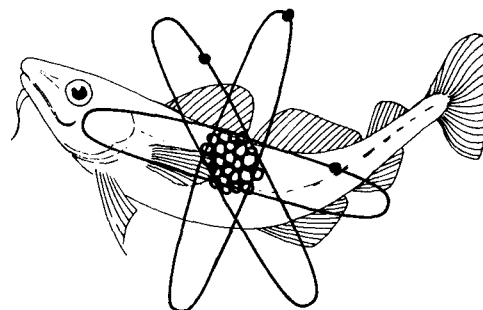


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MINISTRY OF AGRICULTURE FISHERIES AND FOOD

DIRECTORATE OF FISHERIES RESEARCH

AQUATIC ENVIRONMENT MONITORING REPORT



NUMBER 1

CHEMICAL MONITORING OF RESIDUE LEVELS IN FISH AND SHELLFISH LANDED IN ENGLAND AND WALES DURING 1970 - 73

J.E. PORTMANN

LOWESTOFT
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**Chemical monitoring of residue levels in fish and shellfish
landed in England and Wales during 1970-73**

J E PORTMANN

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The author:

J.E. Portmann, BSc, PhD, is a Principal Scientific Officer in the Aquatic Environment Protection Division of the Directorate of Fisheries Research. He is stationed at the Fisheries Laboratory, Burnham-on-Crouch.

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by

J E Portmann

1 Introduction

The Aquatic Environment Protection Division of the Directorate of Fisheries Research is responsible for providing scientific and technical advice to the Ministry of Agriculture, Fisheries and Food in support of its responsibilities for the control of pollution of the aquatic environment. The Fisheries Laboratory at Burnham-on-Crouch is concerned, as part of the Directorate, with the non-radioactive aspects of problems arising from wastes dumped by vessels and from land-based discharges. An essential part of the basis on which advice is formulated is information on the current levels and effects of a range of potentially polluting chemical elements and compounds: a large proportion of the effort of the Burnham-on-Crouch Laboratory is devoted to establishing, maintaining and expanding this part of the information base. The purpose of this report is to provide an account of a substantial part of the laboratory's monitoring programme, and to summarise the results over the years 1970-73 inclusive.

As this is the first report of a series of annual reports on the results of monitoring activities, it is appropriate to define the term monitoring. As used here the term means "The measurement of a pollutant or its effects in order to assess or control exposure to that pollutant of either man or specified elements of the marine resource".

It is possible to measure many pollutants in sea water but, especially in coastal waters, the level at any one site is subject to variations due, for example, to tidal movements, weather conditions and changes in the composition of sea water according to the degree of freshwater influence etc. In addition, concentrations of some pollutants are often so low that chemical analysis poses severe technical difficulties, and the dangers of contamination during sampling, storage or analysis and the significance of contamination become very great. It has, however, been known for many years that fish and shellfish act as concentrators of a number of substances recognised as potential pollutants. Since the concentrations found in the animals are much higher than those found in sea water, the analytical problems are reduced and, even in those water masses where the pollutant level fluctuates, the organism acts as an integrator and thus provides an average value of the concentration and hence the relative degree of pollution in that area. For substances which are bioaccumulated it is, therefore, much more practicable to use biological materials such as fish or shellfish for monitoring purposes.

Pollution is here understood to mean the introduction by man, directly or indirectly, of substances or energy into the

marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities (including fishing), the impairment of quality for use of sea water and reduction of amenities. A pollutant is clearly something which causes pollution. According to this widely accepted definition (GESAMP 1972), the mere presence of an element or man-made organic compound, does not imply that the substance is necessarily polluting. For a substance to be polluting an undesirable effect needs to be demonstrated, and it may well be that this does not occur at the concentration measured.

In many cases, especially in this report, the term contaminant (which implies the presence of a substance foreign to the sample but having no undesirable effect at the concentrations measured) would be more appropriate than pollutant, but as the latter is more commonly used and understood it will be used throughout. However, where a pollutant is referred to, it should not be assumed there is any threat or harm to man or the marine resource at the levels mentioned; merely that at higher levels the substance might have an undesirable effect, i.e. cause pollution. It should also be borne in mind that the organism sampled may not be sensitive to the concentration of substance present, although another species, perhaps its predator, may be. In this report attention is drawn to the few instances where the observed concentrations are at, or approach, those levels which are likely to pose a threat to man, or to an element of the marine ecosystem.

The measurement of levels of pollutants in marine organisms may be used for three purposes:

- a. to monitor environmental levels of pollutants generally,
- b. to determine whether commercial species of fish or shellfish are acceptable for human consumption, and
- c. to determine whether the accumulated substances pose a threat to the fish or shellfish species concerned.

In each situation it may be possible for controls to be applied to limit or more rarely to prohibit the discharge of the pollutant concerned. Additionally or alternatively, it may be necessary for the sale and consumption of the affected species from specific areas to be prevented or controlled. It is, however, possible that the concentration measured is not high enough to pose a threat to either man

or the marine species, but is merely indicative of a locally high level of input of a pollutant. There may also be situations where the substance is not known to pose any threat to man or the marine environment. In both the latter two instances control action may not be necessary and the monitoring operation is then often described by the term surveillance, since trends only are being observed.

As a trend may be upwards, surveillance is almost as important as monitoring, which carries with it more direct implications of control. Similarly, although it is now fairly clear that the concentrations of organochlorine pesticides encountered in the coastal waters off England and Wales pose no threat to either man or marine fish, it is nevertheless desirable to maintain surveillance in order to be able to establish and follow trends which should be downwards,

following the introduction of restrictions on the use of these substances.

1.1 Notes on the presentation of data

Whenever samples were collected, either for the routine or expanded programmes, care was taken to ensure that the date and source were recorded.

In the tables of results the sources of fish samples are usually referred to by the International Council for the Exploration of the Sea (ICES) sub-areas and divisions and/or statistical rectangles for the coastal water, North Sea, English Channel and Irish Sea samples (see Figure 1a) and by place of origin for the more distant water samples.

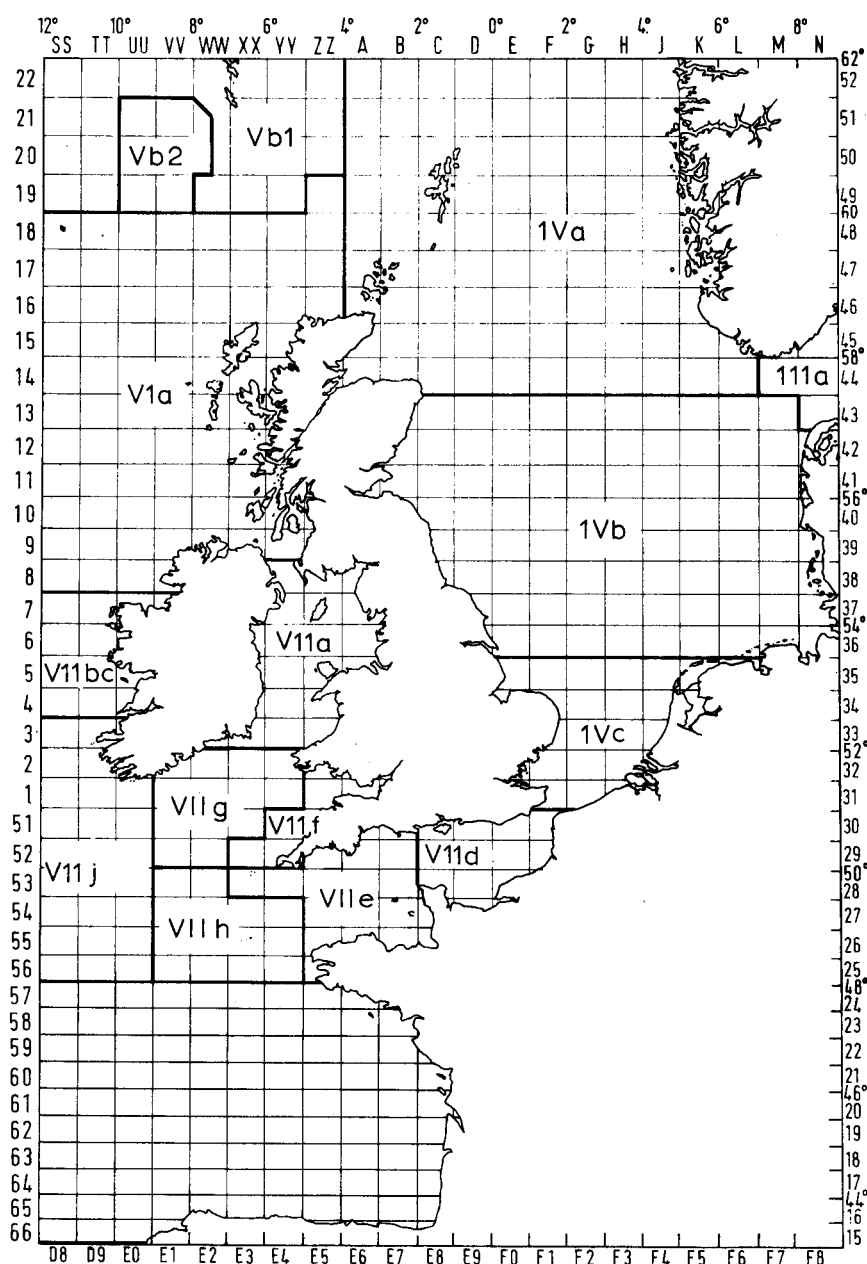


Figure 1a Areas from which most of the fish and shellfish samples are collected showing ICES sub-areas and statistical rectangle codes.

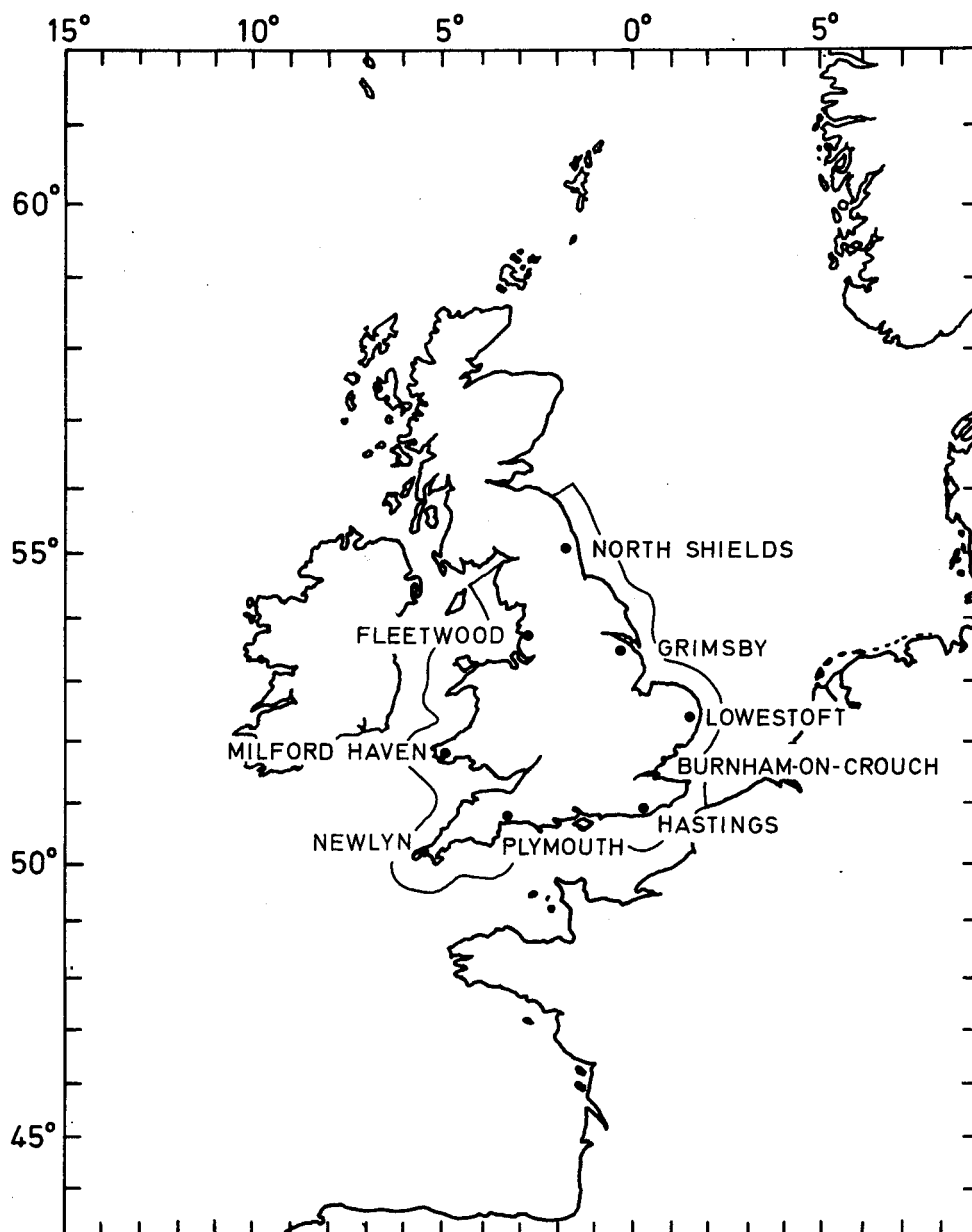


Figure 1b Ports at which the routine sampling was carried out for coastally-caught fish.

In this report the animals sampled are referred to by their common names; species are identified in Appendix 1. For ease of reference results in the tables are given by species in alphabetical order. For the expanded monitoring programme, where several samples were taken from the same area the results are given in date order. All concentrations are given on a wet weight basis.

Throughout the tables, the figures normally quoted for organochlorine pesticide and PCB residues are the results of analyses of homogenised bulked samples, but for metals the minimum, maximum and arithmetic means are shown. Absence of a figure indicates that no measurements was made. It will be noted that there is some variation in the lowest levels recorded. Since the results were obtained over a four-year period during which many improvements in analytical procedures had been introduced, this is

inevitable. In a few cases the variations may be due to very small sample sizes. Despite changes in sensitivity, the results of analytical procedures used between 1970 and 1973 are directly comparable. Full descriptions of chemical compounds referred to are given in Appendix 2.

All tables are grouped together at the end of the text on pages 22—70 of this report.

2 Description of the Routine Programme

2.1 Sampling

The programme of monitoring and surveillance executed by the Burnham-on-Crouch Laboratory commenced in 1968 but it was not until 1970 that the effort was formalised into a routine commitment covering both metals and

chlorinated hydrocarbons such as PCBs and the chlorinated pesticides. Since 1970 samples of fish have been collected twice-yearly from several of the more important fishing ports around England and Wales. These ports are shown in Figure 1b. The species collected wherever possible were cod, whiting, plaice, herring and mackerel. The first samples were taken between January and March and the second between July and September. The samples of fish, which were delivered ungutted, were deep frozen as soon as possible after catching and stored in deep-freeze until analysis. Almost all the samples were collected by fishing vessels working within about 25 miles (40 km) of the coast. (Figure 1b). They were thus representative of the normal port landings for nearshore fisheries and indicate the levels of pollutant likely to be encountered by the consumer of such fish. Because of the reliance on commercial landings, some gaps in sampling were inevitable, as direct purchase of ungutted samples on the dockside is not always possible. Since these samples were taken from estuaries and coastal waters (areas likely to contain elevated pollutant levels) dietary intake studies based on these figures will tend to give a biased picture indicating higher intake levels than those obtained when the proportion of offshore fish in the typical diet is taken into account.

2.2 Pesticide examination

In 1970 the samples were usually analysed only for the organochlorine pesticides α HCH, γ HCH (lindane), dieldrin, DDT and its metabolites TDE (DDD) and DDE, and polychlorinated biphenyls. Polychlorinated biphenyls (PCBs) are organochlorine compounds which have a limited degree of pesticidal activity. Far more important, however, is the wide variety of their possible industrial usage and the fact that they have been in production since the late 1930s.

The reasons for the inclusion of PCBs in the routine monitoring programme were two-fold. Firstly, they have a biological significance, e.g. they have been implicated in the decline of some species of sea birds, in particular the major Irish Sea bird kill in 1969. Secondly, the extraction procedure used as a precursor to analysis of the organochlorine pesticides also extracts PCBs, and separation is necessary to avoid interference in the determination of the organochlorine pesticide residues. Once separated, PCBs can readily be identified although, since the commercial product is a mixture of compounds, quantification is less easy. This is normally done by comparison with a commercial formulation; the observed level is reported on the basis that the residue found is derived from Aroclor 1254, as this formulation usually matched the residue traces most closely (see Figure 2). These residues are probably derived from a wide range of PCB compounds, which have been subjected to selective degradation in the marine environment (Rhead, 1975; Willis and Addison 1974).

In the work reported here, analysis was carried out by gas liquid chromatography using electron capture detection, and verification was almost exclusively on the basis of

comparability of results obtained using two different chromatographic columns. Each sample of fish normally consisted of ten individuals; a full length fillet was cut from each fish, the skin was removed and all ten fillets were homogenised to give a composite sample from which a sub-sample was taken for analysis. The livers were also analysed for organochlorine pesticides and PCBs: since these substances are lipid (fat) soluble they tend to be accumulated in lipid rich tissues such as livers. All the livers from one sample were bulked and homogenised with a sub-sample being taken for analysis. Since 1972 samples of all homogenates have been stored deep frozen to allow repeat analysis or analysis for hitherto unrecognised pollutants.

2.3 Metal examination

Since 1970 samples have also been analysed for six metals, namely mercury, lead, cadmium, copper, zinc and chromium. Of the metals analysed in the routine programme only mercury, lead and cadmium were thought capable of posing any potential risk to man as a consumer. Copper, zinc, and chromium are, however, all potentially damaging to marine life and it is therefore important to establish whether levels are rising or whether there are areas which are subject to high inputs. Each fish was analysed separately and the determination was carried out using atomic absorption spectrophotometry. A conventional air-acetylene flame was used for all metals except mercury which was measured by a cold vapour method. Concentration and or background correction to eliminate interference was employed as necessary but was generally used in the determination of lead and cadmium.

3 Description of expanded monitoring programme (other species and other areas)

In addition to the routine monitoring programme, an expanded monitoring programme has been developed to meet wider needs than those covered by the routine monitoring programme.

All the samples of fish and shellfish taken as part of this expanded programme have been analysed for metals, and in some cases for organochlorine pesticide residues and PCBs. Generally the fish and the larger species of shellfish, e.g. crabs, were analysed on an individual basis for metals, although the organochlorine residues were usually determined on bulked samples due to the time-consuming nature of the analytical procedure. The smaller species such as mussels and oysters were analysed on a bulked sample basis where all the individuals, excluding shells, were homogenised and a sub-sample analysed; shrimps were normally analysed whole.

3.1 Additional fish samples

The routine programme outlined above provided valuable basic information on trends in the levels of the monitored substances in aquatic organisms and on the normal contribution to the human dietary intake by fish from

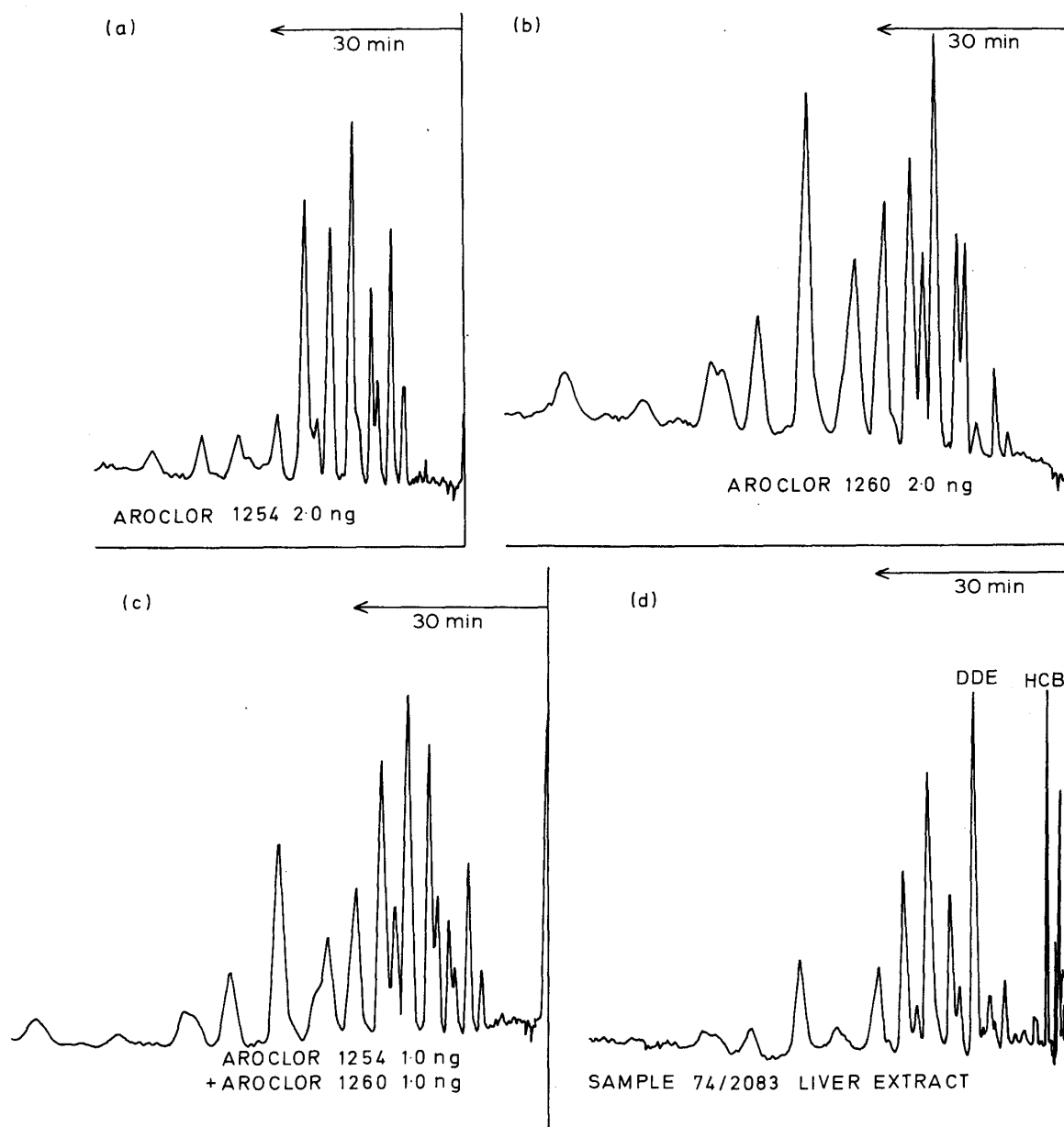


Figure 2 Chromatograms of (a) Aroclor 1254 (b) Aroclor 1260 (c) a 1: 1 mixture of Aroclor 1254 and 1260 (d) an environmental sample.

coastal waters. Since the areas most likely to be subjected to the highest concentrations of naturally occurring and man-made substances are the coastal areas, it is reasonable to assume that the levels found in fish or shellfish taken from these areas are likely to be higher than those found in fish or shellfish from distant waters. The levels of potential pollutants found in fish or shellfish from distant water fishing grounds are therefore important since they provide a baseline level against which the levels found in coastal waters can be assessed. Moreover, at the time the surveys reported here were conducted the majority of the fish consumed in England and Wales came from distant water fishing grounds such as Iceland and the Barents Sea, and it was necessary to measure the levels of these substances in order to establish normal dietary intake levels. In addition, the routine programme did not provide data on fish from those areas most heavily contaminated by

pollutants, i.e. in or near to industrial estuaries. This latter information is particularly important from the point of view of pollution control. Therefore, in addition to the coastal monitoring discussed above samples of fish have been collected from most areas including estuaries and distant water fishing grounds, and fished commercially by vessels operating from ports in England and Wales. Since some species are more likely to accumulate certain pollutants, e.g. tuna and flounders in relation to mercury (Miller *et al* 1972; Somer, 1973), a wider range of species was included in this programme than in the routine sampling programme.

3.2 Shellfish samples

During the period 1970–73 most of the commercial shellfisheries around England and Wales were sampled together

with a number of non-commercial species from areas known or suspected to be polluted. Non-commercial species were used where there were limited commercial fisheries or because a species was known to selectively accumulate the pollutant of interest, e.g. limpets and dog whelks in relation to cadmium.

3.3 Monitoring of dumping areas

A statutory function of MAFF as part of its role in the control of marine pollution is related to the Dumping at Sea Act 1974, and this requires the regular monitoring of sites used for the dumping of wastes at sea. This is carried out at the Burnham-on-Crouch Laboratory. Although this report does include data on fish collected as part of the monitoring surveys in these areas, some of the more detailed results including data for a variety of benthic (bottom-living) organisms, sediments, and non-commercial fish species are to be the subject of separate reports.

3.4 Other samples

As part of the programme to provide data on human dietary intake levels especially of metals, the Laboratory also analysed a variety of canned and frozen fish products. These results have been reported in White Papers dealing with foodstuffs in general (MAFF 1971, 1972, 1973a, 1973b) and are therefore not discussed in this report.

4 Results of the routine programme 1970–73

Summaries of the results of this programme for each of the years 1970, 1971, 1972 and 1973 are presented in Tables 1, 2, 3 and 4. The results show the range of concentrations found for each species; data from all ports have been combined. More comprehensive details, with results according to the port of landing and season, are given in Tables 1a, 2a, 3a and 4a.

4.1 1970 Routine programme

Of the maximum number of samples anticipated (90, comprising 5 types of fish from 9 ports, twice a year) some 69 were collected. Of these three were repeat samples from the same port but different fishing grounds. If these are excluded then the sampling success rate was 70%. Results of residue analyses of the samples are given in Tables 1 and 1a.

At the time when these samples were analysed large numbers of other fish and shellfish were being analysed for mercury and although most of these routine samples were also analysed for mercury time did not allow determination of other metals. However, most samples were analysed for organochlorine pesticide and PCB residues.

4.1.1 Metals (mercury)

Typical average mercury concentrations in fish caught in the coastal waters around England and

Wales was up to about 0.3 mg/kg wet weight (MAFF 1971) although individual fish did reach 1.3 mg/kg. Most of the mean concentrations found in the routine samples were within the range 0.10–0.20 mg/kg.

The highest concentrations both in terms of range and mean values were recorded in fish landed at Burnham-on-Crouch. These fish were caught in the outer Thames Estuary which was identified, by the Interdepartmental Working Party established to investigate the levels of mercury in all foods, as being one of the areas around England and Wales which yielded fish containing above average levels of mercury (MAFF 1971, 1973a). The other areas were within Morecambe and Liverpool Bays. Fish from these areas are not landed in large quantities although it will be noted that the concentrations found in the coastal samples taken at Fleetwood were somewhat higher than those found elsewhere.

Above average concentrations of mercury were found in cod and whiting landed at Hastings in both winter and summer and are difficult to explain. It is likely that these fish had spent some time in the Thames Estuary before migrating round Foreland Point to the English Channel. A further possibility is that the fish had been subjected to an inshore current of relatively polluted water flowing southwards along the Kent coast from the Thames Estuary. No explanation, other than the possibility of adventitious contamination, can be offered for the high concentrations of mercury recorded in the winter and summer samples of cod from Milford Haven and the summer whiting sample from Newlyn; none of the comparable samples taken during early 1971 was high in mercury.

The eight samples of mackerel contained higher concentrations of mercury than other species from the same area. It is now generally recognised (Peterson *et al*, 1973) that certain species, such as tuna, naturally concentrate mercury to a greater extent than other species. Mackerel are similar to tuna and feed on young pelagic fish, and it is possible that this similarity accounts for their natural tendency to attain higher levels of mercury.

4.1.2 Organochlorine compounds

As would be expected from the lipid (fat) soluble nature of the organochlorine pesticides and PCBs, the concentrations of these substances reflect the lipid content of the tissues. Thus, in species like cod, whiting and plaice the highest concentrations were found in livers, whereas the concentrations found in the muscle tissue of the same samples were much lower – often below 0.001 mg/kg, the detection level for most of the residues.

With the exception of one sample of cod from Plymouth, the livers of which were found to contain 0.4 mg/kg γ HCH the concentrations of both isomers of HCH were below 0.1 mg/kg, many of them being recorded as less than 0.001 mg/kg, the limit of detection. The highest concentrations of dieldrin were found in livers of whiting from Grimsby (0.66 mg/kg) and livers of cod and whiting from Plymouth (0.65 and 0.25 mg/kg respectively) all of which were caught in the summer. Residue levels in fish from these areas were low in the winter when the highest dieldrin concentration was found in livers of whiting landed at Lowestoft. It is interesting to note that in the samples containing the highest dieldrin residue concentrations the total DDT concentrations were also comparatively high, although high DDT concentrations were not always associated with high dieldrin.

There was no obvious relationship between DDT and its metabolites TDE and DDE; no compound was consistently predominant. It is however noticeable that where the DDT concentration was low, so was the concentration of TDE and DDE, whereas whenever DDT was present in high concentration TDE was often present in greater concentration than DDE. In almost all the samples analysed the PCB concentration was consistently higher than the remainder of the organochlorine pesticides combined. However, the ratio of PCB to DDT did not usually exceed 10:1. Notable exceptions to this general rule were found in the winter cod liver sample from Burnham-on-Crouch, and the winter whiting liver sample from Hastings, where the ratio was in excess of 100:1 with exceptionally high concentrations of PCB (11.6 and 13.3 mg/kg respectively).

From a knowledge of sources of input and water movements it would be expected that the cod landed at Burnham would have had a higher PCB content than the whiting landed at Hastings. If the concentration of PCB in lipid is calculated, the lipid of Thames cod contained 30.5 mg/kg PCB, and that of Hastings whiting 17.6 mg/kg. It should be noted however that although the amount of PCB in the liver of these fish was high, the concentration in the muscle tissue was low and similar to that found in fish from other areas. The results do however indicate a locally high input into the Thames Estuary of PCB which fish accumulate in their liver.

With very few summer samples available it is not possible to assign any relative significance to the results of organochlorine analysis of samples taken in 1970, but it does appear that the concentrations found in the samples from Milford Haven, Newlyn and Plymouth (with the exception of the high dieldrin in cod liver already mentioned) are generally lower than those found elsewhere.

Samples landed at Grimsby and North Shields were generally found to contain average concentrations, whereas those from Lowestoft, Burnham-on-Crouch Hastings and Fleetwood tended to be highest. In marked contrast to the low levels of fat soluble residues in demersal fish muscle which is low in fat content, the concentrations of residues found in the liver and muscle tissues of mackerel and herring were similar; muscle tissue of these two species is relatively high in its fat content. It should be noted however that high lipid content was not always associated with high organochlorine residue levels, e.g. the livers of whiting from North Shields with a 55% lipid content, contained DDT and PCB's at concentrations of 0.36 and 0.35 mg/kg respectively.

4.2 1971 Routine programme

In 1971 64 samples were examined, representing a 71% sampling success rate. In addition to the routine species, a sample of pilchards from Newlyn and two of haddock landed at Grimsby and Milford Haven were examined. Results are given in Tables 2 and 2a.

4.2.1 Metals

As in 1970, the highest mean concentrations of mercury were recorded in fish from the outer Thames Estuary landed at Burnham-on-Crouch. In 1970 high concentrations were also recorded in cod from Hastings, but in 1971 the concentrations in cod from that port were below normal for coastal water fish, although the concentration found in plaice was higher than average. Of the other samples analysed, most had mean concentrations below 0.2 mg/kg and generally the maximum values recorded were below 0.5 mg/kg. As in 1970, the only species which consistently showed higher than usual values was mackerel, which was again found to exhibit an apparently natural tendency to accumulate mercury. However, not all the mackerel samples contained high concentrations e.g. the Newlyn winter sample contained from less than 0.01 to 0.04 mg/kg (mean 0.02 mg/kg) and the Hastings summer sample between 0.04 and 0.22 mg/kg (mean 0.09 mg/kg).

Also in 1970, the whiting landed at Fleetwood showed higher than normal concentrations of mercury. So did whiting landed at Newlyn, which in the summer of 1970 showed higher concentrations of mercury than at most other places. Cod landed at Milford Haven in the winter of 1971 continued to show the higher values noted in 1970 summer samples, but the sample landed in the summer was normal. The origins of the Milford Haven samples taken in 1971 and 1970 were similar.

The samples were analysed also for other metals recognised as being potentially harmful to man;

cadmium, lead, chromium, zinc and copper.

The maximum cadmium content recorded in any fish was 0.6 mg/kg in a mackerel and a whiting landed at Fleetwood. However, in almost all samples the average concentrations were below 0.1 mg/kg i.e. below the minimum detectable level for the method used.

With the exception of a few high concentrations, most of the lead concentrations found were below 0.5 mg/kg – the minimum detectable level of the method in use at that time. The highest values recorded were 2.5 mg/kg in a pilchard from Newlyn, 7.0 mg/kg in a whiting from Newlyn, 5.0 mg/kg in a herring from Newlyn and 5.0 mg/kg in a mackerel and 5.5 mg in a whiting from Fleetwood. As almost all of the few high values arose in the Newlyn samples it seems possible that they were contaminated either in transit or during dissection and preparation or examination, for all were processed together.

Almost all the concentrations of chromium were recorded as less than 0.5 mg/kg wet weight.

Most of the zinc concentrations in individual fish and all the mean concentrations were below 10 mg/kg. The highest concentrations tended to occur in the pelagic species, herring, mackerel and pilchards, but in samples of cod, plaice and whiting a narrow concentration range was observed, indicating a capacity for regulation of zinc content.

Many of the concentrations of copper were found to be below 0.5 mg/kg. The highest values, including the maximum individual concentration (10 mg/kg in a cod from Milford Haven), appeared to occur in fish caught off the south-west and the west coasts of England and Wales.

4.2.2 *Organochlorine compounds*

The relationship between organochlorine compounds and fatty fish tissues shown in 1970 was apparent in 1971. High concentrations of residues invariably occurred in the high lipid content tissue, e.g. cod livers, whereas the concentrations in the low lipid content muscle tissue were much lower.

With the exception of a single sample, all the HCH residue levels were below 0.1 mg/kg and most of the muscle tissue values were below the detectable level of 0.001 mg/kg. All the samples landed at Plymouth, where some of the 1970 samples were high in HCH, were low in 1971 (from less than 0.001 to 0.025 mg/kg).

All of the maximum dieldrin concentrations were recorded in liver tissues, the highest being recorded

in the winter samples of cod landed at Burnham-on-Crouch (0.23 mg/kg) and cod landed at Hastings (0.20 mg/kg). The equivalent muscle tissue values were, however, very low (less than 0.002 mg/kg). The highest concentrations of dieldrin recorded in 1970 were found in the summer samples, but comparisons cannot be made between years because dieldrin was not measured in most of the 1971 summer samples. The same association of high dieldrin with high DDT content was observed, although again the converse did not apply.

All the high concentrations of total DDT were found in the liver tissues of cod and whiting, although the muscle tissue levels in these same samples were always much lower, generally less than 0.05 mg/kg. Even in herring and mackerel the muscle content exceeded 0.1 mg/kg only in two summer samples of herring landed at Fleetwood and Plymouth (0.14 mg/kg) and in one sample of mackerel at Fleetwood (0.24 mg/kg). Most of the highest concentrations were observed in the summer samples when nine of the samples were recorded as greater than 1 mg/kg, whereas in the winter sample only one of the concentrations exceeded this value. This is probably related to seasonal fluctuations in residue levels. In the winter samples, the liver weights and their lipid content were generally higher than those observed in summer and a dilution effect might be expected. Furthermore, in winter a proportion of the lipid, and probably its organochlorine residue, is mobilised as the gonads develop, leading to a reduction of organochlorine residue in the liver. As in 1970, no clear pattern of predominance of DDT or a metabolite could be discerned. With only a few exceptions, e.g. winter samples of cod from Newlyn, in which the DDT content was much lower than that of DDE and TDE, there was a general trend of roughly the same order of concentration for all three residues. However, there is some evidence that if the DDT content is particularly high then the metabolite present in greatest concentration is DDE, suggesting that this is the main metabolic route in fish.

The concentrations of PCB were always low (with one exception, less than 0.1 mg/kg) in the muscle tissues of cod, plaice and whiting, although concentrations in the muscle tissue of herring and mackerel of up to 0.7 mg/kg were recorded. As with DDT, the highest concentrations were observed in the summer samples. The concentration of PCB was greater than that of DDT in all samples, but generally not by a factor of more than 10. The highest concentrations of PCB (27.6 and 27.8 mg/kg) were higher than the highest found in 1970 and were observed in whiting livers from Grimsby and Plymouth. Although, as in 1970, the samples of fish landed at Burnham and Hastings

contained relatively high PCB residue concentrations, the amounts were not exceptionally high and the ratio of the PCB to DDT levels was normal.

As with the 1970 results, it is difficult to identify any port where the residue levels were consistently lower than elsewhere and, although higher levels can be discerned, there is no clear evidence that these are more preponderant in fish landed at any one port. Again, as in 1970, all the levels of all the residues in muscle tissues are below those normally considered harmful to man.

4.3 1972 Routine programme

The success rate in terms of sample collection was similar to that achieved in 1970 and 1971 with 67 samples collected out of a probable maximum, governed by seasonal availability of fish, of about 80. Samples were landed at most of the ports but no samples were obtained from Burnham-on-Crouch in the summer of 1972 and only one of the required species was collected at Lowestoft and Hastings in the winter period. Results are given in Tables 3 and 3a.

4.3.1 *Metals*

As in previous years, the mean level of mercury in the fish landed at most of the ports was below the level of 0.2 mg/kg found to be typical of fish from coastal waters. The concentrations of mercury found in fish from the Thames Estuary and of those landed at Hastings, at least in the winter, continued to be higher than those generally observed elsewhere, although the mean concentrations were below those established as "action levels" in other countries. The concentrations recorded in the samples landed at Fleetwood in the early part of 1972 were high by comparison with other typical values and those taken in the summer included individual fish containing the highest concentrations (maximum 1.5 mg/kg) recorded in the routine sampling programme. The summer samples were, however, caught nearer to Morecambe Bay than the winter samples, and were probably nearer sources of pollution. Many of the mean concentrations of mercury found in mackerel were less than 0.1 mg/kg, i.e. rather lower than in 1970 and 1971, although there were individual fish with concentrations of up to 0.76 mg/kg.

The highest individual concentration of cadmium was 0.7 mg/kg in a whiting landed at Fleetwood, although the mean concentration in this sample was less than 0.2 mg/kg. The majority of the cadmium concentrations were recorded as being less than the detectable limit of 0.1 mg/kg.

The highest individual concentrations of lead were

found in mackerel landed at Plymouth (3.6 mg/kg) and whiting from Milford Haven (6.8 mg/kg). Most of the fish, however, contained less than 0.5 mg/kg, the detection limit at that time, although those landed at Hastings and Burnham-on-Crouch consistently contained more than 0.5 mg/kg. The concentrations of lead in all fish from Newlyn were low, confirming the view that some of the 1972 samples had been contaminated.

With the exception of all of the samples landed at Hastings and some of those at Lowestoft which contained detectable levels, the chromium concentrations in all fish were recorded as being below the detection limit which was either 0.5 or 0.2 mg/kg, depending upon the date of analysis.

Most of the cod, whiting and plaice contained less than 10 mg/kg zinc, although the summer sample of plaice from Newlyn proved to be an exception with a mean concentration of 13 mg/kg. The range of concentrations and the maximum concentration of zinc found were all higher in the pelagic species (mackerel, herring and pilchards) and, as in 1971, this is especially noticeable in the samples from south-west and west England.

Although the maximum concentration of copper (5.5 mg/kg) was recorded in plaice landed at Burnham-on-Crouch, the majority of the copper concentrations were low — most did not exceed 2 mg/kg.

4.3.2 *Organochlorine compounds*

As in 1970 and 1971, only in one sample of fish (whiting from Milford Haven) did the concentration of either isomer of HCH exceed 0.1 mg/kg (0.13 mg/kg in liver). In the muscle tissue many of the concentrations were below the detectable level of 0.001 mg/kg and none exceeded 0.1 mg/kg.

The highest concentration of dieldrin was recorded in the livers of the summer samples of cod from Hastings. As in 1970, a larger number of concentrations of dieldrin in excess of 0.2 mg/kg were recorded in samples collected during the summer months of 1972 no samples were analysed for dieldrin in the summer of 1971). This is possibly a reflection of the low lipid content of the fish livers in summer months, but might also be due to summer usage of dieldrin on land. All the higher concentrations were recorded in liver tissue; muscle levels were all less than 0.008 mg/kg, except in herring and mackerel where levels of up to 0.02 mg/kg were typical. A higher than average concentration of dieldrin was generally accompanied by higher than average DDT concentrations but, as observed with the results of 1970 and 1971 samples, the converse did not apply.

