activity and intensity of farming operations across the country.

5.1.4 Historical trends

Table 6 shows the number of agricultural pollution incidents, by NRA Region, for the years 1988 to 1994. In comparison with 1993, the total number of substantiated pollution incidents in 1994 has increased by 15%. Regionally, the largest increases were seen in Northumbria & Yorkshire and Southern Regions where the number of incidents more than doubled. The only decreases were found in Thames (24%) and Anglian (8%) Regions. As a proportion of total substantiated incidents, those attributable to agriculture have increased from 11% to 13%. This year, there has been a dramatic change in the ratio of incidents from dairy and beef farming operations: 17:1 respectively in 1994 compared to a ratio of about 1:1 in 1993. This is probably due to more accurate categorisation of incidents in 1994.

5.1.5 Category 1 incidents

Category 1 pollution incidents attributed to agriculture continued to decline, falling from 99 in 1991 to 36 in 1994. This welcome decline appears to reflect both the efforts of the NRA and MAFF to encourage farmers to be aware of the dangers of pollution. Direct comparison with data prior to 1991 is not possible as the MAFF definition of a "serious" incident covers a broader span than the NRA Category 1 incidents. By Region, the largest number of Category 1 incidents in 1994 (Table 6) occurred in South Western Region (25%), whilst Anglian and Thames Regions had only 1 major agricultural pollution incident each. By specific source, dairy farming (42%) was responsible for the largest proportion, with pig farming accounting for 14%. This pattern reflects the national trend in incidents from agricultural sources.

TABLE 6
Total farm pollution incidents by NRA Region, 1988-1994
(Data for 1989 from NRA/MAFF annual farm waste reports; prior to 1989 from WA/MAFF reports)

R = Reported
S = Serious
M = NRA Category 1
Sub = Substantiated

NRA Region	1988		1989		1990		1991		1992		1993		1994	
	R	S	R	S	R	S	Sub	M	Sub	M	Sub	M	Sub	M
Anglian	205	31	204	23	179	-	212	3	283	3	356	0	326	1
Northumbria & Yorkshire	411	52	332	29	370	45	343	22	231	6	148	7	396	5
North West	841	125	468	89	630	140	469	10	417	10	403	11	403	8
Severn-Trent	625	77	431	44	271	46	402	27	320	17	391	15	409	8
Southern	95	17	80	13	84	12	93	3	71	1	68	0	126	2
South Western	1,237	490	895	250	1,008	222	936	28	911	20	943	24	1,025	9
Thames	160	36	125	7	58	9	78	2	91	0	132	2	100	1
Welsh	567	112	354	67	547	134	421	4	446	10	442	4	544	2
TOTAL	4,141	940	2,889	522	3,147	608	2,954	99	2,770	67	2,883	63	3,329	36

5.2 INDUSTRIAL POLLUTION INCIDENTS

5.2.1 Total incidents

A total of 5,309 pollution incidents from industrial sources were substantiated in 1994, 21% of the total.

5.2.2 Sources of industrial pollution

Figure 8 illustrates the general pattern of substantiated industrial incidents by source for 1994. Almost half of these incidents (47%) could not be specifically defined and consequently were designated as "unclassified". An improvement in the recording of incident data has removed the anomaly in last year's report relating to the oil industry, giving a clearer picture of the sources of pollution. This indicates the significance of the construction industry which is highlighted as the largest identified source (16%).

Other important sources were landfill/waste disposal (8%), mining (6%), food industry (6%), chemical industry (4%) engineering (3%), oil industry (3%), fuelling stations (2%) and the paper industry (1%). Incidents arising from demolition, power generation and the metal and textile industries comprised less than 1% of the identified industrial incidents.

5.2.3 Regional distribution

The regional distribution of substantiated industrial pollution incidents is given in figure 9. As in previous years, the largest proportion of industrial incidents occurred in the more heavily industrialised areas of the country, notably Welsh (19%), North West (15%), Severn-Trent (14%) and Northumbria & Yorkshire Region

FIGURE 8
Substantiated industrial pollution incidents by source, where classified, 1994

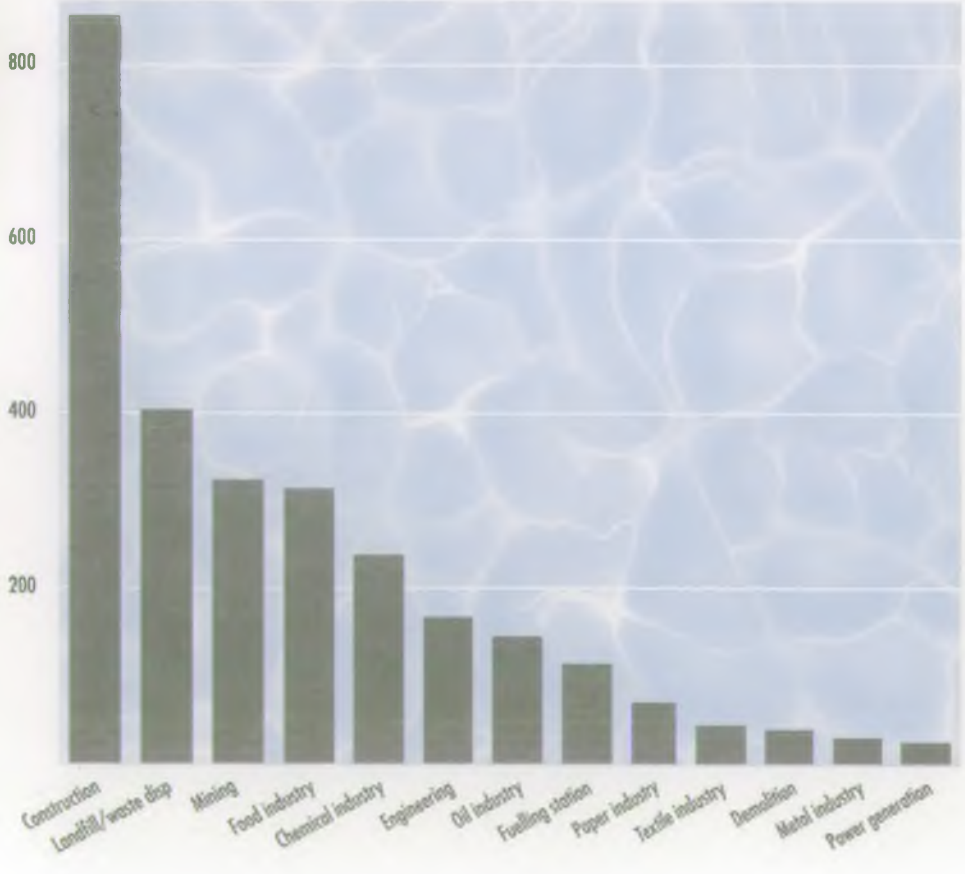
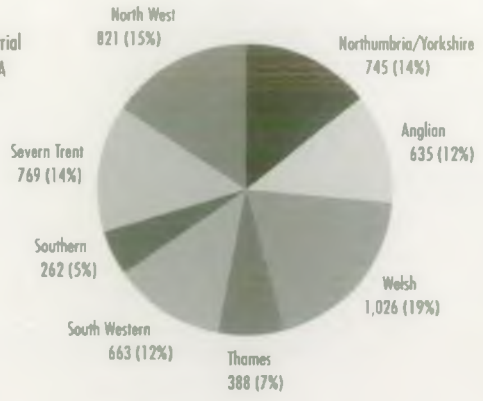


FIGURE 9
Total substantiated industrial pollution incidents by NRA region, 1994
Total: 5,309



(14%). The least number of incidents attributable to industry occurred in the south of the country in Thames (7%) and Southern (5%) Regions. Of those incidents attributable to the chemical industry, the majority occurred in North West (35%) and Anglian (27%) Regions. Incidents from landfill/waste disposal and the construction industry accounted for 23% and 22% respectively of the regional Welsh total. Almost half (47%) of all the incidents arising from the food industry occurred, as in 1993, in Thames Region.

5.2.4 Historical trends

Although there has been a 12% decrease in the total number of industrial pollution incidents since 1993, (which was the highest ever recorded) the number is still significantly higher than in the period 1990-1992. The decrease since 1993 is mainly as a result of significant decreases in North West and Northumbria & Yorkshire Regions (by 39% and 32% respectively). Southern Region experienced a regionally significant 29% increase. (Table 7). For the first time, the construction industry is shown to be the largest single identifiable sector causing pollution. Water pollution from the construction industry has been the cause of concern within the NRA for some time. Improved categorisation of incidents now gives a more accurate picture. It is this, rather than any fundamental change in the performance of the industry, which is responsible for the apparent increase.

5.2.5 Category 1 incidents

Of the 229 substantiated Category 1 pollution incidents, 75 (33%) were classified as arising from industrial sources (figure 4b), a decrease of 32% on 1993. As a percentage of all substantiated industrial incidents, Category 1s represent only 1%. On a regional basis, the majority of Category 1 industrial incidents were found in Severn-Trent (27%), North West (23%) and Welsh (20%) Regions. Category 1 incidents from the chemical industry comprised 12% of the total, whilst 7% were attributable to the food industry.

TABLE 7
Total industrial pollution incidents by NRA Region, 1987-1994

Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989 and provided by previous Water Authorities

* Substantiated incidents

a Includes oil based incidents

NRA Region	1987	1988	1990	1991*	1992*a	1993*	1994*
Anglian	180	169	213	194	584	601	635
Northumbria & Yorkshire	579	686	543	446	827	1,092	745
North West	336	338	267	336	279	1,335	821
Severn-Trent	785	1,108	350	608	715	727	769
Southern	181	182	164	168	236	203	262
South Western	304	501	742a	412	653	767	663
Thames	190	323	385	211	351	397	388
Welsh	237	353	138	428	864	880	1,026
TOTAL	2,792	3,660	2,802	2,803	4,509	6,002	5,309

5.3 SEWAGE & WATER INDUSTRY RELATED POLLUTION INCIDENTS

5.3.1 Total incidents

There were 7,019 substantiated sewage and water related pollution incidents during 1994, accounting for 28% of the national total.

5.3.2 Sources of sewage and water industry related incidents

Figure 10 illustrates the distribution of sewage and water related incidents by source for 1994. In common with the data for 1993, Water Service Company (WSC) combined sewer overflows (CSOs) and surface water outfalls (SWOs) accounted for the greatest proportion (20% and 21% respectively) of all sewage and water related incidents. This indicates, as in previous years, that problems relating to ageing infrastructure and inadequate capacity occur throughout England and Wales. Other important sources included both WSC (10%) and private sewage treatment works (9%) as well as WSC foul sewer systems and pumping stations (7% each).

5.3.3 Regional distribution

The distribution of substantiated sewage and water related pollution incidents by Region is shown in figure 11. The largest number of incidents attributed to this source were found in Severn-Trent (19%), South Western (17%) and North West and Northumbria & Yorkshire Regions (both 15%). Thames and Southern Regions accounted for only 6% each of all sewage and water related incidents, the majority of which were attributable to WSC surface water outfalls (57% and 17%,

FIGURE 10
Substantiated sewage and water industry related pollution incidents by source, 1994

*WTW - Water Treatment Works

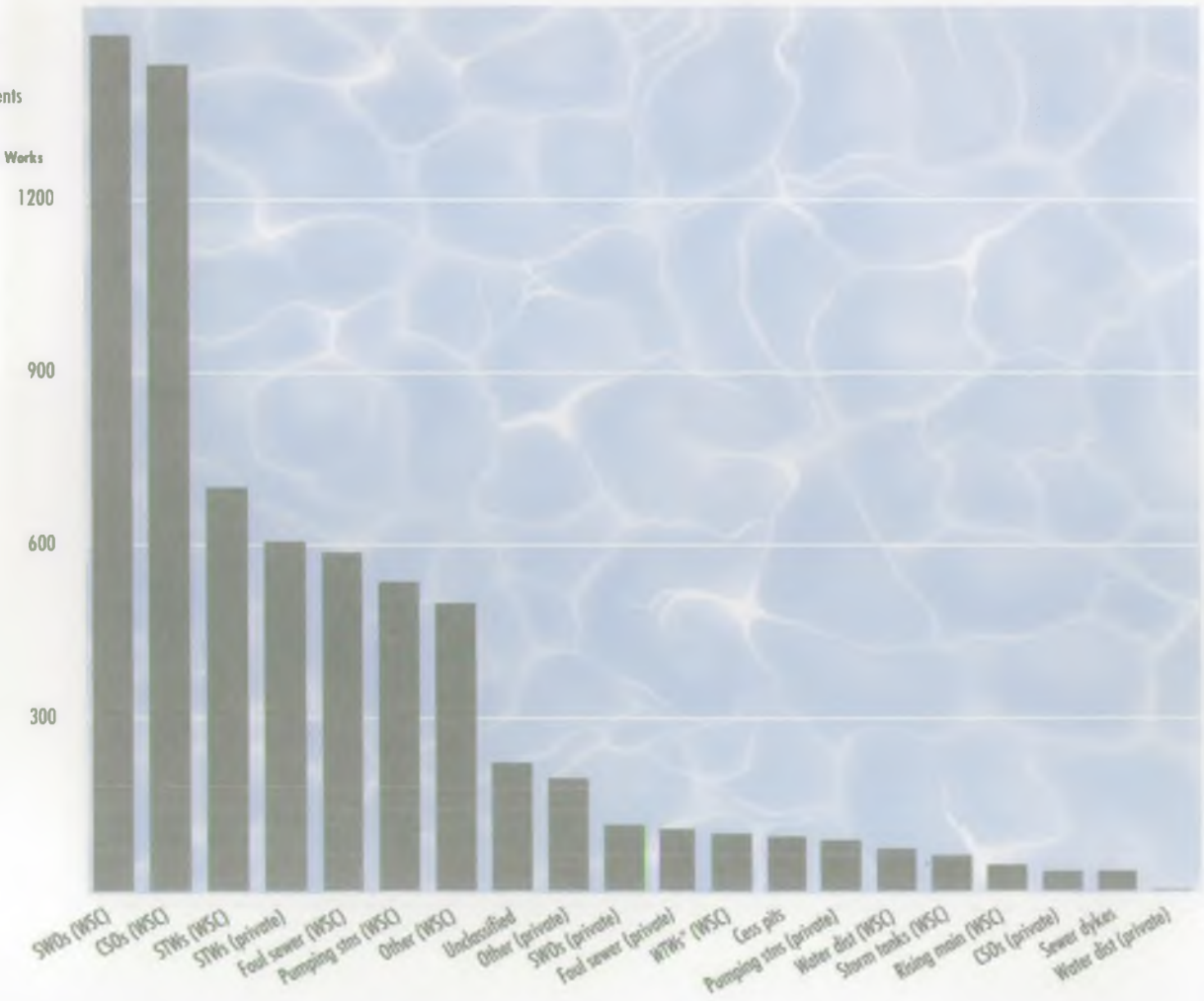
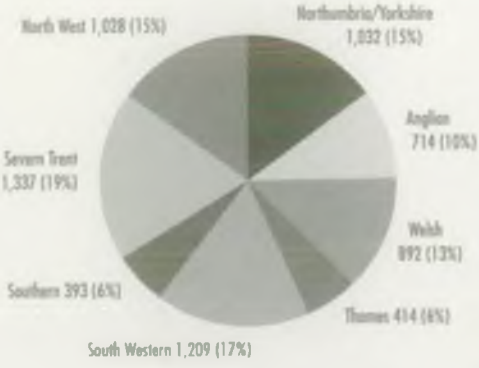


FIGURE 11
Total substantiated sewage and water industry related pollution incidents by NRA Region, 1994

Total: 7,019



respectively, of the regional totals for this source). Similarly, 45% of Severn-Trent Region's sewage and water related incidents originated from WSC surface water outfalls. In Northumbria & Yorkshire Region, incidents arising from WSC combined sewer overflows accounted for 57% of the national total. Over a third of private sewage treatment works incidents occurred in South Western Region, with nearly as many in Anglian Region. Nearly two thirds of all incidents involving cesspools occurred in Southern Region.

5.3.4 Historical trends

Table 8 gives the figures for the regional distribution of sewage and water related pollution incidents from 1987 to 1994. In comparison with 1993, the national figure for 1994 has increased by 10%. The greatest increase in the number of sewage and water related incidents was seen in Southern Region (73%), with smaller increases in Northumbria & Yorkshire (42%), Anglian (22%) and South Western (18%) Regions. Decreases in the number of substantiated incidents were seen in all the other Regions, the largest decrease being in Severn-Trent Region (18%).

5.3.5 Category 1 incidents

Of the total number of sewage and water related incidents, less than 1% (54) were classified as Category 1 incidents (Table 4). This figure represents 24% of all substantiated Category 1 incidents in 1994, a decrease of 15% on 1993. Regionally, 28% of the Category 1 incidents were recorded in Severn-Trent Region and 24% in North West and Northumbria & Yorkshire Regions. The majority of Category 1 incidents were attributable to WSC combined sewer overflows (35%), WSC sewage treatment works (26%), and WSC water treatment works (13%).

TABLE 8
Total sewage and water industry related incidents by NRA Region, 19871990 plus substantiated incidents for 1991 to 1994.

(Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989)

* Substantiated incidents

NRA Region	1987	1988	1990	1991*	1992*	1993*	1994*
Anglian	381	373	362	570	657	586	714
Northumbria & Yorkshire	756	732	1,214	1,220	1,055	726	1,032
North West	460	614	968	986	1,051	1,066	1,028
Severn-Trent	880	772	424	1,329	961	1,327	1,337
Southern	320	345	487	376	446	227	393
South Western	556	656	874	925	1,019	1,124	1,209
Thames	423	610	765	416	373	421	414
Welsh	402	476	717	525	858	898	892
TOTAL	4,178	4,578	5,811	6,347	6,420	6,375	7,019

5.4 TRANSPORT POLLUTION INCIDENTS

5.4.1 Total incidents

A total of 1,783 transport related pollution incidents were substantiated in 1994, 7% of the national total.

5.4.2 Sources of transport related incidents

The distribution of transport incidents by source is shown in figure 12. Of the total number of transport related pollution incidents, the majority originated from roads (74%), mostly as a result of road traffic accidents. Ships and boats accounted for 19% of all incidents, with 4% arising from long distance pipelines. 44 incidents (2%) arose from rail transport incidents and 23 (1%) from airports and aircraft.

5.4.3 Regional distribution

Figure 13. illustrates the regional distribution of substantiated transport related incidents. The proportions in Regions vary from 7% in Southern to 22% in Anglian Region. In all Regions, incidents attributable to road transport accounted for over half of all transport related incidents. Pollution from ships and boats was also an important source in most Regions, accounting for 29% in Thames Region, and 27% and 21% in Southern and Severn-Trent Regions respectively. Many of these incidents are related to the leisure boating industry.

FIGURE 12
Substantiated transport related pollution incidents by source, 1994

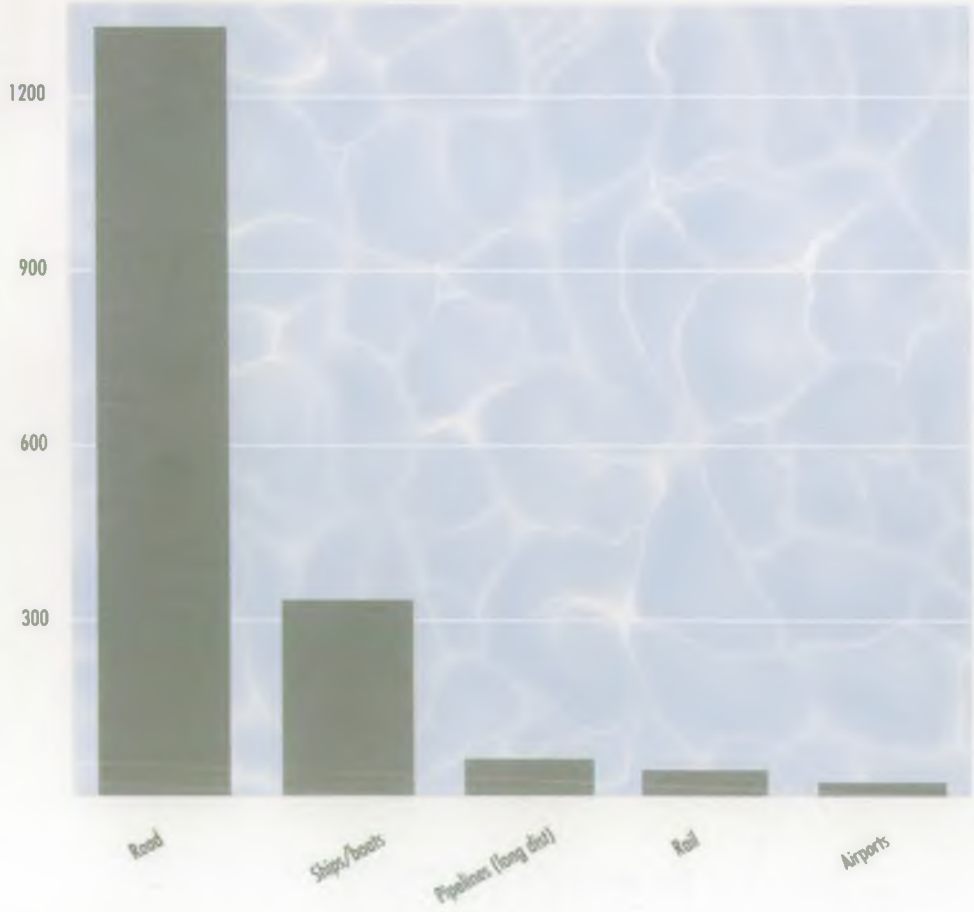
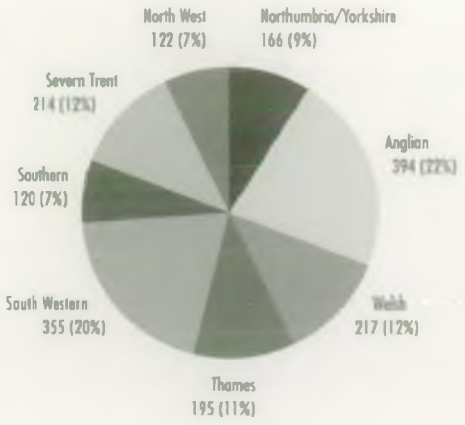


FIGURE 13
Total substantiated transport related pollution incidents by NRA Region, 1994
Total: 1,783



5.4.4 Historical trends

The regional distribution of transport pollution incidents for 1993 and 1994 is given in Table 9. Overall there has been an increase (17%) in the number of transport related incidents during 1994. In Anglian Region incidents increased four fold while in North West Region the number of incidents doubled. Only two Regions had a decrease in transport related incidents, Southern Region (31%) and South Western Region (12%).