Many of the concentrations of total DDT in muscle tissue were below 0.02 mg/kg. Even in the muscle tissues of herring and mackerel, expected to contain higher residue levels, most of the concentrations were below 0.1 mg/kg. Only the muscle tissue levels in the summer mackerel samples landed at Fleetwood, Milford Haven and Lowestoft, with 0.37, 0.17 and 0.31 mg/kg respectively, significantly exceeded this concentration. The highest concentrations of DDT, as in previous years, were found in fish landed at Burnham-on-Crouch or Hastings, although the highest concentrations in individual samples (4.9 mg/kg and 6.3 mg/kg) were found in the two samples of whiting livers from Fleetwood. As noted in 1971, a larger number of concentrations in excess of 1 mg/kg were found in the summer samples compared with the winter samples (15 compared with 6). Generally the residue concentrations of DDT and the metabolites DDE and TDE were similar; usually when the concentration of one was low, all were low. Of the two metabolites DDE and TDE, the former usually predominated.

Concentrations of PCB in the winter samples were highest in the livers of whiting landed at Burnham-on-Crouch and Hastings (25 and 24 mg/kg) respectively, there was also a high concentration (27 mg/kg) in the summer whiting sample landed at Hastings. A similar pattern was observed in 1970 but the maximum concentrations found in 1972, although similar to those found in 1971, were approximately double those found in 1970. As in 1971, the livers of whiting caught off Plymouth in the summer of 1972 contained high concentrations of PCB (26 mg/kg) and whiting caught by a Newlyn vessel in the adjacent ICES rectangle also had a high concentration of PCB in their livers (27 mg/kg). Also high was the PCB content of the summer whiting liver sample landed at Fleetwood (23 mg/kg). The concentrations of PCB in the muscle tissues of cod, plaice and whiting, including those whiting which had high liver concentrations, were comparatively low, all except the summer whiting sample from Plymouth being less than 0.2 mg/kg. In herring and mackerel, which have similar lipid levels in the liver and muscle, concentrations of PCB in the muscle and liver tissues were also similar but generally did not exceed 0.5 mg/kg.

For the organochlorine pesticide residues, although relatively high concentrations in individual fish were recorded there is no evidence that levels in fish landed at one port were higher than those landed elsewhere. However, in contrast, PCB concentrations appeared to be consistently higher in livers of whiting landed at Burnham-on-Crouch, Hastings, Plymouth and Fleetwood.

4.4 1973 Routine programme

Although efforts made in 1972 to improve sample collection met with some success, no samples at all were collected at Burnham-on-Crouch in 1973, and only 42 samples out of a possible 80 or so were collected and analysed. The greatest single contributory factor in this poor record was the tragic sinking of the vessel, and loss of crew, which had previously collected the Plymouth samples. Results are given in Tables 4 and 4a.

4.4.1 Metals

In the absence of any samples from Burnham-on-Crouch or Hastings in the early part of 1973, the highest concentrations of mercury in fish collected in the first half year were recorded in the samples from Fleetwood. With the exception of these Fleetwood samples, and their equivalent samples in the summer of 1973, the mean concentrations of mercury in all the remaining 1973 fish samples were below the typical maximum mean for coastal fish of 0.3 mg/kg. The concentrations of mercury found in the summer samples from Hastings were below those found in previous years. Only two of the fish analysed in 1973 contained more than 0.5 mg/kg.

With the exception of a few samples of mackerel and whiting from Milford Haven the concentrations of cadmium were all below the detection level which varied between 0.1 and 0.3 mg/kg according to the method used.

Most of the lead concentrations were also below the level of detection. However, as in 1972, the samples from Hastings were consistently above the detection level. The highest individual concentration (2.1 mg/kg) was recorded in plaice landed at Lowestoft but this almost certainly reflects sample contamination either during collection or in the course of preparation for analysis.

Most of the summer samples of fish contained less than 0.5 mg/kg of chromium and although several of the winter samples are shown as containing more than 1 mg/kg, the discovery of a consistent analytical error places these figures in some doubt.

As in the three previous years, very few of the samples were found to contain more than 10 mg/kg zinc, the only exceptions being herring landed at Plymouth and North Shields, which included individual fish containing up to 15 and 12 mg/kg respectively and mackerel landed at Fleetwood containing 16 mg/kg.

As in 1972, all the concentrations of copper found

were low, none of the mean concentrations exceeded 2 mg/kg, and the range of concentrations found for both copper and zinc, as observed in previous years' results, was always very small.

4.4.2 Organochlorine compounds

The concentrations of HCH found in the muscle tissues of the samples collected in 1973 were, in most cases, below the detection level of 0.001 mg/kg and none exceeded 0.009 mg/kg. With two exceptions the concentrations of HCH in the lipid rich liver tissues of all samples were lower than 0.1 mg/kg, the vast majority being less than 0.04 mg/kg, the lowest levels recorded since observations began in the routine programme.

The highest mean concentration of dieldrin (0.47 mg/kg) was found in the livers of cod landed at Grimsby early in 1973, but cod and whiting from Lowestoft in both winter and summer carried more than 0.2 mg/kg dieldrin in their liver tissues. Most of the muscle concentrations of dieldrin in cod, plaice and whiting, were very low, often less than 0.001 mg/kg, the detection level. The concentrations found in herring muscle were also low and the highest was only 0.043 mg/kg (herring from Fleetwood). Unlike the pattern observed in previous years, there was no evidence of high concentrations of dieldrin occurring in the summer months, although as in previous years the highest dieldrin concentrations tended to be associated with the highest DDT concentrations.

Following the pattern noted in 1971 and 1972, the highest total DDT concentrations (3.3 mg/kg) were recorded in livers of whiting landed at Fleetwood. Again, as in previous years, the proportion of samples of liver tissues having total DDT concentrations greater than 1 mg/kg was greater in summer samples than in the winter samples, and the concentration of total DDT found in the muscle tissues of cod, plaice and whiting, even in those fish where high concentrations were found in the liver, were low and often less than the detectable concentration 0.005 mg/kg. Although the concentrations of total DDT found in the muscle of herring and mackerel were higher than in cod, plaice or whiting muscle, the highest concentration was still only 0.15 mg/kg (herring from Fleetwood). There was no definite pattern to the proportion of DDT relative to its two metabolites, DDE and TDE, although in most cases the concentrations of all three residues were similar.

Generally the highest concentrations of PCBs were found in those fish livers which had high concentrations of DDT and metabolites. The PCB

concentrations were, however, invariably greater than those of DDT, usually by a factor of between five and ten. The highest concentrations of PCBs were observed in livers of cod landed at Plymouth (18 mg/kg) and whiting at Hastings (15 mg/kg) but were lower than the highest concentrations found in 1972 and 1971. It is possible that levels in the coastal waters have begun to fall following the restrictions imposed in 1971. No samples were landed at Burnham but, although the highest individual values were recorded in fish landed at Plymouth, it seems from inspection of the data that, as in previous years, the areas most heavily contaminated with PCBs were the north Irish Sea and the Southern Bight of the North Sea, ie samples landed between Lowestoft and Hastings and at Fleetwood were most likely to have highest concentrations. There is also some evidence of locally high inputs around Plymouth.

5. Summary of the results of the routine programme 1970-73

At the time of writing, the MAFF routine monitoring programme of coastal waters has run for almost six years and the results of the first four years of monitoring the levels of metals, organochlorine pesticides and PCBs in fish may be summarised as follows:-

a. The mean levels of mercury in the edible portion of muscle of fish sampled between 1970 and 1973 were generally below 0.5 mg/kg and typically were below 0.2 mg/kg. However, in a few areas, particularly off the south-east coast and to a lesser extent off the north-west, the mean values of certain species did exceed 0.5 mg/kg. Some fish were found with concentrations of mercury in their muscle tissue in excess of 1 mg/kg (maximum 1.5 mg/kg) but their total number was only eight individual fish which, out of a total of over 2,000 fish sampled, represents 0.4%.

b. Almost all the concentrations of cadmium found in the fish were below the detectable level of the methods used (less than 0.1 mg/kg in most cases).

c. The observed concentrations of lead exhibit considerable variability; in most cases the levels were below that detectable by the method used at that time, the detection level having been progressively reduced from 0.5 to 0.2 mg/kg over the four year period. However, from time to time, and on one occasion in a whole batch of fish, high values were encountered in individual fish. It is now recognised that lead is a ubiquitous particulate contaminant in the atmosphere and, at the levels normally being measured, it is possible that a single particle landing on a sample could account for a

high value. It is therefore likely that many of the sporadic, high values represent sample contamination rather than true tissue levels.

d. Most of the levels of chromium were lower than 0.5 mg/kg.

e. Copper and zinc levels in muscle tissue generally showed a very narrow range of concentrations within any one sample of fish, although these differ from area to area. The surveys suggest that somewhat higher mean levels occur in fish caught off the south-west coast of England, an area which is rich in metal ores and one where the concentrations of copper and zinc, in both the water and in various fish food species, are known to be high.

f. As was to be expected from their high lipid solubility, the highest organochlorine pesticide and PCB residues were found in the fatty tissues, i.e. liver, of cod, whiting and plaice and to a lesser extent in the muscle of herring and mackerel. Although there is clear association of highest concentrations in samples having a high lipid concentration, this is only a partitioning effect, since the highest absolute concentrations were not always associated with the highest absolute lipid contents.

g. The concentrations of HCH, both α and γ isomers, were generally low; in most of the edible muscle tissues the concentration was below 0.001 mg/kg. Except in 1973, the highest dieldrin concentrations were found in samples of fish collected during the summer months. This may be a reflection of a higher lipid content at that time, but is more probably a reflection of spring and summer usage of this pesticide. It is considered that transport is by direct rain run-off from contaminated soil and by aerial transfer. Levels in 1973 were perhaps slightly lower than in previous years and this, coupled with the absence of higher levels in the summer, may well represent reduced usage.

h. The highest concentrations of dieldrin were often associated with high concentrations of DDT and its metabolites, although high DDT was not necessarily associated with high dieldrin concentration.

i. DDT concentrations in muscle tissue, at least of the demersal species, cod, whiting and plaice, were generally below 0.02 mg/kg and almost always below 0.1 mg/kg. The highest concentrations were found in livers of cod and whiting, but did not normally exceed 1 mg/kg (2 mg/kg for DDT plus its metabolites). There was no clear evidence of predominance of any of the three members of the DDT group, i.e. DDT or its metabolites DDE and

TDE; different members of the group were predominant in different samples. There was some evidence of higher DDT levels being associated with higher DDE levels, especially in the liver, possibly indicating that DDT is metabolised to DDE by fish.

j. Concentrations of PCB were invariably 5 to 10 times higher than the total concentration of DDT plus its metabolites. The highest concentrations were always in the liver of cod or whiting, where concentrations of 10–20 mg/kg were not unusual. However, in herring and mackerel muscle tissue, which can also contain high amounts of lipid, the concentration of PCB only exceeded 1 mg/kg in one sample. The use of PCB was severely restricted in 1971 and uses involving release to the environment have, in the UK at least, largely been eliminated. As a result levels can be expected to decline. Although this effect is not expected to occur rapidly and may not be significant for a few more years, the levels of PCB found in 1973 were not as high as those found in previous years. It should be possible to make a better assessment of this trend when the 1974 and 1975 data are available.

6 Results of expanded monitoring programme 1970–73

The results of analyses in the expanded monitoring programme (see Section 3) are summarised in Tables 5 to 8 and are presented in more detail in Tables 5a, 6a, 7a, 7b and 8a. The summary tables show the results in three broad geographical zones, inshore (within approximately 25 miles of the coast), near waters (North Sea, Irish Sea and English Channel) and distant waters (Iceland, Barents Sea etc).

Most of the samples of fish and all the larger shellfish were analysed for metals on an individual basis, while the smaller species of shellfish were bulked and homogenised for analysis; all analyses for organochlorine pesticide and PCB residues were made of homogenates of all fish in a sample, which usually consisted of several individuals.

6.1 Metals in fish

The results are summarised in Table 5 and set out in detail in Table 5a which shows for each species the maximum and minimum values of individual fish and the mean values of all the fish analysed. The latter is not the same as the mean of the means of each sample of fish analysed; the mean of means is likely to be biased by the presence of a few high or low means which were obtained from small and therefore less representative samples.

Table 5, in summarising the results of analysis of individual fish, cannot be used as a basis for estimating the national distribution of residues in each species, nor the dietary intake of consumers. The samples were derived from many sources, with particular emphasis on fish from areas

receiving large quantities of waste (the industrial estuaries), and without regard to the relative importance of each species. As a result, the data are not representative of fish consumed in England and Wales, and must be interpreted with caution.

It is not intended to discuss the results of all analyses carried out, but to indicate some of the salient points. Details of fish quality in specific areas can be obtained by reference to Tables 5a–8a.

Mercury: The levels of mercury in distant water fish were clearly well below those found in inshore waters and probably represent a true oceanic natural background level, the average value of which appears to be about 0.05 mg/kg. In fish from near waters the mercury concentration is roughly double this value, rising by another factor of two in fish from inshore waters; considerably higher values are found in limited contaminated areas. However, although individual values greater than 1.0 mg/kg were encountered fairly frequently in these latter areas, mean concentrations rarely exceeded 0.5 mg/kg.

Spatial trends can be seen in cod and plaice, both of which species were sampled fairly extensively in all three zones. The mean concentrations of mercury in cod fell from 0.25 mg/kg in inshore waters, through 0.14 mg/kg in near waters, to 0.07 mg/kg in distant waters; for plaice the equivalent figures were 0.24 mg/kg, 0.07 mg/kg and 0.04 mg/kg respectively.

The mean concentration of mercury in inshore fish in the UK is about 0.21 mg/kg, (MAFF, 1971). Using this as a yardstick, higher than average concentrations appear to be found in flounders and dabs but not in plaice. Flounders and dabs occur relatively abundantly in near-coastal and estuarine waters and both were frequently sampled in two areas which receive discharges of mercury-containing wastes – Liverpool and Morecambe Bays and the Thames Estuary. The results of analyses of these species were therefore biased by the high sampling effort which was directed to these areas; a close examination of the figures (Table 5a) reveals that concentrations more closely reflecting the average do occur in other areas. It is also interesting to note that concentrations of mercury found in dabs from near-water areas are about one third of the values found in the inshore areas. The average concentration of mercury in plaice samples was lower than that in the two other species of flatfish examined (dabs and flounders), even in samples from the relatively polluted areas. This is probably a reflection of habits of the species, since older (commercial size) plaice tend to live mostly offshore whereas dabs and particularly flounders live for long periods in near coastal or estuarine environments.

Somewhat higher than average concentrations of mercury were also found in samples of herring and skate but not in those of rays. The apparent difference between the latter two species is difficult to explain, but a closer examination of the results indicates that the difference may not be real,

because no samples of both species are available from a single area, most of the skate being taken from industrial estuaries whereas the rays were not.

The two small samples of smelt (three individuals each) contained well above average concentrations of mercury (mean 0.61 mg/kg) but both were taken from estuarine areas. It is interesting to note that smelt taken from the near water fishing grounds do not appear to contain high concentrations of mercury, and it seems likely that smelt accurately reflect the level of their environmental exposure. The same also appears to hold for dogfish. Dogfish from inshore waters were found to have a mean concentration of 0.76 mg/kg in contrast to those from near waters which contained 0.34 mg/kg.

Certain species e.g. bass, dogfish, flounder, mullet, skate and smelt, clearly accumulate mercury to higher levels than others. None of these is an important component of the national diet although all are eaten occasionally and any one of them may be important in particular areas or at certain times of the year, for example important seasonal catches of dogfish and skate are taken in SE England coastal waters. It should be noted, however, that the mean values of mercury in some of these fish were enhanced by heavy sampling in coastal and estuarine waters which included certain industrial estuaries which produce only a relatively small proportion of the total amount of these species eaten.

The highest individual concentration of mercury in a fish (4.3 mg/kg) was found in a bass taken from the estuary of the River Crouch. The mean concentration of mercury found in bass was also the highest of any species, but only a few samples were analysed. Bass is a long-lived fish and there is considerable evidence which indicates that mercury accumulates with increasing age of fish (Scott, 1972, 1974; Westoo, 1973). A similar explanation probably accounts for the relatively high mean concentration of mercury found in grey mullet and perhaps in dogfish.

Lead and cadmium: Throughout the period of analysis covered by this report the level of detection of the method of analysis was continually improved, and as a result detection levels changed; for lead from 0.5 to 0.1 mg/kg and for cadmium from 0.2 to 0.1 mg/kg. Most of the observed values were below the level of detection of the method used and reported values therefore differ. Even now the method currently used is not as sensitive as is desirable and it is apparent from results reported by other laboratories in the ICES North Atlantic Baseline Survey (ICES, 1977) that true values are probably around 0.05 mg/kg for lead and 0.005 mg/kg for cadmium. Thus, for both elements concentrations at considerably lower values than those shown are probably present.

Zinc: the majority of the mean concentrations of zinc in fish lie in the range 4 to 6 mg/kg wet weight (Table 5) with very little evidence of differences in concentration between areas around the coast or between distant and coastal

waters. It is known (Pentreath, 1976) that fish can excrete zinc and in muscle burdens. It is also noticeable that, within any one sample, the range of concentrations was usually not much more than two-fold, whereas for mercury a factor of ten was normal.

There does, however, appear to be some evidence of species differences. Herring, sprat, pilchard and sand eels all contained consistently higher concentrations of zinc than the other species, e.g. 8.5 mg/kg, 15 mg/kg, 17 mg/kg and 16 mg/kg respectively. All four species have a high muscle lipid content which might be associated with zinc metabolism. The only species in which the zinc in muscle tissue concentrations might possibly reflect environmental levels was the flounder, since this was found to contain slightly higher than average zinc concentrations (mean 7.3 mg/kg). The two samples of catfish from inshore waters and distant waters contained higher than average concentrations of zinc (9.0 mg/kg and 7.6 mg/kg respectively). Both samples were, however, small.

Copper: Like zinc, the concentration of copper is probably capable of being regulated by fish and the concentrations in fish muscle are therefore fairly constant for each species. The results of analyses as summarised in Table 5 and given in detail in Table 5a confirm this, there being little more than a two-fold spread between the highest and lowest concentration found in any one sample. As for zinc, there was no evidence of differences in concentration between areas around the coast or between coastal and distant waters. There was, however, some evidence of differences between species, with herring, sprat and pilchards having concentrations of copper above the typical range (0.5 to 0.9 mg/kg) of other species. The reason for this is probably related to feeding behaviour, for all are plankton feeders, or to the fact that all have a comparatively high muscle lipid content. Unlike zinc, copper does not appear to be accumulated by sand eels, catfish or flounders.

6.2 Organochlorine compounds in fish

Of the 2485 fish from the expanded programme analysed individually for metals, only 321 fish from 43 separate samples were analysed for pesticides and PCBs. The muscle tissue from each sample (usually several individual fish) was bulked and homogenised, and sub-sample of this analysed. In most cases the livers were also bulked, homogenised and analysed separately, thus yielding pesticide and PCB residue concentrations in the liver and muscle of each sample. The results given in Table 6 show only the maximum, minimum and mean concentrations by species of fish in the three geographical zones.

HCH: As was found in the routine survey programme, the levels of both α and γ HCH in the muscle tissue of most of the samples were below the level of detection of the method used (less than 0.001 mg/kg). The exceptions were bass where the levels just exceeded the detection level, and sprat, herring, pilchard and mackerel all of which have a high lipid concentration, and which, in the routine

programme, consistently contained levels in the muscle above the level of detection. Levels in livers rarely exceeded 0.02 mg/kg for either residue, except in the gadoids, haddock and whiting, where concentrations of up to 0.1 mg/kg were recorded for α HCH and 0.07 mg/kg for γ HCH. As in the routine programme, the levels in the muscle tissue were much lower than those in the liver tissue, often by a factor of ten or more.

Dieldrin: Only in samples of herring and a single pollack did the levels of dieldrin in muscle tissue exceed the level of detection (about 0.001 mg/kg). However, in liver tissue levels of dieldrin up to 0.2 mg/kg were not uncommon, with the highest individual mean concentration (0.42 mg/kg) being found in three whiting from the Bristol Channel in March 1972. Levels of dieldrin in samples from inshore waters appeared to be significantly higher than those in fish from near water fishing grounds, concentrations in the muscle of fish from near water grounds being with one exception, below 0.001 mg/kg. This suggests that the distribution of dieldrin is limited to inshore waters or that there is a fairly effective excretion mechanism by which fish can eliminate dieldrin residue burdens once in clean water.

DDT and its metabolites: None of the concentrations of DDT or its metabolites exceeded 0.15 mg/kg in muscle tissue and in many cases, especially the gadoids, the concentrations were little more than one hundredth of that amount. In the liver tissues, however, the concentrations were usually in the range 0.04 to 0.4 mg/kg with the highest level (1.8 mg/kg) being found in the liver of a whiting from the Kent coast in August 1972. The concentrations found in livers of fish from the near water and distant water fishing grounds were significantly lower than those found in fish from coastal waters, but were still well above the detection level, confirming that contamination by DDT is a widespread phenomenon.

There was no evidence that any of the species not sampled in the routine programme accumulated DDT and its metabolites in concentrations greater than those found in the gadoids, whiting and cod, although the single sample of brill showed high concentrations. As was indicated by the routine programme, there was no clear evidence of the preponderance of either the parent compound or its two metabolites.

PCBs: Data summarised in Table 6 show that inshore samples of fish contain greater concentrations of PCBs than those from near and distant waters, that the highest concentrations are found in those tissues containing most lipid and that high lipid fish contained greater concentrations than others.

Apart from the muscle of herring, sprat and mackerel, which from the routine programme were expected to contain more than 0.1 mg/kg PCB, concentrations of PCB in muscle tissue were generally substantially lower than those found in the liver of the same species. In only two cases (bass and mackerel) were the concentrations about

equal. Generally the concentrations of PCB in muscle were less than 0.1 mg/kg and in only three instances did they exceed 0.5 mg/kg. From the comparative data available it is apparent that PCB contamination is widespread.

6.3 Metals in shellfish

Table 7 summarises the results on a species basis only. Most samples of oysters were of native oysters but a few samples of Japanese and Portuguese oysters were analysed; there did not appear to be any difference in metal or pesticide content between the three species. Before analysis most of the shellfish were removed from the shell, but an exception was made for brown and pink shrimps, which were bulked and homogenised, analysis being carried out on a subsample of the resulting homogenate. In the case of the larger species, crab, lobster and crawfish, the claw and body meats of individual animals were analysed separately. The details relating to Table 7 are therefore in two parts: Table 7a gives the results for the larger species on an area and temporal basis with minimum, maximum and mean values for each sample; Table 7b gives the results for the smaller species, on an area and temporal basis only.

6.3.1 Crabs

The concentration of mercury found in the claw meat of the crabs was generally above that found in the body meat, although the difference was small and only just significant. None of the samples of crabs had a mean concentration above 0.34 mg/kg in the body meat and the claw meat exceeded this in only two samples (0.39 and 1.0 mg/kg). The highest recorded values of mercury in an individual crab was 0.55 mg/kg (body meat) and 1.7 mg/kg (claw meat).

The cadmium concentration of the body meat of crabs was always well above the level of detection of the method used (overall mean 12 mg/kg), although that of the claw meat was usually below or just above the level of detection (<0.3 mg/kg). The highest concentration of cadmium found in the body meat of an individual crab was 73 mg/kg, and the sample of which this was a part also contained the highest mean cadmium concentration (44 mg/kg). Although some of the highest concentrations of cadmium in crabs were found in large individuals caught off the metalliferous south-west coast, there is little evidence to suggest that the cadmium level in crabs is related to local sources of the element. Rather, it appears to be related to the size of the animals, since the smaller individuals were little different in their cadmium content from similar sized crabs from nonmetalliferous areas. Thus where samples were collected at the same time, e.g. River Dart, Coverack and Mullion, the highest concentrations of cadmium were found in the sample consisting of the larger animals. This trend was observed only with cadmium and not other metals, e.g. mercury or copper. It is therefore likely

that the phenomenon is a natural one whereby cadmium is accumulated with age.

Generally the levels of lead found in body meat were approximately twice those found in claw meat. Chromium concentrations showed a wide distribution, ranging from less than 0.1 to 17 mg/kg in the body meat and from less than 0.1 to 3.6 mg/kg in the claw meat. High concentrations in one tissue were not always reflected in the other.

Zinc concentrations were high (maximum values in the body meat and claw meat of individuals being 210 mg/kg and 270 mg/kg respectively), but tissue values appeared to be independent of each other. Concentrations in the claw were, however, generally somewhat higher than those found in the body meat by a factor of about two. Copper exhibited the reverse trend, but as this element is incorporated in the blood of crabs, higher concentrations in the body tissue are to be expected. The highest individual concentration of 440 mg/kg, found in the body tissue of an individual crab caught off the north-east coast, was part of a sample having the highest mean copper concentrations found in body tissue (300 mg/kg). Differences between concentrations of copper in body meat and claw meat were often quite marked, normally being four to five fold but with ten-fold differences being not uncommon. Neither the concentration of zinc, nor the concentration of copper, in crabs appears to be related to industrial pollution.

6.3.2 Lobsters and crawfish

The overall mean concentrations of mercury in tail and claw meat were similar (0.29 and 0.30 mg/kg respectively) and substantially greater than that of the body meat (less than 0.10 mg/kg). Several individual lobsters contained more than 0.5 mg/kg in the tail meat but none exceeded 1 mg/kg. In one instance only did the mean for the entire sample exceed 0.5 mg/kg: this sample caught off the North Wales coast might reflect the higher mercury concentrations also found in the fish surveys in that area.

As with crabs, the concentration of cadmium in the claw meat of lobsters was lower than that found in the body meat. The concentration found in the tail was even lower, and in most cases only just exceeded the level of detection of the method. The maximum concentration of cadmium found in the body meat of a lobster (51 mg/kg) was not much lower than that found in crabs (73 mg/kg) but the overall mean concentration (6.0 mg/kg) is only half that found in crab body meat and is a reflection of the generally lower levels of cadmium found in lobsters. As with crabs, there does not appear to be any relationship between cadmium levels and sources of pollution. It is possible that there is also a concentration/age

relationship, but lobsters are probably younger than the crabs sampled, as in general, the latter are not as heavily fished.

Lead and chromium concentrations of lobster tissues show considerable scatter within a sample and there does not appear to be any marked difference in concentrations from one tissue to another.

Concentrations of zinc in the tail meat (mean 21 mg/kg) were generally about half those found in the claw and body meat (49.8–52.0 mg/kg). Concentrations in lobster claws differed only by a factor of about two within any one sample and the difference between the highest and lowest sample was less than five-fold, compared with crabs where it was nearly ten-fold.

As with crabs, the highest concentrations of copper in lobsters were found in the body tissue, where the concentrations averaged 254 mg/kg; the maximum individual copper content (1600 mg/kg) was found in a large lobster caught off Pembroke. This phenomenon was probably associated with blood pigment. In contrast, mean concentrations in tail and body meat were 19 and 26 mg/kg. Copper concentrations in lobster claw meat showed a much narrower range than was found in crab claws.

Only two crawfish were collected in the period under review. The tails of both specimens contained relatively high concentrations of mercury (mean 1.0 mg/kg) but both the eggs and the body meat contained low amounts (0.04 and 0.18 mg/kg respectively). In contrast to crabs, the amount of cadmium in body and tail tissue was low and below the level of detection of the method used (<0.3 mg/kg), as was the concentration of lead and chromium in all tissues analysed. Concentrations of both zinc and copper exceeded 100 mg/kg in the body tissue, but both were relatively low in the tail tissue (20 mg/kg).

6.3.3 Other shellfish

The remaining species were analysed in bulk and therefore only a mean concentration was obtained from each sample. Tables 7 and 7b give summary and full details respectively. In some areas samples of dog whelks and limpets were analysed. Although not normally eaten, these species accumulate metals and therefore may be used as indicators of metal distribution. Dog whelks are occasionally consumed with winkles, which they closely resemble, and limpets are reported to be eaten on a small scale in some areas.

Mercury: From Table 7 it is evident that the average concentration of mercury found in the smaller species of shellfish was generally lower than the 0.25 mg/kg found in inshore fish, in most cases being less than

0.20 mg/kg. The only species where the mean levels exceeded this were the Norway Lobster with an average mercury content in the tail of 0.34 mg/kg and the whelk with an average of 0.26 mg/kg.

The highest concentration of mercury (1.1 mg/kg) was found in a sample of mussels from Poole Harbour, parts of which are known to be affected by local discharges. This was also the source of the sample of winkles which contained 0.81 mg/kg of mercury.

Of the 116 samples of mussels taken, many came from areas where there was no commercial production. All the samples taken from commercially exploited beds were low in mercury content, the overall mean concentration of mercury being 0.15 mg/kg. Only six samples exceeded 0.5 mg/kg and five of these came from Poole Harbour. The remaining one came from the Wyre estuary, which at that time was affected by a discharge of mercury from an industrial site.

Queens contained relatively more mercury than scallops: one sample of edible queen tissue (gonad and muscle) from Liverpool Bay, which receives discharges of mercury, contained 0.57 mg/kg (overall mean 0.17 mg/kg) whereas for scallops the highest level was 0.07 mg/kg (overall mean 0.05 mg/kg). Most of the mercury in the queens appears to be present in the muscle tissue, but there does not appear to be any such distinction in scallops. Mean values of other bivalve molluscs, clams, cockles and oysters, ranged from 0.07 to 0.12 mg/kg.

The average concentration of mercury in winkles was 0.10 mg/kg and, apart from the single sample of winkles referred to above, the highest concentration found was 0.21 mg/kg.

Whelks were the only other species with an average mercury content above 0.2 mg/kg. The highest individual sample concentration (0.89 mg/kg) being found in a sample from the outer Duddon estuary on the north-west coast. Two other samples which contained more than 0.4 mg/kg were from Liverpool Bay and Lune Deep in Morecambe Bay. The main commercially exploited stocks off Wells and off Whitstable contained between 0.07 and 0.38 mg/kg.

Samples of the two species of shrimps were analysed whole, although only the peeled tails are normally consumed; the levels in both species were relatively low, both in terms of maximum (0.32 mg/kg in brown shrimps) and mean (0.16 mg/kg also in brown shrimps). There was no clear evidence of a species difference.

Cadmium: The lowest concentrations of cadmium were found in Norway lobster tails (mean <0.2 mg/kg) but in all other cases except cockles, where many of

the samples contained cadmium only just above the detectable level the concentrations were well above the level of detection. Highest concentrations were found in two species not normally consumed and which are not commercially exploited, namely dog whelks (maximum 31 mg/kg, mean 14 mg/kg) and limpets (maximum 93 mg/kg and mean 15 mg/kg). The samples of these two species were collected as part of a study of metal pollution levels in the Bristol Channel.

The mean concentration in the majority of the commercially exploited species was below 1 mg/kg, the only exceptions being mussels, whelks, winkles and brown shrimps. The mussel data is seriously distorted by a few high concentrations found in non-commercial mussels from Avonmouth (21 mg/kg) which is close to a point source of cadmium and from Poole Harbour (9.0 mg/kg) which at that time was probably affected by a point source of cadmium. Samples of mussels from areas of commercial exploitation, e.g. Berwick and Holy Island, the Wash and North Wales areas contained cadmium at levels below 1 mg/kg. Most oyster samples contained less than 1 mg/kg of cadmium, the highest value being in a sample from Poole Harbour (2.6 mg/kg).

The concentration of cadmium in winkles rarely exceeded 2 mg/kg, except in those samples taken from the Bristol Channel, where levels of up to 27 mg/kg were found.

The mean value of cadmium found in whelks was 1.4 mg/kg. Higher values e.g. those found in samples collected off Whitstable and the south-west Wales coast did not appear to be related to point sources of pollution.

Brown shrimps appear to contain higher levels of cadmium than pink shrimps (means of 2.6 and 0.5 mg/kg respectively) but a closer examination of the results in Table 7b shows that where comparable samples were taken, e.g. from the River Crouch, the levels are similar. The mean for brown shrimps was biased by the numerous samples taken from the upper Bristol Channel, an area known to receive industrial discharges. These shrimps were analysed whole but a small-scale experiment revealed that the cadmium level in peeled tail meats was considerably lower than that found in the whole body tissue, thus confirming earlier work undertaken with crabs and lobsters. Thus, there is no concern for cadmium levels in the shrimps from the upper Bristol Channel.

Lead: The mean value of lead in most species examined was less than 2.5 mg/kg. The lowest concentration was found in Norway lobsters where the levels were judged to be at or about the level of detection (mean less than 0.4 mg/kg). Many of the

samples of oysters also contained lead levels below the level of detection. The highest values do not usually occur in samples from areas expected to be polluted. For example, the highest concentration of lead in cockles occurred in samples from Wash and Angle Bay (4.0 and 5.0 mg/kg respectively); similarly, high values were found in winkles from the Bristol Channel and also from other areas of the west coast not known to receive industrial discharges, thus indicating the geological origin of this element. Although pink shrimps appear to contain more lead than brown shrimps (maximum 32 and 7.5, means 16 and 3.6 mg/kg respectively), comparison of samples from the same area does not support this view. It is perhaps significant that the higher values in pink shrimps were found in samples from the north-west coast of England. Special analyses showed that most of the lead was present in the exoskeleton, and comparison with the data from other crustaceans suggests that tail meat of shrimps probably contains less than 1 mg/kg lead.

Chromium: The highest level of chromium recorded in most of the samples of shellfish is only five times the detection level, and there is thus some doubt about the validity of the lower detected concentrations. However, some credence must be given to the higher concentrations, although absolute values may be inaccurate. With the exception of a single sample of whelks which was found to contain 21 mg/kg of chromium, the levels of chromium found were generally low. Most of the concentrations occurred in the range from below 0.5 mg/kg to 3.0 mg/kg; there does not appear to be any correlation between concentration and origin of samples, nor was there any clear indication that certain species preferentially accumulate chromium more than others.

Zinc: As seen previously, concentrations of zinc in shellfish are generally higher than those of other metals. As expected from other studies, the highest concentrations of zinc occurred in oysters (maximum 1400 mg/kg and mean 380 mg/kg); this is considerably higher than the values found in crab claw and body meat (maxima 270 and 210 mg/kg, means 88 and 41 mg/kg respectively). The highest concentrations of zinc in oysters were usually found in areas where there were naturally high levels of zinc or point sources of zinc contamination.

Several other species, including dog whelks and limpets, contained fairly high concentrations of zinc. The highest concentrations of zinc in limpets were found in samples from the Bristol Channel. Although high levels also occurred in dog whelks from the same area, the highest concentration of zinc in dog whelks was found in a sample from Bracelet Bay in Wales, remote from known industrial pollution.

Whelks contained up to 430 mg/kg zinc, with a mean of 92 mg/kg, the highest concentration being found in a sample from Whitstable.

Up to 210 mg/kg zinc was found in the gonad tissue of queens, the mean of all samples being 140 mg/kg, rather lower (mean 30 mg/kg) concentrations occurred in the muscle tissue. The highest concentrations of zinc in scallops were also found in the gonad tissues. There is little evidence that zinc is accumulated to any great extent by any species other than oysters.

Copper: Like zinc, high values of accumulated copper were not uncommon in shellfish from most sources. None of the concentrations of copper approached the maximum level of 1600 mg/kg found in the body meat of lobsters or even the 440 mg/kg maximum found in crab body meat. However, as for zinc, the highest concentration of copper was found in oysters (200 mg/kg) with a mean value of 73 mg/kg for all oyster samples. The highest concentrations were generally found in oysters from the estuaries on the metalliferous south-west coast, but concentrations around 100 mg/kg were found in all three samples from the River Crouch on the east coast, although concentrations in the neighbouring River Roach were about half that value.

Whelks contained quite a wide range of concentrations (6.9 to 160 mg/kg) and, with the exception of the highest value of all, found off the Duddon Estuary in Cumbria (160 mg/kg), the highest concentrations (50–100 mg/kg) were found in samples from areas not receiving industrial wastes but subject to natural copper contamination, e.g. off the Welsh coast. In contrast, samples of winkles showed a narrower range of concentrations (10–70 mg/kg) with the majority containing concentrations of copper fairly close to the mean.

As might have been expected from experience of the high copper content of the body tissues of the larger species of crustacea, both species of shrimps (which were analysed whole) contained moderately high concentrations of copper, e.g. up to 45 mg/kg in brown shrimps and up to 20 mg/kg in pink shrimps. There is, however, no indication of a species difference; the observed differences were probably due solely to sampling bias (21 samples of brown shrimps but only six of pink shrimps).

The maximum value found for queens of 130 mg/kg in a mixed edible tissue sample is almost certainly anomalously high and, if neglected, the mean concentration is only 7.5 mg/kg. Like zinc, copper appears to be concentrated in the gonad of queens and scallops, although in the latter, the degree of accumulation appears to be lower (2.6 rather than 7.0 mg/kg).

6.4 Organochlorine compounds in shellfish

In all cases, analysis for organochlorine pesticide and PCB residues was conducted on a bulked sample basis, although for crawfish, crabs and lobsters, the several edible tissues were analysed separately. The results are given in Tables 8 and 8a.

With the exception of the residues found in crabs, which were in general higher than those found in all other species analysed, and in one or two mussel samples, the levels of both HCH isomers and of dieldrin in most species were all below or only just above the levels of detection of the methods of analyses, i.e. about 0.001 mg/kg. In all samples of cockles, crawfish and lobsters, the levels of DDT and its metabolites were also either below or just above the level of detection. Several of the samples of mussels analysed contained DDT and/or its metabolites at concentrations well in excess of the detectable level, although in no case did the concentration reach 0.1 mg/kg, the highest being 0.057 mg/kg DDT in a sample from Bridlington. As with the fish samples, there is little evidence that either of the DDT metabolites is present at concentrations greater than that of the parent compound. Two samples of oysters contained DDT and its metabolites at concentrations well above the level of detection but the highest amount was only 0.023 mg/kg (DDT) in a sample from Saltash.

In brown shrimps all the residue levels were low, with the exception of a sample from Yarmouth, which contained more than 0.01 mg/kg DDT and DDE and 0.01 mg/kg of dieldrin, and a sample from the River Ribble which contained all three DDT group compounds at concentrations above 0.01 mg/kg. Pink shrimps also contained generally low concentrations of pesticide residues, but two samples from the River Crouch contained more than 0.01 mg/kg of DDE and two samples, one from Yarmouth and one from the River Ribble, contained 0.011 mg/kg and 0.010 mg/kg of dieldrin respectively. By comparison, crabs contained comparatively high levels of pesticide residues especially in the body meat, where the majority of analyses recorded results in excess of the detectable level. Although the levels in the claw meat were generally much lower, often being below the level of detection, those samples which contained the higher concentrations of dieldrin or the DDT group in the body meat were usually also found to contain detectable levels of DDT in the claw meat. It is noticeable that in crab body meat there is a clear preponderance of DDE over the other two compounds in the DDT group. There is however, no clear indication of high levels of DDT being associated with particular areas of the coast; indeed the highest level of DDE found (0.38 mg/kg) was in a sample of crabs from the relatively unpolluted northern section of the north-east coast. Similarly high concentrations of DDE were found in samples from Sheringham, Swanage, Salcombe, Mullion and Newlyn, none of which would be expected, on the basis of known pollutant input sources, to be particularly high.

The lipid content of crab body meat was high, averaging

18.6% and provides a possible explanation of the higher pesticide residue content which is simply a reflection of the affinity of pesticide residues for lipid rather than water. This might also explain the higher concentrations of PCB found in crabs, maximum 6.0 mg/kg and mean 2.3 mg/kg in crab body meat. The maximum PCB concentrations found in crab claw meat was 2.8 mg/kg, but this appears to be exceptional as many samples contained residues at concentrations below 0.10 mg/kg and the mean is less than 0.14 mg/kg. In contrast to the distribution of pesticide residues, there is some correlation between the source of the crabs and their PCB content, the higher concentrations in body meat generally being found in samples from areas such as Poole or Liverpool Bay which are both likely to be subject to local sources of PCB input. With the exception of cockles which have a low lipid content, most of the samples of other shellfish also contained detectable levels of PCB. As found previously in the fish survey, the levels of PCB in shellfish (excluding crab) were usually at least ten times higher than all other pesticide residues combined. However, in no species excepting crab did the residue level of PCB reach 0.5 mg/kg. Both mussels and oysters contained a wide range of PCB residue levels (0.01–0.27 mg/kg and 0.05–0.36 mg/kg respectively) and in most instances the higher concentrations occurred in samples from areas subject to local discharges.

7. Summary of results of expanded monitoring programme

The expanded monitoring programme revealed that the species which were chosen for the routine survey on the basis of their probable range of pesticide accumulation characteristics were not always the best indicators of metal pollution levels. Several species sampled in the expanded programme, including the longer lived species such as bass, dogfish and skate and the sedentary flatfish such as flounders, contained higher concentrations of mercury than was normally encountered in the routine fish analysis programme. In most cases the lead and cadmium concentrations of fish sampled in the expanded programme and in the routine programme were below the detection level of the method used. The routine programme suggested that pelagic species contained relatively higher concentrations of copper and zinc, this was confirmed by the expanded programme.