5.4.5 Category 1 incidents

Of the 229 substantiated Category 1 incidents for 1994, 14 (6%) of these were classified as arising from transport related sources. As a proportion of the total number of transport incidents, these represent less than 1%. All but one of the Category 1 incidents arose from road transport, reflecting the national trend for all transport incidents. Regionally, 6 (43%) occurred in South Western Region, with 2 each in Northumbria & Yorkshire, Severn-Trent and Welsh Regions.

TABLE 9
Total transport pollution incidents by NRA Region, 1993 and 1994

NRA Region	1993	1994
Anglian	99	394
Northumbria & Yorkshire	146	166
North West	66	122
Severn-Trent	202	214
Southern	173	120
South Western	403	355
Thames	192	195
Welsh	217	217
TOTAL	1,498	1,783

5.5 OTHER SOURCES OF POLLUTION

5.5.1 Total incidents

A total of 7,975 other pollution incidents were substantiated in 1994, 31% of the substantiated pollution incidents that were recorded for the year.

5.5.2 Sources of other pollution

Whilst the majority of pollution incidents categorised as other could not be broken down further, a small proportion originated from domestic/residential sources (9%). Incidents arising from crown exempt sources and restaurants, hotels and public houses accounted for 1% each of categorised other sources (figure 14).

5.5.3 Regional distribution

The regional distribution of other incidents by source is given in figure 15. The greatest proportion of incidents classified by source as other occurred in Severn-Trent Region (27%), together with North West (15%) and South Western (14%). Of those that were classified, incidents from domestic/residential premises were recorded across the whole country with 29% of the national total in Thames Region, 16% in South Western Region and 15% in Northumbria & Yorkshire Region. Of those incidents attributable to contaminated land, 44% occurred in

FIGURE 14
Substantiated other sources of pollution incidents, where classified, 1994

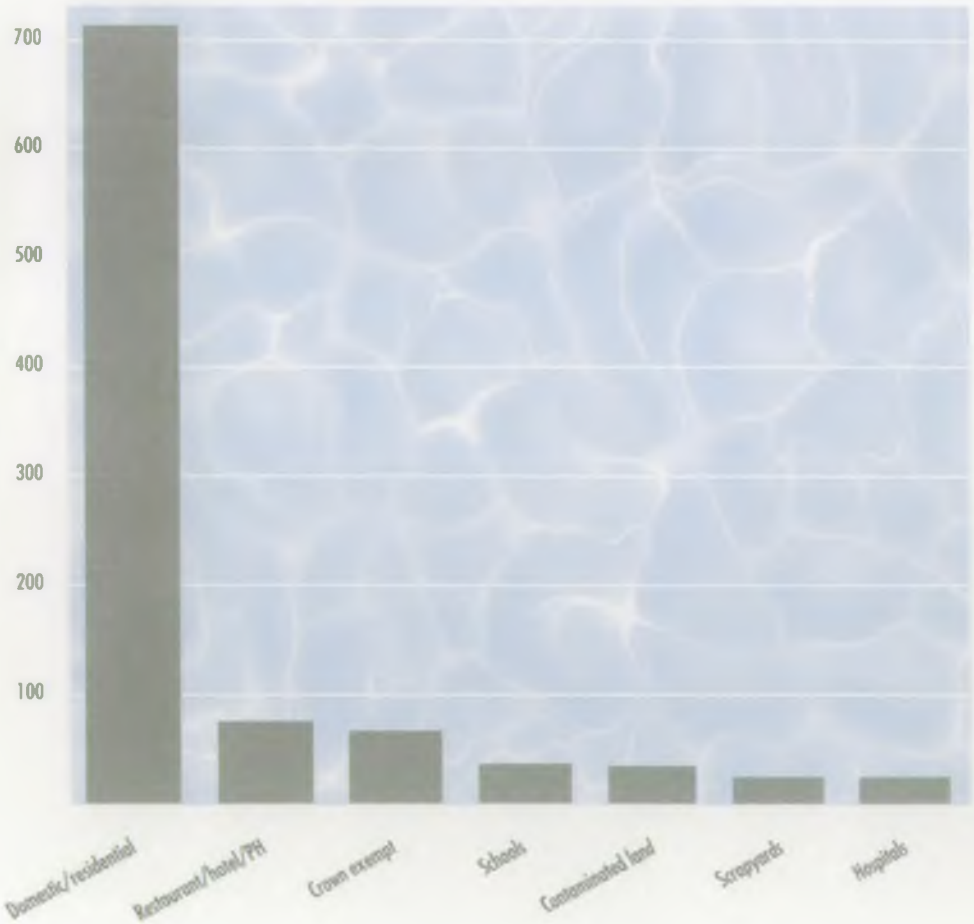
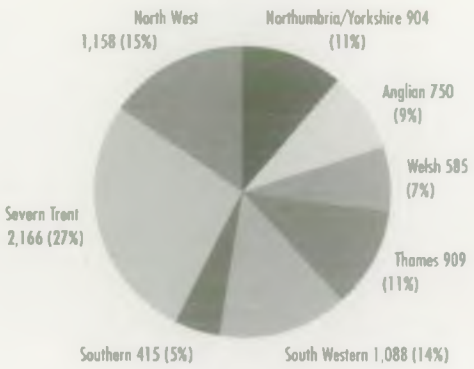


FIGURE 15
Total substantiated other sources of pollution incidents by NRA Region, 1994
Total: 7,975



South Western Region and 29% in Anglian Region. The greatest number of incidents from crown exempt premises occurred in Northumbria & Yorkshire Region (44%).

5.5.4 Category 1 incidents

Category 1 incidents represented less than 1% (50) of the 7,975 other pollution incidents substantiated in 1994, a slight decline on 1993 when there were 66.

Of the 50 major incidents the only one which fitted within a recognisable category was from a crown exempt premises. Although the remainder were individually identifiable, they did not fit within any of the other major source categories.

6 ANALYSIS OF INCIDENTS BY TYPE OF POLLUTANT

6.1 ORGANIC WASTES

6.1.1 Total incidents

A total of 3,165 pollution incidents attributable to organic wastes were substantiated in 1994. This figure represents 12.5% of the total number of substantiated incidents.

6.1.2 Type of organic waste pollution

The distribution of organic wastes by type is given in figure 16. Excluding those incidents that could not be classified (13%), the largest proportion of the 3,165 incidents was related to cattle slurry (33%). Cattle manure (solid) accounted for 9% together with silage liquor which represented 8% of all organic waste incidents. These figures reflect the findings of the agricultural source section, in that pollution from dairy farming accounts for over half of all agricultural incidents by source. Of the remaining incidents, yard washings (8%), animal carcasses and pig slurry (both 6%) were significant.

6.1.3 Regional distribution

Figure 17 illustrates the regional distribution of organic waste pollution incidents, which is almost identical to that for 1993. The greatest proportion of organic waste incidents occurred in South Western Region (30%), where cattle slurry were most prevalent. Similarly, in Welsh Region (18% of all incidents), cattle slurry incidents accounted for 60% of the regional

FIGURE 16
Substantiated organic waste pollution incidents by type, 1994

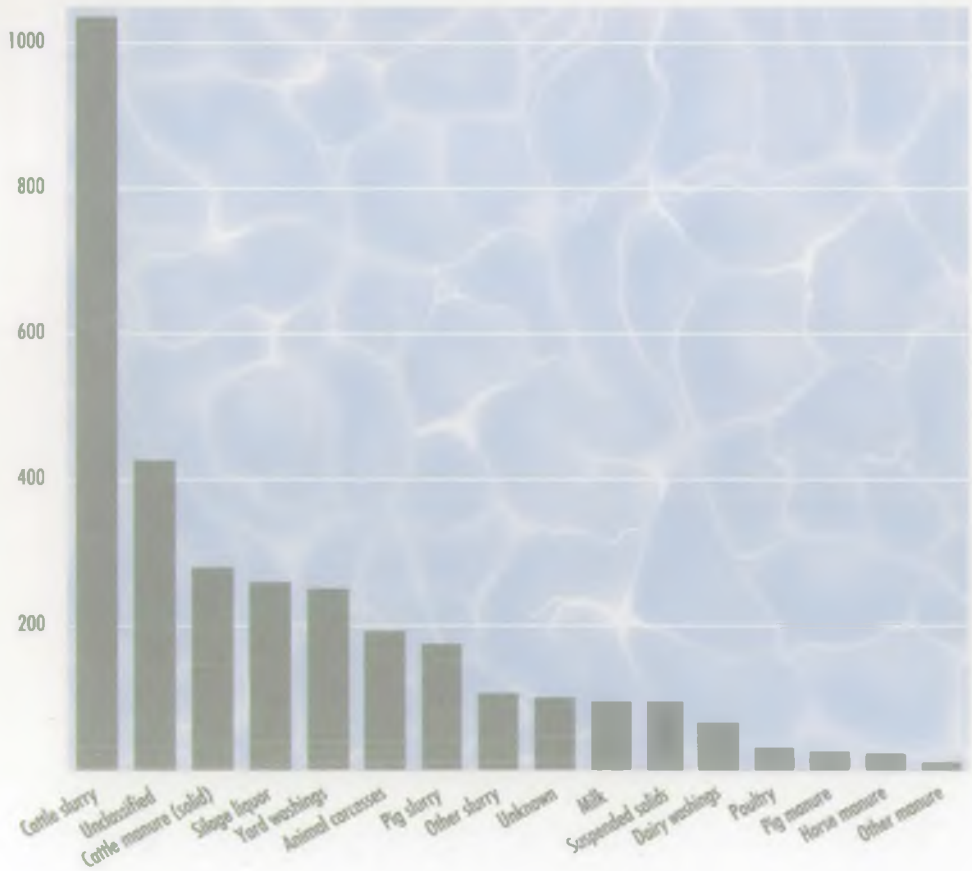
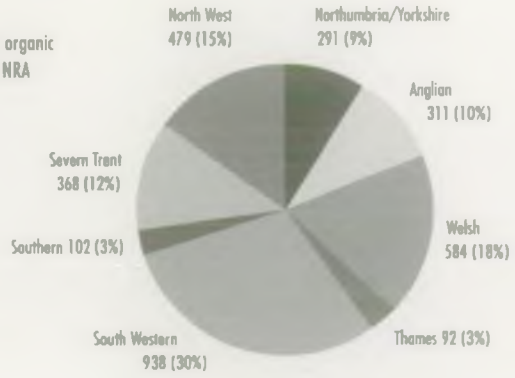


FIGURE 17
Total substantiated organic waste incidents by NRA Region, 1994
Total: 3,165



total. North West Region (15% of all incidents) and Severn-Trent Region (12%) were also notable, with incidents of cattle manure in the latter Region representing 54% of the national total. In Anglian Region (10%), the predominance of pig and poultry farming was reflected in the high level of pollution incidents of pig manure (69% of the national total), pig slurry and poultry farms (both 33%).

6.1.4 Historical trends

Organic waste was introduced as a new category in 1993, making direct comparison with earlier years impossible. However, Table 10 shows the regional distribution of organic waste incidents for 1993 and 1994. The figures given for 1992 show the substantiated previously recorded farm data. The number of organic waste incidents increased by 7% during 1994. The largest increase was in Welsh Region (22%) with North West (20%) and South Western (11%) also showing significant increases. In contrast, Thames Region showed a decrease (10%) in the number of incidents, as did Northumbria & Yorkshire Region (9%).

6.1.5 Category 1 incidents

Of the 3,162 organic waste incidents, 36 (1%) were classified as Category 1 incidents, representing 16% of the total number of substantiated Category 1 incidents. Regionally, the largest number of Category 1 incidents were found in South Western Region (33%), with 25% in North West and 13% in Severn-Trent Region. As with the total number of organic waste incidents, the greatest proportion of Category 1 incidents involved cattle slurry. (See figure 18.)

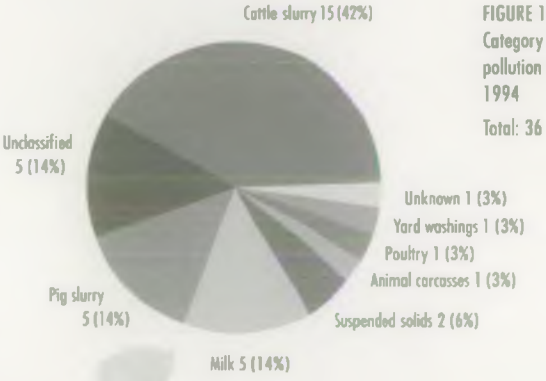


FIGURE 18
Category 1 organic waste pollution incidents by type, 1994
Total: 36

TABLE 10
Total organic waste pollution incidents by NRA Region, 1992-1994

* Substantiated farm incidents by type

NRA Region	1992*	1993	1994
Anglian	203	329	311
Northumbria & Yorkshire	228	320	291
North West	406	398	479
Severn-Trent	296	381	368
Southern	63	101	102
South Western	445	848	938
Thames	69	102	92
Welsh	425	477	584
TOTAL	2,567	2,956	3,165

6.2 OILS

6.2.1 Total incidents

6,908 oil pollution incidents were substantiated in 1994, accounting for 27% of the total.

6.2.2 Type of oil pollution

Figure 19 gives the distribution of oil pollution incidents by type. Whilst a third of oil pollution incidents could not be classified, diesel (32%) was the most commonly identified oil pollutant. Incidents involving gas oil (8%), waste oil (7%), petrol (5%) and other fuel oils (4%) were the other significant types of oil incident.

6.2.3 Regional distribution

The regional distribution of oil pollution incidents is illustrated in figure 20. The greatest percentage of oil incidents were found in Severn-Trent Region (22%), with Anglian Region (15%), North West, South Western and Thames Regions (each 13%) all dealing with considerable numbers of oil pollution incidents during 1994.

Within each Region, oil pollution accounted for a large number of the incidents substantiated during 1994, particularly in Thames Region (45% of the regional total). Similarly, high proportions were found in Anglian (36%), Southern (37%) and Severn-Trent (31%) Regions.

Where discrete data were available, a breakdown of specific types of oil pollution was recorded in each Region. In most Regions, incidents involving diesel oil comprised a large proportion of the total number of oil incidents: in Welsh Region (46%), South Western and Southern Regions (both 35%) and Thames Region (32%). Waste oil incidents in Anglian and Thames Regions accounted for 25% of the national total, whilst 31% of the total number of incidents attributable to gas oil occurred in Welsh Region. In South Western Region, fuel oils and petrol were important types of oil pollutant, comprising 58% and 30% of the national oil pollution total respectively.

FIGURE 19
Substantiated oil pollution incidents by type of oil, 1994

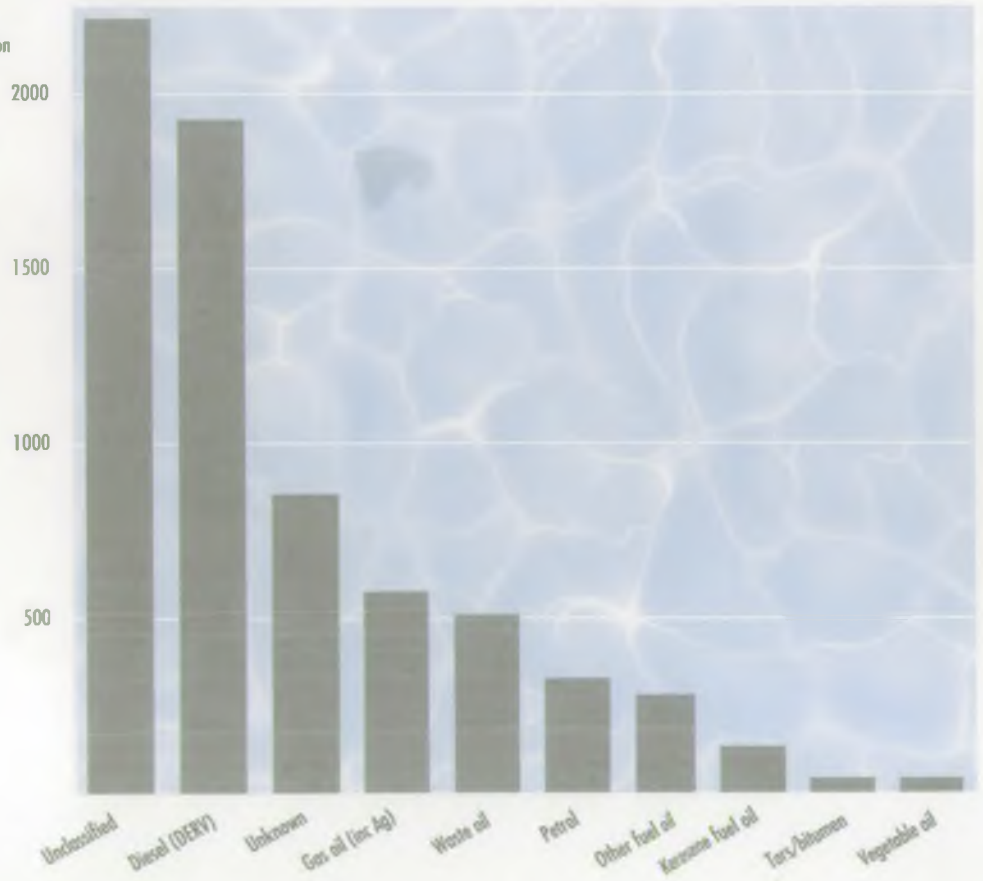
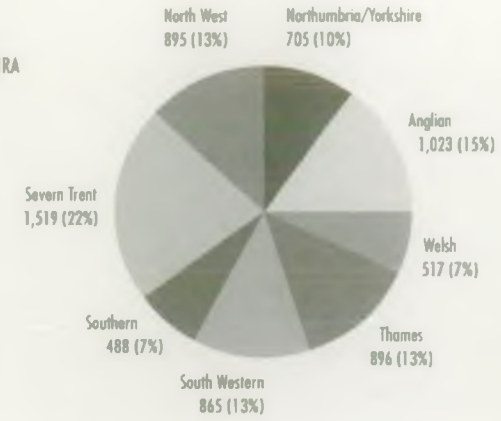


FIGURE 20
Total substantiated oil pollution incidents by NRA region, 1994
Total: 6,908



6.2.4 Historical trends

Table 11 gives the regional distribution of oil pollution incidents between 1987 and 1994. Overall, the total number of substantiated oil pollution incidents has risen during each of the last four years by 8% in 1994, and by 16% since 1990. This rise has been reflected across the country, with most Regions recording some sort of increase in the number of substantiated oil pollution incidents over the last year. The largest increase was recorded in South Western Region (24%), followed by Northumbria & Yorkshire (15%) and North West (10%) Regions. The only Region where the number of oil incidents remained static was Thames.

6.2.5 Category 1 incidents

Category 1 incidents involving oils accounted for less than 1% of the total number of substantiated oil pollution incidents in 1994. Of the total number of Category 1 incidents, those attributable to oil (40) accounted for 17%, a fall of 26% compared to 1993. This may reflect the efforts made by NRA staff and the oil industry to improve oil storage and delivery standards. However, valuable as such initiatives are, even greater improvements could be made if provisions similar to the Control of Pollution (silage, slurry and agricultural fuel oil) Regulations were to be introduced for all industrial and commercial oil users. Regionally, the greatest number of Category 1 pollution incidents was recorded in Severn-Trent Region (25%), with North West (23%) and South Western (20%) Regions all recording significant numbers. Anglian, Southern and Thames Regions each recorded only one Category 1 incident. The distribution of Category 1 incidents by type is shown in figure 21.

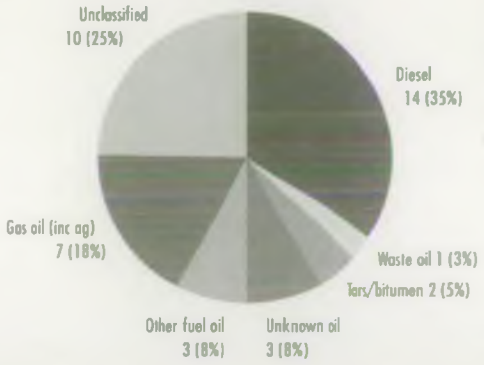


FIGURE 21
Category 1 oil pollution incidents by type, 1994
Total: 40

TABLE 11
Total oil pollution incidents by NRA Region, 19871994.
(Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989)

* Substantiated incidents
a Does not include oil from industrial sources

NRA Region	1987	1988	1990	1991*	1992*	1993*	1994*
Anglian	603	478	620	775	873	961	1,023
Northumbria & Yorkshire	530	538	593	524	561	597	705
North West	494	508	593	571	719	806	895
Severn-Trent	1,078	1,300	1,893	1,194	1,379	1,493	1,519
Southern	483	459	492	536	357	469	488
South Western	601	689	383a	734	945	661	865
Thames	861	1,256	1,122	851	876	896	896
Welsh	133	197	250	103	426	490	517
TOTAL	4,783	5,425	5,946	5,288	6,136	6,373	6,908

6.3 CHEMICALS

6.3.1 Total incidents

In 1994 there were a total of 1,884 substantiated chemical pollution incidents, representing 7.5% of all incidents substantiated during that year.