None of the range of fish species analysed in the expanded sampling programme contained significantly higher amounts of organochlorine compounds than were found in the routine programme and the only species which might bear more examination was bass which contained relatively high concentrations of PCB in the muscle. The survey did, however, show that dieldrin is only commonly encountered in fish caught relatively close to the shore, and that fish caught on distant water grounds, and even in near waters (more than 25 miles from the coast), rarely contain detectable amounts. It also showed that, although DDT and PCB were found in most samples, the levels in fish from inshore waters were usually higher than those found in fish caught

further offshore. The expanded and routine surveys showed that the concentration in muscle tissue of all residues was low.

The expanded programme showed that the analysis of shellfish, excepting crabs for pesticide and PCB residues, appears to be an unrewarding task. With a few exceptions, levels are generally below the level of detection of pesticides (about 0.001 mg/kg and only just above the level of detection of PCBs (about 0.01 mg/kg). The major exception to this is the organochlorine content of crabs, which were found to contain appreciable levels of pesticides and PCBs in the body meat and to a lesser extent in the claw meat. However, although there was some relationship between PCB residue levels and the source of the crabs, there was no obvious reason for many of the higher concentrations of organochlorine pesticides in crabs. An interesting feature of the crab data is the fact that, uniquely in the species analysed (both fish and shellfish), there was a clear preponderance of DDE over DDT and TDE.

Crabs were also exceptional in the levels of cadmium, copper and zinc found in their body tissues. copper and zinc levels were also high in their claw tissues. The high cadmium content appeared to be age-related rather than linked to sources of pollution. Other crustaceans also contained high concentrations of cadmium. Lobsters contained exceptionally high concentrations of copper in their body tissue.

Oysters were found to accumulate high levels of zinc and to a lesser extent copper. Generally, the levels of accumulation appeared to be related to known sources of these metals, although there were exceptions. Mussels appeared to be good general indicators of pollution by metals, although other species were better specific indicators, e.g. winkles for cadmium and oysters for zinc.

8. Conclusions based on the routine and expanded monitoring programmes

The routine survey methods which used selected fish species appeared to provide a good basis on which to judge the levels of organochlorine pesticide and PCB residues present in fish generally. It is evident that greater effort needs to be applied to ensure full sample coverage and a few samples could usefully be included from fishing grounds further offshore, in order to provide an ongoing background or baseline against which to judge the inshore figures. Almost all the residue levels found are low and in no case do they either reach levels likely to cause danger to the fish or, with the possible exception of cod or whiting livers from a few areas, normally exceed the statutory levels established in other countries for the protection of man.

The levels of pesticides and PCB's found in the expanded programme provided few surprises, for none of the levels exceeded those found in the routine fish survey. However, the expanded programme did show that levels decrease offshore and that there were a few species which would merit further study.

The routine fish analysis programme also provided a valuable basis on which to judge typical levels of metals in fish entering the human diet. For copper, zinc, cadmium and lead, the information from a survey of this type is clearly adequate for current purposes. However, some species not sampled in the routine programme clearly contained higher concentrations of mercury and the expanded survey was necessary to determine those areas and species having levels higher than average.

The expanded survey of pesticides in shellfish revealed that some species, mussels in particular, might be good indicators of local sources of pollution, although generally the levels found were low. Crabs, probably because of their high body lipid content, contained higher pesticide and PCB concentrations in their body tissues than any other shellfish but, with the possible exception of PCBs, the residues do not appear to be related to local sources of pollution. Crabs also contained high concentrations of cadmium in their body meat. Similarly, lobster body meat contained very high concentrations of copper but this meat is not normally consumed. It was confirmed that oysters accumulate large concentrations of zinc if laid in waters with higher than normal zinc content, and that limpets are good indicators of cadmium contamination.

The overall conclusion must be that the levels of organochlorine pesticide and PCB residues, although differing from species to species and although higher in some areas than in others, are low by all standards of safety either for the fish or shellfish species or for man. Certain shellfish contain relatively high concentrations of certain metals and some fish contain above average concentrations of mercury, especially in some areas. In no case do these levels appear likely to be dangerous to the species concerned. Similarly, the assessment of the effects on man of the consumption of fish and shellfish containing certain heavy metals has shown that the only sections of the community which might consistently consume well above average amounts of mercury are those composed of individuals consuming large amounts of fish or shellfish drawn almost entirely from certain coastal regions. A recent interdepartmental investigation, the results of which will soon be published, has shown that the uptake of mercury by these individuals does not present an unacceptable risk to the consumer. With regard to cadmium and lead, there is evidence that no section of the community is likely to suffer from unacceptable levels of uptake, if they consume fish and shellfish taken from normal commercial sources.

These surveys have provided valuable information on the sources and effects on body burdens of fish and shellfish of metals, organochlorine pesticides and PCBs and thereby have provided a basis for control. In most areas where relatively high residue levels appear to be caused by industrial or other discharges, there is already a substantial programme in hand to reduce the levels of input of specific substances. The effects of these improvements should be evident in future monitoring programmes.

9. Acknowledgments

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Table 1 Summary of Results from 1970 Routine Programme: Concentrations (mg/kg wet weight) of Mercury and Organochlorine Compounds Found in Fish

Species	Season	Number of Samples	Organ		Mercury	Organochlorine compounds						
						∑HCH	∑HCH	Dieldrin	DDE	TDE	DDT	PCB
Cod	Winter	8	Muscle	min	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007
				max	0.81	0.001	0.012	0.006	0.002	0.002	0.005	0.031
			Liver	min	-	<0.001	<0.001	0.003	<0.001	0.031	0.025	0.40
				max	-	0.022	0.020	0.12	0.15	0.26	0.38	12
	Summer	6	Muscle	min	0.05	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.051
				max	1.3	<0.001	<0.002	<0.001	0.004	<0.002	<0.004	0.033
			Liver	min	-	<0.001	<0.001	0.079	0.36	0.031	0.098	4.4
				max	-	-	-	-	-	-	-	-
Whiting	Winter	8	Muscle	min	0.04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010
				max	0.67	0.005	0.005	0.007	0.008	0.007	0.005	0.14
			Liver	min	-	<0.001	<0.001	<0.001	<0.001	<0.004	<0.008	0.35
				max	-	0.019	0.088	0.31	0.18	0.62	0.46	13
	Summer	8	Muscle	min	0.04	<0.001	<0.001	0.002	0.004	0.003	0.007	0.053
				max	0.92	0.003	0.016	0.009	0.008	0.004	0.009	0.070
			Liver	min	-	<0.001	<0.001	0.25	0.39	0.41	0.53	2.1
				max	-	-	-	0.66	0.64	0.52	0.80	14
Plaice	Winter	8	Muscle	min	0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007
				max	0.59	0.002	0.004	0.009	0.003	0.012	0.012	0.07
			Liver	min	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.024
				max	-	0.012	0.033	0.098	0.035	0.14	0.10	0.69
	Summer	8	Muscle	min	0.03	<0.001	0.002	0.002	0.004	<0.001	<0.001	<0.010
				max	0.35	0.002	0.004	0.004	0.005	0.001	0.014	0.14
			Liver	min	-	<0.001	0.016	0.053	0.028	0.041	0.04	1.1
				max	-	0.016	0.04	0.061	0.067	0.042	0.049	1.6
Herring	Winter	5	Muscle	min	0.04	<0.001	<0.001	<0.001	<0.001	0.004	0.001	0.055
				max	0.89	0.001	0.002	0.032	0.043	0.12	0.031	0.23
			Liver	min	-	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.004
				max	-	0.004	0.010	0.059	0.034	0.034	0.051	0.44
	Summer	4	Muscle	min	<0.01	<0.001	0.034	0.018	0.023	0.011	0.007	0.18
				max	0.19	<0.001	0.065	0.025	0.080	0.018	0.015	0.34
			Liver	min	-	<0.001	<0.001	0.016	0.060	0.010	0.012	0.38
				max	-	<0.001	0.021	0.018	0.070	0.027	0.032	0.54
Mackerel	Winter	4	Muscle	min	0.05	<0.001	<0.001	<0.001	<0.001	0.003	0.003	0.11
				max	0.83	0.003	0.003	0.010	0.002	0.007	0.015	0.50
			Liver	min	-	<0.001	<0.001	<0.001	0.003	0.018	0.044	0.43
				max	-	0.005	0.010	0.020	0.015	0.040	0.086	1.8
	Summer	4	Muscle	min	<0.01	0.003	0.003	0.010	<0.001	0.007	0.015	0.13
				max	1.1	0.004	0.010	0.020	0.045	0.009	0.11	0.5
			Liver	min	-	<0.001	<0.001	<0.001	0.003	0.020	0.031	0.25
				max	-	0.005	0.010	0.076	0.038	0.11	0.052	1.6

Table 1a Results from 1970 Routine Programme: Concentrations (mg/kg wet weight) of Mercury and Organochlorine Compounds Found in Fish

Port and Period of Sampling	Species and Numbers	Date 1970	Position (ICES Rectangle)		Organochlorine Compounds										Lipid
					Mercury	Organ	ΣHCH	γHCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	
North Shields (winter)	Cod (7)	Feb	E8 39	min max mean	0.07 0.15 0.11	liver muscle	0.020 <0.001	0.016 0.010	0.12 0.006	0.060 0.001	0.10 <0.001	0.38 0.001	0.54 <0.003	0.80 <0.010	47.2 <0.2
	Plaice (10)	Feb	E8 39	min max mean	0.05 0.31 0.12	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.006 <0.001	0.001 <0.001	<0.008 <0.003	0.29 <0.025	5.0 0.4
	Whiting (10)	Feb	E8 39	min max mean	0.07 0.21 0.10	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.12 <0.001	0.21 <0.001	0.033 <0.001	0.36 <0.003	0.35 <0.025	55.3 0.3
	Herring (5)	Feb	E8 39	min max mean	0.04 0.07 0.05	liver muscle	<0.001 <0.001	<0.001 <0.001	0.004 0.005	0.014 0.003	0.012 0.018	0.005 0.012	0.031 0.033	0.004 0.055	5.3 6.1
(summer)	Cod (10)	Aug	E8 39	min max mean	0.07 0.15 0.11	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
	Plaice (10)	Aug	E8 39	min max mean	0.04 0.35 0.13	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
	Whiting (10)	Aug	E8 39	min max mean	0.04 0.13 0.08	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
Grimsby (winter)	Plaice (10)	Apr	E9 37	min max mean	0.08 0.27 0.15	liver muscle	0.012 <0.001	0.007 0.004	0.068 0.005	0.022 0.003	0.049 0.004	0.064 0.003	0.14 0.010	0.18 0.007	7.0 0.2
	Whiting (10)	Jan	E9 36	min max mean	0.07 0.33 0.15	liver muscle	0.005 <0.001	0.019 0.005	<0.001 <0.001	<0.001 <0.001	<0.004 0.001	<0.008 0.001	<0.013 <0.003	1.3 <0.010	51.0 0.2
(summer)	Cod (2)	Jul	F0 37	min max mean	0.05 0.12 0.07	liver muscle	<0.001 <0.001	<0.001 <0.001	0.079 <0.001	0.36 0.002	0.031 <0.001	0.096 <0.001	0.49 <0.004	4.4 0.051	4.1 <0.2
	Plaice (10)	Jul	F0 37	min max mean	0.05 0.12 0.07	liver muscle	- -	- -	- -	- -	--- -	- -	- -	- -	- -
	Whiting (3)	Jul	F0 37	min max mean	0.04 0.11 0.06	liver muscle	- 0.003	- 0.016	- 0.009	0.39 0.004	0.52 0.004	0.80 0.009	1.7 0.017	2.1 0.070	4.6 <0.2
	Herring (3)	Jul	F0 37	min max mean	< 0.01 0.03 <0.02	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
	Mackerel (5)	Jul	F0 37	min max mean	0.08 0.35 0.15	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lowestoft (winter)	Cod (10)	Jan	F2 33	min max mean	0.07 0.26 0.12	liver muscle	<0.001 <0.001	<0.001 <0.001	0.095 <0.001	<0.001 <0.001	0.098 <0.001	0.025 <0.001	<0.12 <0.003	4.4 0.013	27.1 0.2
	Plaice (10)	Feb	F1 38	min max mean	0.05 0.38 0.12	liver muscle	<0.001 <0.001	<0.001 <0.001	0.002 <0.001	0.001 <0.001	0.002 <0.001	0.002 0.001	<0.005 <0.003	0.20 0.070	3.4 0.2
	Plaice (8)	Jan	F3 35	min max mean	0.05 0.10 0.08	liver muscle	0.10 <0.001	0.033 <0.001	0.098 0.004	0.035 0.002	0.14 0.007	0.10 <0.003	0.28 0.012	0.69 0.055	14.1 0.4
	Whiting (10)	Jan	F3 35	min max mean	0.10 0.30 0.19	liver muscle	<0.001 0.005	<0.001 0.002	0.31 0.004	0.14 0.005	0.59 0.007	0.46 0.010	1.2 0.022	4.8 0.045	63.3 0.4
	Whiting (10)	Jan	F3 37	min max mean	0.05 0.15 0.10	liver muscle	0.056 <0.001	0.088 <0.001	0.14 0.002	0.10 0.002	0.072 0.002	0.25 <0.004	0.42 <0.008	1.4 0.019	70.0 0.4
	Herring (5)	Dec 1969		min max mean	0.07 0.14 0.10	liver muscle	0.004 <0.001	0.008 <0.001	0.059 0.032	0.034 0.043	0.034 0.021	0.051 0.031	0.12 0.095	0.025 0.23	2.3 5.7
	Plaice (8)	Jul	F1 33	min max mean	0.07 0.15 0.10	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
Burnham (winter)	Whiting (16)	Jul	F1 33	min max mean	0.07 0.35 0.21	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -
	Cod (1)	Dec 1969	F0 32	min max mean	0.32 0.32 0.32	liver muscle	<0.001 <0.001	<0.001 <0.001	0.003 <0.001	0.014 <0.001	0.031 <0.001	0.030 <0.001	0.075 <0.003	11.6 0.019	38.7 0.2
	Herring (10)	Feb	F0 32	min max mean	0.36 0.89 0.63	liver muscle	<0.001 <0.001	<0.001 <0.001	0.019 <0.001	<0.003 <0.001	0.13 0.015	0.022 0.005	0.16 <0.021	0.024 0.020	0.7 7.2
(summer)	Cod (12)	Nov	F0 32	min max mean	0.23 1.3 0.55	liver muscle	- -	- -	- -	- -	- -	- -	- -	- -	- -

Table 1a continued

Port and Period of Sampling	Species and Number	Date 1970	Position (ICES Rectangle)	Organochlorine compounds											%
					Mercury	Organ	α HCH	γ HCH	Dieldrin	DDE	TOE	DDT	EDDT	PCB	Lipid
Hastings (winter)	Cod (10)	Feb-Mar	F0 30	min max mean	0.13 0.80 0.41	liver muscle	0.022 0.001	0.016 0.002	0.060 0.006	0.12 0.002	0.11 0.002	0.36 0.005	0.59 0.009	1.2 0.007	43.1 <0.2
	Plaice (10)	Jan	F0 30	min max mean	0.09 0.42 0.21	liver muscle	0.007 0.002	0.017 0.002	0.049 0.009	0.014 0.002	0.045 0.012	0.056 0.012	0.12 0.026	0.26 0.056	3.6 0.2
	Whiting (10)	Jan	F0 30	min max mean	0.17 0.50 0.31	liver muscle	0.019 <0.001	<0.001 <0.001	0.013 <0.001	0.081 <0.001	0.020 0.002	0.015 0.002	0.12 <0.005	13.3 0.14	75.7 0.6
	Sprats (6)	Jan	F0 30		0.07	whole	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.005	0.15	6.7
(summer)	Cod (10)	Nov	F0 30	min max mean	0.11 0.83 0.35	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
	Plaice (9)	Oct	F0 30	min max mean	0.10 0.22 0.15	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
	Whiting (10)	Oct	F0 30	min max mean	0.40 0.77 0.54	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
	Herring (10)	Nov	F0 30	min max mean	0.02 0.19 0.08	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
Plymouth (winter)	Cod (7)	Feb	E5 29	min max mean	0.07 0.45 0.22	liver muscle	<0.001 <0.001	<0.001 <0.001	0.054 <0.001	0.15 <0.001	0.26 <0.001	0.037 <0.001	0.45 <0.003	0.57 <0.010	41.1 <0.2
	Plaice (10)	Feb	E5 29	min max mean	0.03 0.30 0.17	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.010 <0.001	0.025 <0.001	<0.036 <0.003	0.024 0.023	2.0 0.1
	Whiting (9)	Feb	E5 29	min max mean	0.13 0.33 0.21	liver muscle	- <0.001	- <0.001	- 0.007	- 0.008	- 0.005	- 0.005	- 0.018	- 0.12	- 0.3
	Herring (3)	Feb	E5 29	min max mean	0.07 0.12 0.10	liver muscle	0.003 0.001	0.010 0.002	0.002 0.026	<0.001 <0.001	0.014 0.005	0.025 0.009	<0.040 <0.015	0.44 0.098	0.4 1.0
(summer)	Mackerel (8)	Feb	E5 29	min max mean	0.09 0.24 0.15	liver muscle	0.003 <0.001	0.008 <0.001	0.003 0.002	0.003 <0.010	0.018 0.003	0.050 0.003	0.071 <0.016	0.43 0.17	1.5 3.5
	Cod (10)	Jul	E5 29	min max mean	0.05 0.26 0.10	liver muscle	<0.001 <0.002	<0.002 <0.001	- 0.001	- 0.004	- <0.002	- <0.004	- <0.010	- 0.033	- 0.3
	Cod (1)	Jul	E5 29	min max mean	0.10 0.10 0.10	liver muscle	<0.001 0.002	0.40 0.006	0.65 0.007	0.90 0.002	0.54 0.004	0.62 0.005	2.1 0.011	15.5 0.058	47.1 0.2
	Plaice (10)	Jul	E5 29	min max mean	0.03 0.16 0.11	liver muscle	<0.001 0.002	0.040 0.002	0.053 0.004	0.067 0.004	0.042 0.001	0.049 0.014	0.16 0.019	1.6 <0.010	16.5 0.5
(summer)	Plaice (10)	Jul	E5 29	min max mean	0.15 0.47 0.32	liver muscle	<0.001 <0.001	<0.001 <0.001	0.25 0.002	0.64 0.008	0.41 0.003	0.53 0.007	1.6 0.018	14.0 0.053	58.6 0.6
	Herring (10)	Jul	E5 29	min max mean	0.05 0.14 0.10	liver muscle	<0.001 <0.001	<0.021 0.065	0.016 0.018	0.060 0.080	0.010 0.011	0.012 0.015	0.082 0.11	0.38 0.34	15.5 13.7
	Mackerel (10)	Jul	E5 29	min max mean	<0.01 0.10 0.04	liver muscle	<0.001 0.004	<0.001 0.010	0.076 0.020	0.038 0.045	0.11 0.009	0.031 0.11	0.18 0.16	0.25 0.13	11.6 13.9
	Cod (10)	Feb	E4 29	min max mean	<0.01 0.20 0.10	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
Newlyn (winter)	Whiting (10)	Feb	E4 29	min max mean	0.17 0.28 0.23	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
	Herring (10)	Feb	E4 29	min max mean	0.05 0.12 0.08	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 0.040	0.003 0.12	0.009 0.010	<0.013 0.17	0.087 0.10	5.1 4.5
	Mackerel (10)	Feb	E4 29	min max mean	0.05 0.83 0.36	liver muscle	0.005 <0.001	0.007 <0.001	0.020 0.010	0.008 0.002	0.040 0.007	0.086 0.012	0.13 0.021	1.2 0.25	7.1 6.8
	Plaice (9)	Sept	E4 29	min max mean	0.03 0.20 0.09	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -
(summer)	Whiting (7)	Sept	E4 29	min max mean	0.10 0.92 0.40	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -

Table 1a continued

Port and Period of Sampling	Species and Number	Date 1970	Position (ICES Rectangle)			Mercury	Organ	Organochlorine compounds								% lipid	
								αHCH	βHCH	Dieldrin	DDE	DDE	DDT	ΣDDT	PCB		
Milford Haven (winter)	Cod (10)	Jan	E4 32	min max mean	0.08 0.81 0.23	liver muscle	0.016 <0.001	0.020 <0.001	0.007 <0.001	0.010 <0.001	0.048 <0.001	0.050 <0.001	0.11 <0.003	0.40 0.031	45.8 0.2		
	Plaice (9)	Jan	E4 32	min max mean	0.04 0.41 0.20	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.025 <0.001	0.005 <0.001	<0.031 <0.003	0.48 0.060	9.6 0.3		
	Whiting (10)	Jan	E4 32	min max mean	0.04 0.45 0.18	liver muscle	0.006 <0.001	0.009 0.003	0.044 0.005	0.18 0.003	0.035 0.002	0.040 0.002	0.26 0.007	4.4 0.10	47.2 0.5		
	Herring (10)	Jan	E3 33	min max mean	- - -	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.001 0.004	<0.001 0.001	<0.003 <0.006	0.10 0.20	1.5 7.3		
	Mackerel (10)	Jan	E4 32	min max mean	0.10 0.52 0.30	liver muscle	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	0.015 0.001	0.028 0.006	0.044 0.009	0.087 0.016	1.8 0.41	13.0 3.7		
	(summer)	Cod (7)	Jul	E5 31	min max mean	0.18 0.99 0.51	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -	
		Plaice (10)	Jul	E5 31	min max mean	0.05 0.25 0.14	liver muscle	0.016 <0.001	0.016 0.004	0.061 0.002	0.028 0.005	0.041 <0.001	0.040 <0.001	0.11 <0.007	1.1 0.14	1.4 <0.2	
		Whiting (8)	Jul	E5 31	min max mean	0.10 0.40 0.25	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -	
		Herring (10)	Jul	E5 31	min max mean	0.10 0.16 0.14	liver muscle	<0.001 <0.001	<0.001 0.034	0.018 0.025	0.070 0.023	0.027 0.018	0.032 0.007	0.13 0.048	0.54 0.18	1.7 1.4	
		Mackerel (8)	Jul	E5 31	min max mean	0.08 0.40 0.21	liver muscle	0.009 <0.001	0.023 <0.001	0.050 0.007	0.064 0.048	0.020 0.025	0.052 0.047	0.14 0.12	0.91 0.68	1.2 0.9	
Fleetwood (winter)	Cod (16)	Mar	E5 37	min max mean	0.15 0.78 0.37	liver muscle	0.002 <0.001	<0.001 <0.001	0.037 <0.001	0.006 <0.001	0.14 <0.001	0.036 <0.001	0.18 <0.003	2.0 0.029	41.0 <0.2		
	Plaice (10)	Mar	E5 37	min max mean	0.17 0.59 0.33	liver muscle	<0.001 <0.001	<0.001 <0.001	0.003 <0.001	<0.001 <0.001	0.004 0.002	<0.001 0.001	<0.006 <0.004	0.11 <0.010	2.1 <0.6		
	Whiting (10)	Mar	E5 37	min max mean	0.26 0.67 0.49	liver muscle	0.003 <0.001	0.007 <0.001	0.061 <0.001	0.041 <0.001	0.62 0.003	0.13 <0.001	0.79 <0.005	5.5 0.049	40.4 0.3		
	Mackerel (19)	Feb	E5 37	min max mean	0.17 0.39 0.28	liver muscle	0.005 0.003	0.010 0.003	<0.001 0.010	0.003 <0.001	0.020 0.007	0.052 0.015	0.075 <0.023	1.6 0.50	6.6 5.3		
	(summer)	Plaice (10)	Oct	E6 36	min max mean	0.11 0.24 0.14	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -	- -	
Whiting (10)		Oct	E6 36	min max mean	0.20 0.58 0.30	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -	- -		
Mackerel (3)		Oct	E6 36	min max mean	0.27 1.1 0.60	liver muscle	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- -	- -		

Table 2 Summary of Results from 1971 Routine Programme: Concentrations (ng/kg wet weight) of Metals and Organochlorine Compounds Found in Fish

Species	Season	Number of samples	Organ	Metals										Organochlorine Compounds										PCB
				Metals										Organochlorine Compounds										
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	α-HCH	γ-HCH	Dieldren	DDE	TDE	DDT	ΣDDT								
Cod	Winter	8	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	0.001	<0.006	0.009						
			Liver	max	0.90	1.0	2.0	6.2	1.0	<0.001	0.001	0.005	0.003	0.003	0.004	<0.014	0.049							
	Summer	7	Muscle	min	-	-	-	-	-	-	0.003	0.010	0.032	0.087	0.081	0.053	0.25	0.5						
			Liver	max	0.04	<0.1	<0.5	1.4	<0.5	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.004	0.012							
Whiting	Winter	7	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	0.001	<0.005	<0.009						
			Liver	max	0.72	1.0	2.0	6.5	0.5	<0.001	<0.001	0.003	0.003	0.004	0.004	0.011	0.038							
	Summer	7	Muscle	min	-	-	-	-	-	-	<0.001	<0.001	<0.004	0.028	0.006	0.009	0.057	0.64						
			Liver	max	0.03	<0.1	<0.5	1.7	<0.5	0.010	0.12	0.077	0.21	0.12	0.33	0.66	2.6							
Plaice	Winter	7	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.002	0.001	<0.005	0.020						
			Liver	max	0.63	5.5	<0.5	38	6.0	<0.001	<0.001	-	0.054	0.002	<0.003	<0.057	0.74							
	Summer	7	Muscle	min	-	-	-	-	-	-	<0.003	<0.010	-	0.42	0.39	0.18	0.99	3.8						
			Liver	max	-	-	-	-	-	-	0.066	0.030	-	2.0	4.0	1.2	7.0	28						
Herring	Winter	2	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.009						
			Liver	max	0.54	<0.5	2.0	5.9	2.5	0.006	0.006	0.007	0.008	0.006	0.012	0.026	0.091							
	Summer	7	Muscle	min	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.007	<0.027						
			Liver	max	0.02	<0.1	<0.5	2.0	<0.5	0.025	0.022	0.074	0.21	0.21	0.19	0.61	3.2							
Mackerel	Winter	3	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	0.012						
			Liver	max	0.27	1.0	<0.5	9.0	1.0	0.008	0.003	-	0.023	0.046	0.008	0.077	0.17							
	Summer	3	Muscle	min	-	-	-	-	-	-	<0.001	<0.001	0.028	<0.001	<0.003	<0.007	<0.022	<0.022						
			Liver	max	-	-	-	-	-	-	0.013	0.006	-	0.069	0.086	0.053	0.16	0.93						
Mackerel	Winter	3	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.009						
			Liver	max	0.20	<0.1	<0.5	5.2	0.5	0.002	0.002	0.002	0.006	0.006	0.002	0.012	0.10							
	Summer	3	Muscle	min	-	-	-	-	-	-	0.003	0.003	0.003	0.003	0.003	<0.003	<0.010	0.099						
			Liver	max	0.03	<0.1	<0.5	2.8	<0.5	0.004	0.004	0.004	0.010	0.004	0.005	0.018	0.12							
Mackerel	Winter	3	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.009						
			Liver	max	0.24	5.0	<0.5	13	2.3	0.011	0.008	-	0.10	0.040	0.024	0.14	0.63							
	Summer	3	Muscle	min	-	-	-	-	-	-	<0.001	<0.001	-	0.024	0.001	<0.011	<0.053	0.21						
			Liver	max	-	-	-	-	-	-	0.010	0.006	-	0.10	0.067	0.046	0.17	0.48						
Mackerel	Winter	3	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.009						
			Liver	max	1.20	<0.5	<0.5	12	1.2	0.005	0.006	0.005	0.047	0.010	0.016	0.059	0.41							
	Summer	3	Muscle	min	-	-	-	-	-	-	0.002	0.003	0.006	0.010	0.005	0.010	0.025	0.068						
			Liver	max	0.02	<0.1	<0.5	3.1	<0.5	0.007	0.006	0.010	0.035	0.036	0.042	0.11	0.78							
Mackerel	Winter	3	Muscle	min	<0.1	<0.1	<0.1	<0.1	1.9	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.009						
			Liver	max	0.93	5.0	<0.5	9.6	5.8	0.008	0.004	-	0.067	0.016	0.026	0.24	0.68							
	Summer	3	Muscle	min	-	-	-	-	-	-	<0.001	<0.001	-	0.012	0.008	0.008	0.029	0.14						
			Liver	max	-	-	-	-	-	-	0.013	0.009	-	0.21	0.037	0.071	0.67	1.9						

Table 2a Results from 1971 Routine Programme: Concentrations (mg/kg wet weight) of Metals and Organochlorine Compounds Found in Fish

Port and Period of Sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid			
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE		DDT	Σ DDT	PCB
North Shields (winter)	Cod (10)	Feb	E8 39	0.08	0.1	<0.1	<0.1	4.3	0.5	liver	0.029	0.013	0.13	0.47	0.26	0.93	1.7	3.2	49.0
				0.18	0.4	<0.1	<0.1	5.9	0.5	muscle	<0.001	<0.001	0.001	0.002	<0.003	<0.003	<0.008	0.036	0.3
				mean	0.2	<0.1	<0.1	4.6	0.5										
	Plaice (9)	Feb	E8 39	0.07	<0.1	<0.1	<0.1	4.9	0.5	liver	<0.001	<0.001	<0.001	<0.001	<0.002	<0.004	<0.007	<0.027	52.1
				0.15	0.1	<0.1	<0.1	7.3	1.0	muscle	<0.001	<0.001	0.002	0.001	0.003	<0.004	<0.008	<0.027	1.6
				mean	<0.1	<0.1	<0.1	5.7	0.5										
	Whiting (10)	Feb	E8 39	0.10	<0.1	<0.1	<0.1	4.6	0.5	liver	0.066	0.12	0.077	0.21	0.12	0.33	0.66	1.4	62.6
				0.20	0.4	1.0	<0.1	5.6	0.5	muscle	<0.001	<0.001	0.003	0.001	<0.003	<0.003	<0.007	0.038	0.4
				mean	0.1	<0.1	<0.1	5.2	0.5										
(summer)	Cod (9)	Jul	E8 39	0.04	<0.1	<0.5	<0.5	1.4	0.5	liver	<0.001	<0.001	-	0.35	0.31	0.53	1.2	4.7	19.2
				0.20	<0.1	<0.5	<0.5	3.6	3.0	muscle	<0.001	<0.001	-	<0.001	<0.002	<0.002	<0.005	0.019	0.2
				mean	<0.1	<0.5	<0.5	2.8	0.5										
	Plaice (10)	Jul	E8 39	0.05	<0.1	<0.5	<0.5	5.0	<0.5	liver	0.013	0.006	-	0.069	0.038	0.053	0.16	0.47	7.2
				0.20	<0.1	<0.5	<0.5	9.2	<0.5	muscle	<0.001	<0.001	-	0.003	0.001	0.002	0.006	0.016	0.2
				mean	<0.1	<0.5	<0.5	6.8	<0.5										
	Whiting (12)	Jul	E8 39	0.03	<0.1	<0.5	<0.5	2.5	<0.5	liver	<0.008	<0.010	-	0.70	0.50	1.2	2.4	6.5	19.6
				0.08	<0.1	5.5	<0.5	5.8	<0.5	muscle	<0.001	<0.001	-	0.003	<0.002	<0.002	<0.007	0.053	<0.2
				mean	<0.1	<2.0	<0.5	3.7	<0.5										
	Herring (11)	Jul	E8 39	0.03	<0.1	<0.5	<0.5	3.5	<0.5	liver	0.010	0.006	-	0.036	0.024	0.026	0.086	0.22	6.4
				0.08	0.1	1.0	<0.5	10.6	1.0	muscle	0.005	0.003	-	0.025	0.017	0.013	0.055	0.59	8.2
				mean	<0.1	<0.5	<0.5	5.8	<0.5										
Grimsby (winter)	Cod (10)	Jan	E9 37	0.10	<0.1	<0.5	<0.5	2.9	<0.5	liver	0.029	0.029	0.032	0.087	0.081	0.078	0.25	0.50	40.1
				0.29	<0.1	1.0	<0.5	3.3	<0.5	muscle	<0.001	<0.001	0.002	0.002	0.003	<0.002	<0.007	0.009	0.2
				mean	<0.1	<0.5	<0.5	3.1	<0.5										
	Plaice (10)	Jan	E9 37	0.08	<0.1	<0.5	<0.5	2.1	<0.5	liver	<0.001	0.002	0.006	0.005	0.008	0.007	0.020	0.065	9.7
				0.24	<0.1	<0.5	<0.5	4.3	0.5	muscle	<0.001	<0.001	0.002	<0.003	0.004	<0.002	<0.009	<0.009	0.3
				mean	<0.1	<0.5	<0.5	3.3	<0.5										
	Whiting (10)	Jan	E9 37	0.10	<0.1	<0.5	<0.5	2.6	<0.5	liver	<0.003	<0.005	<0.016	0.099	<0.025	<0.026	<0.15	1.0	64.5
				0.31	<0.1	<0.5	<0.5	4.0	<0.5	muscle	<0.001	<0.001	0.002	<0.003	<0.002	<0.002	<0.007	<0.009	0.3
				mean	<0.1	<0.5	<0.5	3.3	<0.5										

Table 2a Continued

Port and Period of sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid			
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α HCH	γ HCH	Dieldrin	DDE	TDE		DDT	Σ DDT	PCB
Grimsby (summer)	Cod (10)	Jul	F0 37	min	0.08	<0.1	<0.5	1.7	<0.5	liver	0.034	<0.012	-	0.63	0.27	0.35	1.3	3.5	14.4
				max	0.42	<0.1	<0.5	3.7	0.5	muscle	<0.001	<0.001	-	0.001	<0.002	<0.002	<0.005	<0.013	<0.2
				mean	0.15	<0.1	<0.5	2.6	<0.5										
	Plaice (10)	Jul	F0 37	min	0.06	<0.1	<0.5	2.3	<0.5	liver	0.002	<0.001	-	0.020	0.015	0.012	0.047	0.14	2.0
				max	0.09	<0.1	<0.5	4.0	0.5	muscle	<0.001	<0.001	-	0.002	<0.002	<0.002	<0.006	<0.015	<0.2
				mean	0.08	<0.1	<0.5	3.0	<0.5										
	Whiting (10)	Jul	F0 37	min	0.13	<0.1	<0.5	1.7	0.5	liver	0.046	0.014	-	1.9	0.92	0.86	3.7	27.6	18.0
				max	0.32	<0.1	<0.5	4.5	<0.5	muscle	<0.001	<0.001	-	0.032	0.002	<0.002	<0.036	0.029	0.2
				mean	0.24	<0.1	<0.5	2.9	0.5										
Lowestoft (winter)	Cod (10)	Jan	F3 33	min	0.07	<0.1	<0.5	3.0	<0.5	liver	0.003	0.010	0.064	0.13	0.12	0.16	0.41	1.9	27.5
				max	0.20	0.1	<0.5	5.0	<0.5	muscle	<0.001	<0.001	0.003	<0.005	<0.005	0.004	<0.014	<0.018	0.2
				mean	0.11	<0.1	<0.5	4.0	<0.5										
	Plaice (12)	Jan	F3 33	min	0.07	<0.1	<0.1	4.5	<0.5	liver	0.013	0.006	0.074	0.068	0.12	0.094	0.28	2.3	10.4
				max	0.16	0.4	1.0	7.0	0.5	muscle	0.006	0.006	0.007	0.005	0.006	0.004	0.015	0.042	0.7
				mean	0.10	<0.1	<0.1	5.9	<0.5										
	Plaice (20)	Jan	F5 37	min	0.05	<0.1	<0.5	2.0	<0.5	liver	0.006	0.004	0.056	0.038	0.14	0.030	0.21	0.75	8.0
				max	0.11	<0.1	<0.5	4.2	<0.5	muscle	<0.001	<0.001	<0.002	<0.004	0.003	<0.004	<0.011	0.057	0.5
				mean	0.07	<0.1	<0.5	3.1	<0.5										
(summer)	Cod (10)	May	F2 34	min	0.10	<0.1	<0.5	3.5	<0.5	liver	-	-	-	-	-	-	-	-	-
				max	0.32	<0.1	<0.5	5.0	<0.5	muscle	-	-	-	-	-	-	-	-	-
				mean	0.16	<0.1	<0.5	4.6	<0.5										
	Plaice (14)	May	F2 34	min	0.05	<0.1	<0.5	2.0	<0.5	liver	-	-	-	-	-	-	-	-	-
				max	0.15	<0.1	<0.5	4.6	<0.5	muscle	-	-	-	-	-	-	-	-	-
				mean	0.08	<0.1	<0.5	3.9	<0.5										
	Whiting (5)	May	F2 34	min	0.08	<0.1	<0.5	2.0	<0.5	liver	-	-	-	-	-	-	-	-	-
				max	0.21	<0.1	<0.5	2.9	<0.5	muscle	-	-	-	-	-	-	-	-	-
				mean	0.14	<0.1	<0.5	2.6	<0.5										
Burnham (winter)	Cod (10)	Feb	F1 32	min	0.11	<0.1	<0.5	2.8	0.5	liver	0.015	0.021	0.23	0.47	0.29	0.26	1.0	8.3	45.9
				max	0.40	0.2	<0.5	5.7	1.0	muscle	<0.001	<0.001	<0.001	0.001	<0.002	<0.004	<0.007	0.048	0.2
				mean	0.23	<0.1	<0.5	3.5	0.5										
	Whiting (5)	Feb	F1 32	min	0.42	<0.1	<0.5	2.1	0.5	liver	<0.001	<0.001	<0.004	0.073	0.006	0.009	0.088	1.6	51.3
				max	0.74	<0.1	<0.5	3.6	0.5	muscle	<0.001	<0.001	0.002	0.003	0.004	0.004	0.011	0.027	0.2
				mean	0.56	<0.1	<0.5	3.1	0.5										

Table 2a Continued

Port and Period of Sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals				Organochlorine Compounds										% Lipid	
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α HCH	δ HCH	Dieldrin	DDE	TDE	DDT	Σ DDT	PCB	
Hastings (winter)	Cod (10)	Mar	F0 30	0.16	<0.1	<0.5	<0.5	4.3	0.5	liver	0.015	0.015	0.20	0.23	0.19	0.29	0.71	3.5	41.5
				0.26	<0.1	<0.5	<0.5	5.4	0.5	muscle	<0.001	<0.001	0.002	0.003	<0.003	<0.003	<0.009	0.030	0.5
				0.22	<0.1	<0.5	<0.5	4.9	0.5										
(summer)	Plaice (9)	Mar	F0 30	0.15	<0.1	<0.5	<0.5	4.8	0.5	liver	0.005	0.008	0.017	0.025	0.012	0.016	0.053	0.28	7.3
				0.48	<0.1	<0.5	<0.5	6.6	0.5	muscle	0.001	0.001	0.004	0.002	0.003	0.002	0.007	0.024	0.5
				0.27	<0.1	<0.5	<0.5	5.7	0.5										
Plymouth (winter)	Mackerel (10)	Jul	F0 30	0.04	0.2	<0.5	<0.5	5.0	0.5	liver	<0.001	<0.001	-	0.021	0.009	0.008	0.038	0.31	0.8
				0.22	0.4	1.0	<0.5	9.6	5.8	muscle	<0.001	<0.001	-	0.011	0.005	0.014	0.030	0.13	<0.2
				0.09	0.3	<0.5	<0.5	6.8	1.4										
(summer)	Cod (5)	Feb	E5 29	0.18	<0.1	<0.5	<0.5	2.9	0.5	liver	0.025	0.022	0.049	0.21	0.21	0.19	0.61	3.2	28.4
				0.66	<0.1	<0.5	<0.5	4.5	0.5	muscle	<0.001	0.001	0.002	<0.003	<0.003	<0.006	<0.012	0.049	<0.2
				0.29	<0.1	<0.5	<0.5	3.6	0.5										
(summer)	Plaice (10)	Feb	E5 29	0.10	<0.1	<0.5	<0.5	3.6	0.5	liver	0.008	0.007	0.005	0.006	<0.004	<0.005	<0.015	0.076	2.6
				0.54	<0.1	<0.5	<0.5	6.2	0.5	muscle	0.002	0.004	<0.002	<0.001	0.006	0.012	<0.019	0.031	0.8
				0.20	<0.1	<0.5	<0.5	4.5	0.5										
(summer)	Whiting (10)	Feb	E5 29	0.11	<0.1	<0.5	<0.5	3.2	0.5	liver	0.003	<0.003	0.023	0.028	0.009	0.020	0.057	1.1	62.9
				0.48	<0.1	<0.5	<0.5	4.8	0.5	muscle	<0.001	<0.001	<0.002	<0.002	<0.004	<0.006	<0.012	<0.018	0.4
				0.26	<0.1	<0.5	0.5	4.0	0.5										
(summer)	Herring (5)	Feb	E5 29	0.11	<0.1	<0.5	<0.5	7.1	0.5	liver	0.002	0.003	0.004	0.010	0.003	0.005	0.018	0.099	2.3
				0.20	<0.1	<0.5	<0.5	11	1.0	muscle	0.003	0.003	0.005	0.006	0.005	0.005	0.016	0.14	6.5
				0.14	<0.1	<0.5	<0.5	8.5	1.0										
(summer)	Mackerel (5)	Feb	E5 29	0.17	<0.1	<0.5	<0.5	6.0	0.5	liver	0.002	0.003	0.007	0.033	0.026	0.038	0.097	0.78	9.1
				0.44	<0.1	<0.5	<0.5	10	1.0	muscle	0.001	<0.001	0.003	0.010	0.010	0.016	0.036	0.41	3.7
				0.32	<0.1	<0.5	<0.5	8.4	1.0										
(summer)	Cod (10)	Jul	E5 29	0.11	<0.1	<0.5	<0.5	2.0	0.5	liver	<0.006	<0.008	-	0.65	0.19	0.45	1.3	11.7	22.8
				0.32	<0.1	<0.5	<0.5	3.3	0.5	muscle	<0.001	<0.001	-	0.001	<0.002	<0.002	<0.005	0.012	0.2
				0.22	<0.1	<0.5	<0.5	2.7	0.5										
(summer)	Plaice (10)	Jul	E5 29	0.11	<0.1	<0.5	<0.5	2.4	0.5	liver	<0.001	<0.001	-	0.037	0.028	0.039	0.10	0.93	13.6
				0.21	<0.1	<0.5	<0.5	5.3	1.0	muscle	<0.001	<0.001	-	<0.001	<0.002	<0.002	<0.005	0.012	<0.2
				0.15	<0.1	<0.5	<0.5	3.5	0.7										
(summer)	Whiting (10)	Jul	E5 29	0.14	<0.1	<0.5	<0.5	2.2	<0.5	liver	<0.016	<0.020	-	1.4	0.50	1.1	3.0	27.8	44.8
				0.37	<0.1	<0.5	<0.5	4.2	6.0	muscle	0.001	<0.001	-	0.003	0.002	<0.002	<0.007	0.069	0.2
				0.23	<0.1	<0.5	<0.5	2.9	1.4										
(summer)	Herring (10)	Jul	E5 29	0.11	<0.1	<0.5	<0.5	2.8	0.5	liver	<0.001	0.003	-	0.10	0.001	0.030	0.13	0.48	8.4
				0.24	<0.1	<0.5	<0.5	5.5	1.0	muscle	0.011	0.008	-	0.10	0.019	0.024	0.14	0.63	12.0
				0.16	<0.1	<0.5	<0.5	4.3	0.5										
(summer)	Mackerel (10)	Jul	E5 29	0.05	<0.1	<0.5	<0.5	3.1	<0.5	liver	<0.001	<0.001	-	0.052	0.037	0.071	0.16	0.64	3.0
				0.51	<0.1	<0.5	<0.5	8.3	<0.5	muscle	0.002	<0.001	-	0.010	0.006	0.019	0.035	0.10	<0.2
				0.14	<0.1	<0.5	<0.5	4.7	<0.5										

Table 2a Continued

Port and Period of Sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals				Organochlorine Compounds										% Lipid	
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	
Newlyn (winter)	Cod (10)	Mar	E4 30	min.	<0.1	<0.5	<0.5	3.5	0.5	liver	0.006	0.010	0.087	0.31	0.55	0.053	0.91	4.1	41.6
				max.	<0.1	<0.5	<0.5	6.2	1.0	muscle	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	<0.006	0.025	0.4
				mean	<0.1	<0.5	<0.5	4.8	0.5										
	Plaice (10)	Mar	E4 30	min.	<0.1	<0.5	<0.5	1.9	<0.5	liver	0.003	0.002	0.011	0.016	0.004	0.004	0.024	0.23	1.4
				max.	0.2	<0.5	<0.5	5.9	<0.5	muscle	<0.001	<0.001	<0.001	0.001	<0.002	<0.002	<0.005	0.021	0.3
				mean	<0.1	<0.5	<0.5	3.9	<0.5										
(summer)	Whiting (10)	Mar	E4 30	min.	<0.1	<0.5	<0.5	2.5	<0.5	liver	0.007	0.007	0.011	0.11	0.080	0.077	0.027	2.6	50.1
				max.	0.2	<0.5	<0.5	3.6	<0.5	muscle	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	0.019	0.3
				mean	<0.1	<0.5	<0.5	3.1	<0.5										
	Pilchards (10)	Apr	E4 30	min.	<0.1	<0.5	<0.5	7.4	0.5	liver	0.002	0.003	0.005	0.011	0.006	0.004	0.021	0.076	1.3
				max.	0.2	<0.5	<0.5	13	2.0	muscle	<0.001	<0.001	0.003	0.008	0.006	0.010	0.024	0.070	2.4
				mean	0.1	<0.5	<0.5	9.5	1.1										
	Mackerel (10)	Jan	E4 30	min.	<0.1	<0.5	<0.5	3.6	<0.5	liver	0.007	0.006	0.006	0.010	0.005	0.010	0.025	0.068	10.1
				max.	0.2	<0.5	<0.5	8.8	1.2	muscle	0.005	0.006	0.005	0.004	0.009	<0.011	<0.024	<0.097	17.5
				mean	0.1	<0.5	<0.5	4.8	<0.5										
	Cod (6)	Aug	E4 29	min.	<0.1	<0.5	<0.5	4.1	0.3	liver	0.016	<0.012	-	0.63	0.30	0.21	1.1	9.2	14.0
				max.	0.3	<0.5	<0.5	5.2	0.5	muscle	<0.001	<0.001	<0.001	0.002	0.001	0.001	0.004	0.025	0.2
				mean	0.1	<0.5	<0.5	4.7	0.3										
	Plaice (10)	Aug	E4 29	min.	0.1	<0.5	<0.5	4.3	0.3	liver	0.003	0.002	-	0.025	0.016	0.015	0.056	0.54	4.4
				max.	0.3	<0.5	<0.5	6.2	0.5	muscle	<0.001	<0.001	-	0.001	<0.002	<0.002	<0.005	0.016	<0.2
				mean	0.1	<0.5	<0.5	4.9	0.4										
	Whiting (8)	Aug	E4 29	min.	<0.1	0.5	<0.5	3.8	0.3	liver	0.016	<0.024	-	0.66	0.97	1.0	2.6	14.9	27.2
				max.	0.3	7.0	<0.5	38	0.5	muscle	<0.001	<0.001	-	0.002	<0.003	<0.003	<0.008	0.020	<0.2
				mean	0.2	2.8	<0.5	8.7	0.3										
	Herring (10)	Aug	E4 29	min.	0.1	1.0	<0.5	4.5	0.8	liver	0.001	0.002	-	0.024	0.018	<0.011	<0.053	0.21	4.8
				max.	0.3	5.0	<0.5	13	1.5	muscle	0.003	0.002	-	0.025	0.004	0.004	0.033	0.16	3.4
				mean	0.2	2.5	<0.5	6.6	1.1										
	Mackerel (10)	Aug	E4 29	min.	0.2	<0.5	<0.5	3.9	0.3	liver	0.002	0.003	-	0.012	0.008	0.009	0.029	0.14	7.2
				max.	0.2	0.5	<0.5	7.4	0.8	muscle	0.008	0.004	-	0.022	0.016	0.022	0.060	0.17	18.6
				mean	0.2	<0.5	<0.5	4.9	0.5										

Table 2a continued

Port and Period of Sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid				
				Mercury		Cadmium	Lead	Chromium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	
Milford Haven (winter)	Cod (10)	Feb	E4 30	min.	0.10	<0.1	<0.5	1.0	1.9	<0.1	liver	0.022	0.013	0.042	0.12	0.073	0.096	0.29	3.3	40.6
				max. mean	0.91	0.3	<0.5	2.0	3.9	1.0	muscle	<0.001	0.001	0.005	0.002	0.003	0.001	0.006	0.044	0.2
	Plaice (10)	Feb	E4 30	min.	0.07	<0.1	<0.5	1.0	3.4	<0.1	liver	0.002	0.002	0.005	0.003	<0.002	<0.002	<0.007	0.078	2.6
				max. mean	0.46	0.5	<0.5	2.0	5.2	0.5	muscle	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.003	0.017	0.3
Milford Haven (summer)	Whiting (10)	Feb	E4 30	min.	0.13	<0.1	<0.5	1.0	3.5	<0.1	liver	0.008	0.013	0.014	0.029	0.036	0.045	0.11	0.64	59.1
				max. mean	0.34	0.4	<0.5	2.0	6.5	0.5	muscle	<0.001	<0.001	<0.001	<0.002	<0.001	<0.002	<0.005	<0.022	0.3
	Herring (10)	Jan	E3 33	min.	0.09	<0.1	<0.5	<0.5	5.2	0.5	liver	0.004	0.004	0.003	<0.003	0.004	<0.003	<0.010	0.12	1.1
				max. mean	0.18	<0.1	<0.5	<0.5	8.8	1.0	muscle	0.002	0.002	0.002	0.008	0.002	0.002	0.012	0.10	7.2
	Mackerel (12)	Feb	E4 30	min.	0.21	<0.1	<0.5	<0.5	7.0	0.5	liver	0.006	0.006	0.010	0.035	0.036	0.042	0.11	0.54	9.9
				max. mean	1.2	<0.1	<0.5	<0.5	12	1.0	muscle	<0.001	0.001	0.003	0.047	0.007	0.005	0.059	0.14	7.1
	Cod (5)	Jul	E5 32	min.	0.07	<0.1	<0.5	<0.5	4.7	<0.5	liver	0.019	0.006	0.080	0.29	0.29	0.19	0.77	7.0	28.4
				max. mean	0.29	<0.1	1.0	<0.5	7.5	10.0	muscle	<0.001	<0.001	-	<0.001	<0.002	<0.002	<0.005	0.022	0.3
	Plaice (10)	Jul	E5 32	min.	0.05	<0.1	<0.5	<0.5	3.2	<0.5	liver	0.002	0.002	0.028	0.032	0.086	0.017	0.14	0.88	11.6
				max. mean	0.20	0.1	<0.5	<0.5	7.1	<0.5	muscle	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.003	0.016	1.2
	Whiting (10)	Jul	E5 32	min.	0.11	<0.1	<0.5	<0.5	3.9	<0.5	liver	0.021	0.012	-	0.42	0.39	0.18	0.99	8.8	45.2
				max. mean	0.22	0.1	<0.5	<0.5	6.1	3.5	muscle	<0.001	<0.001	-	<0.001	<0.002	<0.002	<0.005	0.020	0.2
Mackerel (5)	Jul	E5 32	min.	0.05	<0.1	<0.5	<0.5	4.3	<0.5	liver	-	-	-	-	-	-	-	-	-	-
			max. mean	0.13	0.4	<0.5	<0.5	8.7	<0.5	muscle	0.003	0.002	0.001	0.011	0.010	0.026	0.047	0.12	6.0	

Table 2a Continued

Port and Period of Sampling	Species and Number	Date 1971	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid				
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE		DDT	ΣDDT	PCB	
Fleetwood (winter)	Plaice (6)	Feb	E6 38	min.	0.06	<0.1	<0.5	<0.5	2.5	0.5	liver	0.002	0.003	0.008	0.007	0.005	0.006	0.018	0.13	12.7
				max.	0.23	<0.1	<0.5	<0.5	4.7	2.5	muscle	0.001	0.002	0.005	0.008	0.006	0.012	0.026	0.091	2.0
				mean	0.11	<0.1	<0.5	<0.5	3.4	0.3										
(summer)	Whiting (10)	Feb	E6 38	min.	0.18	<0.1	<0.5	<0.5	1.3	0.5	liver	0.010	0.009	0.028	0.064	0.083	0.051	0.22	1.7	61.9
				max.	0.56	<0.1	<0.5	<0.5	4.3	0.5	muscle	<0.001	<0.001	<0.001	0.002	0.002	0.002	0.006	0.032	0.7
				mean	0.34	<0.1	<0.5	<0.5	2.6	0.5										
(summer)	Cod (10)	Jun	E6 38	min.	0.11	<0.1	<0.5	<0.5	2.8	<0.5	liver	0.017	0.009	-	0.37	0.29	0.12	0.78	2.6	10.0
				max.	0.45	<0.1	<0.5	<0.5	5.7	<0.5	muscle	<0.001	<0.001	-	<0.001	<0.002	<0.002	<0.005	<0.016	<0.2
				mean	0.17	<0.1	<0.5	<0.5	4.1	<0.5										
(summer)	Plaice (13)	Jun	E6 38	min.	0.03	<0.1	<0.5	<0.5	5.0	<0.5	liver	0.008	0.003	-	0.023	0.046	0.008	0.077	0.17	6.0
				max.	0.09	0.1	<0.5	<0.5	9.0	1.0	muscle	<0.001	<0.001	-	<0.001	<0.003	<0.003	<0.007	<0.022	0.4
				mean	0.05	<0.1	<0.5	<0.5	6.5	<0.5										
(summer)	Whiting (10)	Jun	E6 38	min.	0.24	<0.1	<0.5	<0.5	3.4	<0.5	liver	0.066	0.030	-	2.0	4.0	1.0	7.0	16.6	18.4
				max.	0.63	0.6	<0.5	<0.5	8.5	0.5	muscle	<0.001	<0.001	-	0.054	0.002	<0.001	<0.057	0.74	0.2
				mean	0.40	0.2	<0.5	<0.5	5.3	<0.5										
(summer)	Herring (12)	Jul	E5 37	min.	0.03	<0.1	<0.5	<0.5	5.4	1.0	liver	0.006	0.003	-	0.055	0.067	0.046	0.17	0.26	14.4
				max.	0.07	0.2	<0.5	<0.5	8.8	2.3	muscle	0.008	0.003	-	0.079	0.040	0.022	0.14	0.55	12.0
				mean	0.05	<0.1	<0.5	<0.5	7.2	1.5										
(summer)	Mackerel (12)	Jul	E5 37	min.	0.05	<0.1	<0.5	<0.5	3.0	<0.5	liver	0.013	0.009	-	0.21	0.37	0.088	0.67	1.9	4.4
				max.	0.93	0.6	5.0	<0.5	7.5	<0.5	muscle	0.005	0.004	-	0.067	0.15	0.022	0.24	0.68	3.0
				mean	0.51	0.3	<1.5	<0.5	5.5	<0.5										

Table 3 Summary of Results from 1972 Routine Programme: Concentrations (mg/kg wet weight) of Metals and Organochlorine Compounds Found in Fish

Species	Season	Number of Samples	Organ	Metals				Organochlorine Compounds							PCB			
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	∑HCH	γHCH	Dieldrin	DDE	TDE		DDT	∑DDT	
Cod	Winter	8	Muscle	min	0.05	<0.1	<0.5	<0.5	2.8	0.3	<0.001	<0.001	<0.001	0.001	<0.002	<0.002	<0.004	0.020
			max	0.67	0.3	1.0	<0.5	8.6	1.0	<0.001	0.002	0.002	0.004	0.003	0.010	0.049		
	Summer	8	Liver	min	-	-	-	-	-	-	0.017	0.014	0.13	0.04	0.42	1.1		
			max	-	-	-	-	-	-	0.044	0.031	0.27	0.53	0.58	0.65	1.7		
Whiting	Winter	6	Muscle	min	0.02	<0.1	<0.2	<0.1	2.4	<0.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015
			max	0.47	0.2	2.3	1.1	5.9	2.8	<0.001	<0.001	0.001	0.002	0.002	0.002	0.006	0.031	
	Summer	8	Liver	min	-	-	-	-	-	-	0.017	0.013	0.14	0.24	0.16	0.10	0.70	2.8
			max	-	-	-	-	-	-	0.063	0.070	0.29	1.2	0.65	0.52	2.0	18	
Plaice	Winter	7	Muscle	min	0.07	<0.1	<0.2	<0.2	1.0	0.3	<0.001	<0.001	<0.001	0.001	0.002	<0.002	<0.005	0.017
			max	1.1	0.7	2.0	0.5	6.5	1.6	<0.001	<0.002	0.002	0.020	0.008	0.014	0.042	0.097	
	Summer	8	Liver	min	-	-	-	-	-	-	0.013	0.028	0.11	0.32	0.15	0.20	0.73	1.1
			max	-	-	-	-	-	-	0.078	0.068	0.19	1.6	3.0	0.88	4.9	26	
Herring	Winter	5	Muscle	min	0.02	<0.1	<0.2	<0.2	2.2	<0.5	<0.001	<0.001	<0.001	0.002	<0.002	0.001	0.007	<0.019
			max	0.40	0.2	6.8	1.4	8.1	4.2	<0.001	0.001	0.002	0.020	0.017	0.014	0.042	0.42	
	Summer	8	Liver	min	-	-	-	-	-	-	0.013	0.018	0.12	0.22	0.34	0.26	1.4	3.3
			max	-	-	-	-	-	-	0.10	0.13	0.24	1.6	4.4	1.50	6.3	26	
Mackerel	Winter	3	Muscle	min	0.05	<0.1	<0.5	<0.5	2.1	<0.3	<0.001	<0.001	<0.001	0.002	<0.002	<0.002	<0.006	0.023
			max	0.63	0.3	2.0	0.5	7.4	5.5	<0.001	0.004	0.004	0.008	0.012	0.005	0.025	0.19	
	Summer	7	Liver	min	-	-	-	-	-	-	0.001	0.001	0.011	0.007	0.009	<0.004	<0.021	<0.052
			max	-	-	-	-	-	-	0.013	0.014	0.044	0.11	0.17	0.078	0.36	2.4	
Herring	Winter	5	Muscle	min	<0.01	<0.2	<0.2	<0.2	3.0	<0.3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.018
			max	1.5	0.3	1.9	1.1	31.0	2.6	<0.001	<0.001	0.008	0.006	0.015	0.003	0.023	0.18	
	Summer	1	Liver	min	-	-	-	-	-	-	0.005	0.001	0.016	0.017	0.012	0.006	0.035	0.15
			max	-	-	-	-	-	-	0.023	0.025	0.092	0.28	0.63	0.18	1.0	9.7	
Mackerel	Winter	4	Muscle	min	0.02	<0.1	<0.5	<0.5	3.2	0.3	<0.001	0.001	0.008	0.014	0.009	0.015	0.038	0.093
			max	0.21	0.3	<0.5	<0.5	35.0	4.0	0.006	0.004	0.031	0.058	0.038	0.035	0.12	0.54	
	Summer	7	Liver	min	-	-	-	-	-	-	0.001	0.002	0.009	0.020	0.007	0.009	0.036	0.15
			max	-	-	-	-	-	-	0.005	0.004	0.059	0.074	0.018	0.04	0.17	0.42	
Mackerel	Winter	3	Muscle	min	0.02	<0.1	<0.2	<0.2	5.2	0.8	0.004	0.004	0.011	0.022	0.016	0.018	0.056	0.16
			max	0.04	0.1	<0.2	<0.2	6.7	1.1	-	-	-	-	-	-	-	-	-
	Summer	7	Liver	min	-	-	-	-	-	-	0.011	0.005	0.022	0.017	0.027	0.034	0.078	0.10
			max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mackerel	Winter	3	Muscle	min	0.07	<0.1	<0.5	<0.5	3.0	0.1	<0.001	<0.001	0.003	0.017	0.008	0.012	0.037	0.055
			max	0.76	0.3	<0.5	<0.5	11.0	2.0	0.008	0.003	0.017	0.038	0.032	0.046	0.12	0.27	
	Summer	7	Liver	min	-	-	-	-	-	-	0.002	0.003	0.030	0.015	0.014	0.080	0.11	0.20
			max	-	-	-	-	-	-	0.009	0.008	0.073	0.19	0.20	0.23	0.55	3.5	
Mackerel	Winter	3	Muscle	min	<0.02	<0.1	<0.2	<0.2	4.5	<0.5	0.001	0.002	0.007	0.018	0.012	0.029	0.070	0.22
			max	0.75	0.3	3.6	1.5	32.0	3.1	0.013	0.016	0.033	0.11	0.24	0.12	0.37	1.7	
	Summer	7	Liver	min	-	-	-	-	-	-	0.002	0.001	0.012	0.015	0.014	0.022	0.051	0.30
			max	-	-	-	-	-	-	0.029	0.016	0.074	0.18	0.5	0.22	0.78	3.0	

Table 3a Results from 1972 Routine Programme: Concentrations (mg/kg wet weight) of Metals and Organochlorine Compounds Found in Fish

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals				Organochlorine Compounds							% Lipid				
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	αHCH	Σ HCH	Dieldrin	DDE		TDE	DDT	Σ DDT	PCB
North Shields (winter)	Cod (10)	Mar	E9 39	min	0.04	0.1	<0.5	3.9	0.5	liver	0.017	0.014	0.14	0.13	0.25	0.040	0.42	1.1	13.2
				max	0.12	0.2	<0.5	5.4	1.0	muscle	<0.001	0.001	0.001	0.002	<0.002	<0.002	<0.006	0.022	1.0
				mean	0.08	0.1	<0.5	4.7	0.5										
	Plaice (10)	Mar	E9 39	min	0.06	<0.1	<0.5	4.0	0.3	liver	0.010	0.014	0.035	0.027	0.071	0.061	0.16	0.42	3.2
				max	0.47	0.2	<0.5	6.3	0.5	muscle	<0.001	<0.001	0.002	0.004	0.003	0.004	0.011	0.060	1.0
				mean	0.19	0.1	<0.5	5.3	0.3										
Whiting (10)	Mar	E9 39	min	0.07	0.1	<0.5	4.1	0.5	liver	0.037	0.028	0.12	0.32	0.15	0.30	0.77	2.5	13.2	
			max	0.11	0.2	<0.5	5.4	0.8	muscle	<0.001	0.001	0.002	0.002	0.002	0.003	0.007	0.017	0.8	
			mean	0.09	0.2	<0.5	4.6	0.5											
(summer)	Cod (10)	Nov	E8 39	min	0.04	<0.1	<0.2	2.8	<0.5	liver	0.043	0.013	0.17	0.45	0.32	0.49	1.3	3.9	35.2
				max	0.07	0.1	<0.2	5.1	2.8	muscle	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.004	<0.015	<0.2
				mean	0.05	<0.1	<0.2	3.6	<0.7										
	Plaice (6)	Nov	E8 39	min	0.03	<0.1	<0.2	3.6	<0.5	liver	0.005	0.001	0.016	0.017	0.012	0.006	0.035	0.15	6.4
				max	0.08	<0.1	<0.2	6.7	0.6	muscle	<0.001	<0.001	0.008	0.001	<0.002	<0.002	<0.005	<0.018	<0.2
				mean	0.05	<0.1	<0.2	5.0	<0.5										
Whiting (15)	Nov	E8 39	min	0.02	<0.1	<0.2	4.1	<0.5	liver	0.081	0.065	0.24	0.57	0.65	1.1	2.3	3.3	70.0	
			max	0.14	0.1	<0.2	7.7	1.3	muscle	<0.001	<0.001	<0.001	0.002	0.002	0.003	0.007	<0.019	0.2	
			mean	0.06	<0.1	<0.2	5.9	<0.7											
Herring (5)	Nov	E8 39	min	0.02	<0.1	<0.2	5.2	0.8	liver	0.011	0.005	0.022	0.017	0.027	0.034	0.078	0.10	10.7	
			max	0.04	0.1	<0.2	6.7	1.1	muscle	0.004	0.004	0.011	0.022	0.016	0.018	0.056	0.16	8.4	
			mean	0.03	<0.1	<0.2	5.9	0.9											
Mackerel (5)	Nov	E8 39	min	0.02	<0.1	<0.2	4.5	<0.5	liver	0.029	0.016	0.027	0.040	0.032	0.066	0.14	0.36	29.2	
			max	0.04	<0.1	1.0	8.0	2.4	muscle	0.013	0.005	0.016	0.024	0.012	0.034	0.070	0.22	16.0	
			mean	0.03	<0.1	<0.4	6.4	1.2											
Grimsby (winter)	Cod (10)	Mar	F0 36	min	0.06	<0.1	<0.5	2.8	0.3	liver	0.044	0.013	0.27	0.49	0.58	0.65	1.7	4.9	21.6
				max	0.10	0.1	<0.5	3.5	0.8	muscle	<0.001	<0.001	0.002	0.004	0.003	0.003	0.010	0.037	0.2
				mean	0.08	<0.1	<0.5	3.2	0.5										
	Cod (6)	Apr	F0 42	min	0.05	<0.1	<0.5	1.9	0.5	liver	0.011	0.005	0.034	0.16	0.17	0.21	0.54	1.3	6.8
				max	0.09	0.1	<0.5	2.6	0.5	muscle	<0.001	<0.001	0.001	0.006	0.002	0.006	0.014	0.057	0.2
				mean	0.06	<0.1	<0.5	2.3	0.5										
Plaice (9)	Apr	F0 42	min	0.05	<0.1	<0.5	3.4	0.3	liver	0.003	0.001	0.011	0.018	0.013	0.011	0.042	0.23	0.8	
			max	0.11	0.1	<0.5	4.5	0.8	muscle	<0.001	<0.001	<0.001	0.002	0.002	0.002	0.006	0.023	<0.2	
			mean	0.07	<0.1	<0.5	3.9	0.4											
Herring (6)	Mar	F0 36	min	0.05	0.1	<0.5	8.0	0.8	liver	0.001	0.002	0.008	0.014	0.009	0.015	0.038	0.093	2.2	
			max	0.08	0.2	<0.5	10.3	1.8	muscle	0.001	0.002	0.008	0.014	0.009	0.015	0.038	0.093	2.2	
			mean	0.06	0.1	<0.5	9.6	1.2											

Table 3a Continued

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals			Organochlorine Compounds										% Lipid			
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE	DDT		ΣDDT	PCB	
Grimsby (summer)	Cod (8)	Aug	E9 36	min	<0.1	<0.2	<0.2	3.6	0.5	liver	0.063	0.028	0.25	0.51	0.36	0.52	1.4	3.2	30.0	
				max	0.12	0.1	<0.2	5.9	1.1	muscle	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.016	<0.2	
				mean	0.06	<0.1	<0.3	4.4	0.9											
	Plaice (10)	Aug	E9 36	min	<0.1	<1.0	<0.3	2.6	<0.6	liver	0.010	0.004	0.029	0.057	0.029	0.039	0.13	0.35	11.2	
				max	0.11	<1.0	<0.3	6.1	0.7	muscle	<0.001	<0.001	0.001	0.003	<0.002	<0.002	<0.007	<0.020	<0.2	
				mean	0.07	<0.1	<1.0	4.6	0.6											
	Whiting (18)	Aug	E9 36	min	<0.1	<0.2	<0.2	3.5	<0.5	liver	0.058	0.050	0.24	1.3	1.2	1.5	4.0	18	35.2	
				max	0.26	0.1	<0.2	5.8	1.5	muscle	<0.001	<0.001	<0.001	0.004	0.002	0.003	0.009	0.035	<0.2	
				mean	0.09	<0.1	<0.2	4.3	0.8											
Lowestoft (winter)	Cod (10)	Mar	F1 33	min	<0.1	<0.5	<0.5	3.2	0.3	liver	0.021	0.016	0.25	0.37	0.22	0.26	0.85	2.3	16.0	
				max	0.15	0.2	<0.5	5.3	0.6	muscle	<0.001	<0.001	0.002	0.002	0.002	0.002	0.006	0.020	<0.2	
				mean	0.12	0.1	<0.5	3.7	0.5											
(summer)	Cod (10)	Jul	F1 39	min	<0.1	<0.4	<0.1	3.8	0.4	liver	0.062	0.018	0.15	0.24	0.16	0.30	0.70	2.8	28.4	
				max	0.33	0.1	2.3	0.7	5.6	0.9	muscle	<0.001	<0.001	0.001	0.002	0.002	0.002	0.006	0.019	0.8
				mean	0.14	<0.1	<0.8	4.4	0.7											
	Plaice (10)	Jul	F1 39	min	<0.1	<0.4	<0.3	4.4	0.4	liver	0.008	0.006	0.037	0.044	0.050	0.038	0.13	0.38	8.8	
				max	0.28	0.1	1.3	0.5	7.4	0.6	muscle	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.020	0.8
				mean	0.17	<0.1	0.8	5.2	0.5											
	Whiting (10)	Jul	F1 39	min	<0.1	<0.4	<0.1	3.4	0.4	liver	0.054	0.018	0.11	0.22	0.34	0.86	1.4	1.6	29.6	
				max	0.31	0.2	1.0	0.4	5.9	0.8	muscle	<0.001	<0.001	<0.001	0.003	0.001	0.003	0.007	0.016	1.0
				mean	0.22	<0.1	0.6	4.6	0.6											
	Mackerel (10)	Jul	F1 33	min	<0.1	<0.5	<0.3	3.6	0.6	liver	0.003	0.004	0.036	0.074	0.068	0.064	0.21	1.7	8.0	
				max	0.75	0.1	<0.5	6.4	1.5	muscle	0.001	0.008	0.025	0.11	0.075	0.12	0.31	1.7	8.2	
				mean	0.31	<0.1	<0.5	4.4	1.1											
Burnham (winter)	Cod (7)	Dec 1971	F1 32	min	<0.1	0.5	<0.5	5.0	<0.5	liver	0.041	0.029	-	0.53	0.39	0.20	1.1	11	17.6	
				max	0.43	<0.1	1.0	0.5	6.3	0.5	muscle	<0.002	<0.001	-	0.003	0.002	<0.002	<0.007	0.049	<0.2
				mean	0.32	<0.1	0.8	5.8	0.5											
	Plaice (12)	Dec 1971	F1 32	min	<0.1	0.5	<0.5	4.8	<0.5	liver	0.013	0.011	-	0.11	0.17	0.078	0.36	2.4	15.6	
				max	0.63	<0.1	2.0	0.5	7.4	5.5	muscle	0.001	0.002	-	0.008	0.012	0.005	0.025	0.19	<1.0
				mean	0.29	<0.1	1.1	6.6	1.0											
	Whiting (7)	Dec 1971	F1 32	min	<0.1	<0.5	<0.5	4.6	<0.5	liver	0.042	0.028	-	1.6	0.87	0.88	3.4	25	15.2	
				max	1.1	<0.1	2.0	0.5	6.4	0.5	muscle	<0.001	<0.001	-	0.005	0.002	0.003	0.010	0.097	<0.2
				mean	0.48	<0.1	<0.8	5.4	<0.5											
Hastings (winter)	Whiting (10)	Apr	F0 30	min	<0.1	<0.2	<0.1	2.8	0.4	liver	0.011	0.016	0.22	1.1	0.94	0.92	3.0	24	20.0	
				max	1.1	<0.1	<0.5	4.4	0.8	muscle	0.001	0.001	0.001	0.008	0.008	0.004	0.020	0.14	<0.2	
				mean	0.44	<0.1	<0.5	3.4	0.6											

Table 3a Continued

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid			
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	Organ	α-HCH	Σ-HCH	Dieldrin	DDE	TDE	DDT	Σ DDT	PCB	
Hastings (summer)	Cod (6)	Aug	F0 30	min	<0.1	<1.0	0.8	3.2	<0.3	liver	0.032	0.048	0.29	0.28	0.36	0.36	1.0	4.2	
				max	0.25	1.9	1.1	5.0	1.9	muscle	<0.001	<0.001	<0.001	0.001	<0.002	<0.002	<0.005	<0.020	
				mean	0.16	<0.1	<1.2	0.9	3.8	<0.6								20.8	
	Plaice (6)	Aug	F0 30	min	<0.1	<1.0	0.6	4.3	<0.3	liver	0.010	0.012	0.040	0.066	0.096	0.080	0.24	1.6	
				max	0.17	1.1	1.9	1.1	6.5	1.2	muscle	<0.001	<0.001	<0.002	0.003	0.002	0.003	0.008	0.079
				mean	0.14	0.1	<1.2	0.8	5.3	<0.6								20.8	
	Whiting (6)	Aug	F0 30	min	<0.1	<1.0	0.8	3.5	0.5	liver	0.038	0.090	0.12	1.6	0.92	0.70	3.2	27	
				max	0.31	<0.1	1.5	1.4	4.1	0.7	muscle	<0.001	<0.001	0.002	0.010	0.007	0.008	0.025	0.17
				mean	0.27	<0.1	<1.2	1.1	3.8	0.6								61.6	
	Mackerel (10)	Aug	F0 30	min	<0.1	<1.0	0.8	6.4	0.8	liver	0.002	0.001	0.008	0.015	0.014	0.022	0.051	0.30	
				max	0.10	<0.1	2.0	1.1	29	1.7	muscle	0.003	0.002	0.007	0.018	0.023	0.029	0.070	0.34
				mean	0.06	<0.1	<1.2	0.9	15	1.3								3.2	
Plymouth (winter)	Cod (6)	Mar	E5 29	min	<0.1	<0.5	<0.5	3.4	0.3	liver	0.024	0.031	0.13	0.45	0.22	0.30	0.97	8.4	
				max	0.51	<0.5	<0.5	3.9	0.5	muscle	<0.001	0.002	0.001	0.003	0.002	0.002	0.007	0.049	
				mean	0.27	<0.1	<0.5	<0.5	3.6	0.3								56.8	
	Plaice (10)	Mar	E5 29	min	0.06	<0.5	<0.5	5.0	0.3	liver	0.001	0.005	0.044	0.028	0.038	0.024	0.090	2.0	
				max	0.30	<0.5	<0.5	6.9	0.8	muscle	<0.001	<0.001	0.004	0.005	0.005	0.005	0.015	0.17	
				mean	0.21	<0.1	<0.5	<0.5	5.7	0.5								4.4	
	Whiting (10)	Mar	E5 29	min	<0.1	<0.5	<0.5	3.5	0.3	liver	0.030	0.042	0.19	0.54	0.47	0.40	1.4	7.3	
				max	0.32	<0.5	<0.5	5.5	0.5	muscle	<0.001	<0.001	0.002	0.002	0.003	0.002	0.007	0.034	
				mean	0.21	<0.1	<0.5	<0.5	4.4	0.5								23.2	
	Herring (8)	Mar	E5 29	min	0.12	<0.5	<0.5	4.1	1.0	liver	0.001	0.002	0.012	0.057	0.018	0.019	0.094	0.42	
				max	0.18	<0.5	<0.5	35	4.0	muscle	0.001	0.003	0.010	0.052	0.019	0.024	0.095	0.36	
				mean	0.15	<0.5	<0.5	<0.5	15.9	2.4								1.2	
	Mackerel (10)	Mar	E5 29	min	0.10	<0.5	<0.5	3.8	0.5	liver	0.006	0.006	0.073	0.16	0.20	0.19	0.55	2.5	
				max	0.76	<0.5	<0.5	7.5	0.8	muscle	0.002	0.002	0.017	0.038	0.032	0.046	0.12	0.055	
				mean	0.33	<0.1	<0.5	<0.5	5.3	0.8								8.8	

Table 3a Continued

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals		Organochlorine Compounds										% Lipid				
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	α HCH	γ HCH	Dieldrin	DDE	TDE		DDT	Σ DDT	PCB	
Plymouth (summer)	Cod (5)	Oct	E5 29	min	0.15	<0.1	<1.0	<0.3	3.0	<0.6	liver	0.035	0.054	0.18	1.2	0.34	0.46	2.0	18	41.2
				max	0.47	<0.1	<1.0	<0.3	3.8	<0.6	muscle	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.003	<0.017	0.2
				mean	0.30	<0.1	<1.0	<0.3	3.5	<0.6										
Plaice (10)	Plaice (10)	Oct	E5 29	min	<0.01	<0.1	<0.2	<0.2	4.1	0.5	liver	0.009	0.010	0.068	0.28	0.16	0.15	0.59	9.7	34.4
				max	0.15	0.1	0.2	<0.2	6.2	1.0	muscle	<0.001	<0.001	<0.001	0.002	<0.001	0.001	<0.004	0.048	0.2
				mean	0.08	<0.1	<0.2	<0.2	4.8	0.8										
Whiting (10)	Whiting (10)	Oct	E5 29	min	0.11	<0.1	<0.2	<0.2	3.0	0.5	liver	0.013	0.040	0.12	1.1	0.63	0.67	2.4	26	69.2
				max	0.33	0.1	<0.2	0.4	6.5	1.6	muscle	<0.001	0.001	0.002	0.020	0.008	0.014	0.042	0.42	1.6
				mean	0.21	<0.1	<0.2	<0.2	4.6	1.0										
Mackerel (10)	Mackerel (10)	Oct	E5 29	min	0.02	<0.1	<0.2	<0.2	5.0	0.8	liver	0.013	0.014	0.012	0.037	0.031	0.070	0.14	0.31	18.0
				max	0.04	0.1	3.6	0.3	26	1.8	muscle	0.007	0.006	0.007	0.019	0.021	0.037	0.077	0.22	17.0
				mean	0.03	<0.1	<0.6	<0.2	8.4	1.3										
Newlyn (winter)	Cod (10)	Feb	E4 29	min	0.10	0.1	<0.5	<0.5	4.1	0.5	liver	0.019	0.014	-	0.28	0.42	0.11	0.81	4.2	22.4
				max	0.67	0.2	<0.5	<0.5	8.6	0.8	muscle	<0.001	<0.001	-	0.001	0.001	<0.002	<0.004	0.028	0.4
				mean	0.34	0.2	<0.5	<0.5	5.2	0.6										
Plaice (9)	Plaice (9)	Feb	E4 29	min	0.05	0.1	<0.5	<0.5	3.8	<0.3	liver	0.001	0.004	-	0.008	0.009	<0.004	<0.021	0.18	0.4
				max	0.22	0.2	<0.5	<0.5	6.8	0.5	muscle	<0.001	<0.001	-	0.002	0.001	<0.002	<0.005	0.031	0.4
				mean	0.14	0.1	<0.5	<0.5	4.8	0.3										
Whiting (10)	Whiting (10)	Feb	E4 29	min	0.17	0.1	<0.5	<0.5	3.9	0.3	liver	0.017	0.016	-	0.30	0.18	0.17	0.65	4.5	25.2
				max	0.27	0.2	<0.5	<0.5	6.4	0.5	muscle	<0.001	<0.001	-	0.001	<0.002	<0.002	<0.005	<0.028	0.2
				mean	0.21	0.1	<0.5	<0.5	4.5	0.3										
Mackerel (10)	Mackerel (10)	Feb	E4 29	min	0.07	0.1	<0.5	<0.5	4.5	0.8	liver	0.009	0.008	-	0.015	0.014	0.080	0.11	0.20	10.0
				max	0.10	0.3	<0.5	<0.5	11	2.0	muscle	0.008	0.003	-	0.018	0.014	0.016	0.048	<0.13	14.0
				mean	0.08	0.2	<0.5	<0.5	8.0	1.2										
(summer)	Cod (10)	Aug	E4 29	min	0.12	<0.1	<1.0	<0.3	3.2	<0.6	liver	0.018	0.017	0.072	0.62	0.28	0.29	1.2	11	42.0
				max	0.40	<0.1	<1.0	<0.3	5.4	0.8	muscle	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.004	0.030	0.4
				mean	0.22	<0.1	<1.0	<0.3	3.9	<0.6										
Plaice (10)	Plaice (10)	Aug	E4 29	min	0.05	<0.2	<1.0	<0.3	6.2	1.1	liver	0.023	0.011	0.060	0.074	0.13	0.11	0.31	3.3	26.8
				max	0.27	0.3	<1.0	<0.3	31	2.6	muscle	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.005	0.18	1.8
				mean	0.14	<0.2	<1.0	<0.3	13	1.7										
Whiting (10)	Whiting (10)	Aug	E4 29	min	0.11	<0.1	<1.0	<0.3	2.9	<0.8	liver	0.074	0.072	0.13	1.5	0.90	1.2	3.6	27	47.2
				max	0.40	0.2	<1.0	<0.3	5.1	1.4	muscle	<0.001	<0.001	<0.001	0.002	<0.002	0.002	<0.006	0.031	0.2
				mean	0.25	0.1	<1.0	<0.3	4.0	<0.9										
Pilchards (11)	Pilchards (11)	Aug	E4 29	min	<0.02	<0.2	<1.0	<0.3	5.0	1.8	liver	0.005	0.007	0.010	0.051	0.010	0.014	0.075	0.23	9.8
				max	0.06	0.2	<1.0	<0.3	35	3.6	muscle	0.006	0.006	0.023	0.075	0.018	<0.016	<0.11	0.35	25.6
				mean	0.04	<0.2	<1.0	<0.3	18	2.3										
Mackerel (14)	Mackerel (14)	Aug	E4 29	min	<0.02	<0.1	<1.0	<0.3	13	1.3	liver	0.014	0.013	0.074	0.049	0.065	0.090	0.20	0.57	19.2
				max	0.09	0.1	<1.0	<0.3	26	2.0	muscle	0.007	0.006	0.023	0.019	0.019	0.042	0.080	0.22	10.4
				mean	0.04	<0.1	<1.0	<0.3	20	1.6										