6.3.2 Types of chemical pollutants

The distribution of chemical pollutants by type is shown in figure 22. 31% of incidents could not be precisely defined and were therefore recorded as unclassified. Of the remaining incidents, pollution from paint and dyes (16%), detergents (12%), other inorganics (6%), acid (5%), alkali (4%) and pesticides (3%) comprised the most notable types of chemical pollutants.

6.3.3 Regional distribution

Figure 23 illustrates the regional distribution of chemical pollutants for 1994. One fifth of all chemical incidents occurred in North West Region, accounting for 11% of the regional total. Severn-Trent and Anglian Regions both had 16% of all chemical pollution incidents and Northumbria & Yorkshire Region had 13%. The lowest number of chemical pollution incidents were recorded in Southern and Welsh Regions (both 7%).

Where possible, within each Region incidents attributable to chemical pollutants were broken down into type of chemical. Distinct regional differences are apparent. Within Anglian Region, incidents involving fertilisers (13) and pesticides (16) comprised 39% and 25% of the national total respectively, whilst solvents accounted for 39%. Incidents in North West Region accounted for 36% of all those involving alkalis, 34 % of all detergent pollutions, 30% of those involving acids and

FIGURE 22
Substantiated chemical pollution incidents by type of chemical, where classified, 1994

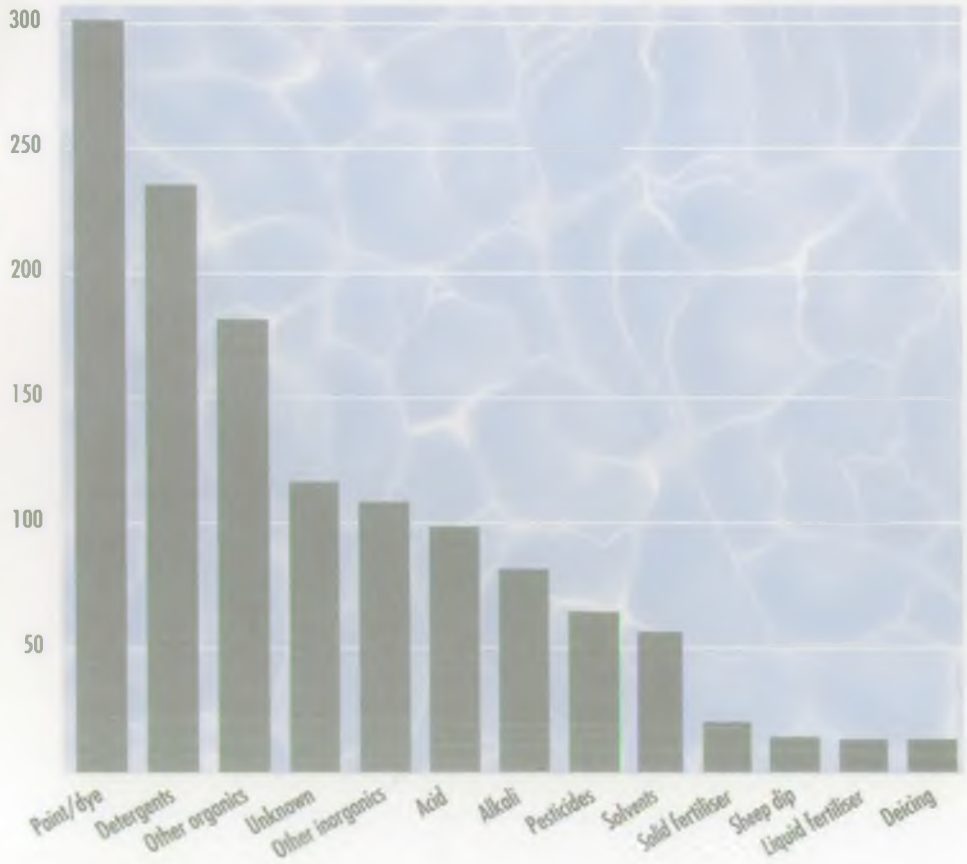
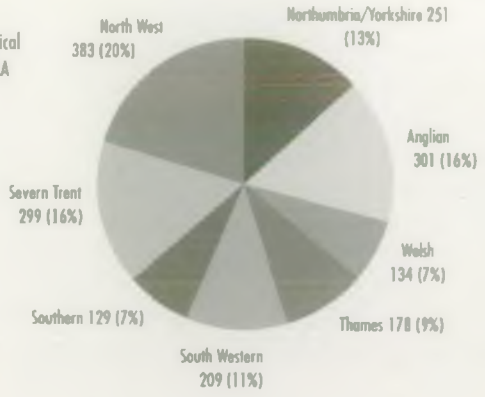


FIGURE 23
Total substantiated chemical pollution incidents by NRA region, 1994
Total: 1,884



27% of paint and dye pollutions. Half of the small number of incidents (14) involving sheep dip occurred in Welsh Region.

6.3.4 Historical trends

Table 12 shows the regional distribution of chemical incidents for 1992 to 1994. During 1994, the total number of substantiated chemical pollution incidents has decreased by 8%. However, the total of 1,874 is still 42% higher than the figure for 1992. The year-on-year decrease in 1994 has been evident in most Regions and particularly in the north of the country, with chemical pollution incidents decreasing by about a third in both Northumbria & Yorkshire and North West Regions. Both Anglian and South Western Regions showed regionally significant increases.

6.3.5 Category 1 incidents

Of the 1,884 incidents involving chemical pollutants only 3% (52) fell into the Category 1 classification, comprising 23% of the national total of Category 1 incidents (figure 5). This is a decrease of 31% in the number of Category 1s of this type during 1994. Whilst most of the Category 1 incidents could not be classified, pesticides (15%), paint and dye and alkali (both 8%) accounted for the largest proportions of categorised chemical incidents. See figure 24.

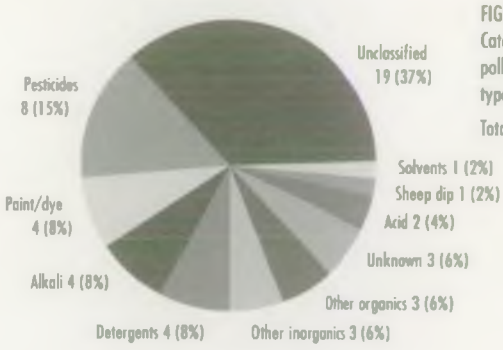


FIGURE 24
Category 1 chemical pollution incidents by type, 1994
Total: 52

TABLE 12
Total chemical pollution incidents by NRA Region, 1992-1994

NRA Region	1992	1993	1994
Anglian	209	198	301
Northumbria & Yorkshire	135	410	251
North West	236	568	383
Severn-Trent	206	281	299
Southern	57	100	129
South Western	124	145	209
Thames	194	172	178
Welsh	160	165	134
TOTAL	1,321	2,039	1,884

6.4 SEWAGE

6.4.1 Total incidents

The total number of incidents defined as sewage (6,287) represented 25% of all incidents substantiated during 1994.

6.4.2 Types of sewage pollution

Figure 25 illustrates the distribution of substantiated sewage pollution incidents in 1994. Pollution from crude sewage accounted for the largest proportion of incidents (42%). Apart from those incidents that could not be easily identified and were therefore unclassified (18%), septic tank effluent (15%), storm sewage (12%), and treated effluent (11%) were important types of sewage pollution. Pollution from sewage debris (2%) and sewage sludge (1%) comprised only a small proportion of all sewage incidents.

6.4.3 Regional distribution

The regional distribution of sewage incidents is illustrated in figure 26. Severn-Trent Region had the largest percentage of sewage pollutions (21%) whilst Southern Region had the smallest (5%).

Within each Region, sewage incidents accounted for between 20% (in Thames Region) and 31% (in Northumbria & Yorkshire Region), of all incidents substantiated in 1994.

Of all these incidents, pollution of crude sewage was the most common type of incident in many Regions, accounting for 72% of all sewage incidents in Welsh Region (this figure includes CSOs and crude sewage incidents), 59% in both Southern and Thames Regions and 51% in South Western Region. In each of Anglian, Severn-Trent and South Western Regions sewage

FIGURE 25
Substantiated sewage pollution incidents by type of sewage, 1994

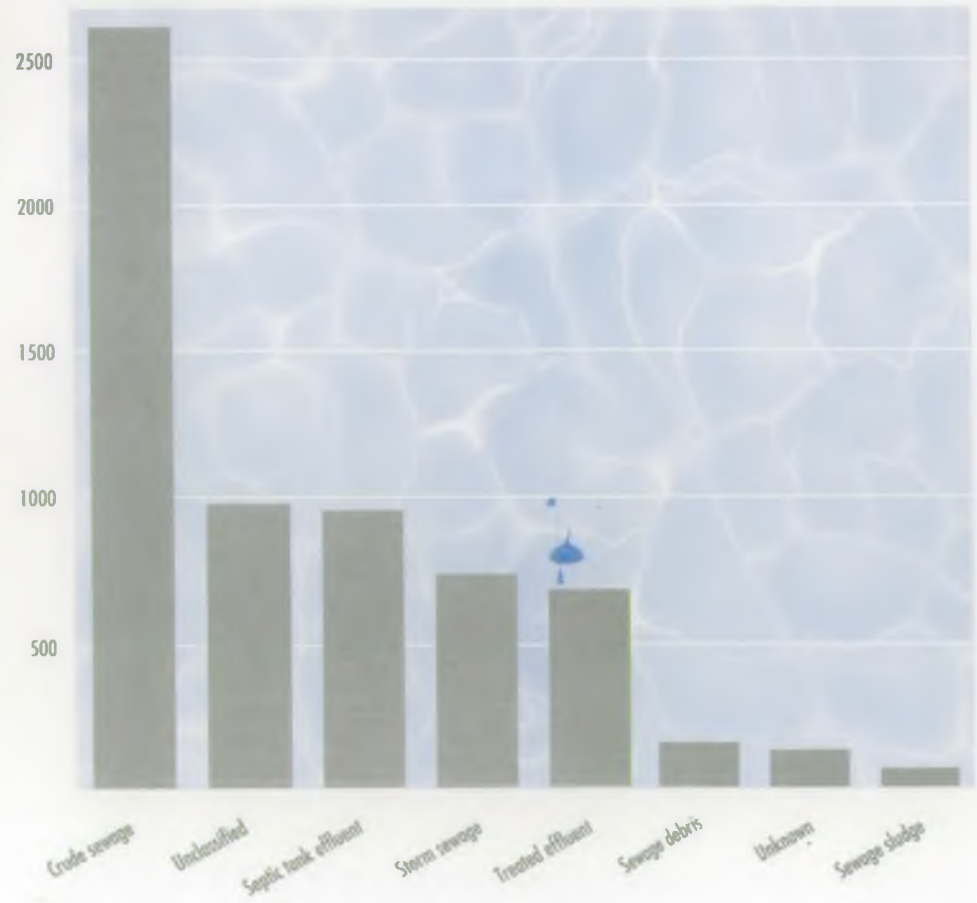
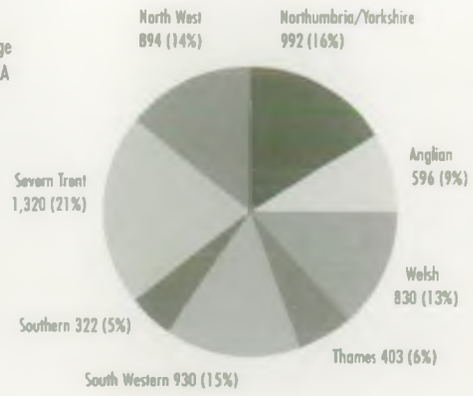


FIGURE 26
Total substantiated sewage pollution incidents by NRA region, 1994
Total: 6,287



pollution from septic tanks comprised 20% of the national total for this type of incident.