Table 3a Continued

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals					Organochlorine Compounds										% Lipid	
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	α HCH	γ HCH	Dieldrin	DDE	TDE	DDT	Σ DDT	PCB		
Milford Haven (winter)	Cod (10)	Feb	E4 30	min	0.05	<0.1	<0.5	2.8	0.3	liver	0.031	0.031	0.14	0.41	0.16	0.10	0.67	11	22.8	
				max	0.62	<0.1	<0.5	3.6	0.5	muscle	<0.001	<0.001	<0.001	0.001	<0.002	<0.002	<0.005	0.035	0.2	
				mean	0.18	0.1	<0.5	3.3	0.3											
	Plaice (10)	Feb	E4 30	min	0.07	<0.1	<0.5	2.1	0.5	liver	0.001	0.005	0.012	0.019	0.015	0.008	0.042	0.50	2.8	
				max	0.24	<0.1	<0.5	4.5	0.5	muscle	<0.001	<0.001	0.002	0.003	0.003	0.003	0.009	0.068	0.4	
				mean	0.15	0.1	<0.5	3.3	0.5											
	Whiting (10)	Feb	E4 30	min	0.09	<0.1	<0.5	1.0	0.3	liver	0.030	0.028	0.11	0.33	0.20	0.20	0.73	4.4	51.2	
				max	0.32	0.2	<0.5	3.9	0.5	muscle	<0.001	<0.001	<0.001	0.001	<0.002	<0.002	<0.005	0.025	0.2	
				mean	0.20	0.1	<0.5	2.5	0.4											
	Herring (10)	Jan	E6 31	min	0.02	<0.1	<0.5	5.3	0.8	liver	0.002	0.003	0.009	0.020	0.007	0.009	0.036	0.15	1.2	
				max	0.11	0.2	<0.5	9.0	1.3	muscle	0.006	0.004	0.023	0.047	0.029	0.041	0.12	0.24	4.6	
				mean	0.06	0.1	<0.5	7.3	1.2											
(summer)	Herring (10)	Apr	E4 32	min	0.12	<0.1	<0.5	3.2	0.3	liver	0.002	0.003	0.013	0.052	0.020	0.030	0.10	0.50	3.0	
				max	0.21	0.2	<0.5	5.3	0.6	muscle	<0.001	0.001	0.011	0.058	0.022	0.035	0.12	0.54	3.4	
				mean	0.18	0.1	<0.5	3.7	0.5											
	Mackerel (10)	Feb	E4 30	min	0.10	<0.1	<0.5	3.0	0.1	liver	0.002	0.003	0.030	0.19	0.11	0.23	0.53	3.5	4.0	
				max	0.52	0.2	<0.5	6.3	0.8	muscle	<0.001	<0.001	0.003	0.017	0.008	0.012	0.037	0.27	0.6	
				mean	0.21	0.2	<0.5	4.8	0.3											
	Cod (7)	Sep	E4 32	min	0.04	<0.1	<1.0	2.4	<0.6	liver	0.057	0.070	0.22	0.29	0.22	0.22	0.73	6.1	38.4	
				max	0.14	<0.1	<1.0	4.1	0.7	muscle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	0.010	0.2	
				mean	0.10	<0.1	<1.0	3.4	<0.6											
	Plaice (7)	Sep	E4 32	min	<0.02	<0.1	<0.5	3.4	0.7	liver	0.010	0.012	0.092	0.038	0.13	0.18	0.35	0.80	42.4	
				max	0.05	<0.1	1.3	4.6	1.3	muscle	<0.001	<0.001	<0.001	0.002	0.002	0.003	0.007	0.024	1.0	
				mean	0.03	<0.1	<0.7	4.2	0.9											
	Whiting (8)	Sep	E4 32	min	0.04	<0.1	<0.5	2.2	0.9	liver	0.10	0.13	0.20	0.72	1.4	0.58	2.7	10	63.6	
				max	0.26	<0.1	6.8	8.1	4.2	muscle	<0.001	<0.001	0.001	0.002	0.005	0.001	0.008	0.037	0.4	
				mean	0.13	<0.1	1.6	3.6	1.5											
	Mackerel (7)	Sep	E4 32	min	0.04	<0.2	<1.0	6.1	1.8	liver	0.012	0.008	0.050	0.13	0.090	0.22	0.44	1.7	25.2	
				max	0.27	0.3	<1.0	32	3.1	muscle	0.010	0.004	0.017	0.032	0.038	0.098	0.17	0.39	11.2	
				mean	0.12	<0.2	<1.0	11	2.5											

Table 3a Continued

Port and Period of Sampling	Species and Number	Date 1972	Position (ICES Rectangle)	Metals				Organochlorine Compounds										% Lipid	
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	α -HCH	γ -HCH	Dieldrin	DDE	TDE	DDT	Σ DDT	PCB	
Fleetwood (winter)	Cod (10)	Feb	E5 38	min	0.07	<0.1	<0.5	<0.5	3.6	0.3	0.025	0.019	0.14	0.27	0.30	0.072	0.64	2.3	17.6
				max	0.34	0.3	1.0	<0.5	5.6	0.8	<0.001	<0.001	-	0.002	<0.002	<0.002	<0.006	<0.026	0.4
				mean	0.15	<0.2	<0.5	<0.5	4.2	0.5									
	Plaice (10)	Feb	E5 38	min	0.05	0.1	<0.5	<0.5	4.5	0.3	0.002	0.003	-	0.007	0.010	0.006	0.023	<0.052	1.2
				max	0.37	0.3	<0.5	<0.5	7.5	1.0	<0.001	0.001	-	0.002	<0.002	<0.002	<0.006	<0.026	0.4
				mean	0.11	0.2	<0.5	<0.5	5.4	0.6									
	Whiting (10)	Feb	E5 38	min	0.18	<0.1	<0.5	<0.5	3.0	0.3	0.078	0.068	-	1.1	3.0	0.76	4.9	1.1	19.6
				max	0.54	0.7	<0.5	<0.5	4.3	0.8	<0.001	<0.002	-	0.003	<0.002	<0.002	<0.007	0.032	0.6
				mean	0.32	<0.2	<0.5	<0.5	3.5	0.5									
	Herring (10)	Feb	E4 37	min	0.03	0.1	<0.5	<0.5	4.2	0.5	0.005	0.004	0.059	0.074	0.054	0.040	0.17	0.42	4.8
				max	0.13	0.1	<0.5	<0.5	10	1.8	0.004	0.003	0.031	0.047	0.038	0.018	0.10	0.35	3.8
				mean	0.08	0.1	<0.5	<0.5	7.5	1.2									
(summer)	Cod (10)	Oct	E6 36	min	0.06	<0.1	<0.2	<0.3	2.5	0.5	0.024	0.042	0.14	0.36	0.65	0.10	1.1	6.6	18.0
				max	0.51	0.1	0.9	0.4	3.7	0.7	<0.001	<0.001	0.001	0.002	0.002	0.002	0.006	0.031	<0.2
				mean	0.31	<0.1	<0.3	<0.3	3.2	0.6									
	Plaice (10)	Oct	E6 36	min	0.21	<0.1	<0.2	<0.2	3.0	<0.5	0.018	0.025	0.11	0.27	0.63	0.12	1.0	5.6	40.4
				max	1.5	<0.1	<0.2	<0.2	4.6	1.0	<0.001	0.001	0.002	0.006	0.015	0.002	0.023	0.12	0.4
				mean	0.62	<0.1	<0.2	<0.2	3.7	<0.6									
	Whiting (10)	Oct	E6 36	min	0.20	<0.1	<0.2	<0.2	2.7	<0.5	0.044	0.060	0.20	1.6	4.4	0.26	6.3	23	48.4
				max	1.1	0.1	<0.2	0.3	3.8	1.9	<0.001	<0.001	0.001	0.008	0.017	0.002	0.027	0.11	0.2
				mean	0.53	<0.1	<0.2	<0.2	3.3	0.7									
	Mackerel (4)	Oct	E6 36	min	0.02	<0.1	<0.2	<0.3	5.3	0.9	0.023	0.031	0.068	0.18	0.50	0.096	0.78	3.0	26.8
				max	0.13	0.2	0.3	<0.3	8.2	1.2	0.011	0.016	0.033	0.076	0.24	0.056	0.37	1.3	12.6
				mean	0.08	<0.1	<0.2	<0.3	6.9	1.1									

Table 4 Summary of Results from 1973 Routine Programme: Concentrations (mg/kg wet weight) of Metals and Organochlorine Compounds Found in Fish

Species	Seasons	Number of Samples	Organ	Metals				Organochlorine Compounds										
				Mercury	Cadmium	Lead	Chromium	Zinc	Copper	α-HCH	γ-HCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	
Cod	Winter	5	Muscle	min 0.04	<0.1	<0.1	<0.3	2.8	0.4	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.020
			max 0.33	0.3	0.6	1.8	5.7	3.4	<0.001	<0.001	0.002	0.002	0.003	0.002	0.006	0.027		
	Liver	min -	-	-	-	-	-	0.021	0.010	0.088	0.075	0.17	0.16	0.06	2.3			
		max -	-	-	-	-	-	0.052	0.037	0.18	0.51	0.60	0.40	1.4	4.6			
	Summer	7	Muscle	min <0.01	<0.1	<0.1	0.1	2.6	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015
			max 0.51	0.3	1.0	1.0	4.8	0.8	<0.001	<0.001	0.001	0.002	0.002	0.002	0.004	0.068		
	Liver	min -	-	-	-	-	-	0.008	0.005	0.067	0.24	0.19	0.13	0.64	2.0			
		max -	-	-	-	-	-	0.045	0.024	0.22	0.55	0.54	0.40	1.2	18			
Whiting	Winter	3	Muscle	min 0.03	<0.1	<0.1	0.3	2.7	0.4	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.016
			max 0.89	<0.3	0.6	2.1	5.3	1.7	<0.001	<0.001	0.001	0.002	0.005	0.002	0.006	0.030		
	Liver	min -	-	-	-	-	-	0.030	0.015	0.13	0.45	0.24	0.40	1.5	2.9			
		max -	-	-	-	-	-	0.051	0.027	0.21	0.68	2.2	0.78	3.3	7.7			
	Summer	4	Muscle	min 0.04	<0.2	<0.1	<0.2	2.5	<0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015
			max 0.30	0.9	0.9	1.5	5.0	0.6	<0.001	<0.001	0.060	0.002	0.001	0.002	0.005	0.039		
	Liver	min -	-	-	-	-	-	0.026	0.010	0.060	0.32	0.32	0.23	0.87	6.4			
		max -	-	-	-	-	-	0.24	0.16	0.11	0.91	0.44	0.58	1.6	15			
Plaice	Winter	4	Muscle	min 0.02	<0.1	<0.1	0.1	2.1	0.3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	0.005	0.022
			max 0.39	0.2	0.9	1.5	8.0	1.8	0.001	0.001	0.004	0.007	0.013	0.002	0.022	0.086		
	Liver	min -	-	-	-	-	-	0.001	0.001	0.006	0.005	0.008	0.004	0.017	0.10			
		max -	-	-	-	-	-	0.007	0.004	0.021	0.043	0.030	0.004	0.094	0.38			
	Summer	8	Muscle	min 0.02	<0.2	<0.1	<0.2	2.5	<0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	0.012
			max 0.39	<0.2	2.1	2.0	6.7	1.1	<0.001	<0.001	0.002	0.007	0.005	0.003	0.014	0.068		
	Liver	min -	-	-	-	-	-	0.004	0.001	0.019	0.014	0.020	0.010	0.064	0.29			
		max -	-	-	-	-	-	0.014	0.011	0.036	0.050	0.11	0.046	0.18	1.9			
Herring	Winter	4	Muscle	min 0.01	<0.1	<0.1	<0.3	2.0	0.7	0.002	0.001	0.004	0.011	0.007	0.006	0.030	0.068	
			max 0.20	0.2	0.4	1.8	15	4.1	0.003	0.004	0.032	0.048	0.029	0.027	0.097	0.72		
	Liver	min -	-	-	-	-	-	0.001	0.001	0.006	0.019	0.011	0.019	0.049	0.10			
		max -	-	-	-	-	-	0.007	0.005	0.043	0.062	0.065	0.031	0.15	0.44			
	Summer	2	Muscle	min 0.01	<0.2	<0.2	<0.2	5.0	0.7	0.005	0.002	0.013	0.033	0.016	0.023	0.072	0.27	
			max 0.20	<0.2	0.8	<0.2	12	1.4	0.009	0.004	0.015	0.036	0.036	0.042	0.11	1.1		
	Liver	min -	-	-	-	-	-	0.002	0.001	0.007	0.002	0.006	0.012	0.020	0.16			
		max -	-	-	-	-	-	0.006	0.002	0.014	0.014	0.009	0.013	0.036	0.24			
Mackerel	Summer	2	Muscle	min 0.07	<0.1	<0.1	<0.3	3.7	0.6	0.003	0.002	0.011	0.009	0.020	0.021	0.050	0.10	
			max 0.33	0.6	0.7	1.0	16	1.1	0.009	0.002	0.013	0.019	0.030	0.025	0.074	0.20		
	Liver	min -	-	-	-	-	-	0.003	0.003	0.010	0.014	0.018	0.014	0.046	0.17			
		max -	-	-	-	-	-	0.005	0.003	0.028	0.069	0.12	0.076	0.27	0.76			

Table 4a Results from 1973 Routine Programme: Concentrations (mg/kg wet weight) of Organochlorine Compounds Found in Fish

Port and Period of Sampling	Species and Number	Date 1973	Position (ICES Rectangle)	Metals		Organochlorine Compounds														
				Mer-cury	Cad-mium	Lead	Chro-mium	Zinc	Copper	Organ	α-HCH	γ-HCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	% Lipid	
North-shields (winter)	Cod (10)	Mar	E9 40	min	0.04	<0.3	<0.1	0.8	2.8	0.4	Liver	0.034	0.013	0.11	0.28	0.17	0.40	0.85	2.3	23.2
				max	0.11	<0.3	<0.1	1.0	4.9	1.2	Muscle	<0.001	<0.001	<0.001	0.002	0.002	0.002	0.006	0.019	<0.2
				mean	0.07	<0.3	<0.1	0.9	3.8	0.5										
	Plaice (10)	Mar	E9 40	min	0.06	<0.3	<0.1	0.9	2.1	<0.4	Liver	0.002	0.001	0.010	0.013	0.017	0.015	0.045	0.10	2.0
				max	0.16	<0.3	<0.1	1.2	4.6	0.5	Muscle	<0.001	<0.001	<0.001	0.003	0.003	0.002	0.008	0.024	0.4
				mean	0.10	<0.3	<0.1	1.0	3.7	0.4										
	Whiting (10)	Mar	E9 40	min	0.03	<0.3	<0.1	<0.4	2.7	0.4	Liver	0.051	0.015	0.015	0.45	0.24	0.78	1.5	2.9	50.4
				max	0.18	<0.3	<0.1	1.6	5.3	0.6	Muscle	<0.001	<0.001	<0.001	<0.001	0.002	<0.002	<0.005	<0.016	<0.2
				mean	0.08	<0.3	<0.1	1.0	3.4	0.5										
	Herring (7)	Mar	E9 40	min	0.01	<0.3	<0.1	1.0	5.6	0.7	Liver	0.002	0.001	0.009	0.011	0.007	0.012	0.030	0.068	2.0
				max	0.05	<0.3	<0.1	1.4	7.8	1.6	Muscle	0.003	0.005	0.010	0.019	0.011	0.019	0.049	0.10	3.4
				mean	0.04	<0.3	<0.1	1.2	6.3	1.2										
(summer)	Cod (10)	Oct	E8 39	min	0.04	<0.2	0.3	<0.2	4.1	0.2	Liver	0.023	0.010	0.14	0.24	0.19	0.21	0.64	2.0	52.0
				max	0.07	<0.2	1.1	<0.2	4.6	0.7	Muscle	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.003	0.017	0.8
				mean	0.05	<0.2	0.4	<0.2	4.3	0.4										
	Plaice (10)	Oct	E8 39	min	0.03	<0.2	0.4	<0.2	4.1	0.2	Liver	0.009	0.003	0.023	0.044	0.026	0.046	0.12	0.34	17.2
				max	0.10	<0.2	0.8	<0.2	5.7	0.5	Muscle	<0.001	<0.001	<0.001	0.002	<0.001	0.002	<0.005	0.017	0.8
				mean	0.06	<0.2	0.5	<0.2	4.8	0.3										
	Whiting (10)	Oct	E8 39	min	0.04	<0.2	0.2	<0.2	3.4	0.2	Liver	0.062	0.010	0.11	0.41	0.35	0.58	1.3	2.8	58.0
				max	0.08	<0.2	0.6	<0.2	5.0	0.5	Muscle	0.001	<0.001	0.001	0.002	0.001	0.002	<0.005	0.017	0.4
				mean	0.06	<0.2	0.4	<0.2	4.3	0.3										
	Herring (10)	Oct	E8 39	min	0.01	<0.2	<0.2	<0.2	5.0	0.7	Liver	0.006	0.002	0.014	0.002	0.006	0.012	0.020	0.24	7.6
				max	0.06	<0.2	0.6	<0.2	12.1	1.4	Muscle	0.005	0.002	0.013	0.033	0.016	0.023	0.072	0.27	13.8
				mean	0.04	<0.2	<0.2	<0.2	7.1	1.0										
Grimsby (winter)	Cod (10)	Feb	E9 36	min	0.07	<0.2	<0.2	0.5	3.1	0.4	Liver	0.060	0.024	0.47	0.51	0.51	0.36	1.4	3.6	28.0
				max	0.19	<0.2	0.6	0.7	5.6	0.6	Muscle	<0.001	<0.001	0.002	0.001	<0.002	<0.002	<0.005	<0.020	<0.2
				mean	0.11	<0.2	0.4	0.6	3.9	0.5										
(summer)	Cod (10)	Aug	E9 36	min	<0.01	<0.2	0.3	<0.2	2.6	<0.2	Liver	0.022	0.005	0.14	0.54	0.30	0.21	1.1	6.2	24.4
				max	0.10	<0.2	0.6	<0.2	3.8	0.3	Muscle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015	<0.2
				mean	<0.05	<0.2	0.4	<0.2	3.2	0.3										
	Plaice (10)		E9 36	min	0.02	<0.2	<0.2	<0.2	2.5	<0.2	Liver	0.005	0.001	0.023	0.045	0.033	0.010	0.088	0.69	4.8
				max	0.39	<0.2	1.0	<0.2	4.5	0.3	Muscle	<0.001	<0.001	0.001	0.005	0.002	<0.001	<0.008	0.055	<0.2
				mean	0.09	<0.2	<0.2	3.4	<0.2											

Table 4a continued

Port and Period of Sampling	Species and Number	Date 1973	Position (ICES Rectangle)	Metals						Organ	ΣHCH	ΣHCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	% Lipid
				Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper										
Lowestoft (winter)	Cod (14)	Mar	F1 33	min	<0.2	0.1	0.9	3.3	0.4	liver muscle	0.021	0.010	0.088	0.43	0.19	0.16	0.78	4.6	29.7
				max	0.3	0.3	1.8	5.7	3.4		<0.001	<0.001	<0.001	<0.002	<0.002	<0.006	0.025	<0.5	
				mean	<0.2	<0.2	1.5	4.0	1.0										
	Plaice (10)	Feb	F1 33	min	<0.3	<0.1	0.9	3.4	0.5	liver muscle	0.007	0.004	0.011	0.043	0.011	0.040	0.094	0.38	6.0
				max	<0.3	<0.1	1.4	6.1	0.8		<0.001	<0.001	0.001	0.002	0.001	0.002	0.005	0.030	0.4
				mean	<0.3	0.1	1.1	4.4	0.6										
	Whiting (5)	Mar	F1 33	min	<0.2	0.2	1.5	3.1	0.7	liver muscle	0.030	0.025	0.21	0.56	0.43	0.55	1.5	7.1	51.2
				max	<0.2	0.2	1.8	4.6	0.8		<0.001	<0.001	0.001	0.002	0.002	0.002	0.006	0.030	0.2
				mean	<0.2	0.2	1.6	4.0	0.7										
(summer)	Cod (10)	Aug	F2 38	min	<0.2	<0.2	<0.2	2.9	<0.2	liver muscle	0.045	0.017	0.22	0.45	0.33	0.40	1.2	9.4	48.0
				max	<0.2	1.0	<0.2	3.9	0.3		<0.001	<0.001	0.001	0.002	<0.001	<0.002	<0.005	<0.020	<0.2
				mean	<0.2	<0.2	<0.2	3.4	<0.2										
	Cod (9)	Aug	F2 39	min	<0.1	<0.1	<0.3	3.0	<0.2	liver muscle	0.023	0.008	0.086	0.25	0.16	0.20	0.61	1.9	14.8
				max	0.3	0.7	<0.3	3.9	0.3		<0.001	<0.001	<0.001	0.002	<0.001	<0.002	<0.005	0.020	<0.2
				mean	<0.1	<0.2	<0.3	3.4	0.3										
	Plaice (10)	Aug	F2 39	min	<0.2	<0.2	<0.2	3.4	<0.2	liver muscle	0.007	0.003	0.019	0.026	0.020	0.019	0.065	0.29	7.6
				max	<0.2	2.1	1.2	4.5	0.4		<0.001	<0.001	0.001	0.003	<0.001	<0.002	<0.006	0.029	<0.2
				mean	<0.2	0.6	<0.3	4.0	<0.2										
	Whiting (10)	Aug	F2 38	min	<0.2	<0.2	<0.2	1.9	<0.2	liver muscle	0.048	0.015	0.26	0.70	0.10	0.20	1.0	11	55.2
				max	<0.2	0.6	<0.2	3.9	0.5		<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.003	0.020	<0.2
				mean	<0.2	<0.4	<0.2	3.3	0.3										
Hastings (summer)	Cod (10)	Nov	F0 30	min	<0.2	0.2	<0.2	3.3	0.3	liver muscle	0.013	0.015	0.12	0.35	0.24	0.30	0.89	6.3	29.6
				max	<0.2	0.4	<0.2	3.8	0.5		<0.001	<0.001	<0.001	0.001	<0.001	0.002	<0.004	0.018	0.2
				mean	<0.2	0.3	<0.2	3.6	0.4										
	Plaice (10)	Nov	F0 30	min	<0.2	0.3	<0.2	4.1	0.3	liver muscle	0.010	0.006	0.021	0.018	0.033	0.030	0.081	0.46	14.4
				max	<0.2	0.6	<0.2	5.8	0.8		<0.001	<0.001	0.002	0.002	0.001	0.002	0.005	0.041	1.0
				mean	<0.2	0.4	<0.2	4.8	0.4										
	Whiting (10)	Nov	F0 30	min	<0.2	0.3	<0.2	3.2	0.3	liver muscle	0.24	0.16	0.11	0.91	0.44	0.26	1.6	15	16.4
				max	<0.2	0.5	<0.2	4.0	0.6		<0.001	<0.001	<0.001	0.002	0.001	0.002	0.005	0.039	0.6
				mean	<0.2	0.4	<0.2	3.7	0.4										
	Herring (10)	Nov	F0 30	min	<0.2	0.3	<0.2	4.0	0.7	liver muscle	0.002	0.001	0.007	0.014	0.009	0.013	0.036	0.16	2.8
				max	<0.2	0.8	<0.2	7.8	1.3		0.009	0.004	0.015	0.036	0.036	0.042	0.11	1.1	10.4
				mean	<0.2	0.5	<0.2	5.8	0.9										
Plymouth (winter)	Herring (10)	Feb	E5 29	min	<0.1	<0.1	<0.3	2.0	1.3	liver muscle	0.002	0.003	0.004	0.048	0.022	0.027	0.097	0.72	2.7
				max	0.2	0.3	0.6	15	4.1		0.001	0.001	0.006	0.030	0.017	0.022	0.069	0.44	1.6
				mean	<0.1	0.2	<0.4	4.1	1.7										

Table 4a continued

Port and Period of Sampling	Species and Number	Date 1973	Position (ICES Rectangle)	Metals Mer- cury	Cad- mium	Lead	Chro- mium	Zinc	Copper	Organ	ΣHCH	ΣHCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	% Lipid
Plymouth (summer)	Cod (11)	Jul	E5 29	min	<0.2	<0.1	0.1	2.9	0.4	liver	0.008	0.012	0.067	0.45	0.32	0.27	1.0	18	26.6
				max	<0.2	0.2	1.0	4.4	0.8	muscle	<0.001	<0.001	<0.001	0.002	0.001	0.001	0.004	0.068	<0.2
				mean	<0.2	<0.1	0.6	3.5	0.5										
Newlyn (summer)	Plaice (10)	Jul	E5 29	min	<0.2	<0.1	0.5	5.0	0.4	liver	0.007	0.007	0.022	0.050	0.025	0.031	0.11	1.5	16.8
				max	<0.2	0.2	0.8	6.4	0.6	muscle	<0.001	<0.001	<0.007	0.007	0.004	0.003	0.014	0.22	1.2
				mean	<0.2	<0.2	0.6	5.5	0.5										
Newlyn (summer)	Cod (9)	Oct	E4 29	min	<0.2	0.3	<0.2	3.2	0.3	liver	0.018	0.011	0.080	0.40	0.22	0.36	0.98	4.5	51.2
				max	<0.2	0.7	<0.2	4.8	0.8	muscle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015	0.4
				mean	<0.2	0.5	<0.2	3.9	0.4										
Newlyn (summer)	Plaice (10)	Oct	E4 29	min	<0.2	<0.2	<0.2	3.2	<0.2	liver	0.004	0.002	0.019	0.014	0.029	0.021	0.064	1.9	12.4
				max	<0.2	0.5	<0.2	6.7	0.4	muscle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	0.012	0.4
				mean	<0.2	<0.3	<0.2	5.0	0.2										
Newlyn (summer)	Whiting (10)	Oct	E4 29	min	<0.2	<0.2	<0.2	3.3	<0.2	liver	0.026	0.019	0.060	0.32	0.33	0.47	1.1	6.4	62.0
				max	<0.2	0.5	<0.2	6.1	0.5	muscle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.015	0.4
				mean	<0.2	<0.3	<0.2	4.5	0.3										
Milford Haven (winter)	Cod (8)	Apr	E4 30	min	<0.1	0.1	<0.3	3.5	0.4	liver	0.026	0.037	0.13	0.075	0.32	0.24	0.64	4.3	45.6
				max	<0.2	0.3	0.5	4.5	1.0	muscle	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.020	<0.2
				mean	<0.1	0.2	<0.3	3.9	0.6										
Milford Haven (winter)	Plaice (10)	Apr	E4 31	min	<0.1	0.1	<0.3	3.7	0.3	liver	0.001	0.002	0.006	0.005	0.008	0.004	0.017	0.11	1.2
				max	<0.1	0.3	0.9	6.0	1.8	muscle	<0.001	<0.001	<0.001	0.001	0.003	<0.002	<0.006	0.022	0.2
				mean	<0.1	0.2	0.5	4.3	0.7										
(summer)	Herring (10)	Apr	E3 33	min	<0.1	0.1	<0.3	4.7	0.9	liver	0.002	0.003	0.011	0.020	0.012	0.006	0.038	0.088	1.6
				max	<0.2	0.3	0.6	8.8	1.3	muscle	0.001	0.002	0.035	0.062	0.037	0.031	0.13	0.37	4.4
				mean	<0.1	0.2	<0.4	6.3	1.1										
(summer)	Plaice (10)	Jul	E5 32	min	<0.2	<0.1	0.5	4.2	0.4	liver	0.009	0.007	0.036	0.038	0.056	0.024	0.12	0.80	21.6
				max	<0.2	0.2	0.7	6.2	0.6	muscle	<0.001	<0.001	0.002	0.005	0.003	0.001	0.009	0.068	1.8
				mean	<0.2	<0.1	0.6	4.8	0.5										
(summer)	Whiting (10)	Jul	E5 32	min	<0.1	<0.1	<0.3	2.5	<0.2	liver	0.19	0.018	0.11	0.32	0.32	0.23	0.87	6.6	51.2
				max	<0.1	0.9	1.5	4.0	0.6	muscle	<0.001	<0.001	<0.001	0.002	<0.001	<0.002	<0.005	0.022	<0.2
				mean	<0.3	<0.2	<0.4	3.2	0.3										
(summer)	Mackerel (10)	Jul	E4 32	min	<0.1	<0.1	<0.3	3.7	0.6	liver	0.003	0.003	0.010	0.014	0.018	0.014	0.046	0.17	7.2
				max	<0.6	0.7	0.3	5.2	1.0	muscle	0.009	0.002	0.013	0.009	0.020	0.021	0.050	0.10	7.4
				mean	<0.2	<0.2	<0.3	4.3	0.8										

Table 4a continued

Port and Period of Sampling	Species and Number	Date 1973	Position (ICES Rectangle)	Metals						Organ	ΣHCH	ΣHCH	Dieldrin	DDE	TDE	DDT	ΣDDT	PCB	% Lipid	
				Mer- Cury	Cad- mium	Lead	Chro- mium	Zinc	Copper											
Fleetwood (winter)	Cod (1)	Feb	E6 37	0.28	0.1	0.7	0.7	3.5	1.0	liver muscle	0.052 <0.001	0.032 <0.001	0.18 0.002	0.23 0.002	0.50 0.003	0.18 <0.002	1.0 <0.007	2.5 0.027	51.2 0.2	
	Plaice (10)	Feb	E6 37	min max mean	<0.1 0.2 0.1	0.4 0.9 0.6	0.1 1.5 0.7	4.0 8.0 5.1	0.6 1.1 0.8	liver muscle	0.003 0.001	0.003 0.001	0.021 0.004	0.024 0.007	0.030 0.013	0.024 0.002	0.078 0.022	0.17 0.086	4.0 0.6	
	Whiting (9)	Feb	E6 37	min max mean	0.21 0.89 0.38	0.1 0.2 0.1	0.5 0.6 0.6	0.3 2.1 1.1	3.1 3.9 3.4	0.6 1.7 1.0	liver muscle	0.044 <0.001	0.027 <0.001	0.17 0.001	0.68 0.002	2.2 0.005	0.40 <0.002	3.3 <0.009	7.7 <0.016	58.8 <0.2
(summer)	Herring (10)	Feb	E6 37	min max mean	0.05 0.13 0.08	<0.1 0.1 0.1	<0.1 0.4 0.2	<0.3 1.8 0.9	4.0 8.4 5.6	0.9 2.5 0.9	liver muscle	0.003 0.007	0.004 0.004	0.032 0.043	0.024 0.051	0.029 0.065	0.013 0.030	0.066 0.15	0.22 0.42	1.6 5.6
	Cod (10)	Jul	E6 37	min max mean	0.24 0.46 0.34	<0.1 0.2 0.1	0.3 0.6 0.5	0.6 0.7 0.6	3.5 4.5 3.9	0.2 0.6 0.3	liver muscle	0.031 <0.001	0.024 <0.001	0.14 0.001	0.55 0.002	0.54 0.001	0.13 0.001	1.2 0.004	5.0 0.027	46.4 <0.2
	Plaice (10)	Jul	E6 37	min max mean	0.11 0.30 0.19	<0.2 0.2 0.2	<0.1 0.2 0.1	0.5 2.0 0.8	4.2 5.4 4.7	0.4 0.6 0.4	liver muscle	0.014 <0.001	0.011 <0.001	0.034 0.001	0.050 0.002	0.11 0.005	0.024 <0.001	0.18 <0.008	0.58 0.025	20.8 0.6
	Mackerel (10)	Jul	E6 37	min max mean	0.07 0.33 0.18	<0.2 0.2 0.2	<0.1 0.3 0.1	0.5 1.0 0.6	6.2 16 11	0.6 1.1 0.8	liver muscle	0.005 0.003	0.003 0.002	0.028 0.011	0.069 0.019	0.12 0.030	0.076 0.025	0.27 0.074	0.76 0.20	6.4 2.4

Table 5 Summary of Results From Expanded Monitoring Programme 1970-73 Metals in Fish Muscle (ng/kg wet weight)

Geographical Zone and Species	Number of Fish Analysed	Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Inshore	5	0.16	0.29	0.61	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Angler	6	0.08	1.3	4.3	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Basil	10	0.10	0.14	0.21	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Coalfish	1	0.06	0.34	0.34	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Coalfish	5	0.04	0.35	0.34	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cod	151	0.04	0.25	2.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dab	229	0.14	0.76	2.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dogfish	206	0.02	0.24	2.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Flounder	9	0.02	0.16	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Gurnard	47	<0.01	0.24	0.66	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Haddock	33	<0.01	0.08	0.43	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hake	18	0.05	0.13	0.63	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Halibut	4	0.04	0.08	0.08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Herring	119	0.02	0.27	0.97	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sad	24	0.09	0.35	0.69	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
John Dory	1	-	0.38	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lemon Sole	29	<0.01	0.31	0.31	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ling	3	0.10	0.19	0.26	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lump Sucker	1	-	0.04	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mackerel	38	0.03	0.54	0.54	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mullet (Grey)	9	0.1	0.98	2.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mullet (Red)	1	-	0.15	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Norway Pout	9	0.02	0.03	0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pilchard	29	0.02	0.11	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Plaice	376	<0.01	0.26	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pollack	47	0.02	0.24	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pout	89	0.05	0.68	0.68	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pout Whiting	29	0.03	0.37	0.37	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ray	5	<0.01	0.17	0.59	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sand Eel	18	0.18	0.74	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Skate	6	0.25	0.77	0.61	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Smeit	1	-	0.61	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sole	58	<0.02	0.72	0.72	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sprat (Whole)	104	0.04	0.45	0.45	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sprat (Muscle)	8	0.07	0.20	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Turbot	3	0.02	0.18	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Whiting	327	0.02	0.27	1.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Near Water	2	0.07	0.19	0.32	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Blue Ling	1	-	0.30	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Brill	1	-	0.11	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Catfish	2	0.05	0.05	0.06	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Coalfish	16	0.08	0.20	0.13	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Cod	13	0.04	0.38	0.38	<0.1	<0.2	<0.2	<0.1	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Dab	14	0.04	0.25	0.25	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Dogfish	1	0.11	0.34	0.95	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Grenadier	2	-	0.13	-	-	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Gurnard	1	0.28	0.28	0.28	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Haddock	16	0.04	0.43	0.43	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.7	<0.5	<0.2	<0.7	<0.5	<0.3	<0.3	<0.3
Lemon Sole	5	0.03	0.08	0.08	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Mackerel	20	0.03	0.08	0.08	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Morrid Fish	1	-	0.46	-	<0.1	<0.2	<0.2	<0.5	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Pilchard	10	0.04	0.09	0.09	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Plaice	45	<0.02	0.07	0.15	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Pollack	1	-	0.08	-	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Rabbit Fish	1	-	0.43	-	-	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Ray	2	0.06	0.17	0.17	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Sand Eel (Whole)	2	<0.01	0.01	0.01	<0.1	<0.3	<0.3	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Seabard Fish	1	-	0.08	-	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Scorpion Fish	1	-	0.25	-	-	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Smeit	1	-	0.16	-	-	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Sole	1	-	0.03	-	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1	<0.5	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5
Smoothhead	5	0.05	0.03	0.15	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1									

Table 5a Results From Expanded Monitoring Programme 1970-73: Metals in Fish Muscle (ng/kg wet weight)

Geographical Zone and Species	ICES Area	ICES Rectangle	Number	Date	Mercury			Cadmium			Lead			Chromium			Zinc			Copper				
					Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean		
Inshore	Angler	Muscle	E4 37	5	Apr 1971	0.16	0.61	0.29	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
		Muscle	F0 32	1	May 1971	-	-	1.2	-	-	0.2	-	-	0.5	-	-	<0.1	-	-	5.6	-	2.5		
		"	"	1	Jul 1971	-	-	4.3	-	-	<0.1	-	-	<0.5	-	-	<0.5	-	-	4.7	-	0.5		
		"	"	1	Sep 1971	-	-	0.80	-	-	0.1	-	-	1.0	-	-	<0.5	-	-	6.3	-	0.3		
		"	"	1	Oct 1971	-	-	0.94	-	-	0.1	-	-	<0.5	-	-	0.3	-	-	3.5	-	0.5		
	Brill	"	E5 29	2	Dec 1973	0.08	0.16	0.12	<0.2	<0.2	<0.2	0.5	0.7	0.6	<0.2	<0.2	<0.2	5.3	5.4	5.3	0.7	0.9	0.8	
		Muscle	E9 36	10	Feb 1973	0.10	0.21	0.14	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	0.5	0.5	0.7	4.2	6.5	5.3	0.6	1.0	0.7	
		Muscle	E8 38	1	Jun 1971	-	-	0.34	-	-	<0.1	-	-	<0.5	-	-	<0.5	-	-	9.0	-	<0.5		
		Muscle	E8 38	1	Nov 1970	-	-	0.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Muscle	F1 31	1	Mar 1971	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Offshore	Coalfish	"	E3 39	2	Jun 1971	0.06	0.10	0.08	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.6	5.6	5.6	0.5	0.5	0.5
		"	"	1	Jun 1971	0.06	0.10	0.08	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	1	Jun 1971	0.06	0.10	0.08	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	1	Jun 1971	0.06	0.10	0.08	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	1	Jun 1971	0.06	0.10	0.08	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cod	Muscle	E8 38	3	Nov 1970	0.05	0.20	0.11	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	5	Feb 1972	0.06	0.27	0.18	0.2	0.2	0.2	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	2	Dec 1970	0.12	0.12	0.12	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	8	May 1971	0.13	0.41	0.26	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	79	Mar 1971	0.14	1.1	0.35	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Dab	" "	F0 31	4	Oct 1971	0.31	0.41	0.34	0.1	0.2	0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
		"	"	2	Jun 1972	0.28	0.29	0.29	0.4	0.4	0.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	10	Jan 1972	0.11	0.52	0.25	<0.1	0.2	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	2	Jun 1971	0.04	0.36	0.20	-	-	0.3	-	-	<0.1	-	-	2.0	-	-	3.6	-	1.0	-	-
		"	"	6	Apr 1971	0.16	0.31	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	" "	"	E5 34	6	Apr 1972	0.05	0.19	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	17	Mar 1971	0.17	0.56	0.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	"	16	Mar 1971	0.05	0.24	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	"	E3 33	12	Apr 1971	0.08	0.34	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	"	E3 39	4	Jun 1971	0.09	0.11	0.10	<0.1	0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dogfish	" "	Muscle	E8 39	1	Nov 1972	-	-	0.06	-	-	0.1	-	-	<0.2	-	-	<0.2	-	-	5.4	-	0.8		
		"	"	1	Dec 1971	-	-	0.08	-	-	0.1	-	-	<0.5	-	-	<0.5	-	-	5.0	-	0.6		
		"	"	7	Feb 1972	0.03	0.08	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	5	Jul 1971	0.15	0.43	0.26	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	1	Mar 1971	0.09	0.16	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	" "	"	F1 35	2	Dec 1970	0.10	0.28	0.21	0.1	0.2	0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	9	Mar 1972	0.18	0.29	0.23	0.1	0.2	0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
		"	"	3	Jun 1972	0.06	0.27	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	4	Mar 1971	0.15	0.64	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	10	Mar 1971	0.06	0.45	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dogfish	" "	"	"	12	Mar 1971	0.15	0.33	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	6	Mar 1971	0.15	0.29	0.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	2	Mar 1971	0.06	0.52	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	5	Jan 1971	0.07	0.62	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	2	Oct 1971	0.11	0.53	0.32	0.1	0.1	0.1	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	" "	"	F0 31	6	Jan 1971	0.06	0.18	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	"	3	Jan 1971	0.09	0.27	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	"	10	Jun 1973	0.12	0.30	0.21	<0.1	<0.1	<0.1	<0.2	0.6	0.3	0.6	0.6	0.8	4.1	7.3	5.3	0.3	0.4	0.3	
		"	"	8	Jun 1973	0.15	0.52	0.28	<0.1	0.2	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	1	Apr 1973	0.09	0.66	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dogfish	" "	"	E9 30	6	Apr 1971	0.12	0.22	0.17	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	6	May 1971	0.07	0.24	0.16	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	6	May 1971	0.07	0.24	0.16	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	6	May 1971	0.07	0.24	0.16	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		"	"	6	May 1971	0.07	0.24	0.16	<0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	" "	"	E6 32	1	Aug 1972	<0.02	0.40	0.34	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	11	Sep 1972	0.08	0.53	0.16	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	7	Apr 1972	0.08	0.53	0.16	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
		"	"	35	Nov 1970	0.59	1.5	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	"	15	Oct 1972	0.20	0.76	0.38	<0.1	<0.1	<0.1	<0.2	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Table 5a continued

Geographical Zone and Species	ICES Area	ICES Rectangle	Number	Date	Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
					Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Flounder Inshore (contd)	IV b IV c "<																					

Table 5a continued

[illegible]

Table 5a continued

Table 5a continued

Geographical Zone and Species Inshore (cont'd)	ICCS Area	ICCS Reckling	Number	Date	Mercury				Cadmium				Lead				Chromium				Zinc				Copper			
					Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Puffin	VII a	E6 37	20	Feb 1971	0.28	0.54	0.45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	"	"	8	Mar 1971	0.12	0.38	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	E3 33	6	Apr 1971	0.13	0.30	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	6	Apr 1971	0.08	0.17	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	E4 37	6	"	<0.01	0.05	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	E4 38	5	Apr 1971	0.04	0.13	0.07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E3 39	3	Jun 1971	0.01	0.11	0.06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	6	Jun 1971	<0.01	0.27	0.08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 29	5	"	0.12	0.18	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 31	1	Mar 1972	0.12	0.21	0.21	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Puffin	VII f	E7 32	2	Feb 1972	0.10	0.13	0.12	0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E7 32	2	Feb 1972	0.10	0.13	0.12	0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 32	23	Mar 1972	0.02	0.24	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 32	23	Mar 1972	0.02	0.24	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 32	23	Mar 1972	0.02	0.24	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Puffin	VII a	E4 37	7	Feb 1971	0.03	0.11	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E4 37	7	Feb 1971	0.03	0.11	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E3 39	8	Jun 1971	0.05	0.07	0.06	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	8	Jun 1971	0.05	0.07	0.06	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	8	Jun 1971	0.05	0.07	0.06	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Pout	IV c	F1 33	9	Jun 1972	0.12	0.68	0.27	0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	F0 31	1	Oct 1971	0.23	-	0.33	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	6	Oct 1971	0.23	0.36	0.31	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	F1 31	10	Jun 1973	0.25	0.43	0.35	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2	0.3	<0.2		
	"	F0 30	7	Jun 1971	0.15	0.30	0.25	0.1	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
	"	"	10	Apr 1972	0.18	0.37	0.25	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E8 30	10	Mar 1971	0.11	0.18	0.14	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E7 32	2	Mar 1972	0.09	0.16	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 32	2	Mar 1972	0.13	0.31	0.22	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	E6 35	10	Oct 1972	0.08	0.23	0.17	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Pout	"	"	10	Oct 1972	0.08	0.23	0.17	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	15	Oct 1972	0.11	0.31	0.20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	2	Dec 1970	0.11	0.20	0.16	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	F0 30	1	Apr 1973	0.21	-	0.31	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Apr 1973	0.21	-	0.31	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Sand Eel	IV c	F1 35	2	Jan 1971	<0.01	0.01	<0.01	0.3	0.3	0.3	1.5	2.5	2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	F1 32	1	Mar 1971	-	-	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Mar 1971	-	-	0.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	E5 33	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
	"	"	1	Jun 1971	-	-	0.09	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Skate	IV c	F1 32	3	Mar 1971	0.90	1.0	0.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	13	Mar 1971	0.53	1.0	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	E6 32	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	"	"	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	"	"	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	"	"	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	"	"	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	"	"	2	Aug 1972	0.18	0.25	0.22	0.1	0.1	0.1	0.7	1.3	1.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0			

Table 5a continued

Geographical Zone and Species Inshore (cont'd)	ICES Area	ICES Rectangle	Number	Date	Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
					Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Turbot	Muscle	F1 35	1	Dec 1970	-	0.04	0.03	-	<0.1	<0.1	<0.7	0.8	<0.7	2.3	4.1	7.3	6.8	0.9	2.0	1.5	-	-
		E5 32	2	Apr 1972	0.02	-	0.18	<0.1	<0.1	<0.1	<0.5	0.8	<0.5	0.5	4.1	7.7	6.8	0.9	2.0	1.5	-	-
	Muscle	E8 38	1	Nov 1970	0.05	0.22	0.09	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	5.4	7.1	3.6	<0.5	1.0	<0.5	-
		"	13	Jun 1971	0.03	0.04	0.11	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	5.2	7.2	5.9	<0.5	2.0	2.0	-
	Muscle	E9 38	4	Dec 1971	0.04	0.15	0.08	0.1	0.2	0.2	<0.5	1.0	<0.5	<0.5	<0.5	18	3.7	2.5	0.3	1.0	0.5	-
		"	22	Feb 1972	0.04	0.15	0.08	0.1	0.2	0.2	<0.5	1.0	<0.5	<0.5	<0.5	18	3.7	2.5	0.3	1.0	0.5	-
	Muscle	E9 36	2	Mar 1971	0.06	0.14	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	2	Mar 1971	0.06	0.14	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	F1 33	10	Dec 1970	0.08	0.33	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.0	5.7	4.0	0.3	1.2	0.6	-
		"	4	Jun 1971	0.38	0.63	0.51	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.0	5.7	4.0	0.3	1.2	0.6	-
	Muscle	F1 32	3	Mar 1971	0.35	0.63	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	3	Mar 1971	0.45	0.80	0.61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	"	10	Mar 1971	0.27	0.81	0.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	6	Mar 1971	0.22	0.71	0.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	"	6	Mar 1971	0.15	0.59	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	2	Mar 1971	0.29	0.33	0.31	0.1	0.1	0.1	0.5	1.0	0.8	<0.5	<0.5	4.2	4.4	4.3	0.3	0.3	0.3	-
	Muscle	F0 31	9	Oct 1971	0.23	0.41	0.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	6	Oct 1971	0.27	0.42	0.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	F1 31	2	Jan 1971	0.22	0.34	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	8	Aug 1972	0.13	0.41	0.26	<0.1	<0.1	<0.1	1.7	3.6	2.8	0.8	2.0	1.2	4.1	0.8	2.3	1.1	-	-
	Muscle	F0 30	10	Jun 1973	0.07	0.24	0.15	<0.2	0.3	0.2	0.1	0.5	0.2	1.3	1.6	1.4	3.7	0.5	0.8	0.7	-	-
		"	2	Apr 1971	0.40	0.41	0.41	0.4	0.4	0.4	0.6	0.8	0.7	<0.5	<0.5	<0.5	4.4	0.4	0.9	0.7	-	-
	Muscle	E6 29	6	Apr 1971	0.07	0.62	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	6	Apr 1971	0.14	0.26	0.17	<0.1	0.4	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.4	0.5	1.0	0.8	-	-
	Muscle	E5 31	1	Oct 1970	-	0.43	0.43	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.3	0.5	1.0	0.8	-	-
		"	3	Mar 1972	0.10	0.36	0.21	0.1	0.2	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.2	0.5	0.5	0.5	-	-
	Muscle	E6 31	19	Jun 1971	-	0.14	0.14	0.1	0.5	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.4	0.5	0.5	0.5	-	-
		"	10	Jun 1971	0.11	0.60	0.29	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.2	0.5	0.5	0.5	-	-
	Muscle	E7 32	22	Feb 1972	0.11	0.67	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.2	0.5	0.5	0.5	-	-
		"	16	Aug 1972	0.22	0.97	0.45	0.1	0.1	0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.0	0.3	1.8	0.5	-	-
	Muscle	E5 32	9	Jun 1971	0.07	0.14	0.07	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	0.2	0.3	0.3	-	-
		"	6	Jun 1971	0.07	0.14	0.07	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	0.2	0.3	0.3	-	-
	Muscle	E5 33	6	Apr 1971	0.13	0.44	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	6	Apr 1971	0.13	0.24	0.19	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.3	0.5	1.0	0.8	-	-
	Muscle	E5 34	6	Apr 1971	0.13	0.24	0.19	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.3	0.5	1.0	0.8	-	-
		"	6	Nov 1970	0.26	0.90	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	E6 35	6	Oct 1972	0.19	1.1	0.41	<0.1	0.1	<0.1	0.4	1.0	0.7	<0.3	<0.3	3.4	5.7	4.7	<0.5	0.5	<0.5	-
		"	10	Oct 1972	0.09	0.24	0.16	<0.1	0.1	<0.1	0.5	3.2	1.2	0.3	0.7	2.8	5.0	2.8	0.5	0.9	0.7	-
	Muscle	E6 36	1	Oct 1972	-	-	0.21	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.3	0.5	0.5	0.5	-	-
		"	11	Mar 1971	-	-	0.90	-	-	-	-	-	-	-	-	-	4.3	0.5	1.5	<0.5	-	-
	Muscle	E6 37	6	Mar 1971	0.29	1.1	0.61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	6	Mar 1971	0.35	0.89	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	E3 33	8	Apr 1971	0.12	0.67	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	8	Apr 1971	0.17	0.66	0.36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Muscle	E4 37	10	Feb 1971	0.03	0.39	0.15	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.6	6.9	4.9	<0.5	0.5	0.5
		"	11	Apr 1971	0.04	0.14	0.07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.9	4.9	4.3	0.5	2.0	0.9
	Muscle	E4 38	6	Apr 1971	0.07	0.23	0.15	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.4	4.9	4.3	0.5	2.0	0.9
		"	6	Apr 1971	0.09	0.19	0.16	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.4	4.9	4.3	0.5	2.0	0.9
Near Water	Angler	F3 42	1	Dec 1970	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		F1 37	1	Dec 1970	-	-	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Blue Ling	E1 46	1	Aug 1973	-	-	0.30	-	-	<0.2	-	-	0.5	-	-	2.6	-	-	-	-	0.4	-
		"	1	Dec 1970	-	-	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Catfish	F3 42	1	Dec 1970	-	-	0.06	-	-	<0.1	-	-	0.5	-	-	6.4	-	-	-	-	<0.5	-
		"	1	Dec 1970	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Coalfish	F2 38	1	Dec 1970	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		"	2	Dec 1970	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cod	F1 39	2	Dec 1970	0.04	0.08	0.06	<0.1	<0.1	<0.1	1.0	1.5	1.3	1.0	1.0	4.3	4.9	4.3	0.5	0.5	0.5	-
		"	2	Dec 1970	-	-	0.06	-	-	<0.1	-	-	2.0	-	-	5.8	-	-	-	-	<0.5	-
	Dub	F3 42	1	Dec 1970	-	-	0.15	-	-	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	3.9	5.0	4.4	<0.3	0.3	<0.3	-
		"	3	Apr 1972	0.06	0.10	0.08	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	3.2	3.1	0.5	0.5	0.5	-
	Dub	F4 39	2	Dec 1970	0.05	0.06	0.06	<0.1	0.2	<0.2	1.0	1.5	1.5	<0.1	<0.1	6.0	5.6	5.1	<0.5	<0.5	<0.5	-
		"	2	Dec 1970	0.06	0.07	0.06	<0.1	0.2	<0.2	<0.1	0.5	0.5	<0.1	<0.1	6.0	6.2	6.1	0.5	0.5	0.5	-
	Dub	F2 38	2	Dec 1970	0.19	0.25	0.22	-	-	0.3	-	-	1.5	-	-	1.0	-	-	-	-	0.5	-
		"	2	Dec 1970	0.19	0.25	0.22	-	-	0.3	-	-	1.5	-	-	1.0	-	-	-	-	0.5	-

Table 5a continued

Geographical Zone and Species			ICES			Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
Area	Organ	Rectangle	Number	Date	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max		
Dogfish	Muscle	IV b	1	Dec 1970	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	10	Aug 1971	0.11	0.69	0.25	0.1	0.2	0.2	<0.5	1.5	<1.0	<0.5	0.5	4.7	5.8	0.3	0.8	0.5	-		
	"	"	1	Dec 1970	-	-	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Jul 1973	-	-	0.95	-	-	<0.2	-	-	0.5	<0.2	-	2.0	-	-	3.0	0.3	0.5		
	"	"	1	Jul 1973	-	-	0.95	-	-	<0.2	-	-	0.5	<0.2	-	3.0	-	-	-	-	-		
Grenadier	Muscle	VII j	1	Jul 1973	-	-	0.13	-	-	<0.2	-	-	0.5	<0.2	-	2.5	-	-	-	-	0.3		
Gurnard	Muscle	IV b	2	Dec 1970	0.28	0.28	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Haddock	Muscle	IV b	10	Apr 1972	0.07	0.43	0.29	<0.1	0.2	<0.1	<0.5	<0.5	<0.5	<0.5	2.7	4.9	3.3	0.3	0.5	0.3	-		
	"	"	2	Dec 1970	0.04	0.04	0.04	<0.1	0.2	<0.2	1.0	1.0	1.0	<0.6	3.7	4.0	3.9	<0.5	<0.5	<0.5	0.3		
	"	"	2	Dec 1970	0.26	0.34	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5		
	"	"	2	Dec 1970	0.05	0.07	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Dec 1970	0.05	0.07	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Lemon Sole	Muscle	IV b	1	Dec 1970	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
"	"	"	1	Dec 1970	-	-	0.08	-	-	<0.1	-	-	0.5	<0.1	-	4.5	-	-	-	-	0.5		
"	"	"	1	Dec 1970	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
"	"	"	1	Dec 1970	-	-	0.06	-	-	<0.1	-	-	0.5	1.0	-	4.9	-	-	-	-	1.5		
"	"	"	1	Dec 1970	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mackerel	Muscle	IV b	10	Sep 1971	0.06	0.66	0.29	0.1	0.2	0.1	<0.5	1.0	<0.5	<0.5	1.9	7.6	5.5	0.5	1.5	1.0	-		
	"	"	10	Dec 1970	0.04	0.06	0.05	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	5.2	9.3	7.5	<0.5	1.0	<1.0	-		
	"	"	1	Jul 1973	-	-	0.46	-	-	<0.2	-	-	0.5	<0.2	-	2.5	-	-	-	-	0.4		
	"	"	10	Dec 1970	0.04	0.09	0.06	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	5.1	9.7	7.5	1.0	1.5	1.0	-		
	"	"	10	Jul 1971	0.02	0.10	0.07	0.2	0.2	0.2	0.5	1.0	0.8	<0.5	4.2	9.4	5.6	0.3	0.3	0.3	-		
Pilchard	Muscle	IV b	1	Dec 1970	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Dec 1970	0.06	0.09	0.08	0.2	0.2	0.2	1.0	1.0	1.0	<0.1	7.2	7.2	7.2	1.0	1.0	1.0	-		
	"	"	2	Dec 1970	0.09	0.10	0.10	<0.1	0.4	<0.3	0.5	0.5	0.5	<0.1	5.6	7.2	6.4	0.5	1.5	1.0	-		
	"	"	2	Dec 1970	0.03	0.03	0.03	<0.1	0.4	<0.3	0.5	0.5	0.5	<0.1	5.6	7.2	6.4	0.5	1.5	1.0	-		
Pollack	Muscle	IV b	16	Jan 1971	<0.02	0.13	0.04	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	5.3	16	7.7	<0.5	1.0	<0.5	-		
	"	"	10	Dec 1970	0.06	0.15	0.10	<0.1	0.2	<0.1	<0.5	1.0	<0.5	<0.5	3.8	6.7	5.1	<0.5	1.0	<0.5	-		
	"	"	1	Dec 1970	-	-	0.08	-	-	0.2	-	-	<0.1	-	-	5.1	-	-	-	-	0.5		
	"	"	1	Jul 1973	-	-	0.43	-	-	<0.2	-	-	0.6	<0.2	-	2.2	-	-	-	-	0.4		
	"	"	1	Dec 1970	-	-	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sand Eel	Muscle	IV b	1	Dec 1970	-	-	0.08	-	-	<0.2	-	-	<0.1	-	-	5.1	-	-	-	-	0.5		
	"	"	1	Jul 1973	-	-	0.09	-	-	<0.2	-	-	0.6	<0.2	-	3.0	-	-	-	-	0.4		
	"	"	1	Jul 1973	-	-	0.25	-	-	<0.2	-	-	0.4	<0.2	-	2.7	-	-	-	-	0.4		
	"	"	1	Jul 1973	-	-	0.19	-	-	<0.2	-	-	0.6	<0.2	-	2.7	-	-	-	-	0.4		
	"	"	1	Jul 1973	-	-	0.03	-	-	<0.2	-	-	0.6	<0.2	-	4.3	-	-	-	-	0.4		
Scabbard Fish	Muscle	IV b	1	Dec 1970	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	3	Apr 1972	0.05	0.15	0.09	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	3.4	2.9	0.5	0.5	0.5	-		
	"	"	1	Dec 1970	-	-	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	10	Mar 1973	-	-	0.02	-	-	0.3	-	-	<0.1	-	-	24	-	-	-	-	1.5		
	"	"	1	Dec 1970	-	-	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Scorpion Fish	Muscle	IV b	1	Dec 1970	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Smelt	Muscle	IV b	2	Dec 1970	0.13	0.14	0.14	<0.1	0.2	<0.2	0.5	0.5	0.5	<0.1	1.0	5.6	5.5	<0.5	<0.5	<0.5	-		
	"	"	2	Dec 1970	0.05	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Dec 1970	0.07	0.18	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Dec 1970	0.07	0.18	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	10	Sep 1971	0.11	0.47	0.29	0.1	0.2	0.2	<0.5	1.0	<0.6	<0.5	4.8	7.2	5.7	0.3	0.8	0.4	-		
Whiting	Muscle	IV b	10	Dec 1970	0.08	0.33	0.19	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	5.0	3.3	<0.5	<0.5	<0.5	-		
	"	"	10	Dec 1970	0.08	0.33	0.19	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	5.0	3.3	<0.5	<0.5	<0.5	-		
	"	"	10	Dec 1970	0.08	0.33	0.19	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	5.0	3.3	<0.5	<0.5	<0.5	-		
	"	"	10	Dec 1970	0.08	0.33	0.19	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	5.0	3.3	<0.5	<0.5	<0.5	-		
	"	"	10	Dec 1970	0.08	0.33	0.19	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	2.3	5.0	3.3	<0.5	<0.5	<0.5	-		
Distant Water	Muscle	IV b	2	Dec 1970	0.08	0.10	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Dec 1970	0.05	0.07	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Feb 1971	-	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	5	Jan 1973	0.05	0.19	0.11	<0.2	<0.2	<0.2	1.1	1.1	1.0	0.7	7.8	7.6	0.8	1.2	0.8	1.2	0.3		

Table 5a continued

Geographical Zone Zone and Species Distant Water (Cont'd)				ICES			Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
Organ	ICES Area	ICES Rectangle	Number	Date	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean		
Coalfish	Muscle	I	5	Dec 1970	0.03	0.05	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	II a	3	Dec 1970	0.06	0.07	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	5	Feb 1971	0.06	0.09	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	4	Feb 1971	0.04	0.06	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	V a	5	Jul 1971	0.03	0.07	0.05	0.2	0.4	0.2	<0.5	1.0	0.7	<0.5	<0.5	<0.5	5.4	8.3	6.3	0.5	2.0	0.8		
Cod	Muscle	I	4	Dec 1970	0.03	0.05	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	II a	7	Dec 1970	0.04	0.07	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.2	5.3	4.6	0.5	0.5	0.5		
	"	"	6	Feb 1971	0.04	0.10	0.07	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.2	5.4	4.6	0.5	0.5	0.5		
	"	"	5	Feb 1971	0.04	0.11	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	V a	1	Dec 1970	-	-	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	2	Jul 1971	0.02	0.03	0.03	0.2	0.2	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.0	5.2	4.6	0.5	0.8	0.7		
	"	"	4	Jul 1971	0.02	0.03	0.02	0.2	0.2	0.2	<0.5	1.0	<0.6	<0.5	<0.5	<0.5	4.2	4.9	4.4	0.3	0.8	0.5		
	"	"	11	Jan 1973	0.04	0.07	0.05	<0.2	0.2	<0.2	<1.0	1.2	<1.0	<1.0	0.3	0.8	0.5	1.4	5.1	3.2	0.6	1.1		
	"	XIV	13	1970	0.02	0.30	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Conger	Muscle	II a	2	Dec 1970	0.08	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dab	Muscle	II a	1	Dec 1970	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		"	II a	1	Dec 1970	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
"		V a	1	Dec 1970	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Haddock	Muscle	I	6	Dec 1970	0.04	0.09	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	II a	7	Dec 1970	0.02	0.04	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	4	Feb 1971	0.04	0.10	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	6	Feb 1971	0.06	0.25	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	V a	1	Dec 1970	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	11	Jan 1973	0.04	0.12	0.07	<0.2	0.2	<0.2	<1.0	1.2	<1.0	<0.3	1.6	0.8	2.5	4.0	3.3	0.6	0.9	0.7		
Halibut	Muscle	II a	2	Dec 1970	0.02	0.03	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Lemon Sole	Muscle	II a	3	Dec 1970	0.02	0.04	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Ling	Muscle	II a	1	Feb 1971	-	-	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Mock Halibut	Muscle	II a	1	Feb 1971	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Plaice	"	V a	6	Jan 1973	<0.02	0.13	0.07	<0.2	<0.2	<0.2	<1.0	1.0	<1.0	0.9	2.7	1.7	5.0	7.7	5.7	0.8	1.1	0.9		
	Muscle	I	18	Dec 1970	0.03	0.08	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.9	9.9	7.1	1.0	3.0	2.0		
	"	II a	3	Dec 1970	0.04	0.05	0.04	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.3	7.3	6.2	0.5	1.0	0.8		
	"	V a	1	Dec 1970	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	1	Dec 1970	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Redfish	Muscle	I	4	Dec 1970	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	II a	7	Dec 1970	0.02	0.04	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	4	Feb 1971	0.04	0.09	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	"	"	4	Feb 1971	0.05	0.08	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Table 6 Summary of Results from Expanded Monitoring Programme 1970-73: Mean Concentration of Organochlorine Pesticide and PCB Residues (mg/kg wet weight)

Geographical Zone and Species	Number of Samples	α HCH		γ HCH		Dieldrin		DDE		TDE		DDT		PCB		% Lipid	
		Fish	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	
Inshore																	
Bass	2	2	0.002	0.002	0.002	0.10	0.005	0.024	0.026	0.046	0.031	0.039	0.040	0.85	0.85	4.6	0.4
Brill	1	10	0.016	<0.001	0.012	0.16	0.003	0.20	0.003	0.27	0.005	0.11	0.002	1.6	0.027	18.4	0.2
Cod	1	2	0.018	<0.001	0.011	0.22	<0.001	0.66	0.002	0.34	<0.001	0.42	0.002	7.8	0.026	18.4	0.8
Dab	4	38	0.007	<0.001	0.009	0.048	0.005	0.090	0.007	0.044	0.003	0.045	0.006	1.5	0.082	19.7	0.7
Dog Fish	1	1	0.002	<0.001	0.006	0.032	0.002	0.21	0.005	0.032	<0.001	0.056	0.002	2.5	0.062	28.0	<0.2
Flounder	3	23	0.006	<0.001	0.010	0.10	0.009	0.17	0.016	0.19	0.020	0.12	0.014	3.4	0.28	11.0	0.7
Haddock	3	28	0.062	<0.001	0.030	0.14	<0.001	0.19	<0.001	0.19	<0.002	0.32	<0.002	2.2	<0.017	41.7	<0.2
Hake	1	1	0.020	<0.001	0.040	0.22	0.006	0.20	0.004	0.37	0.009	0.076	0.003	4.0	0.099	27.2	0.8
Herring	3	62	-	0.006	-	-	0.026	-	0.080	-	0.061	-	0.048	-	0.72	-	9.3
Scad	1	10	0.004	<0.001	0.004	0.022	0.001	0.099	0.008	0.057	0.002	0.079	0.005	1.2	0.10	6.0	0.6
Mackerel	1	8	<0.002	0.003	<0.002	-	-	0.019	0.015	0.016	0.010	0.040	0.013	0.44	0.15	9.6	6.2
Pilchard	1	29	-	0.002	-	-	0.008	-	0.049	-	0.009	-	0.007	-	0.41	-	3.3
Plaice	6	41	<0.006	<0.001	0.006	0.041	<0.002	0.080	0.004	0.065	<0.004	0.040	<0.003	1.5	0.086	13.0	<0.5
Pollack	1	1	0.018	<0.001	0.041	0.23	0.017	0.69	0.012	0.62	0.016	0.42	0.021	11.0	0.30	18.4	0.4
Pout Whiting	1	10	0.021	<0.001	0.030	0.22	0.001	0.36	0.002	0.44	0.002	0.21	<0.001	9.2	0.045	43.6	0.4
Sprats	1	9	-	0.009	-	-	0.007	-	0.013	-	0.011	-	0.013	-	0.21	-	15.7
Whiting	5	33	0.032	<0.001	0.033	0.25	<0.002	0.73	0.003	0.72	<0.003	0.62	<0.002	17.0	0.078	44.6	0.5
Near water																	
Blue Ling	1	1	-	<0.001	-	-	<0.001	-	0.003	-	<0.001	-	0.006	-	0.012	-	<0.2
Cod	1	10	0.070	<0.001	0.020	-	-	0.86	<0.001	0.55	<0.003	0.40	<0.003	1.1	<0.021	17.6	<0.2
Dog Fish	2	2	-	<0.001	-	-	<0.001	-	<0.003	-	<0.001	-	<0.001	-	0.013	-	<0.2
Grenadier	1	1	-	0.001	-	-	0.004	-	0.026	-	0.023	-	0.099	-	0.18	-	7.2
Haddock	1	10	0.038	<0.001	0.018	0.088	0.001	0.21	0.002	0.15	0.002	0.23	0.002	2.3	0.024	14.0	<0.2
Mackerel	1	10	0.012	0.010	0.004	-	-	0.21	0.13	0.13	0.087	0.21	0.12	3.1	1.7	10.8	10.4
Morid Fish	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Plaice	1	10	<0.001	<0.001	<0.001	-	-	0.024	0.001	0.008	<0.002	0.027	<0.002	0.19	<0.013	9.6	<0.2
Rabbit Fish	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Scabbard Fish	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Scorpion Fish	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Smeit	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Smoothhead	1	1	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.007	-	<0.2
Whiting	1	10	0.084	<0.001	<0.024	<0.001	-	1.8	<0.007	1.7	<0.002	1.2	<0.002	24.0	0.026	24.0	<0.2
Distant water																	
Cod	2	6	<0.006	<0.002	<0.007	<0.001	-	0.20	<0.001	0.095	<0.001	0.19	<0.003	1.1	<0.020	39.0	<0.2

Table 6a Results from Expanded Monitoring Programme 1970-73: Organochlorine Pesticide and PCB Residues Found in Fish (mg/kg wet weight)

Geographical Zone and Species	ICES Area	ICES Rectangle	Number in sample	Date	α HCH		γ HCH		Dieldrin		DDE		TDE		DDT		PCB		% Lipid	
					Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle	Liver	Muscle
Inshore																				
Bass	Vile	E5 29	1	Dec 1973	0.002	0.001	0.002	0.002	0.011	0.002	0.005	0.025	0.016	0.048	0.025	0.039	0.031	0.87	6.0	0.2
Brill	IVb	E9 36	1	Dec 1973	0.001	0.002	0.001	0.002	0.008	0.008	0.004	0.022	0.035	0.044	0.037	0.039	0.031	0.82	3.2	0.6
Cod	Vile	F0 30	10	Feb 1973	0.016	0.001	0.012	0.001	0.16	0.001	0.003	0.20	0.003	0.27	0.007	0.11	0.002	0.82	18.4	0.2
Dab	IVc	F1 33	2	Jun 1972	0.018	0.001	0.011	0.001	0.22	0.001	0.009	0.088	0.002	0.34	0.004	0.42	0.006	7.8	0.026	0.8
"	"	"	10	Jun 1972	0.002	0.001	0.003	0.001	0.048	0.001	0.006	0.12	0.005	0.034	0.004	0.050	0.006	0.55	18.4	0.4
"	"	"	10	Jun 1972	0.014	0.001	0.015	0.001	0.048	0.001	0.006	0.057	0.006	0.054	0.003	0.032	0.003	2.2	0.083	0.4
"	Vile	F0 30	8	Jun 1972	0.002	0.001	0.003	0.001	0.043	0.001	0.006	0.095	0.005	0.032	0.003	0.048	0.013	1.0	0.087	0.2
Dogfish	IVc	F1 31	1	Sep 1972	0.002	0.001	0.006	0.001	0.036	0.001	0.003	0.21	0.005	0.052	0.003	0.050	0.003	2.3	0.092	1.6
Flounder	Vile	F0 30	10	Jun 1973	0.002	0.001	0.006	0.001	0.032	0.001	0.002	0.11	0.005	0.032	0.003	0.056	0.003	2.5	0.082	0.2
"	"	"	4	Mar 1972	0.003	0.001	0.012	0.001	0.16	0.001	0.013	0.23	0.008	0.32	0.008	0.15	0.006	3.7	4.4	0.4
"	IVb	E6 32	9	Sep 1972	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.16	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.010	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	10	Aug 1972	0.040	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Aug 1972	0.020	0.001	0.016	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E6 32	9	Jul 1971	0.009	0.001	0.012	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	"	"	10	Jul 1971	0.045	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.37	0.010	0.13	0.006	4.3	0.8	0.4
"	IVb	E9 36	8	Aug 1972	0.004	0.001	0.010	0.001	0.043	0.001	0.011	0.33	0.003	0.3						

Table 7 Summary of Results from Expanded Monitoring Programme 1970-73: Metals in Shellfish (mg/kg wet weight)

Species	Organ	Number of Samples	Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
			Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
Clams		6	<0.02	0.14	0.07	0.3	1.0	0.6	<1.0	6.0	3.2	<0.3	1.5	<1.0	8.5	55	25	1.0	5.0	3.1
Cockles		22	0.01	0.12	0.05	<0.1	0.8	<0.3	<0.5	5.0	<1.3	0.3	4.2	<1.2	3.5	40	18	<0.5	33	4.8
Crabs	Claw	40	0.03	1.7	0.19	<0.1	3.4	<0.3	<0.1	9.8	<1.4	<0.1	3.6	<1.1	35	270	88	4.0	40	19
"	Body	40	<0.01	0.55	0.15	0.3	73	12	<0.1	13	4.1	<0.1	17	<1.7	3.4	210	41	4.0	440	79
Crawfish	Body	2	0.16	0.19	0.18	2.0	2.0	2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	110	120	115	150	150	150
"	Tail	2	0.91	1.1	1.0	<0.2	<0.3	<0.3	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	13	26	20	10	15	13
"	Eggs	2	0.04	0.04	0.4	<0.3	<0.3	<0.3	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	85	140	110	2.5	4	3
Dog Whelks		6	0.04	0.10	0.08	3.1	31	14	1.0	5.4	3.6	1.1	3.3	2.1	79	202	126	13	28	22
Limpets		55	<0.01	0.37	0.07	0.6	93	15	<0.2	9.5	2.3	<0.1	8.9	<1.5	12	114	44	1.9	61	14.4
Lobster	Body	9	<0.01	0.52	<0.10	0.3	51	6.0	<0.1	4.5	<1.1	<0.1	3.7	<1.1	9.7	230	52	9.0	1600	254
"	Tail	9	0.01	0.84	0.29	<0.1	1.6	<0.3	<0.2	4.0	<1.1	<0.1	3.6	<1.2	8.7	58	21	5.0	46	19
"	Claw	6	<0.02	0.86	0.30	<0.1	6.1	1.4	<0.2	5.5	<1.8	<0.1	3.4	<1.4	20	95	50	10	50	26
Mussels		105	<0.01	1.1	0.15	<0.1	21	1.4	<0.1	10	<2.3	<0.1	3.0	<1.3	3.8	63	25	<0.1	29	4.5
Norway Lobsters		5	0.15	0.55	0.34	<0.1	0.4	<0.2	<0.2	0.5	<0.4	<0.2	1.0	<0.5	12	17	14	2.5	15	8.3
Native Oysters		47	0.01	0.36	0.12	<0.1	2.6	0.9	<0.5	16	<1.4	<0.3	3.5	<1.1	49	1400	380	10	200	73
Prawns		1	-	-	0.06	-	-	0.5	-	-	0.4	-	-	0.3	-	-	27	-	-	16
Queens	Whole	9	0.02	0.57	0.17	0.2	0.8	0.5	<0.5	2.0	<1.0	<0.5	<2.5	<0.8	3.4	130	63	0.3	130	21
"	Muscle	3	0.10	0.27	0.16	0.4	0.5	0.4	1.3	2.4	1.8	0.3	1.6	0.8	17	48	30	1.4	4.1	2.6
"	Gonad	3	0.03	0.15	0.10	0.9	1.3	1.0	2.9	4.5	3.8	0.3	1.9	1.3	89	210	140	4.4	9.8	7.0
Scallops	Whole	3	0.04	0.07	0.05	1.1	7.5	3.5	<0.5	0.8	0.6	<0.5	<1.0	<0.7	25	65	42	1.5	23	8.6
"	Muscle	4	0.03	0.07	0.05	0.3	1.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	34	22	<0.5	2.5	<1.3
"	Gonad	4	0.02	0.07	0.05	0.4	0.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	36	88	56	2.0	3.5	2.6
Shrimps (Brown)		21	0.02	0.32	0.16	0.1	9.4	2.6	<0.1	7.5	3.6	<0.1	2.6	<1.0	12	60	27	13	45	26
Shrimps (Pink)		6	0.03	0.21	0.14	0.3	0.6	0.5	<0.2	32	16	0.2	2.0	1.2	13	24	17	8.7	20	13
Squid		2	-	-	0.12	-	-	<0.2	-	-	0.4	-	-	0.6	-	-	13	-	-	11
Whelks		16	0.03	0.89	0.26	0.3	4.6	1.4	<0.2	8.3	<1.3	<0.2	21	<2.0	15	430	92	6.9	160	43
Winkles		57	<0.02	0.81	0.10	0.2	27	3.5	<0.2	18	<4.3	<0.1	3.8	<1.2	8.0	74	24	10	70.0	26

Table 7a Results from Expanded Monitoring Programme 1970-73: Metals in Shellfish - Crabs, Crawfish and Lobsters (mg/kg wet weight)

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury			Cadmium			Lead			Chromium			Zinc			Copper			
							Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min
Crab	Claw	Seahouses	IVb	E8 40	23	Oct 1972	0.08	0.37	0.17	0.1	0.6	0.3	0.5	0.5	0.3	0.5	1.0	0.8	51	120	88	7.9	34	31	
		Gullercoats		E8 39	10	Sep 1971	0.19	0.53	0.31	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	88	120	100	10	20	16	
		Noses Point		E8 38	8	Oct 1973	0.04	0.76	0.30	0.2	0.3	0.2	0.5	0.5	0.3	0.5	1.8	1.8	75	180	110	7.1	35	28	
		Hartlepool		E9 37	9	Jun 1971	0.15	0.43	0.26	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	68	100	83	13	28	21	
		Whitby			10	Apr 1972	0.12	0.28	0.18	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	62	80	67	12	25	19	
					11	Apr 1973	0.10	0.28	0.17	0.1	0.3	0.3	0.5	0.5	0.3	0.5	0.5	0.5	59	81	72	4.9	29	21	
					15	Apr 1972	0.10	0.28	0.17	0.2	0.3	0.3	0.5	0.5	0.3	0.5	0.5	0.5	60	110	71	4.8	30	18	
		Flamborough Head		F0 36	6	Jun 1972	0.03	0.16	0.07	0.1	1.2	0.4	0.5	0.5	0.3	0.5	0.5	0.5	53	180	87	5.4	32	20	
		Canada Bay	IVc	F1 34	24	Jul 1972	0.15	0.31	0.20	0.1	0.8	0.3	0.5	0.5	0.3	0.5	0.5	0.5	68	130	93	11	36	21	
		Crozier			10	Apr 1971	0.07	0.19	0.11	0.1	0.4	0.3	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		Sherringham			15	Sep 1971	0.04	0.25	0.16	0.1	0.4	0.3	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
					11	Mar 1972	0.09	0.46	0.16	0.1	0.4	0.3	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		Lowestoft			12	Jun 1972	0.18	0.34	0.25	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		R. Thames			4	Sep 1972	0.08	0.23	0.16	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		Seisey Bill	VIIId	F0 31	12	Jun 1972	0.19	0.34	0.25	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		Isle of Wight			10	Sep 1972	0.18	0.34	0.26	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	61	93	61	11	36	21	
		Poole			9	Apr 1972	0.03	0.36	0.17	0.1	0.6	0.3	0.5	0.5	0.3	0.5	0.5	0.5	66	210	120	19	35	25	
		Swanage			6	Aug 1972	0.10	0.39	0.16	0.1	0.6	0.3	0.5	0.5	0.3	0.5	0.5	0.5	94	140	120	15	21	18	
		Anvil Head			6	Jan 1972	0.31	0.54	0.39	0.1	0.4	0.2	0.5	0.5	0.3	0.5	0.5	0.5	82	72	9.0	30	21	18	
		Hurd Deep	VIIId	E7 29	12	Oct 1972	0.10	0.27	0.13	0.2	0.4	0.2	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16	
		R. Dart			E6 29	6	Oct 1971	0.08	0.28	0.19	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16
						6	Sep 1972	0.05	0.16	0.09	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16
						24	Sep 1972	0.05	0.15	0.09	0.1	0.5	0.4	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16
				10	Oct 1972	0.05	0.15	0.09	0.1	0.5	0.4	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16		
				6	Oct 1971	0.09	0.38	0.18	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16		
				6	Oct 1972	0.09	0.23	0.18	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	85	100	82	7.2	38	16		
				6	Oct 1971	0.09	0.23	0.14	0.1	0.4	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				24	Sep 1972	0.08	0.52	0.22	0.1	0.6	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				6	Aug 1972	0.11	0.24	0.18	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				6	Aug 1972	0.19	0.44	0.28	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				12	Sep 1972	0.05	0.33	0.22	0.1	0.2	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				12	Sep 1972	0.07	0.44	0.21	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				12	Sep 1972	0.07	0.44	0.21	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				10	Sep 1971	0.07	0.22	0.14	0.1	0.3	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				6	Aug 1972	0.03	0.29	0.14	0.1	0.2	0.1	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				8	Jul 1972	0.09	0.38	0.20	0.1	0.2	0.1	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				6	Sep 1972	0.04	0.24	0.09	0.2	0.1	0.1	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				13	Aug 1972	0.08	0.25	0.17	0.1	0.5	0.2	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
				6	Oct 1972	0.24	1.7	1.0	0.2	1.8	1.0	0.5	0.5	0.3	0.5	0.5	0.5	92	130	110	12	16	15		
Crab	Body	Seahouses	IVb	E8 40	23	Oct 1972	0.02	0.16	0.06	0.3	28	6.5	5.4	5.4	5.4	5.4	2.5	1.4	17	66	38	20	190	81	
		Gullercoats		E8 39	10	Sep 1971	0.12	0.35	0.24	0.1	18	6.9	5.4	5.4	5.4	5.4	2.5	1.4	17	66	38	20	190	81	
		Noses Point		E8 38	7	Oct 1973	0.12	0.35	0.24	0.1	18	6.9	5.4	5.4	5.4	5.4	2.5	1.4	17	66	38	20	190	81	
		Hartlepool			10	Jun 1971	0.05	0.16	0.11	0.8	3.8	1.9	0.5	0.5	0.3	0.5	0.5	0.5	34	80	58	170	440	300	
		Whitby		E9 37	10	Apr 1972	0.16	0.35	0.27	0.4	2.3	0.8	1.0	0.5	0.3	0.5	0.5	0.5	34	80	58	170	440	300	
					15	Apr 1973	0.09	0.35	0.19	1.6	6.3	3.6	0.4	0.4	0.4	0.4	0.4	0.4	34	80	58	170	440	300	
					11	Oct 1973	0.05	0.24	0.16	0.5	3.8	2.7	0.4	0.4	0.4	0.4	0.4	0.4	34	80	58	170	440	300	
		Flamborough Head		F0 36	5	Oct 1972	0.05	0.10	0.07	1.2	3.5	2.4	0.9	0.5	0.5	0.5	0.5	0.5	34	80	58	170	440	300	
		Canada Bay			24	Jun 1972	0.16	0.30	0.24	1.0	29	3.4	0.3	0.3	0.3	0.3	0.3	0.3	34	80	58	170	440	300	
		Crozier	IVc	F1 34	10	Apr 1972	0.02	0.12	0.06	-	-	-	-	-	-	-	-	-	-	34	80	58	170	440	300
		Sherringham			15	Sep 1971	0.03	0.12	0.07	1.2	12	4.4	2.5	1.3	1.3	1.3	1.3	1.3	34	80	58	170	440	300	
					11	Mar 1972	0.08	0.18	0.13	-	-	1.2	4.4	2.5	1.3	1.3	1.3	1.3	1.3	34	80	58	170	440	300
		Lowestoft			11	Jun 1972	-	-	0.26	-	-	2.0	4.4	2.5	1.3	1.3	1.3	1.3	34	80	58	170	440	300	
		R. Thames			12	Jul 1972	0.13	0.41	0.29	2.3	14	6.9	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
		Seisey Bill	VIIId	F0 31	12	Sep 1972	0.07	0.26	0.16	6.4	19	13	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
		Isle of Wight			4	Sep 1972	0.20	0.34	0.25	7.1	35	10	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
		Poole			9	Apr 1972	0.12	0.34	0.25	7.1	35	10	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
		Swanage			6	Aug 1972	0.22	0.45	0.30	7.2	35	11	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
		Anvil Head			6	Mar 1972	0.10	0.15	0.13	2.2	9	3.5	0.2	0.2	0.2	0.2	0.2	0.2	34	80	58	170	440	300	
						12	Oct 1972	0.02	0.10	0.04	9.8	7													