6.4.4 Historical trends

The regional distribution of sewage pollution incidents for 1992 to 1994 is given in Table 13. Overall there has been a decrease (2%) in the number of sewage incidents during 1994. The largest decrease was recorded in North West Region (16%), with Thames (14%) Region also showing a significant decrease in the number of sewage incidents. In contrast, Southern Region showed a substantial increase (50%) in the number of incidents, as did Northumbria & Yorkshire Region (17%).

6.4.5 Category 1 incidents

There were 52 Category 1 sewage pollution incidents during 1994, which represented less than 1% of all sewage incidents. On a national scale, sewage incidents accounted for 23% of the national Category 1 total, a 32% decrease on 1993, (Table 5). The greatest proportion of these incidents consisted of crude sewage (40%) as can be seen in figure 27. Most of these Category 1 incidents occurred in Severn-Trent Region (42%), with Northumbria & Yorkshire (21%) and North West (33%) Regions both recording significant numbers.

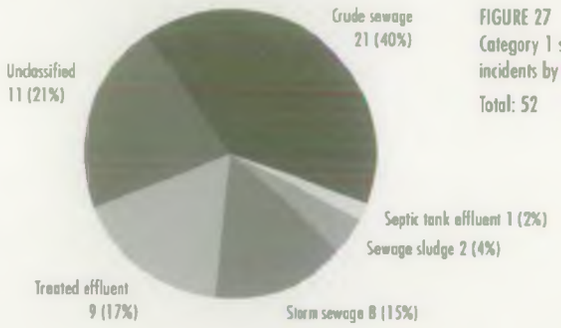


FIGURE 27
Category 1 sewage pollution incidents by type, 1994
Total: 52

TABLE 13
Total sewage pollution incidents by NRA Region, 1992-1994

NRA Region	1992	1993	1994
Anglian	657	586	596
Northumbria & Yorkshire	1,032	851	992
North West	1,026	1,066	894
Severn-Trent	961	1,327	1,320
Southern	392	215	322
South Western	857	1,024	930
Thames	423	468	403
Welsh	786	836	830
TOTAL	6,134	6,373	6,287

6.5 OTHER TYPES OF POLLUTANTS

6.5.1 Total incidents

During 1994, a total of 7,171 incidents involving other types of pollutant were substantiated. This figure represents 28% of the total number of incidents substantiated during the year.

6.5.2 Types of other pollutants

The other category contains those pollution incidents whose type could not be readily defined as belonging to any of the categories listed previously. Figure 28 gives the distribution of other incidents that could be classified in more detail. Excluding those that were unclassified or unknown (34%), the principal types of pollutant were inert suspended solids (23%), natural pollution incidents (12%), rubble/litter (9%), foam (7%), urban run-off (6%) and colour (5%).

6.5.3 Regional distribution

The regional distribution of other pollution types is illustrated in figure 29. South Western and Severn-Trent Regions (both 19%), together with Welsh Region (17%) and Northumbria & Yorkshire Region (14%), recorded the greatest proportion of other pollution incidents. In Severn-Trent Region, aesthetic pollution due to colour accounted for 59% of the national total for this pollutant. Pollution caused by inert suspended solids was reported in all Regions, accounting for 26% of the national total in Severn-Trent Region and 25% in Welsh Region. In Thames Region inert suspended solids accounted for over a third of the regional total. South Western Region recorded 60% of the national total of urban run-off

FIGURE 28
Substantiated other types of pollutant, where classified, 1994

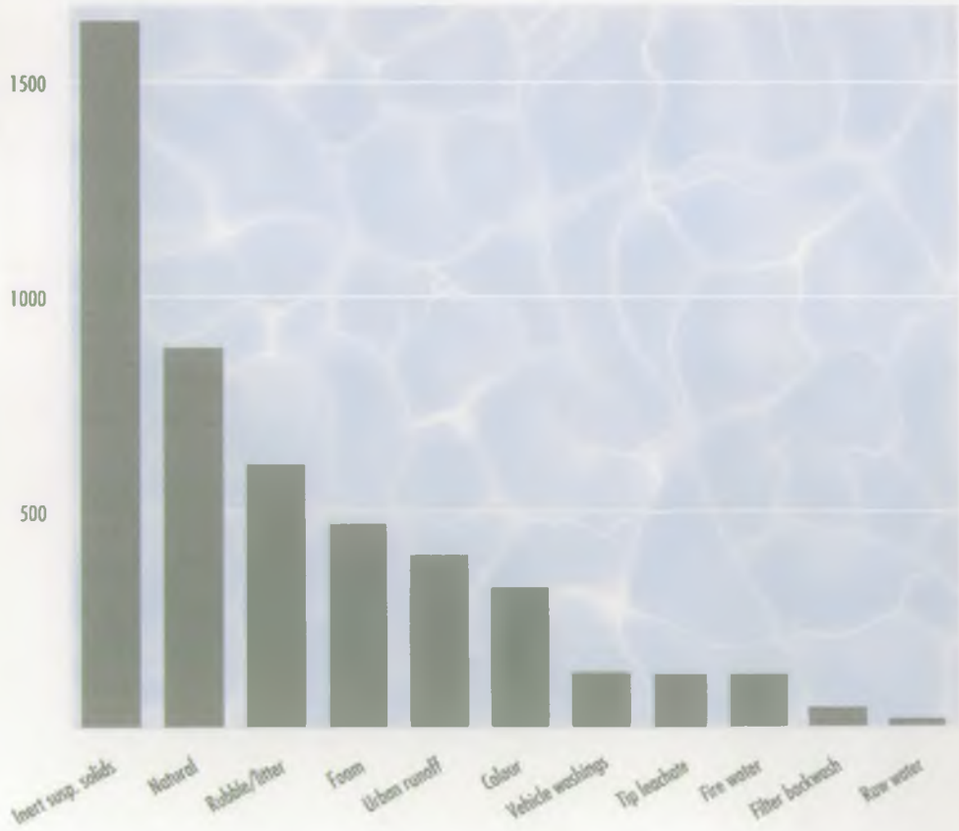
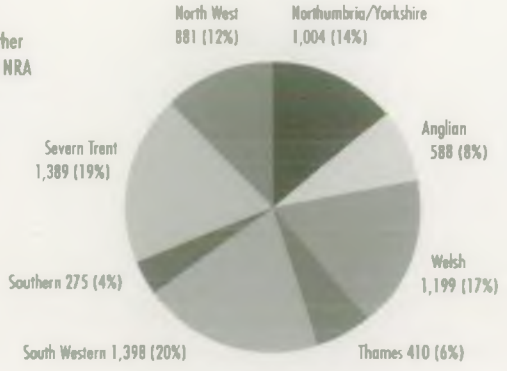


FIGURE 29
Total substantiated other types of pollutant by NRA region, 1994
Total: 7,144



incidents, and in North West Region 29% of all tip leachate incidents were recorded.

6.5.4 Historical trends

Significant improvements have been made in identifying and recording pollutant types. Most categories show an increase and the unknown percentage has fallen from 53% in 1993 to 34% in 1994. Inert suspended solids are again the most significant proportion and represent over 3% of all pollution incidents.

6.5.5 Category 1 incidents

Of the 7,171 other types of incident, 49 (less than 1%) fell into the Category 1 classification. This figure represents only 21% of the total Category 1 incidents by pollution type, and is a 25% decline in Category 1 other incidents since 1993. As can be seen in figure 30, a significant proportion of the remainder was attributable to inert suspended solids (24%).

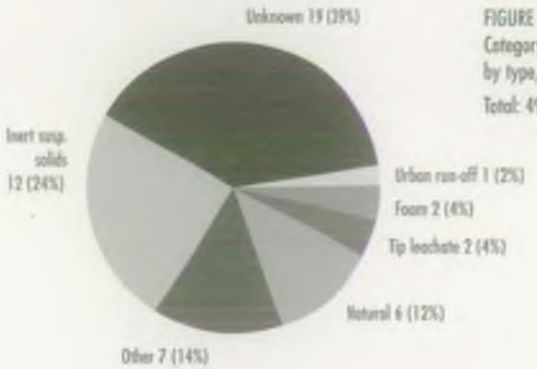


FIGURE 30
Category 1 other pollutant by type, 1994
Total: 49

7 LIMITATIONS OF DATA

Almost all the pollution incidents dealt with by the NRA are reported by members of the public, although some are reported by the emergency services, principally the Fire Brigades. The notification to the NRA and its response are, therefore, to a large extent influenced by public perception of pollution. For example oil is highly visible and most people would regard its presence as unacceptable pollution. However, chronic pollution involving regular discharges of sewage or chemicals may escape reporting because local residents have become accustomed to them. Many pollutants are not visible and can only be detected by their effect on fish and plant life. If there are no fish killed, pollution may go undetected. It is therefore probable that this report underestimates the extent of episodic pollution problems in England and Wales.

The great diversity in polluting materials and the nature of pollution incidents mean that the assessment of impact severity associated with an incident is not always straightforward. Delays in incident reporting by the public, or finding that the polluting discharge has stopped prior to the arrival of NRA staff, may make incident substantiation very difficult or impossible. It is therefore likely that pollution does occur in many of the reported incidents which are not actually confirmed by NRA staff.

Limitations in the different computer systems in use in the regions meant that many incidents could not be easily categorised into the reported source and type fields. Considerable efforts have been made to overcome these difficulties. However, a large number of substantiated incidents remain unclassified. The development of a national incident system has been proposed which would provide a nationally consistent approach.

Lastly, even when the pollutant source and type have been identified, the interpretation of pollutant source and type categories is often rather subjective. For instance, within the organic waste pollution category, it is often difficult to assign an incident to a single type due to the involvement of more than one pollutant material (e.g. slurry and silage liquor). We intend to include information on incident causes in future reports to help to clarify this situation.

8 NRA LEGAL ACTIONS

8.1 COURT ACTIONS

The regional distribution of prosecutions taken and convictions for pollution offences that occurred in 1994 are shown in Table 14. By the end of March 1995, 237 prosecutions for pollution incidents that occurred in 1994 had been heard in court and 94% of these resulted in convictions. As of 1 April 1995 there were 151 cases which had still to come to court.