Table 7a Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury			Cadmium			Lead			Chromium			Zinc			Copper		
							Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Crab	Body	Hayle	Vile	E4 29	6	Aug 1972	<0.01	0.12	0.09	1.9	28	8.6	5.6	7.8	7.0	1.0	17	4.7	17	53	32	340	160	
		Cadepark	Vile	E5 30	8	Jul 1972	0.15	0.47	0.22	5.5	48	14	1.3	5.5	3.3	1.2	2.3	1.7	30	58	40	96	430	
		Milford Haven	Vile	E4 32	6	Sep 1972	0.04	0.11	0.07	4.0	35	20	5.1	12.3	3.9	0.9	3.1	2.1	31	71	45	11	130	
		Fishguard	Vile	E5 32	14	Aug 1972	0.05	0.25	0.13	2.6	18	11	1.2	8.3	3.9	0.9	3.1	2.1	27	49	37	100	230	
		Llandudno	Vile	E5 35	6	Oct 1972	0.19	0.55	0.34	4.3	45	15	2.2	7.4	4.8	1.9	3.6	2.9	27	49	37	100	410	
Crawfish	Body	Plymouth	Vile	E5 29	2		0.16	0.19	0.18	2.0	2.0	2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	110	120	120	150	150	
		Plymouth	Vile	E5 29	2		0.91	1.1	1.0	<0.3	<0.2	<0.3	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	13	26	20	10	15	
Crawfish	Eggs	Plymouth	Vile	E5 29	2		0.04	0.04	0.04	<0.3	<0.3	<0.3	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	85	140	110	2.5	3.7	
		Cullercoats	IVb	E3 39	10	Sep 1971	0.02	0.20	0.07	0.3	2.5	1.2	<10	<10	<10	<0.5	<0.5	<0.5	19	87	30	61	390	
		Sherringham	IVc	F1 34	7	Sep 1971	<0.01	0.06	<0.03	1.3	3.1	2.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	12	27	19	10	110	
		Selsey B111	Vile	E3 30	6	Jul 1972	0.07	0.34	0.24	1.0	3.4	2.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	32	220	74	140	510	
		Newlyn	Vile	E4 29	10	Sep 1971	0.02	0.08	0.05	2.0	11	4.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	40	230	170	260	1600	
Lobster	Body	Pembroke	Vile	E3 32	4	Sep 1972	<0.02	0.29	<0.11	2.1	12	7.8	1.8	3.4	2.4	3.3	3.7	3.5	40	230	170	260	1600	
		Milford Haven	Vile	E4 32	6	Sep 1972	0.02	0.23	0.08	2.1	18	5.1	1.9	3.7	2.6	2.4	3.0	2.6	14	100	42	230	370	
		Cardigan Bay	Vile	E5 33	4	Jul 1972	<0.02	0.14	<0.06	2.5	6.7	4.7	<0.5	<0.5	<0.5	<0.5	<0.5	57	230	120	65	610		
		Cardigan Bay	Vile	E5 34	4	Jul 1972	0.14	0.52	0.24	2.5	6.7	4.7	<0.5	<0.5	<0.5	<0.5	<0.5	57	230	120	65	610		
		Llandudno	Vile	E6 35	6	Oct 1972	0.04	0.24	0.12	1.0	5.0	2.8	2.7	4.5	3.7	2.3	2.9	<0.2	57	230	120	65	610	
Lobster	Tail	Cullercoats	IVb	E8 39	10	Sep 1971	0.17	0.33	0.24	<0.1	0.4	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.7	12	11	5.0	9.0	
		Scarborough	IVc	E9 37	8	Sep 1971	0.22	0.63	0.36	<0.1	0.3	<0.2	<0.5	2.0	1.0	<0.5	<0.5	<0.5	9.1	13	11	6.0	20	
		Sherringham	Vile	F1 34	7	Sep 1971	0.11	0.29	0.21	<0.1	0.3	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	27	58	41	16	38	
		Selsey B111	Vile	E3 30	6	Jul 1972	0.09	0.26	0.19	0.1	0.5	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.7	12	10	8.5	21	
		Newlyn	Vile	E5 32	14	Sep 1971	<0.02	0.36	<0.24	0.3	0.6	0.4	1.0	1.8	1.4	2.9	3.6	3.2	24	38	32	28	44	
Lobster	Body	Pembroke	Vile	E3 32	4	Sep 1972	0.20	0.80	0.38	0.3	1.6	0.7	1.9	3.0	2.3	2.1	2.5	2.4	17	24	20	15	46	
		Milford Haven	Vile	E4 32	4	Sep 1972	0.01	0.78	<0.25	0.3	0.5	0.4	<0.5	2.8	<1.1	0.9	1.0	0.9	32	37	35	21	34	
		Cardigan Bay	Vile	E5 34	6	Jul 1972	0.20	0.41	0.32	0.2	0.3	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	20	28	22	12	36	
		Abertovey	Vile	E6 35	6	Oct 1972	0.28	0.94	0.57	0.3	0.5	0.4	1.8	4.0	2.9	1.0	3.6	2.3	23	28	26	22	36	
		Llandudno	Vile	E6 35	6	Oct 1972	0.28	0.94	0.57	0.3	0.5	0.4	1.8	4.0	2.9	1.0	3.6	2.3	23	28	26	22	36	
Lobster	Claw	Selsey B111	Vile	E9 30	6	Jul 1972	0.31	0.65	0.52	0.1	0.3	0.2	<0.2	0.8	0.5	<0.1	<0.1	<0.1	20	22	20	10	20	
		Pembroke	Vile	E3 32	4	Sep 1972	<0.02	0.33	<0.21	0.2	0.4	0.2	<0.5	1.0	0.8	2.9	3.4	3.1	45	85	64	33	49	
		Milford Haven	Vile	E4 32	4	Sep 1972	<0.02	0.33	<0.21	0.2	0.4	0.2	<0.5	1.0	0.8	2.9	3.4	3.1	45	85	64	33	49	
		Cardigan Bay	Vile	E5 34	6	Jul 1972	<0.02	0.33	<0.21	0.2	0.4	0.2	<0.5	1.0	0.8	2.9	3.4	3.1	45	85	64	33	49	
		Abertovey	Vile	E6 35	6	Oct 1972	0.13	0.28	0.21	<0.1	0.3	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	26	46	48	21	31	

Table 7b Results from Expanded Monitoring Programme 1970-73: Metals in Shellfish (mg/kg wet weight)

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Clams	Whole	R Blackwater	IVc	F0 32	2	Jan 1972	0.05	1.0	6.0	1.0	8.5	1.0
"	"	"	"	"	1	Jan 1972	0.06	0.3	4.0	1.0	9.1	5.0
"	"	Portsmouth	VIIId	E8 30	10	Mar 1973	<0.02	0.4	<1.0	<0.3	55	3.5
"	"	Poole	"	"	10	Mar 1971	0.13	-	-	-	-	-
"	"	"	"	"	11	Apr 1972	0.14	0.3	1.6	<1.0	31	3.7
"	"	Amroth	VIIIf	E5 32	18	Jan 1973	0.02	0.8	3.5	1.5	20	2.2
Cockles	Whole	R Humber	IVb	E9 36	40	Aug 1971	-	<0.1	<0.5	<0.5	21	5.7
"	"	The Wash	IVc	F0 34	12	Jan 1971	0.06	0.5	<0.5	<0.5	29	5.0
"	"	"	"	"	30	Feb 1972	0.06	0.2	0.8	<2.5	7.0	3.7
"	"	"	"	"	20	Nov 1972	-	0.4	4.0	4.2	25	1.9
"	"	Cley-Next-Sea	"	F1 34	50	Apr 1972	0.11	0.2	1.2	<0.5	8.4	1.5
"	"	Buxey Sands	"	F1 32	22	Jul 1972	0.06	<0.1	<0.5	1.0	11	2.0
"	"	"	"	"	20	Aug 1972	-	0.8	<0.5	<0.5	12	<0.5
"	"	R Crouch	"	F0 32	12	Jan 1971	0.12	<0.1	<0.5	<0.5	9.3	2.5
"	"	Maplin Sands	"	"	15	Jan 1971	0.12	0.8	<0.5	<0.5	29	18
"	"	R Swale	"	F0 31	4	Feb 1971	0.02	-	-	-	-	-
"	"	"	"	"	10	Feb 1971	0.02	-	-	-	-	-
"	"	"	"	"	30	Mar 1971	0.10	0.5	<0.5	<0.5	14	33
"	"	Poole	VIIId	E8 30	20	Aug 1971	-	<0.1	<0.5	<0.5	16	2.5
"	"	"	"	"	19	Aug 1971	-	0.3	<0.5	<0.5	3.5	2.5
"	"	Burry Inlet	VIIIf	E5 32	33	Mar 1971	0.05	0.4	1.0	2.0	9.8	3.0
"	"	"	"	"	40	May 1971	0.02	0.5	2.0	3.0	13	12
"	"	"	"	"	20	Aug 1971	-	<0.1	<0.5	<0.5	11	<0.5
"	"	"	"	"	25	Jun 1972	0.01	0.4	1.6	0.7	6.6	2.5
"	"	"	"	"	50	Oct 1972	<0.02	0.3	1.3	2.3	36	2.5
"	"	"	"	"	50	Oct 1972	<0.02	0.3	1.6	2.5	27	1.5
"	"	"	"	"	40	Jan 1973	0.05	0.3	1.7	0.6	30	2.1
"	"	"	"	"	50	Oct 1972	0.02	0.3	<1.0	0.5	18	1.5
"	"	Laugharne Sands	"	"	26	Jan 1973	0.02	0.3	5.0	0.3	40	1.9
"	"	Angle Bay	VIIIf	E4 32	50	Sep 1972	0.03	0.3	3.3	1.0	20	2.0
"	"	St Ishmael	"	"	50	May 1973	0.07	3.1	1.0	1.1	-	13
Dog Whelks	Whole	R Exe	VIIe	E6 30	20	Jan 1973	0.10	14	5.4	3.3	200	28
"	"	Aberavon	VIIIf	E5 32	30	Jan 1973	0.08	31	3.7	2.7	180	20
"	"	Bracelet Bay	"	"	40	Jan 1973	0.08	14	3.5	2.3	84	18
"	"	Rhossili	"	"	35	Jan 1973	0.08	14	2.6	1.8	79	23
"	"	Amroth	"	"	35	Jan 1973	0.04	9.6	5.4	1.6	87	28
"	"	Saundersfoot	"	"	50	Jan 1973	0.08	10	-	-	-	-
Limpets	Whole	Seaton Hole	VIIe	E6 30	28	May 1973	0.05	1.0	<0.2	0.3	20	2.3
"	"	Beer Head	"	"	24	May 1973	0.05	1.0	<0.2	<0.2	12	2.6
"	"	R Exe	"	"	10	May 1973	<0.01	1.0	1.1	2.7	13	13
"	"	R Dart	"	E6 29	10	Jun 1973	0.04	3.0	1.1	0.8	38	5.9
"	"	"	"	"	20	Jun 1973	0.02	2.1	1.0	1.5	24	2.8
"	"	"	"	"	20	Jun 1973	0.02	0.6	1.2	1.0	29	1.9
"	"	Connacombe	"	"	20	Jun 1973	0.04	0.7	0.5	1.1	27	2.4
"	"	Kingsbridge	"	"	20	Jun 1973	0.03	1.1	1.1	8.8	21	2.4
"	"	Outer Hope	"	"	20	Jun 1973	0.03	0.8	0.7	2.2	28	2.7
"	"	R Avon	"	"	15	Mar 1973	0.03	1.2	1.8	5.2	23	3.6
"	"	Challaboro	"	"	15	May 1973	0.02	1.7	1.8	2.4	22	2.4
"	"	R Erme	"	"	15	May 1973	0.02	1.3	0.5	8.9	21	2.5

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Limpets	Whole	Godreuy Head	VII f	E4 29	12	Jul 1971	-	1.3	<0.5	<0.5	17	15
"	"	Welcombe	"	E5 30	25	Apr 1973	0.02	3.3	0.8	1.5	25	3.2
"	"	Hartland	"	"	30	May 1973	0.08	1.3	0.4	1.0	34	3.2
"	"	Shipload Bay	"	"	30	Apr 1973	0.09	2.2	2.8	2.6	39	3.6
"	"	Westward Ho!	"	E5 31	10	Mar 1973	0.04	2.5	2.0	1.1	29	2.7
"	"	R Torridge	"	"	10	Mar 1973	0.06	3.2	<0.2	3.2	22	2.5
"	"	Woolacombe	"	"	20	May 1973	0.05	2.7	0.7	5.8	22	3.4
"	"	Lee	"	"	15	May 1973	0.04	12	0.8	1.8	32	3.2
"	"	Hele Bay	"	"	15	May 1973	0.02	6.8	<0.2	0.9	37	2.7
"	"	Combe Martin	"	"	20	Mar 1973	0.08	9.4	1.4	4.9	29	3.0
"	"	Minehead	"	E6 31	-	Jun 1971	0.05	12	2.0	2.0	53	22
"	"	"	"	"	11	Mar 1972	0.37	5.3	<1.0	<2.5	28	28
"	"	Watchet	"	"	-	Jun 1971	0.02	16	5.5	2.0	56	13
"	"	Stolford	VII f	E6 31	21	Mar 1972	0.17	27	<1.0	<1.0	65	9.0
"	"	Bream Down	"	E7 31	21	Mar 1972	0.18	42	<1.0	<1.0	55	9.5
"	"	Weston-Super-Mare	"	"	-	Jun 1971	0.12	26	0.5	<1.0	70	23
"	"	"	"	"	-	Jun 1971	0.06	93	2.5	1.0	56	38
"	"	Clevedon	"	"	19	Mar 1972	0.17	24	1.0	<1.0	68	8.5
"	"	"	"	"	-	Jun 1971	0.06	49	5.0	1.0	70	23
"	"	"	"	"	11	Mar 1972	0.21	53	2.0	<1.0	110	17
"	"	Portishead	"	"	-	Jun 1971	0.12	-	-	-	-	-
"	"	"	"	"	-	Jun 1971	0.05	50	2.5	1.0	72	13
"	"	"	"	"	-	Jun 1971	0.11	54	6.0	2.0	90	30
"	"	Avonmouth	"	"	-	Jun 1971	0.04	65	5.0	<0.1	72	20
"	"	Newport	"	E6 32	-	Jun 1971	0.10	33	3.0	1.0	100	29
"	"	Cardiff	"	E6 31	-	Jun 1971	0.03	7.8	1.0	<0.1	16	10
"	"	Barry Island	"	"	-	Jun 1971	0.08	14	3.0	1.0	84	21
"	"	Llantwit	"	"	-	Jun 1971	0.07	65	9.5	<0.1	68	61
"	"	Nash Point	"	"	-	Jun 1971	0.08	15	2.0	<0.1	61	25
"	"	Portcawl	"	"	-	Jun 1971	0.07	8.3	5.5	1.0	54	53
"	"	Aberavon	"	E6 32	-	Jun 1971	0.06	13	3.5	2.0	63	29
"	"	"	"	"	-	Jun 1971	0.02	7.6	9.0	<0.1	56	29
"	"	Oystermouth	"	"	23	Jun 1971	0.04	9.3	5.0	<0.3	94	29
"	"	Mumbles	"	"	11	Jan 1973	0.04	23	1.8	0.6	74	6.1
"	"	Bracelet Bay	"	"	-	Jan 1973	0.04	13	6.0	1.0	61	28
"	"	Rhossili	"	E5 32	13	Jan 1973	0.04	17	4.0	2.3	58	4.2
"	"	Nolton Haven	VII g	E4 32	17	Jan 1973	0.04	4.0	1.6	<0.3	41	4.9
"	"	Fishguard	VII a	E5 32	7	Jun 1972	0.07	1.8	0.5	0.6	30	20
"	"	Aberporth	"	E5 33	-	Jun 1971	0.03	3.3	2.5	1.0	16	8.0
"	"	Llangrannog	"	"	-	Jun 1971	0.04	4.6	5.0	<0.1	15	6.5
"	"	New Quay	"	"	-	Jun 1971	0.03	2.5	0.5	<0.1	16	23
"	"	Aberayron	"	"	-	Jun 1971	0.04	5.2	1.5	<0.1	16	15
"	"	Towyn	"	"	-	Jun 1971	0.03	2.7	3.5	<0.1	15	47
"	"	"	"	E5 34	-	Jun 1971	0.03	2.1	1.5	<0.1	14	6.5
Mussels	Whole	Berwick	IV b	E7 40	20	Apr 1971	<0.01	<0.1	<0.5	<0.5	60	<0.5
"	"	Holy Island	"	E8 40	50	Nov 1971	0.07	0.3	2.5	1.6	30	2.8
"	"	Budle Bay	"	"	12	Apr 1971	0.03	<0.1	<0.5	<0.5	14	2.5
"	"	North Shields	"	E8 39	30	Dec 1970	0.15	<0.1	<0.5	<0.5	41	10
"	"	Hartlepool	"	E8 38	50	Jan 1972	0.11	0.4	4.6	5.4	40	3.3
"	"	Whitby	"	E9 37	60	Nov 1971	0.14	0.3	4.1	1.8	39	2.6

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Mussels	Whole	Bridlington The Wash	IVb IVc	E9 37 F0 34	82	Nov 1971	0.10	0.4	3.7	2.0	28	4.1
"	"	"	"	"	12	Jan 1971	0.05	0.8	<0.5	<0.5	21	15
"	"	"	"	"	20	Feb 1972	0.07	0.4	2.9	<2.5	17	3.7
"	"	"	"	"	20	Feb 1972	0.06	0.3	2.6	<2.5	18	3.7
"	"	Kings Lynn	"	"	60	Oct 1971	0.04	0.3	2.1	1.5	28	4.4
"	"	Hunstanton	"	"	60	Dec 1971	0.04	0.4	4.0	2.2	30	3.3
"	"	Brancaster	"	"	12	Feb 1971	0.04	<0.1	<0.5	<0.5	5.3	2.5
"	"	"	"	"	50	Nov 1971	0.06	0.3	2.5	1.8	23	2.2
"	"	Wells	"	"	12	Feb 1971	0.06	0.8	<0.5	<0.5	20	<0.5
"	"	Blakeney	"	"	50	Jan 1972	0.05	0.3	2.7	1.8	29	1.7
"	"	R Crouch	"	F1 34 F0 32	15	Apr 1970	0.16	-	-	-	-	-
"	"	"	IVc	"	20	Nov 1970	0.24	<0.1	<0.5	<0.5	19	5.0
"	"	"	"	"	20	May 1971	0.27	-	-	-	-	-
"	"	"	"	"	20	May 1971	0.25	-	-	-	-	-
"	"	"	"	"	20	Jun 1971	0.27	-	-	-	-	-
"	"	"	"	"	80	Oct 1971	0.13	0.5	3.2	1.8	33	2.6
"	"	"	"	"	10	Apr 1970	0.03	-	-	-	-	-
"	"	R Roach	"	"	72	Nov 1971	0.32	1.3	3.5	2.3	60	4.6
"	"	Southend	"	F0 31	6	Feb 1971	0.02	0.5	<0.5	<0.5	18	2.5
"	"	R Swale	"	"	20	Feb 1971	0.02	0.8	<0.5	<0.5	59	5.0
"	"	"	"	"	15	Feb 1971	0.06	0.8	<0.5	<0.5	36	10
"	"	"	"	"	20	Mar 1971	0.11	1.3	<0.5	<0.5	63	10
"	"	"	"	"	20	Mar 1971	0.11	0.5	<0.5	<0.5	33	2.5
"	"	"	"	"	20	Mar 1971	0.08	0.8	<0.5	<0.5	25	5.0
"	"	"	"	"	20	Mar 1971	0.09	0.5	<0.5	<0.5	38	5.0
"	"	Leysdown	"	"	20	Mar 1971	-	<0.1	<0.5	<0.5	12	<0.5
"	"	Poole	VIIId	E8 30	10	Aug 1971	0.46	-	-	-	-	-
"	"	"	"	"	20	Mar 1971	0.16	0.9	2.0	<0.1	15	2.5
"	"	"	"	"	16	Apr 1971	0.18	1.2	1.5	<0.1	15	2.5
"	"	"	"	"	16	Apr 1971	0.18	1.2	1.5	<0.1	15	2.5
"	"	"	"	"	20	Apr 1971	0.22	1.4	2.5	<0.1	16	2.5
"	"	"	"	"	20	Apr 1971	0.24	1.4	3.5	<0.1	15	4.0
"	"	"	"	"	19	Apr 1971	0.54	5.3	3.0	<0.1	15	3.0
"	"	"	"	"	19	Apr 1971	0.34	7.3	5.5	<0.1	16	6.5
"	"	"	"	"	13	Jun 1971	0.19	0.2	<0.1	<0.1	14	1.5
"	"	"	"	"	21	Jun 1971	0.52	0.2	<0.1	<0.1	15	1.5
"	"	"	"	"	23	Jun 1971	0.52	1.6	<0.1	<0.1	16	2.0
"	"	"	"	"	26	Jun 1971	-	1.3	4.5	<0.1	14	6.0
"	"	"	"	"	24	Jun 1971	-	1.4	2.5	<0.1	14	6.0
"	"	"	"	"	24	Jun 1971	-	9.0	4.0	1.0	16	5.0
"	"	"	"	"	30	Aug 1971	-	0.3	<0.5	<0.5	13	<0.5
"	"	"	"	"	50	Apr 1972	1.1	3.4	2.5	<0.5	28	2.0
"	"	"	"	"	25	Apr 1972	0.58	4.9	2.8	<0.5	19	4.0
"	"	R Exe	VIIe	E6 30	20	May 1973	0.04	0.5	1.7	0.7	12	5.2
"	"	"	"	"	20	May 1973	0.05	0.5	1.9	0.5	16	21
"	"	"	"	"	20	May 1973	0.03	0.4	0.7	0.3	14	1.9
"	"	"	"	"	20	Jun 1973	0.02	0.3	0.8	2.4	13	1.3
"	"	Dawlish Warren	"	"	30	Jun 1973	0.05	0.4	1.8	1.1	23	1.6
"	"	Dawlish	"	"	20	Nov 1970	-	0.5	<0.5	1.0	13	3.0
"	"	R Teign	"	"	20	Nov 1970	0.04	0.2	1.0	2.0	11	3.5
"	"	"	"	"	20	Dec 1970	-	0.2	1.0	2.0	12	3.0
"	"	"	"	"	20	Jun 1973	0.11	0.4	2.7	1.0	20	1.4

Table 7b Continued

Species	Organ	Port of Landing or position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Mussels	Whole	R Dart	VIIe	E6 29	26	June 1973	0.06	1.5	1.4	0.3	16	2.0
"	"	R Erme	"	"	19	May 1973	0.05	0.4	0.6	1.8	12	2.5
"	"	Godrevy Head	VIIIf	E4 29	10	Jul 1971	-	<0.1	<0.5	<0.5	51	<0.5
"	"	R Torridge	"	E5 31	20	Mar 1973	0.10	0.7	0.7	0.8	13	1.4
"	"	R Taw	"	"	20	Mar 1973	0.11	0.6	<0.4	0.8	12	1.2
"	"	"	"	"	20	Mar 1973	0.14	0.6	0.8	1.9	13	1.8
"	"	Avonmouth	"	E7 31	30	Jun 1971	0.08	21	3.5	1.0	53	8.0
"	"	Barry Island	"	E6 31	30	Jun 1971	-	9.1	5.3	<0.1	36	5.3
"	"	Nash Point	"	"	30	Jun 1971	0.07	4.4	3.0	1.0	46	13
"	"	Tusker Rock	"	"	20	Aug 1973	0.13	4.6	1.6	-	5.4	3.0
"	"	Aberavon	"	E6 32	30	Jun 1971	0.03	3.7	9.5	<0.1	43	29
"	"	"	"	"	30	Jan 1973	0.10	3.1	6.2	2.0	61	3.8
"	"	Oystermouth	"	"	35	Jan 1973	0.04	3.0	4.6	2.0	51	2.5
"	"	Mumbles	"	"	30	Jun 1973	0.05	4.5	2.0	1.0	17	8.0
"	"	Bracelet Bay	"	E5 32	26	Jan 1973	0.07	3.8	5.2	2.0	55	3.8
"	"	Rhossili	"	"	30	Jan 1973	0.06	1.2	2.8	1.0	30	3.0
"	"	Burry Inlet	"	"	20	Jan 1971	0.07	0.8	2.0	2.0	12	13
"	"	"	"	"	40	May 1971	0.04	1.7	1.0	3.0	13	2.5
"	"	"	"	"	20	Jan 1973	0.05	1.3	2.5	1.8	37	2.4
"	"	St Ishmael	"	"	20	Jan 1973	0.02	1.3	2.5	2.1	25	2.7
"	"	Amroth	"	"	30	Jan 1973	0.03	1.3	2.0	1.6	24	2.2
"	"	Saundersfoot	"	"	30	Jan 1973	0.03	1.2	2.0	2.5	33	1.6
"	"	Angle Bay	"	"	40	Jan 1973	0.06	1.5	1.6	1.0	49	2.6
"	"	St Ishmael	VIIg	E4 32	20	Jan 1973	0.02	0.7	3.6	1.5	32	2.0
"	"	"	"	"	20	Jun 1971	0.03	1.2	-	-	-	-
"	"	Nolton Haven	"	"	20	Sep 1972	0.03	1.2	5.4	<0.3	20	2.0
"	"	R Solva	"	"	20	Jun 1972	0.08	0.5	1.3	0.5	16	24
"	"	"	"	"	4	Aug 1972	0.10	0.4	1.1	0.4	15	3.0
"	"	Aberporth	VIIa	E5 33	11	Aug 1972	0.06	0.6	2.5	0.6	16	2.7
"	"	Llangrannog	"	"	30	Jun 1971	0.03	1.6	2.0	<0.1	27	10
"	"	New Quay	"	"	30	Jun 1971	0.03	0.3	2.0	<0.1	8.8	4.0
"	"	Aberayron	"	"	30	Jun 1971	0.05	0.6	2.0	<0.1	21	5.0
"	"	Towyn	"	"	30	Jun 1971	0.05	0.7	4.0	1.0	10	10
"	"	Portmadoc	"	"	40	Jun 1971	0.03	0.8	2.5	<0.1	27	10
"	"	Menai Straits	"	E5 34	40	May 1971	0.03	-	-	-	-	-
"	"	Conwy	"	E5 35	40	Dec 1971	0.10	0.3	2.7	<2.5	23	6.3
"	"	"	"	E6 35	50	Nov 1970	-	0.9	<0.5	1.0	17	5.5
"	"	"	"	"	50	Nov 1970	0.06	0.1	1.5	2.0	9.0	2.5
"	"	"	"	"	50	Dec 1970	-	0.4	2.5	2.0	17	3.0
"	"	"	"	"	50	Dec 1970	-	0.4	<0.5	-	14	2.5
"	"	"	"	"	50	Jan 1971	-	0.9	<0.5	-	20	5.5
"	"	"	"	"	6	Jan 1971	0.07	-	-	-	-	-
"	"	"	"	"	20	Feb 1972	0.12	0.5	3.5	<2.5	18	3.8
"	"	"	"	"	20	Feb 1972	0.18	0.5	3.1	<2.5	18	1.3
"	"	Deganwy	"	"	30	Jan 1973	0.09	0.4	1.4	22.5	3.8	<0.1
"	"	Knot End	"	E6 36	10	Jan 1971	0.32	0.8	10	<0.5	50	5.0
"	"	R Wyre	"	"	20	Mar 1971	0.46	<0.1	<0.5	<0.5	18	2.5
"	"	"	"	"	20	Mar 1971	0.36	<0.1	10	<0.5	16	2.5
"	"	"	"	"	20	Feb 1972	0.38	0.5	4.5	<2.5	36	10
"	"	"	"	"	20	Feb 1972	0.83	0.4	2.6	<2.5	40	8.7

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Mussels	Whole	R Wyre	VIIa	E6 36	20	Jul 1972	0.20	0.3	<0.5	0.9	18	1.7
"	"	"	"	"	20	Jan 1973	0.48	0.4	3.1	1.3	37	1.6
"	"	"	"	"	30	Jan 1973	0.19	0.4	3.2	0.8	36	2.1
"	"	"	"	"	25	May 1973	0.20	0.2	0.8	1.6	20	1.4
"	"	Heysham	"	E7 37	10	Sep 1970	0.10	-	-	-	-	-
"	"	"	"	"	20	Jul 1972	0.14	0.5	3.8	1.0	40	4.5
"	"	"	"	"	26	Jan 1973	0.14	0.5	<0.2	1.2	25	2.6
"	"	"	"	"	26	May 1973	0.10	0.5	1.2	0.7	25	2.0
Norway Lobsters	Tails	Farne Deep			6	Dec 1971	0.42	0.4	<0.2	0.3	12	15
"	"	R Tyne		E8 40	17	Jan 1973	0.15	0.1	<0.2	<0.5	14	9.0
"	"	Morscombe Bay		E6 37	12	Mar 1971	0.36	<0.1	<0.5	<0.5	14	2.5
"	"	Lightening Knoll		"	10		0.55	0.2	0.4	0.6	17	6.8
"	"	Buoy		"	20	May 1973	0.23	<0.2	0.5	1.0	14	8.4
Native Oysters	Whole	Horsey Island	IVc	F1 32	8	Jan 1971	0.15	1.8	<0.5	<0.5	110	48
"	"	R Colne	"	"	6	Dec 1970	0.08	-	-	-	-	-
"	"	R Blackwater	"	F0 32	6	May 1970	0.07	-	-	-	-	-
"	"	"	"	"	6	May 1970	0.03	-	-	-	-	-
"	"	"	"	"	-	Nov 1970	-	1.1	2.5	2.0	600	75
"	"	"	"	"	-	Nov 1970	-	1.1	1.5	2.0	200	67
"	"	"	"	"	-	Nov 1970	-	0.8	1.5	1.0	220	57
"	"	"	"	"	-	Nov 1970	-	1.2	<0.5	1.0	200	59
"	"	"	"	"	-	Nov 1970	0.03	0.4	2.5	2.0	240	49
"	"	"	"	"	-	Nov 1970	0.07	1.4	1.5	1.0	470	72
"	"	"	"	"	-	Nov 1970	-	0.9	<0.5	1.0	60	59
"	"	"	"	"	-	Nov 1970	0.09	1.1	<0.5	1.0	200	66
"	"	"	"	"	-	Dec 1970	-	0.5	2.0	2.0	360	50
"	"	"	"	"	-	Dec 1970	-	0.6	1.5	2.0	190	48
"	"	"	"	"	-	Dec 1970	-	0.3	1.5	3.5	310	52
"	"	"	"	"	-	Jan 1971	-	0.8	<0.5	1.0	350	65
"	"	"	"	"	-	Jan 1971	-	0.8	<0.5	-	240	58
"	"	"	"	"	-	Jan 1971	-	0.8	<0.5	-	320	56
"	"	"	"	"	-	Jan 1971	0.20	1.5	<0.5	<0.5	100	110
Oysters Native	"	R Crouch	"	"	6	Jan 1971	-	-	-	-	-	-
Oysters	"	"	"	"	19	Jun 1972	0.36	1.8	1.0	<0.5	49	100
Oysters	"	"	"	"	20	Jun 1972	0.25	1.8	1.0	<0.5	58	99
Port. Oysters	"	R Roach	"	"	15	Jun 1972	0.07	1.4	<0.5	<0.5	47	67
Oysters	"	"	"	"	12	Jun 1972	0.19	1.9	1.0	<0.5	52	56
Oysters	"	"	"	"	12	Jun 1972	0.14	1.7	1.0	<0.5	53	79
"	"	Whitstable	"	F1 31	-	Nov 1970	0.07	0.4	<0.5	2.0	270	71
"	"	Langstone Harbour	VIIId	E8 31	-	Mar 1973	0.23	2.2	<1.0	<0.3	580	69
"	"	Stanswood Bay	"	E8 30	-	Mar 1973	0.26	1.2	<1.0	<0.3	670	71
"	"	Newtown IOW	"	"	-	Mar 1973	0.03	0.6	<1.0	<0.3	440	46
"	"	Poole	"	"	-	Jan 1971	0.24	1.3	<0.5	<0.5	110	33

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Oysters Native	Whole	Poole	VIIId	E8 30	-	Mar 1971	0.19	2.6	1.0	1.0	340	34
Oysters	"	"	"	"	-	Mar 1971	<0.02	0.8	<1.0	<0.3	540	62
Oysters	"	R Dart	VIIe	E6 29	15	Feb 1971	0.10	0.5	<0.5	<0.5	100	150
Oysters Native	"	R Tamar	"	E5 29	10	Oct 1972	0.04	1.2	16	0.8	1400	200
Oysters	"	"	"	"	-	Apr 1973	0.09	-	-	-	-	-
"	"	Flushing	"	E4 29	-	Nov 1970	-	0.4	3.5	2.0	530	75
"	"	"	"	"	-	Nov 1970	0.07	0.6	<0.5	2.0	340	100
"	"	"	"	"	-	Nov 1970	-	0.8	<0.5	1.0	660	110
"	"	"	"	"	-	Dec 1970	-	0.7	3.5	2.0	540	70
"	"	"	"	"	-	Dec 1970	-	0.4	<0.5	-	710	97
"	"	"	"	"	-	Jan 1971	-	0.4	<0.5	-	630	75
"	"	"	"	"	-	Jan 1971	-	0.4	<0.5	-	400	67
"	"	"	"	"	-	Mar 1971	-	0.5	1.0	1.0	310	99
"	"	R Fa1	"	"	-	Nov 1970	-	0.8	<0.5	1.0	650	120
"	"	"	"	"	-	Nov 1970	-	0.7	<0.5	2.0	600	61
"	"	"	"	"	-	Nov 1970	0.05	0.3	1.5	2.0	810	66
"	"	"	"	"	-	Jan 1971	-	0.8	1.0	-	950	120
"	"	"	"	"	-	Mar 1971	-	0.9	1.5	-	1000	120
"	"	"	"	"	14	Mar 1971	0.06	<0.1	<0.5	<0.5	100	20
"	"	Helford	"	"	12	Dec 1970	-	0.4	1.5	2.0	520	47
"	"	"	"	"	4	Jan 1971	0.07	<0.1	<0.5	<0.5	99	53
Oysters	"	Morlaix-France	"	E6 26	4	Mar 1971	0.01	0.5	<0.5	<0.5	90	10
Prawns	Whole	R Tyne	IVb	E8 39	21	Jan 1973	0.06	0.5	0.4	0.3	27	16
Queens	Whole	Exmouth	VIIe	E6 30	18	Feb 1971	-	0.5	<0.5	<0.5	76	18
"	"	Torbay	"	E6 29	10	Feb 1971	-	0.8	<0.5	<0.5	63	10
"	"	Cardigan Bay	VIIa	E5 33	25	Feb 1972	0.04	0.3	1.2	<2.5	3.4	2.5
"	"	"	"	"	12	Feb 1972	0.08	0.2	1.0	<0.5	22	0.3
"	"	"	"	"	8	Apr 1972	0.12	0.4	1.0	<0.5	53	2.0
"	"	Liverpool Bay	"	E6 35	10	"	0.25	0.3	<1.0	<0.5	68	4.5
"	"	"	"	"	8	"	0.57	0.5	2.0	<0.5	130	10
"	"	Isle of Man	"	E5 37	8	Jan 1971	0.02	0.8	<0.5	<0.5	93	130
"	"	"	"	"	10	"	0.13	0.5	<1.0	<1.0	61	14
Queens	Muscle	New Quay	VIIa	E5 33	20	Aug 1972	0.10	0.4	1.7	0.6	23	1.4
"	"	Bangor	"	E5 35	30	Oct 1972	0.11	0.4	2.4	1.6	48	2.3
"	"	Great Ormes Head	"	E6 35	24	"	0.27	0.5	1.3	0.3	17	4.1
Queens	Gonad	New Quay	VIIa	E5 33	20	Aug 1972	0.11	1.3	4.5	1.9	89	4.4
"	"	Bangor	"	E5 35	30	Oct 1972	0.03	0.9	3.9	1.8	110	6.8
"	"	Great Ormes Head	"	E6 35	24	"	0.15	0.9	2.9	0.3	210	9.8
Scallops	Whole	Cardigan Bay	VIIa	E5 33	6	Apr 1972	0.04	1.1	<0.5	<0.5	25	1.9
"	"	Isle of Man	"	E5 37	4	Jan 1971	0.04	7.5	<0.5	<0.5	65	23
"	"	"	"	"	5	"	0.07	1.9	0.8	<1.0	36	1.5

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Scallops	Muscle	Newhaven	VIIId	F0 30	10	Mar 1971	0.07	0.8	<0.5	<0.5	15	2.5
"	"	Porthleven	VIIe	E4 29	10	Feb 1971	0.06	0.8	<0.5	<0.5	18	<0.5
"	"	Newlyn	"	"	10	Apr 1972	0.03	0.3	<0.5	<0.5	19	0.5
"	"	St Brides Bay	VIIg	E4 32	8	Apr 1972	0.03	1.5	<0.5	<0.5	34	1.5
Scallops	Gonad	Newhaven	VIIId	F0 30	10	Mar 1971	0.06	0.5	<0.5	<0.5	36	2.5
"	"	Porthleven	VIIe	E4 29	10	Feb 1971	0.04	0.5	<0.5	<0.5	88	2.5
"	"	Newlyn	"	"	10	Apr 1972	0.07	0.4	<0.5	<0.5	47	3.5
"	"	St Brides Bay	VIIg	E4 32	8	Apr 1972	0.02	0.6	<0.5	<0.5	52	2.0
Shrimps (Brown)	Whole	R Humber	IVb	E9 36	80	Mar 1971	0.08	0.5	<0.5	<0.5	31	45
"	"	"	"	"	78	Nov 1971	0.07	1.0	4.5	2.6	40	21
"	"	The Wash	IVc	F0 34	50	Jan 1971	0.09	0.8	<0.5	<0.5	60	33
"	"	Kings Lynn	"	"	80	Oct 1971	0.23	0.7	6.8	2.3	36	23
"	"	Yarmouth	"	F1 34	"	Jun 1971	0.14	0.1	<0.1	<0.1	12	18
"	"	"	"	"	85	Jan 1972	0.13	0.5	4.4	2.1	38	22
"	"	R Crouch	"	F0 32	40	Nov 1970	0.19	-	-	-	-	-
"	"	"	"	"	36	Aug 1971	0.02	-	-	-	-	-
"	"	"	"	"	100	Oct 1971	0.13	0.6	4.4	2.3	29	19
"	"	"	"	"	50	Apr 1972	-	0.5	3.4	<0.5	26	13
"	"	"	"	"	50	Mar 1973	0.32	-	-	-	-	-
"	"	Poole	VIIId	E8 30	-	Mar 1971	0.13	-	-	-	-	-
"	"	Hinkley Point	VIIIf	E6 31	-	Jun 1971	0.08	3.8	-	-	-	-
"	"	"	"	"	-	Jun 1971	0.10	3.5	-	-	-	-
"	"	Lydney	"	E7 32	-	Jun 1971	-	4.4	3.5	<0.1	14	39
"	"	"	"	"	-	Jun 1971	-	4.5	5.0	<0.1	13	38
"	"	"	"	"	-	Jun 1971	-	5.7	3.0	<0.1	13	37
"	"	"	"	"	-	Jun 1971	-	4.9	4.5	0.5	35	31
"	"	"	"	"	100	Feb 1972	0.15	1.9	2.0	0.5	19	18
"	"	"	"	"	30	Feb 1972	0.17	1.9	2.0	0.5	23	21
"	"	Guscow Rocks	"	"	50	Apr 1972	0.21	5.6	4.1	0.9	29	27
"	"	"	"	"	50	May 1972	0.26	8.8	4.8	0.9	29	27
"	"	"	"	"	50	May 1972	0.25	9.4	4.6	0.6	41	29
"	"	"	"	"	50	Nov 1970	0.21	-	-	-	21	19
"	"	New Brighton	VIIa	E6 35	50	Nov 1970	0.21	0.8	1.4	0.7	21	19
"	"	Liverpool Bay	"	"	50	Jan 1973	0.18	0.8	7.5	0.8	36	29
"	"	R Ribble	"	E7 36	50	Jan 1973	0.18	0.4	0.6	0.7	29	19
"	"	R Ribble	"	"	50	Jan 1973	0.18	0.4	0.6	0.7	29	19
"	"	Fleetwood	"	E6 36	-	Nov 1970	0.07	-	-	-	-	-
"	"	Morecambe Bay	"	"	60	Jan 1970	0.14	0.6	6.0	<2.5	14	29
"	"	Heysham	"	E7 37	50	Jul 1972	0.26	0.6	4.4	1.2	19	20
"	"	Flookburgh	"	E6 37	30	Feb 1971	0.12	-	-	-	-	-
"	"	Baycliff	"	"	30	Feb 1971	0.07	-	-	-	-	-
Shrimps (Pink)	Whole	Farne Deep	IVb	E8 40	20	Dec 1971	0.15	0.4	<0.2	0.2	18	8.7
"	"	"	"	"	20	Dec 1971	0.16	0.4	1.9	0.5	22	11
"	"	R Crouch	IVc	F0 32	40	Nov 1970	0.15	-	-	-	-	-
"	"	"	"	"	53	Aug 1971	0.05	-	-	-	-	-
"	"	"	"	"	50	Apr 1972	-	0.6	3.2	<0.5	24	20
"	"	"	"	"	50	Jan 1973	0.14	-	-	-	-	-
"	"	Point of Atr	VIIa	E6 35	30	Dec 1970	0.16	-	-	-	-	-