TABLE 14
Regional distribution of prosecutions and convictions, by NRA Region, against incidents occurring in 1994 and prosecutions outstanding at 1 April 1995

NRA Region	Number of incidents prosecuted	Number of convictions	Outstanding prosecutions	Number of cautions issued	Number of cautions still to be issued at 31 March 1995
Anglian	45	45	14	24	2
Northumbria & Yorkshire	13	13	22	10	4
North West	49	46	20	89	2
Severn-Trent	32	31	27	15	16
Southern	9	5	16	4	4
South Western	29	27	15	25	3
Thames	32	28	10	11	0
Welsh	28	27	27	15	15
TOTAL	237	222	151	193	46

In addition to the court action taken against polluters, the NRA can issue formal cautions. The purpose of these is to deal quickly with less severe incidents, but nevertheless minimise the chances of further pollution being caused. Before a formal caution is issued there must be evidence of the polluter's guilt, the polluter must admit the offence and also understand the significance of a caution and give informed consent to being cautioned. Such cautions can be produced in court if the polluter should subsequently offend again. The regional distribution of cautions issued by the NRA during 1994 is also given in Table 14.
A total of 193 formal cautions were issued during the period January 1994 to March 1995, with a further 46 still to be issued as of 1 April 1995.

8.2 PROSECUTION POLICY

It is the NRA's policy to prosecute Category 1 pollution incidents where there is adequate evidence to support the case. This is not always possible, because the source cannot be traced, because the incident was the result of the actions of unknown persons, or because Crown exemption applies. The policy for Category 2 incidents is less rigid, and allows for the use of formal cautions or warning letters as alternatives to court action where appropriate.

TABLE 15
Prosecutions taken and convictions obtained for Category 1 and Category 2 incidents by pollution source, 1994

Pollution source	Category 1			Category 2		
	Incidents	Prosecution	Convictions	Incidents	Prosecution	Convictions
Agricultural	36	3	3	1,087	71	69
Industrial	75	28	26	1,699	93	88
Sewage & water industry	54	1	1	1,933	20	17
Transport	14	0	0	252	2	2
Other	50	3	3	1,596	16	13
TOTAL	229	35	33	6,567	202	189

TABLE 16
Prosecutions taken and convictions obtained for Category 1 and Category 2 incidents by type of pollutant, 1994

Pollution Source	Category 1			Category 2		
	Incidents	Prosecution	Convictions	Incidents	Prosecution	Convictions
Organic wastes	36	6	6	1,109	65	62
Oil	40	5	4	1,742	30	28
Sewage	52	4	3	1,810	35	32
Chemical	52	13	13	479	24	24
Other	49	7	7	1,427	48	43
TOTAL	229	35	33	6,567	202	189

8.3 PROSECUTION BY SOURCE AND TYPE

Tables 15 and 16 give the number of Category 1 and Category 2 prosecutions taken and convictions obtained by pollution source and type.

8.4 FINES

Detailed information on fines is presented in tables 17 to 19. The largest fine of £30,000 was obtained for an oil pollution incident in Welsh Region. The range of fines shows some signs of moving upwards with higher maximum fines reported for seven of the eight Regions and higher minimum fines in four. The maximum fine available in the magistrates' court under Section 85(6) of the Water Resources Act 1991 remains £20,000, whilst there is no limit to fines imposed in the Crown Court. In deciding the level of fine, the courts will take into account not only the severity of the offence but also the ability of the defendant to pay.

8.5 RECOVERY OF COSTS

In introducing the Water Act 1989 the then Secretary of State for the Environment stated:

> "On the "polluter pays" principle, (the NRA) will be able to charge for discharge consents and *to recover the cost of dealing with pollution incidents.*"

TABLE 17
Fines and Costs Awarded for Pollution Incidents which occurred in 1994 and resulted in Convictions (Jan 1994 - Mar 1995)

NRA Region	Range of fines £	Range of costs £
Anglian	0 - 15,000	0 - 1,598
Northumbria & Yorkshire	250 - 10,000	644 - 3,388
North West	400 - 15,000	0 - 1,813
Severn-Trent	0 - 12,000	0 - 4,645
Southern	0 - 5,000	0 - 5,000
South Western	100 - 12,000	100 - 1,520
Thames	0 - 8,000	300 - 480
Welsh	200 - 30,000	250 - 2,000
Nationally	0 - 30,000	0 - 5,000

TABLE 18
Range of fines and costs by pollution source (Jan 1994 - Mar 1995)

Pollution source	Range of fines £	Range of costs £
Agriculture	0 -14,000	125 - 2,000
Industry	0 - 30,000	0 - 21,908
Sewage & water industry	0 - 15,000	100 - 1,871
Transport	0 - 12,000	350 - 5,033
Other	0 - 7,500	0 - 5,033

TABLE 19
Range of fines and costs by type of pollutant (Jan 1994 - Mar 1995)

Pollution type	Range of fines £	Range of costs £
Organic waste	0 - 14,000	125 - 2,000
Oil	0 - 30,000	0 - 21,908
Sewage	0 - 15,000	100 - 1,871
Chemical	0 - 12,000	350 - 5,033
Other	0 - 10,000	0 - 5,033

In broad terms the principle places the burden of remedial action and of complying with existing environmental provisions on the "producer". The NRA is, of course, fully committed to the principle, which is amongst the other main guiding principles of Community environmental law, although the extent to which the Authority can put it into practice is dependent upon Section 161, Water Resources Act 1991.

The NRA has proceeded on the basis that the legislation provides for recovery of the costs of dealing with pollution incidents, which allows a broad interpretation of Section 161, and enables investigative and supervision costs to be included in "works and operations" as referred to in Section 161.

It is often the case that the NRA recovers its "clean-up" costs as part of a criminal prosecution. However, Section 161 provides an additional civil claim entirely separate from a prosecution in the criminal courts, and subject to a "de minimis" rule where NRA involvement is limited, it is the policy of the Authority to seek to recover in full its clean-up costs where the polluter is traced. Therefore, in addition to the fines and legal costs imposed by the criminal courts, the offender may face a heavy clean-up bill.

In one major case in the Anglian Region, although the criminal prosecution for pollution was unsuccessful, a subsequent civil court case for the recovery of costs resulted in the polluter having to pay costs totalling £107,000.

NRA and the Anglers Cooperative Association (ACA) v Mr J.E. Clarke

In March 1989, some 3 million gallons of slurry entered the river Sapiston near Bury St Edmunds, Suffolk, after the earth bank of a slurry lagoon gave way. The pollution affected 75 kilometres of the Sapiston and Little Ouse and destroyed a fishery. Criminal prosecution against the pig farmer, Mr Clarke, failed on appeal. However, the NRA together with the ACA proceeded with a civil claim for costs to cover investigations, restocking and damage to the fishery. The court finally awarded costs and the sums were eventually agreed in March 1995. The NRA was awarded £90,000 while the ACA got £8,400 and the local angling club £8,450.

The recovery of costs related to agricultural incidents was an area studied by the National Audit Office. Their report recommended an equitable treatment of polluters and steps have been taken within the NRA to ensure that costs are recovered consistently. The Environment Bill includes a clause which clarifies the interpretation of recoverable costs to ensure that the full costs of dealing with pollution incidents are paid for by the polluter where possible.

8.6 NRA PROSECUTIONS THAT OCCURRED IN 1994

8.6.1 Introduction

This section highlights a number of pollution incidents where legal action was taken during 1994. These cases depict the types of incidents dealt with by the NRA on a regular basis, and illustrate the way in which the legal process has operated. The section further clarifies case law and examines some of the more unusual and interesting cases.

8.6.2 Organic waste incidents

NRA v Powell Duffryn Terminals Ltd and UK Waste Management Ltd

In 1994 the NRA commenced the prosecution of Powell Duffryn Terminals Ltd and UK Waste Management Ltd for a pollution incident at Barry Dock, South Wales. The former company had engaged UK Waste Management Ltd to clean out redundant bulk storage tanks prior to demolition. The tanks contained molasses residues and the tank washings were deliberately discharged into the ground to soak away. The molasses

thus found its way into the docks and there deoxygenated the water, resulting in the death of over 17,000 bass, mullet and eels.

The NRA mounted a fish rescue operation saving more than 10,000 fish by netting and transporting them to the open sea. In addition, aeration equipment, borrowed from neighbouring Regions, was deployed in an attempt to remedy the oxygen depletion.

Many complaints were received about the incident and local residents complained of nausea due to the release of hydrogen sulphide from the anaerobic dock waters.

Both companies pleaded not guilty at Cardiff Crown Court, but half way through the second week of the case changed their pleas to guilty under the burden of overwhelming evidence. They were both fined £25,000 for offences against Section 85 (1) of the Water Resources Act 1991 and ordered to pay £65,000 costs between them.

NRA v Cleansing Services Group Ltd

On 24th November 1993 officers of the NRA Southern Region were called to a pollution incident near Kemsing in Kent. On arrival they discovered that part of a watercourse was running red with blood. Further investigations revealed that abattoir effluent had been injected into the soil of an adjoining farm. Some of this waste had apparently found its way into land drains, and from there had discharged into the watercourse. Cleansing Services Group Ltd, the company responsible for the disposal of this waste, pleaded guilty to causing pollution at Sevenoaks Magistrates Court on 4th October 1994, and was fined £4,000 and ordered to pay £750 costs. Such incidents are of particular concern to the NRA for a number of reasons. Firstly, it is concerned that the number of incidents involving the run-off from land of organic wastes is increasing. Secondly, such incidents are difficult to deal with effectively and are often long-lived. They, in effect, become pollution incidents from diffuse sources, often resulting in significant environmental impact for long periods of time. Thirdly, and of most concern, is the fact that many organic wastes are exempt from the Waste Management Licensing system and NRA powers can only be brought into force after an incident has occurred. Thus, the NRA only receives notification once these wastes have been spread onto land and problems have arisen.

8.6.3 Oil incidents

NRA v Highgate School and Independent Petroleum Supplies Ltd

Gas oil from Highgate School, Highgate found its way into the Mutton Brook after a delivery of heating oil caused a spillage to a bunded area surrounding the tank. Due to a hole in the bund, the oil escaped to the drainage system and from there to the brook. On the 20th September 1994, the NRA prosecuted both the school and Independent Petroleum Supplies Ltd, the delivery company, since the pollution resulted from two causes: the failure to check the oil storage tanks, and the failure to maintain the bund. Independent Petroleum Supplies Ltd was fined £2,000 with £260 legal costs to the NRA and Highgate School was fined £5,000 with £260 costs. This case is an example of how more than one party can be held liable for a pollution incident.

NRA v The National Grid Company Plc

Oil pollution spotted by a member of the public in Thames Region was traced to a leaking cable from an electricity line belonging to The National Grid Company Plc. The oil passed through the river bank and into the Beverley Brook at East Sheen, London where the NRA installed booms to prevent further pollution of the stream. Investigations revealed a slow leak from the cable which had contaminated the surrounding ground. On the 11th October 1994

The National Grid Company Plc, which was responsible for the maintenance of the cables, was fined £7,500 and ordered to pay £370 legal costs to the NRA.

NRA v Taylor Woodrow Property Management Ltd

Between March and May 1993 an officer of the Authority saw oil entering the River Test in Hampshire on four separate occasions. The oil was being discharged from an outfall for which there was a licence to discharge held by Taylor Woodrow Property Management Ltd. This licence specified that the discharge should include no traces of oil or grease. Proceedings were therefore brought against the company for breaches of consent. At a hearing in Southampton Magistrates Court in February 1994, the company pleaded not guilty to the offences but was found guilty by a stipendiary magistrate and fined £250 on each charge. It appealed to the High Court on the basis that an offence under section 85(6) of the Water Resources Act 1991 (breach of consent) could only be made out if it were shown that the defendant had made the discharge. Here it was agreed that the defendant merely held the consent and was not directly responsible for what came out of the discharge point. The court held that failure to comply with positive obligations would constitute a contravention of the sub-section, and that it was unrealistic to argue that a defendant was not originally liable because it had not committed a positive act.

8.6.4 Chemical incidents

NRA v Hickson & Welch Ltd

In late 1991, the NRA informed the chemical company Hickson & Welch Ltd that the conditions on their consent to discharge to the River Aire would become more stringent from 1 January 1993. The company failed to take sufficient measures to meet these tighter limits. As a consequence they breached the consented limits for Biochemical Oxygen Demand (BOD), suspended solids, pH and ammonia numerous times during 1993 and 1994. In addition, on 4 February 1994 a spillage of the chemical nitrotoluene at the site entered the river. This was due to the failure of two alarms and the poor state of repair of bunds around a drain. On 31st October 1994 28 breaches, in 21 samples taken, were brought to the attention of the courts through 5 prosecutions; 12 cases and 3 formal cautions were taken into consideration. In total the Company was fined a total of £50,000 and ordered to pay costs of £3,511.

NRA v Dairy Crest

In May 1994 Dairy Crest at Aspatria, Cumbria lost 6,000 litres of concentrated caustic soda solution to the river Ellen, killing 11,000 fish. The incident occurred after an employee left a tap on the caustic soda tank open, allowing it to enter the tank bund. The caustic soda quickly dissolved a protective coating on the bund wall and seeped through a crack into a surface water drain, and from there into the river Ellen. Dairy Crest were fined £2,000, having already spent £150,000 on pollution prevention improvements, £20,000 in restocking costs, over £10,000 for legal and investigation costs and around £13,000 in compensation to anglers for loss of the fishery.

8.6.5 Sewage incidents

NRA v Welsh Water

During a routine inspection of Saundersfoot sewage treatment works (STW) near Tenby, it was noticed that storm sewage was discharging to the Saundersfoot stream. The discharge consent for the STW specifies that storm sewage should only be discharged after a 1-in-50 years rainfall event. Such an event had not occurred and Welsh Water failed to inform the NRA of the discharge, as required by its consent. The stream is

particularly sensitive because it flows across Saundersfoot beach, which is designated under the 1976 EC Bathing Water Directive. Seawater samples from the beach showed that the discharge would have caused a failure of the Directive if formal samples had been taken. The District Council put up signs warning bathers of the poor water quality. Welsh Water pleaded guilty to causing sewage effluent to be discharged to controlled waters, and was fined £20,000 and ordered to pay £2,264 costs.

8.6.6 Inert suspended solids incidents

NRA v Tarmac Construction Ltd

Following a report by a member of the public in February 1994, NRA officers found that the Grand Union Canal at Iver, Buckinghamshire was polluted by quantities of oil and silt. This was a result of lorry washings escaping into the canal via the surface water drainage system. Tarmac Construction Ltd pleaded guilty to causing polluting matter to enter controlled waters and was fined £3,000 with costs of £380.

NRA v Alfred McAlpine Construction Ltd

A second construction company, Alfred McAlpine Construction Ltd, was prosecuted on the 21st November 1994. A pump had been set up to clear clay-contaminated water from a bridge construction site on the new A5 Tamworth by-pass, but workers had failed to ensure that the water was safely discharged. This led to a discharge of clay into the Kettle Brook. Alfred McAlpine Construction Ltd was fined £5,000 and ordered to pay £1,089 costs.

9 CONCLUSIONS AND RECOMMENDATIONS

A number of conclusions together with recommendations for future action can be drawn from this report;

9.1 The level of both reported and substantiated incidents has increased slightly compared to 1993, whilst Category 1 incidents have decreased by 31%. This continued downward trend in Category 1 incidents reflects a growing awareness of the consequences of pollution and an increased willingness to work with the NRA to prevent pollution.

9.2 The NRA is putting considerable efforts into pollution prevention, and into raising public awareness of water pollution. Through our pollution prevention work, we are trying to reduce the number and severity of pollution incidents, whilst initiatives such as the NRA Emergency Hotline are aimed at improving the level of reporting.

9.3 Pollution incidents from the Construction Industry more than doubled during 1994, while inert suspended solids incidents significantly increased. Construction is by a large margin the most frequently identified industrial sector, so pollution prevention campaign efforts will be targeted at this area of industry.

9.4 Despite real progress in improving the quality of effluent from sewage treatment works, sewage pollution from surface water outfalls and combined sewer overflows remains a significant problem. This indicates, as in previous years, that problems of ageing sewerage infrastructure and inadequate capacity exist throughout England and Wales. This is being tackled through the Water Service Companies' agreed programme of investment (known as the AMP2 settlement).

9.5 Oil pollution incidents accounted for over a quarter of all those substantiated during 1994 and, as in previous years, the number of incidents involving oil continues to rise. The recently launched Oil Care Campaign aims to bring about a reduction in oil pollution by working with the oil industry to educate users of oil in industry, commerce and at home on its safe handling, storage and disposal.

9.6 The high percentage of incidents categorised as either unclassified or other, stresses the need for a nationally consistent approach to the recording and reporting of pollution incidents. An improved categorisation system was introduced on the 1st January 1995. A proposal for a single computer-based incident database is under consideration. The NAO study emphasised that the "effective use of prevention resources relies on the existence of comprehensive information" and recognised the considerable potential that increased computerisation offered. In many Regions vital pollution prevention and incident information is held on paper, and only available for local use.

9.7 The NAO study of farm pollution in England examined a significant proportion of the NRA's work in dealing with pollution incidents and in pollution prevention. Most of the conclusions reflected well on the performance of the NRA, and most importantly indicated that pollution prevention had contributed to the overall improvement in water quality between 1990-1993.

10 REFERENCES

DEPARTMENT OF THE ENVIRONMENT (1989).
Digest of Environmental Protection and Water Statistics, No.12. HMSO.

NATIONAL RIVERS AUTHORITY/ MINISTRY OF AGRICULTURE, FISHERIES AND FOOD (1990).
Water pollution from farm waste in England and Wales, 1989.
NRA South West Region, Exeter.

NATIONAL RIVERS AUTHORITY (1992).
The influence of Agriculture on the Quality of Natural Waters in England and Wales - 1990.
Water Quality Series No.6.

NATIONAL RIVERS AUTHORITY (1992).
Water Pollution Incidents in England and Wales - 1990.
Water Quality Series No.7.

NATIONAL RIVERS AUTHORITY (1992).
Water Pollution Incidents in England and Wales - 1991.
Water Quality Series No.9.

NATIONAL RIVERS AUTHORITY (1993).
Water Pollution Incidents in England and Wales - 1992.
Water Quality Series No.13.

NATIONAL RIVERS AUTHORITY (1994).
Water Pollution Incidents in England and Wales - 1993.
Water Quality Series No.21.

NATIONAL AUDIT OFFICE (1995).
Report by the Comptroller and Auditor General. National Rivers Authority: River Pollution from Farms in England

APPENDIX A

DEFINITIONS

NRA Definitions of pollution incident categories

Category 1

A major incident involving one or more of the following:

(a) potential or actual persistent effect on water quality or aquatic life;
(b) closure of potable water, industrial or agricultural abstraction necessary;
(c) extensive fish kill;
(d) excessive breaches of consent conditions;
(e) extensive remedial measures necessary;
(f) major effect on amenity value.

Category 2

A significant pollution which involves one or more of the following:

(a) notification to abstracters necessary;
(b) significant fish kill;
(c) measurable effect on invertebrate life;
(d) water unfit for stock;
(e) bed of watercourse contaminated;
(f) amenity value to the public, owners or users reduced by odour or appearance.

Category 3

Minor suspected or probable pollution which, on investigation, proves unlikely to be capable of substantiation or to have no notable effect.

MAFF Definition of a serious incident

An incident that has any of the following effects and includes all cases where legal proceedings are initiated:

(a) downgrades the class of any water course classified in the River Quality Survey by more than 10% over 0.5 km;
(b) interferes with water abstraction through quantity and quality;
(c) results in fish mortality;
(d) causes significant interference with legitimate use of water, including stock watering;
(e) adversely affects any SSSI, nature reserve or area of high conservation interest

APPENDIX B

Prosecutions relating to pollution incidents that occurred in 1993 irrespective of the date of hearing.

NRA Region	Prosecutions	Convictions
Anglian	Unknown	Unknown
Northumbria & Yorkshire	45	43
North West	90	83
Severn-Trent	97	88
Southern	7	7
South Western	48	44
Thames	49	45
Welsh	28	28

APPENDIX C

Pollution Prevention Guidelines

PPG1 General guide to the prevention of pollution of controlled waters
PPG2 Above ground oil storage tanks
PPG3 The use and design of oil separators in surface water drainage systems
PPG4 Disposal of sewage where no mains drainage is available
PPG5 Works in, near or liable to affect watercourses
PPG6 Working at demolition and construction sites
PPG7 Fuelling stations: construction and operation
PPG8 Safe storage and disposal of used oils
PPG9 The prevention of pollution of controlled water by pesticides
PPG10 Pollution from highway depots
PPG11 Preventing pollution on industrial sites
PPG12 The prevention of pollution of controlled waters by sheep dip
PPG13 High pressure water and steam cleaners
PPG14 Inland waterways: marinas and craft
PPG15 Food stores and similar sites
PPG16 Schools and other educational establishments
PPG17 Dairies and other milk handling operations
PPG18 Control of spillages and fire fighting run-off

In draft: Scrap yards
Airfields
Timber treatment plants
Garages

Leaflets: River pollution and how to avoid it
Chemical pollution and how to avoid it
Chlorinated solvent pollution and how to avoid it
Pollution from your home and how to avoid it
Is your home killing fish - advice on wrong connections
Pollution prevention pays
The Pollution Prevention Pays video is also available from the NRA

Oil Care Campaign:
Follow the Oil Care Code
Oil care at Home
Oil Care at Work

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The NRA is committed to the principles of stewardship and sustainability. In addition to pursuing its statutory responsibilities as Guardians of the Water Environment, the NRA will aim to establish and demonstrate wise environmental practice throughout all its functions.

Water Pollution Incident in England and Wales – 1994

This report details the statistics for pollution incidents notified to and dealt with by the NRA during 1994. It provides an analysis of substantiated pollution incidents by both source and type of pollutant and gives an indication of their environmental impact. The report also gives details of legal action taken in respect of these incidents and a commentary on notable legal cases. In addition the report gives a detailed commentary on how NRA manages pollution incidents and pollution prevention initiatives are described.

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