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Shrimps (Pink)	Whole	R Ribble	VIIa	E7 36	-	May 1971	0.21	0.3	26	2.0	14	14
"	"	"	"	"	-	May 1971	0.18	0.5	32	2.0	14	13
"	"	Silloth	"	E6 38	-	May 1971	0.03	0.5	31	2.0	13	13
Squid	Mantle	Rockall	VIIb	D6 44	9	May 1971	0.09	-	-	-	-	-
"	"	"	"	"	9	Aug 1972	0.15	<0.2	0.4	0.6	13	11
Whe'lks	Whole	R Humber	IVb	E9 36	16	Jan 1973	0.03	0.3	<0.2	<0.2	15	21
"	"	Wells	IVc	F0 34	55	Apr 1972	0.07	0.5	<0.5	<0.5	56	15
"	"	Whitstable	"	F1 31	19	Mar 1972	0.38	0.4	1.3	21	17	15
"	"	"	"	"	20	Sep 1973	0.25	4.6	0.7	1.4	430	59
"	"	Dawlish	VIIe	E6 30	20	Jun 1973	0.14	1.5	0.8	0.8	56	6.9
"	"	Caldy Island	VIIIf	E5 32	12	May 1972	0.10	0.3	<0.5	<0.5	25	17
"	"	Worms Head	"	"	2	May 1972	0.09	3.1	<0.5	<0.5	50	22
"	"	St Govans Head	VIIg	E4 32	12	Apr 1972	0.26	2.0	<0.5	<0.5	92	62
"	"	Fishguard	VIIa	E5 32	12	Aug 1972	0.21	2.1	1.7	<0.3	21	59
"	"	Cardigan Bay	"	E5 33	12	Apr 1972	0.07	0.9	1.0	<0.5	49	10
"	"	Liverpool Bay	"	E6 35	2	Apr 1972	0.45	0.4	1.0	<0.5	27	37
"	"	"	"	"	1	Apr 1972	0.16	0.4	1.0	<0.5	15	20
"	"	Fleetwood	"	E6 36	6	Dec 1971	-	1.7	1.4	<2.5	300	58
"	"	Lune Deep	"	"	4	Jan 1971	0.23	1.8	<0.5	<0.5	97	98
"	"	"	"	"	20	Aug 1972	0.62	0.3	0.3	0.3	20	34
"	"	Duddon Bar	"	E6 37	24	May 1973	0.89	1.3	0.5	1.1	200	160
Winkles	Whole	Cley-Next-Sea	IVc	F1 34	50	Apr 1972	0.16	0.5	2.0	<0.5	18	21
"	"	Goldhanger	VIIId	F0 32	20	Jun 1971	-	0.7	2.0	2.0	11	26
"	"	Poole	"	E8 30	30	Apr 1972	0.21	1.0	2.9	<2.5	17	20
"	"	"	"	"	50	Apr 1972	0.81	1.6	0.8	<0.5	23	25
"	"	Seaton	VIIe	E6 30	30	May 1973	0.09	0.6	0.3	0.5	16	20
"	"	R Exe	"	"	30	May 1973	0.05	0.7	0.6	2.4	22	15
"	"	"	"	"	20	May 1973	0.04	0.9	<0.2	<0.2	14	28
"	"	Dawlish Warren	"	"	20	Jun 1973	0.07	1.1	0.8	1.6	26	17
"	"	Dawlish	"	"	25	Jun 1973	0.05	0.6	<0.2	0.8	19	22
"	"	R Teign	"	"	30	Jun 1973	0.08	1.2	1.6	0.8	29	23
"	"	"	"	"	30	Jun 1973	0.03	1.3	1.9	0.8	34	42
"	"	"	"	"	25	Jun 1973	0.14	1.3	1.7	0.9	28	29
"	"	R Dart	"	E6 29	30	Jun 1973	0.04	0.6	0.7	0.3	19	16
"	"	Kingsbridge	"	"	30	Jun 1973	0.04	0.6	0.3	0.6	21	13
"	"	Outer Hope	"	"	20	Jun 1973	0.06	0.6	0.3	0.6	16	10
"	"	Challaboro	"	"	50	Jun 1973	0.05	1.1	0.3	0.6	16	16
"	"	R Erme	"	"	25	May 1973	0.04	0.6	<0.2	0.7	10	15
"	"	Thurlestone	"	"	25	May 1973	0.06	0.4	<0.2	0.3	8.0	15
"	"	Hartland	VIIIf	E5 30	50	Jul 1972	<0.02	0.4	<0.5	0.5	19	20
"	"	Westward Ho!	"	E5 31	10	May 1973	0.07	0.4	<0.2	<0.2	31	8.8
"	"	R Torridge	"	"	30	Mar 1973	0.06	2.5	1.4	<1.0	24	30
"	"	"	"	"	30	Mar 1973	0.13	2.2	1.4	1.4	20	24
"	"	"	"	"	30	Mar 1973	0.17	0.2	<0.2	<0.2	11	13
"	"	"	"	"	30	Mar 1973	0.09	1.0	<0.2	0.2	12	23
"	"	R Taw	"	"	30	Mar 1973	0.07	1.3	<0.2	0.3	13	20
"	"	"	"	"	20	Mar 1973	0.07	2.4	0.3	0.4	14	14
"	"	Lee	"	"	30	Mar 1973	0.08	1.0	0.3	<0.2	16	19
"	"	Hele Bay	"	"	30	Mar 1973	0.08	1.0	0.3	<0.2	16	19

Table 7b Continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	Mercury	Cadmium	Lead	Chromium	Zinc	Copper
Winkles	Whole	Combe Martin	VII f	E5 31	30	Mar 1973	0.08	1.4	<0.2	<0.2	15	18
"	"	Lynmouth	"	"	60	Mar 1973	0.05	1.3	<0.2	<0.2	11	14
"	"	Minehead	"	E6 31	-	Jun 1971	-	4.9	9.0	1.0	16	45
"	"	"	"	"	4	Mar 1972	0.21	12.1	<1.0	<1.0	74	10
"	"	Watchet	"	"	-	Jun 1971	-	7.1	8.0	1.0	16	46
"	"	Stolford	"	"	19	Mar 1972	0.20	27	1.0	<1.0	62	45
"	"	Bream Down	"	E7 31	-	Jun 1971	-	19	17	3.0	16	34
"	"	Clevedon	"	"	-	Jun 1971	-	20	18	2.0	16	24
"	"	Portishead	"	"	-	Jun 1971	-	26	14	2.0	50	28
"	"	Newport	"	"	-	Jun 1971	-	2.9	2.0	<0.1	15	35
"	"	Barry Island	"	E6 32	-	Jun 1971	-	8.6	4.7	1.5	22	31
"	"	Llantwit	"	E6 31	-	Jun 1971	-	5.3	13	2.0	15	28
"	"	Nash Point	"	"	-	Jun 1971	-	3.8	9.0	2.0	15	38
"	"	Porthcawl	"	"	-	Jun 1971	-	3.8	16	1.0	19	49
"	"	Aberavon	"	E6 32	-	Jun 1971	-	3.3	18	1.0	56	70
"	"	Oystermouth	"	"	40	Jan 1973	0.06	5.8	6.1	2.8	61	37
"	"	Mumbles	"	"	-	Jun 1971	-	3.5	8.0	1.0	16	33
"	"	Bracelet Bay	"	E5 32	56	Jan 1973	0.05	2.7	8.4	2.3	52	28
"	"	Rhossili	"	"	35	Jan 1973	0.04	2.0	3.3	3.8	39	31
"	"	Burry Inlet	"	"	40	Jan 1973	0.03	2.1	2.8	2.5	38	24
"	"	St Ishmael	"	"	45	Jan 1973	0.04	2.2	5.2	3.2	37	22
"	"	Amroth	"	"	40	Jan 1973	0.04	2.3	3.6	2.5	39	20
"	"	Saundersfoot	"	"	40	Jan 1973	0.03	1.8	4.1	1.9	34	23
"	"	Coedcanlass	"	"	50	Sep 1972	0.08	0.9	2.4	1.4	37	42
"	"	Angle Bay	VII g	E4 32	30	Jan 1973	0.05	1.0	2.2	1.8	35	33
"	"	Aberporth	VII a	E5 33	-	Jun 1971	-	1.6	6.0	1.0	15	22
"	"	Llangrannog	"	"	-	Jun 1971	-	1.2	6.0	<0.1	15	22
"	"	New Quay	"	"	-	Jun 1971	-	1.9	17	2.0	14	28
"	"	Aberayron	"	"	-	Jun 1971	-	1.1	7.0	1.0	14	23
"	"	Towyn	"	E5 34	-	Jun 1971	-	1.5	8.3	1.0	20	21
"	"	Fleetwood	"	E6 36	40	Dec 1971	0.07	0.5	1.7	<2.5	12	17

Table 8 Summary of Results from Expanded Monitoring Programme 1970-73: Concentrations of Organochlorine Pesticide & PCB Residues in Shellfish (mg/kg wet weight)

Species	Organ	Number of Samples	HCH			HCH			Dieldrin			DDE			TDE			DDT			PCB			Lipid Means
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
Cockles	Whole	8	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.006	0.020	<0.010	<0.5	
Crab	Claw	37	<0.001	0.004	<0.001	<0.001	0.010	<0.002	<0.001	0.043	0.005	<0.001	<0.010	<0.002	<0.001	<0.005	<0.001	<0.002	0.085	<0.006	<0.01	2.8	<0.14	<1.4
Crab	Body	37	<0.001	0.034	0.010	<0.001	0.040	0.010	<0.001	0.056	<0.017	<0.002	0.38	0.11	<0.001	0.060	<0.016	<0.002	0.17	0.027	<0.01	6.0	2.3	18.6
Crawfish	Body	1	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	0.24	8.6
Crawfish	Tail	1	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	0.06	0.3
Lobster	Tail	1	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	0.075	<0.2
Mussels	Whole	42	<0.001	0.011	<0.002	<0.001	0.017	<0.003	<0.001	0.013	<0.004	<0.001	0.013	0.005	<0.001	0.024	0.007	<0.001	0.057	0.008	0.01	0.27	0.065	1.2
Oysters (Native)	Whole	6	<0.001	0.001	<0.001	<0.001	0.002	<0.002	0.001	0.005	0.002	0.001	0.012	0.007	0.004	0.016	0.009	0.004	0.023	0.010	0.052	0.36	0.12	1.2
Shrimps (Brown)	Whole	17	<0.001	0.002	<0.001	<0.001	0.005	<0.002	<0.001	0.010	<0.004	<0.001	0.017	<0.005	<0.001	0.026	<0.004	<0.001	0.013	<0.004	0.01	0.40	0.093	1.3
Shrimps (Pink)	Whole	9	<0.001	0.003	<0.002	<0.001	0.005	0.002	<0.001	0.01	0.005	<0.001	0.013	0.006	0.001	0.008	0.003	<0.001	0.007	<0.003	0.040	0.24	0.11	1.4

Table 8a Results from Expanded Monitoring Programme 1970-1973: Organochlorine Pesticide & PCB Residues in Shellfish (mg/kg wet weight)

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	αHCH	γHCH	Dieldrin	DDE	TDE	DDT	PCB	% Lipid
Cockles	Whole	The Wash	IV c	F0 34	30	Feb 1972	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	<0.2
"	"	Cley-Next-Sea	"	F1 34	50	Apr 1972	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.007	1.8
"	"	Buxey Sands	"	F1 32	20	Aug 1971	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<0.2
"	"	R Crouch	"	F0 32	12	Jan 1971	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.006	0.4
"	"	R Swale	"	F0 31	30	Mar 1971	<0.001	<0.001	<0.001	0.001	0.003	<0.001	0.019	<0.2
"	"	Poole	VII d	E8 30	19	Aug 1971	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.020	0.2
"	"	Burry Inlet	VII f	E5 32	40	Jan 1973	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.008	0.2
"	"	Angle Bay	VII g	E4 32	26	Jan 1973	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.006	0.8
Crab	Claw	Seahouses	IV b	E8 40	23	Oct 1972	<0.001	<0.001	0.004	0.001	0.001	0.003	0.030	<1.0
"	"	Cullercoats	"	E8 39	10	Sep 1971	0.001	0.001	<0.001	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Noses Point	"	E8 38	8	Oct 1973	<0.001	0.001	0.002	<0.001	<0.001	<0.002	0.050	<1.0
"	"	Whitby	"	E9 37	10	Apr 1972	0.001	0.002	0.002	0.005	<0.002	<0.003	0.80	<1.0
"	"	Flamborough Head	"	"	5	Oct 1972	0.002	0.001	<0.001	0.004	<0.001	<0.002	0.040	2.0
"	"	Canada Bay	"	F0 36	6	Jun 1972	0.004	0.003	0.001	<0.001	<0.002	<0.003	0.040	<1.0
"	"	Sheringham	IV c	F1 34	15	Sep 1971	<0.001	<0.001	0.007	0.002	<0.002	0.035	0.25	0.5
"	"	Cromer	"	"	24	Jul 1972	0.002	0.007	0.003	<0.005	<0.001	<0.002	<0.010	2.0
"	"	Lowestoft	"	F1 33	11	Mar 1972	0.001	0.002	0.005	<0.010	0.003	0.006	2.8	0.8
"	"	R Thames	"	F0 31	1	Jun 1972	0.002	0.010	0.043	0.004	<0.005	<0.008	0.40	14.7
"	"	Selsey Bill	VII d	E9 30	12	Jul 1972	<0.001	0.001	0.002	0.002	<0.001	<0.002	0.070	<1.0
"	"	Isle of Wight	"	E8 30	4	Sep 1972	<0.001	<0.001	0.004	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Poole	"	"	10	Apr 1972	0.001	0.003	0.011	0.003	<0.002	0.085	<0.020	<1.0
"	"	Swanage	"	"	9	Aug 1972	<0.001	0.002	0.002	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Anvil Head	"	"	6	Mar 1972	0.004	0.010	0.007	0.002	<0.002	<0.005	<0.010	<1.0
"	"	Hurd Deep	VII e	E7 29	12	Aug 1972	<0.001	0.002	0.004	0.001	0.001	<0.002	0.020	<1.0
"	"	R Dart	"	E6 29	6	Oct 1971	<0.001	<0.001	0.006	<0.001	<0.001	0.020	0.040	<1.0
"	"	"	"	"	24	Sep 1972	<0.001	0.002	0.006	<0.001	0.001	<0.002	<0.010	<1.0
"	"	"	"	"	10	Oct 1972	<0.001	0.002	0.004	<0.001	<0.001	<0.002	<0.010	1.2
"	"	Salcombe	"	"	6	Oct 1971	<0.001	0.002	<0.001	<0.001	<0.002	<0.003	<0.050	<1.0
"	"	Plymouth	"	E5 29	6	Oct 1971	<0.001	0.008	0.010	0.002	<0.001	<0.002	0.010	<1.0
"	"	Eddystone	"	"	24	Sep 1972	<0.001	<0.002	<0.005	<0.001	<0.001	<0.002	0.020	<1.0
"	"	Coverack	"	E4 28	6	Aug 1972	0.003	<0.001	<0.001	0.004	<0.002	<0.003	0.050	<1.0
"	"	"	"	"	6	Aug 1972	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.020	<1.0
"	"	Mullion	"	"	12	Sep 1972	<0.001	0.001	0.005	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	"	"	"	12	Sep 1972	<0.001	<0.001	0.002	0.002	<0.001	<0.002	0.040	<1.0
"	"	Porthleven	VII e	E4 29	12	Jul 1972	<0.002	0.002	0.002	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Newlyn	"	"	10	Sep 1971	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.010	0.5
"	"	Hayle	"	"	6	Aug 1972	<0.001	0.001	0.004	<0.001	0.002	<0.002	<0.020	<1.0
"	"	Bude Bay	VII f	E5 30	8	Jul 1972	<0.001	0.002	0.003	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Milford Haven	VII g	E4 32	6	Sep 1972	<0.001	0.002	0.005	<0.002	<0.001	<0.002	<0.050	<1.0
"	"	Fishguard	VII a	E5 32	14	Aug 1972	<0.001	0.002	0.005	<0.001	<0.001	<0.002	0.010	<1.0
"	"	Llandudno	"	E6 35	6	Oct 1972	<0.001	0.002	0.003	<0.001	<0.001	<0.002	<0.010	<1.0
"	"	Liverpool Bay	"	"	5	Oct 1973	0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.020	0.8
"	"	Lune Deep	"	E6 36	4	Apr 1972	0.001	<0.001	0.003	0.001	<0.001	<0.002	0.050	<1.0
"	"	Morecambe Bay	"	"	10	Oct 1973	<0.001	<0.001	0.001	<0.001	<0.001	<0.002	<0.010	2.4
"	"	St Bees Head	"	E6 37	3	Apr 1972	0.001	0.005	0.007	<0.001	<0.001	<0.002	<0.020	<1.0
Crab	Body	Seahouses	IV b	E8 40	23	Oct 1972	0.015	0.012	0.025	0.20	<0.005	0.015	1.0	24.0
"	"	Cullercoats	"	E8 39	10	Sep 1971	0.012	0.010	<0.010	0.38	<0.016	<0.025	2.9	26.5
"	"	Noses point	"	E8 38	8	Oct 1973	0.005	0.007	<0.003	0.010	0.009	<0.008	0.65	15.6
"	"	Whitby	"	E9 37	10	Apr 1972	0.015	0.015	0.045	0.050	0.020	0.025	0.30	19.6
"	"	Flamborough Head	"	"	5	Oct 1972	0.017	0.011	0.015	0.075	0.007	0.035	0.45	24.0
"	"	Canada Bay	"	F0 36	6	Jun 1972	0.009	0.008	0.025	0.085	0.018	<0.015	0.85	18.8
"	"	Sheringham	IV c	F1 34	15	Sep 1971	0.025	0.010	0.018	0.25	<0.016	0.17	2.6	26.5
"	"	Cromer	"	"	24	Jul 1972	0.014	0.009	0.015	0.092	0.018	<0.008	0.70	30.0
"	"	Lowestoft	"	F1 33	11	Mar 1972	0.012	0.008	0.026	0.023	0.025	<0.015	1.3	15.6
"	"	R Thames	"	F0 31	1	Jun 1972	0.006	0.003	0.040	0.050	<0.005	<0.008	0.80	22.0
"	"	Selsey Bill	VII d	E9 30	12	Jul 1972	0.015	<0.002	<0.005	0.11	0.010	<0.012	1.2	8.8
"	"	Isle of Wight	"	E8 30	4	Sep 1972	0.004	0.009	0.020	0.11	0.023	<0.008	1.7	14.8
"	"	Poole	"	"	10	Apr 1972	0.012	0.014	0.041	0.11	0.050	0.10	6.0	20.0
"	"	Swanage	"	"	9	Aug 1972	0.009	0.008	<0.003	0.35	0.016	<0.008	1.3	19.6
"	"	Anvil Head	"	"	6	Mar 1972	0.004	0.002	0.015	0.060	0.005	0.030	0.65	17.8
"	"	Hurd Deep	VII e	E7 29	12	Aug 1972	0.006	0.008	0.008	0.10	<0.001	<0.002	1.1	14.5
"	"	R Dart	"	E6 29	6	Oct 1971	0.006	<0.001	<0.003	0.021	<0.004	<0.010	0.24	16.5
"	"	"	"	"	24	Sep 1972	0.002	0.003	<0.001	0.050	<0.002	<0.003	0.50	13.2
"	"	"	"	"	10	Oct 1972	0.013	0.015	0.024	0.080	0.011	0.020	1.0	24.0
"	"	Salcombe	"	"	6	Oct 1971	0.034	0.034	0.056	0.23	<0.008	0.070	4.5	20.8
"	"	Plymouth	"	E5 29	6	Oct 1971	0.010	0.017	0.017	0.12	0.010	0.015	1.6	22.0
"	"	Eddystone	"	"	24	Sep 1972	0.003	0.003	0.009	0.055	0.009	<0.008	1.0	24.0
"	"	Coverack	"	E4 28	6	Aug 1972	0.010	0.024	<0.005	0.12	0.040	<0.015	1.3	28.0
"	"	"	"	"	6	Aug 1972	<0.001	<0.001	<0.003	<0.005	<0.005	<0.008	<0.10	16.8
"	"	Mullion	"	"	12	Sep 1972	0.009	0.017	<0.003	0.23	0.020	0.045	<0.010	19.2
"	"	"	"	"	12	Sep 1972	0.004	0.007	0.009	0.080	0.007	<0.008	0.65	16.4
"	"	Porthleven	"	E4 29	12	Jul 1972	0.001	0.008	0.016	<0.002	<0.003	<0.003	0.90	13.2
"	"	Newlyn	"	"	10	Sep 1971	0.008	0.008	<0.001	0.24	<0.005	<0.010	2.4	26.5
"	"	Hayle	"	"	6	Aug 1972	0.007	0.008	0.015	0.10	0.024	<0.015	0.80	11.4
"	"	Bude Bay	VII f	E5 30	8	Jul 1973	0.007	0.007	0.010	0.045	<0.005	<0.008	0.50	27.6
"	"	Milford Haven	VII g	E4 32	6	Sep 1972	0.009	0.006	0.007	0.060	0.003	0.008	0.60	24.0

Table 8a continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Number	Date	α HCH	γ HCH	Dieldrin	DDE	TDE	DDT	PCB	% Lipid
Crab	Body	Fishguard	VII a	E5 32	14	Aug 1972	0.002	0.003	-	0.010	<0.002	<0.004	<0.060	14.2
"	"	Llandudno	"	E6 35	6	Oct 1972	0.030	0.040	0.040	0.13	0.060	0.040	1.6	14.0
"	"	Liverpool Bay	"	"	5	Oct 1973	0.003	0.003	0.009	0.090	0.035	<0.002	1.4	11.2
"	"	Lune Deep	"	E6 36	4	Apr 1972	0.020	0.013	0.045	0.19	0.060	<0.015	2.3	24.0
"	"	Moraombe Bay	"	"	10	Oct 1973	0.006	0.006	0.007	0.12	0.001	0.008	1.2	22.0
"	"	St Bees Head	"	E6 37	3	Apr 1972	0.002	0.002	<0.003	0.008	<0.005	<0.008	0.08	16.8
Crawfish	Body	Newlyn	VII e	E4 29	1	May 1970	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.24	8.6
Crawfish	Tail	Newlyn	VII e	E4 29	1	May 1970	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.060	0.3
Lobster	Tail	Newlyn	VII e	E4 29	1	May 1970	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.015	<0.2
Mussels	Whole	Berwick	IV b	E8 40	20	Apr 1971	<0.001	0.001	0.002	0.012	0.013	0.041	0.090	1.6
"	"	Holy Island	"	"	50	Nov 1971	0.001	0.001	<0.001	0.002	0.003	0.003	0.023	1.2
"	"	Marsden Bay	"	E8 38	12	Jul 1970	<0.001	<0.001	<0.001	0.003	0.004	<0.001	0.15	1.7
"	"	Hartlepool	"	"	50	Jan 1972	<0.001	<0.001	0.001	0.008	0.002	0.005	0.14	2.6
"	"	Whitby	"	E9 37	60	Nov 1971	<0.001	<0.001	0.002	0.005	0.017	0.013	0.047	2.4
"	"	Bridlington	"	"	82	Nov 1971	0.001	0.002	0.002	0.008	0.017	0.057	0.048	<0.2
"	"	Grimsby	"	E9 36	5	"	<0.001	<0.001	<0.001	<0.001	0.019	<0.001	0.045	0.8
"	"	Kings Lynn	IV c	F0 34	60	Oct 1971	<0.001	<0.001	0.004	0.012	0.006	0.005	0.050	0.4
"	"	Hunstanton	"	"	60	Dec 1971	0.002	0.002	0.006	0.004	0.012	0.008	0.034	0.8
"	"	Brancaster	"	"	50	Nov 1971	0.001	0.002	<0.001	0.004	0.005	0.004	0.018	3.0
"	"	Blakeney	"	F1 34	50	Jan 1972	0.001	0.002	0.002	0.005	0.005	0.005	0.025	3.4
"	"	R Crouch	"	F0 32	20	May 1971	0.002	0.004	0.007	0.006	0.011	0.007	0.068	1.0
"	"	Southend	"	"	72	Nov 1971	<0.001	<0.001	0.007	0.012	0.018	0.010	0.065	1.0
"	"	Poole	VII d	E8 30	5	May 1970	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.010	0.4
"	"	"	"	"	20	Apr 1971	0.001	0.001	0.005	0.003	0.005	0.006	0.057	0.9
"	"	"	"	"	19	Apr 1971	0.001	0.001	0.005	0.007	<0.003	0.004	0.018	0.6
"	"	"	"	"	25	Apr 1972	0.001	0.002	0.003	0.013	0.013	0.025	0.27	3.2
"	"	Lymestone	VII e	E6 30	20	May 1973	<0.001	<0.001	<0.001	0.004	0.002	<0.002	0.056	0.8
"	"	R Dart	"	E6 29	26	Jun 1973	<0.001	<0.001	<0.001	0.006	<0.001	<0.001	0.039	1.0
"	"	R Erme	"	"	19	May 1973	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.018	1.0
"	"	Newlyn	"	E4 29	10	May 1970	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.022	0.7
"	"	Porlock	VII f	E6 31	20	May 1970	0.006	0.008	0.011	0.003	0.005	0.006	0.17	0.6
"	"	Porthcawl	"	"	15	May 1970	0.005	0.016	0.005	0.003	0.007	0.015	0.067	0.5
"	"	"	"	"	20	May 1970	0.009	0.013	0.004	0.001	0.003	0.003	0.095	0.7
"	"	Aberavon	"	E6 32	10	May 1970	0.006	0.009	0.010	<0.001	0.003	0.010	0.071	0.7
"	"	"	"	"	20	Jan 1973	<0.001	0.001	0.002	0.005	0.008	0.010	0.088	2.8
"	"	Oystermouth	"	"	35	Jan 1973	<0.001	<0.001	0.003	0.005	0.005	0.006	0.096	2.6
"	"	Mumbles	"	"	10	May 1970	0.006	0.012	0.011	0.002	0.004	0.009	0.092	0.8
"	"	"	"	"	20	May 1970	0.011	0.017	0.013	0.007	0.005	0.014	0.083	0.8
"	"	Oxwich	"	E5 32	10	May 1970	0.003	0.004	0.006	<0.001	0.003	0.003	0.042	0.4
"	"	Worms Head	"	"	10	May 1970	0.007	0.009	0.007	0.010	0.004	0.006	0.030	0.2
"	"	Burry Inlet	"	"	20	Jan 1973	0.001	0.002	0.002	0.007	0.007	0.008	0.093	3.2
"	"	Saundersfoot	"	"	40	Jan 1973	<0.001	<0.001	<0.001	0.002	0.003	0.003	0.053	2.0
"	"	Angle Bay	VII g	E4 32	20	Jan 1973	<0.001	<0.001	<0.001	0.004	0.002	0.003	0.058	0.6
"	"	Aberporth	VII a	E5 33	10	May 1970	0.007	0.001	0.002	0.005	0.002	0.004	0.038	0.6
"	"	Aberayron	"	"	10	May 1970	0.007	0.005	0.004	0.005	0.002	0.005	0.028	0.3
"	"	Menai Straits	"	E5 35	40	Dec 1971	0.001	0.001	<0.001	0.003	0.024	0.007	0.060	1.0
"	"	Conwy	"	E6 35	5	Jun 1970	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.022	0.5
"	"	"	"	"	20	Feb 1972	0.001	0.001	0.004	0.006	0.023	0.004	0.070	2.8
"	"	R Wyre	"	E6 36	25	May 1973	<0.001	<0.001	<0.001	0.011	0.016	0.019	0.042	0.4
"	"	Heysham	"	E7 37	10	Jun 1970	<0.001	<0.001	<0.001	<0.001	0.006	0.002	0.13	0.6
"	"	"	"	"	26	May 1973	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.017	1.2
Native Oyster	Whole	R Blackwater	IV c	F0 32	20		0.001	0.002	0.001	0.008	0.008	0.009	0.053	2.6
"	"	R Crouch	"	"	20	Jun 1972	0.001	0.002	0.005	0.011	0.014	0.014	0.11	2.6
"	"	Stanswood Bay	VII d	E8 30		Mar 1973	<0.001	<0.001	0.001	0.006	0.005	0.004	0.088	0.6
"	"	Saltash	VII e	E4 29		Oct 1972	<0.001	0.002	0.002	0.012	0.016	0.023	0.36	0.8
"	"	R Fal	"	"	14	Mar 1971	<0.001	0.001	0.003	0.004	0.004	0.005	0.063	0.2
"	"	Helford	"	"	12	Jan 1971	0.001	<0.001	0.001	0.001	0.005	0.006	0.052	0.2
Shrimps (Brown)	Whole	R Humber		E9 36	78	Nov 1971	<0.001	0.002	0.009	0.009	0.010	0.003	0.060	0.8
"	"	Kings Lynn		F0 34	80	Oct 1971	0.002	0.002	0.004	<0.001	<0.001	<0.002	0.010	2.4
"	"	Yarmouth		F1 34		Jun 1971	0.002	0.003	0.010	0.017	0.006	0.013	0.090	3.6
"	"	R Crouch		F0 32		Apr 1970	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.050	0.3
"	"	"		"		Jan 1971	<0.001	<0.001	<0.001	<0.001	<0.002	<0.003	0.025	0.4
"	"	"		"		Jun 1972	0.001	0.001	0.001	0.005	0.002	0.004	0.032	0.8
"	"	"		"		Oct 1973	0.002	0.001	<0.001	0.001	<0.001	<0.002	0.012	0.4
"	"	Middle Deep		F1 32	20	Feb 1973	<0.001	<0.001	<0.001	0.005	<0.001	<0.002	0.20	1.6
"	"	Barrow Deep		"	50	Feb 1973	<0.001	0.001	0.005	0.006	0.003	<0.002	0.12	0.4
"	"	Lydney		F7 32	100	Feb 1972	0.002	0.002	0.009	0.002	0.001	0.003	0.24	1.2
"	"	Gustow Rocks		"	50	Apr 1972	0.002	0.001	0.010	0.009	0.005	0.012	0.40	2.4
"	"	Liverpool Bay		E6 35	50		0.001	0.003	0.003	0.006	0.005	0.002	0.10	2.4

Table 8a continued

Species	Organ	Port of Landing or Position	ICES Area	ICES Rectangle	Num- ber	Date	α HCH	γ HCH	Dieldrin	DDE	TDE	DDT	PCB	% Lipid
Shrimps (Brown)	Whole	R Ribble		E7 36	50	Jan 1973	0.002	0.005	0.009	0.015	0.026	0.012	0.13	0.8
"	"	Morcambe Bay		E6 36	60	Jan 1972	<0.001	0.003	0.804	0.003	0.002	0.002	0.030	2.0
"	"	"		"	20	Oct 1973	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.010	0.4
"	"	Lune Deep		"	35	Oct 1973	0.001	0.001	0.003	0.001	<0.001	0.002	0.030	2.0
"	"	Heysham		E7 37	50	Jul 1972	0.001	0.002	0.003	0.005	0.001	0.003	0.050	0.8
Shrimps (Pink)	Whole	Farne Deep		E8 40	20	Dec 1971	0.002	0.002	0.004	0.007	0.003	0.005	0.090	1.2
"	"	Yarmouth		F1 34		Jun 1971	0.003	0.005	0.011	0.006	<0.002	<0.003	0.040	4.0
"	"	R Crouch		F0 32		Apr 1970	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.050	0.3
"	"	"		"		Jan 1971	<0.001	0.001	0.002	0.007	0.002	<0.003	0.16	0.8
"	"	"		"		Jun 1972	0.002	0.002	0.005	0.011	0.005	0.002	0.15	1.8
"	"	"		"		Oct 1973	0.003	0.001	0.001	0.013	0.001	<0.002	0.24	0.6
"	"	R Ribble		F7 36		May 1971	0.001	0.002	0.010	0.005	0.008	0.007	0.076	1.7
"	"	"		"		May 1971	<0.001	0.001	0.005	0.003	0.004	<0.003	0.046	1.2
"	"	Silloth		E6 38		May 1971	0.001	0.001	0.004	0.005	0.004	<0.003	0.096	1.4

Appendix 1

Common & Scientific names

(a) Fish

Angler (Frogfish, Monkfish)	<i>Lophius piscatorius</i>
Bass	<i>Dicentrarchus labrax</i> ,
Blue Ling	<i>Molva dipterygia</i>
Brill	<i>Scophthalmus rhombus</i>
Catfish (Wolf-Fish)	<i>Anarhichas lupus</i>
Coalfish (Coley, Saithe)	<i>Pollachius virens</i>
Cod	<i>Gadus morhua</i>
Conger (Conger Eel)	<i>Conger conger</i>
Dab	<i>Limanda limanda</i>
Dogfishes & Sharks:	
Darkie Charlie	<i>Dalatias licha</i>
Dogfish (Lesser Spotted Dogfish, Rough Hound, Sandy Dog)	<i>Scyliorhinus caniculus</i>
Spiny Shark	<i>Deania calcea</i>
Spur dog	<i>Squalus acanthias</i>
Tope (Sweet William)	<i>Galeorhinus galeus</i>
Flounder	<i>Platichthys flesus</i>
Grenadier, Round-nosed	<i>Coryphaenoides rupestris</i>
Gurnards:	
Red Gurnard (Cuckoo Gurnard)	<i>Aspitrigla cuculus</i>
Haddock	<i>Melanogrammus aeglefinus</i>
Hake	<i>Merluccius merluccius</i>
Halibut	<i>Hippoglossus hippoglossus</i>
Herring	<i>Clupea harengus</i>
Horse Mackerel (Scad)	<i>Trachurus trachurus</i>
John Dory (Dory, St Peter's Fish)	<i>Zeus faber</i>
Lemon Sole	<i>Microstomus kitt</i>
Ling	<i>Molva molva</i>

Lumpsucker (Hen-Fish, Lump Sea-Hen)

Cyclopterus lumpus

Mackerel

Scomber scombrus

Mock Halibut (Blue Halibut, Greenland Halibut)

Reinhardtius hippoglossoides

Morid Fish

Mora moro

Mullet, Grey, Thick lipped

Crenimugil labrosus

Mullet, Red

Mullus surmuletus

Norway Pout

Trisopterus esmarkii

Pilchard, Sardine

Sardinia pilchardus

Plaice

Pleuronectes platessa

Pollack

Pollachius pollachius

Pout Whiting (Bib, Pout, Pouting)

Trisopterus luscus

Rabbit Fish (Rat-Fish, Rat-Tail)

Chimaera monstrosa

Ray (Roker, Thornback Ray)

Raja clavata

Redfish (Norway Haddock)

Sebastes marinus

Sand Eel

Ammodytes spp. *Gymnammodytes* spp *Hyperoplus* spp

Scabbard Fish (Black Scabbard)

Aphanopus carbo

Scorpion Fish

Trachyscorpia cristulata

Skate (Blue Skate, Grey Skate)

Raja batis

Smelt (Sparling)

Osmerus eperlanus

Smelt, Great Silver (Argentine)

Argentina silus

Smoothhead

Alepocephalus bairdi

Sole (Dover Sole)

Solea solea

Sprat

Sprattus sprattus

Turbot

Scophthalmus maximus

Whiting

Merlangius merlangus

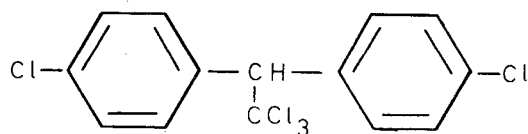
(b) Shellfish

Clam (American Hard Shell Clam, Hard Clam)	<i>Mercenaria (Venus) mercenaria</i>
Cockle	<i>Cardium edule</i>
Crab, Edible	<i>Cancer pagurus</i>
Crawfish (Spiny Lobster)	<i>Palinurus vulgaris</i>
Dog Whelk Common	<i>Nucella lapillus</i>
Limpet, Common	<i>Patella vulgata</i>
Lobster	<i>Homarus vulgaris</i>
Mussel	<i>Mytilus edulis</i>
Norway Lobster (Dublin Bay Prawn)	<i>Nephrops norvegicus</i>
Oysters:	
Japanese (Pacific) Oyster	<i>Crassostrea gigas</i>
Native Oyster (Flat Oyster)	<i>Ostrea edulis</i>
Portuguese Oyster	<i>Crassostrea (Gryphaea) angulata</i>
Prawn Common	<i>Palaemon serratus</i>
Queen (Queen Scallop)	<i>Chlamys opercularis</i>
Scallop (Escallop, Great Scallop, St James Shell)	<i>Pecten maximus</i>
Shrimp, Brown (Common Shrimp)	<i>Crangon crangon</i>
Shrimp, Pink (Aesop Prawn)	<i>Pandalus montagui</i>
Squid, Common	<i>Loligo forbesi</i>
Whelk	<i>Buccinum undatum</i>
Winkle (Periwinkle)	<i>Littorina littorea</i>

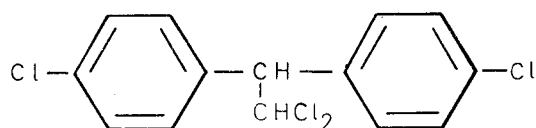
Appendix 2

Chemical compounds with abbreviated or common names

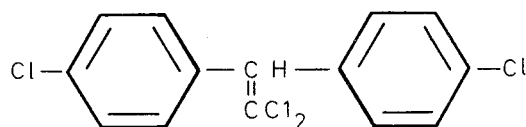
DDT 1,1,1-trichloro-2,2-di-(4-chlorophenyl) ethane



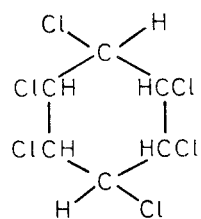
TDE (DDD) 1,1-dichloro-2,2-di-(4-chlorophenyl) ethane



DDE 1,1-dichloro-2,2-di-(4-chlorophenyl) ethylene

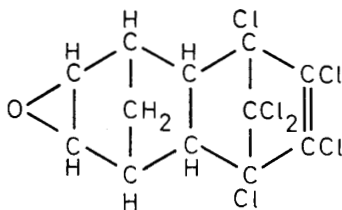


γ HCH gamma isomer of 1,2,3,4,5,6-hexachlorocyclohexane

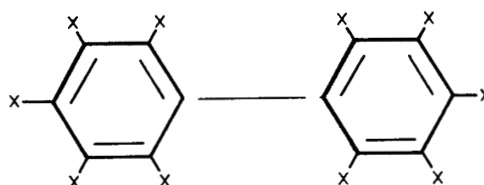


α HCH alpha isomer of the same chemical formula

Dieldrin 1,2,3,4,10,10-hexachlor-6,7-epoxy 1,4,4a,5,6,7,8,8a octa-
hydro-exo-1,4-endo-5,8, dimethanonaphthalene



PCB Polychlorinated biphenyl



Substitution by chlorine at any of a number of points marked X gives a polychlorinated biphenyl compound. Substitution is usually by percentage added chlorine and for any level of substitution several compounds are produced. Thus, any PCB product sold is normally a mixture of many compounds and even a moderate GC analysis would show 10 or 12 separate peaks indicating different compounds in the mixture.