

**The Economic Impact
of Algal Toxin Closures
on Shellfish Dependent Communities
on the Scottish Coast
and Implications for
the Sector's Future Structure**

*Final Report
for*

Scottish Executive Environment and Rural Affairs Department

Prepared By



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EXECUTIVE SUMMARY

This Report presents an assessment of the economic impact of algal toxin closures on shellfish dependent communities on the Scottish coast and implications for the sector's future structure. The study was commissioned by the Fisheries and Rural Development Group of the Scottish Executive Environment and Rural Affairs Department.

Scallops have become an increasingly important fishery in the UK over the past ten years and there are extensive scallop grounds right around the coast of Scotland. Between 1991 and 1998 there has been reasonably steady growth in the volume of landings into Scotland by UK vessels. Landings grew from 8,900 tonnes in 1991 to over 16,600 by 1998, an annual average growth rate of 9.5%. Over the same period the value of these landings grew from £8.8m to £18m. Landings fell to just under 13,500 tonnes (£16.5m) in 1999 and to just under 13,000 (£15.8m) in 2000 before recovering in 2001 to 15,300 tonnes (£19.5m).

Farmed shellfish production in Scotland is dominated by mussels and oysters with only small volumes of queen and king scallops being farmed. Total scallop and queen scallop farmed production in Scotland in 2000 was only three-quarters of one percent of total landings in Scotland.

Currently there are estimated to be in the region of 150-200 scallop divers in Scotland compared to in the region of 300 or so only a few years ago. Divers tend to work from smaller boats and so are dependent on specific fishing areas and on weather conditions.

The majority of the closures around the Scottish coast have been caused by the presence of ASP toxins. The first closures occurred in 1997 for a limited period around Orkney. In 1998 more intensive closures occurred to the east of Orkney lasting between 200 and 300 days. However, it was during 1999 that extensive harvesting bans were applied around the Scottish Coast, with the West Coast of Scotland from Cape Wrath down to the Northern Irish Coast severely affected in terms of both the area covered by the bans and the length of the bans.

In 2000, the extent and duration of the bans were less than in 1999 with areas around Orkney and along the West Coast being most affected but with the number of days that areas were closed often being only half that of 1999. During 2001, while the geographic extent of closures further reduced the intensity (i.e. number of days closed) of the ban increased in a number of areas. The evidence for 2002 (to end-March) shows further reductions with only 18 boxes having been affected so far and currently bans are in operation in only six boxes.

The choices to the ban facing the different parts of the industry vary. For vessels these include moving to other areas, targeting other species, or laying-up (permanently or temporarily). For divers the options include moving to other areas or leaving the industry. For farmers they include accepting the loss of sales or closing. For processors they include reducing the scale of operations, sourcing from elsewhere in Scotland, the UK, or perhaps abroad, or closing.

Although overall levels of landings declined there was a clear shift in 1999 to landings on the East Coast, as the West was closed and a shift back towards the West Coast in 2000 as the bans became less extensive. There does not seem to be any evidence of a widespread departure from the fishery and it appears that there

has been no shift in the base location of the fleet though it may well have been fishing in a different pattern dictated in part by the closures.

It is suspected, however, that the data does not reveal the true extent of the impact on the catching sector and consequentially on the downstream sectors. Most business enterprises faced with unfavourable trading conditions will soldier on, despite making losses, for as long as they can in order to preserve their trading links, sources of supply and customer goodwill, until times improve. In this respect fishing enterprises are no different from others and as a rough general rule they appear to be able to run with losses for about two years before their position becomes untenable in large numbers.

Reviewing all of the evidence for the nature and scale of the impact of the scallop fishing bans associated with algal toxins the following conclusions can be drawn:

- ❖ There has been a significant impact in terms of reductions in the value of scallops landed in Scotland as a result of the fishing bans. The total value of landings into the UK by Scottish vessels fell by 11% between 1998 and 1999.
- ❖ The negative impact was primarily focused on West coast ports, with increases of landings at East coast ports in 1999 compared to 2000. This does not imply a reduction in fishing employment on the West coast although it will imply some local output impacts as stores, fuel etc are bought at East coast ports.
- ❖ While there appears to be evidence that the number of registered vessels over 10m that were landing king scallops in 1999 were some 8.6% down on 1998 (**Table 3.2**), other evidence (**Table 3.3**) points to similar numbers of vessels fishing for scallops over 1998 and 1999. Furthermore there is little evidence of vessels being sold and removed from scallop fishing as a result of the bans. However, more recently, evidence from fishermen themselves suggests that a number of vessels have been decommissioned or sold.
- ❖ Average vessel earnings are down from £389,000 for the UK fleet in 1998/9 to £280,000 for the Scottish West Coast vessels in 2000/1 or some 28% per vessel. At the same time, fuel costs have risen from 7.6% of earnings to 12.5%. As a result, owners' expenses are now £65,000 compared to £47,000 three years ago. This has meant a decline in profitability from 40% of earnings before depreciation and interest, an unsustainable and perhaps exceptional figure, to about 20%. When depreciation and interest are taken into account this suggests that the West of Scotland fleet is currently just breaking even.
- ❖ Based on an income multiplier analysis, it is estimated that direct, indirect and induced income fell by £3.0m - £8.4m between 1998 and 1999.
- ❖ There is anecdotal evidence that divers are the first to leave the industry with a scaling down in some diving operations evident.
- ❖ The reaction of processors to the closures has been mixed. Some smaller processors have been forced to close as their supplies have stopped. For many, scallops only account for a relatively small part of their output and they have relied on other products, especially crabs, to keep them going. Larger processors have been able to source supplies from elsewhere, especially the south-west of England and the largest processors have maintained production, if at lower levels, by importing supplies particularly from France.

- ❖ It has also been estimated (based on **Table 3.7**) that the Scottish balance of payments deteriorated by about £5m in 1999 as a result of the problems to supply caused by algal toxins. In addition, a further loss in the region of £2.5m is likely for 2000.

On balance therefore, it would appear that the Scottish scallop sector has survived the catching bans imposed because of the presence of algal toxins. There is some evidence that the number of divers has reduced. It is also likely that vessels have been operating on reduced profits and incomes which is possible in the short term but not sustainable in the long term.

The options for government in essence reduce to assisting the industry reach a soft landing in the face of an inevitable situation. It is not the business of this report to consider the normative aspects of closure measures but only to analyse their potential impact.

The options include offering retraining for those who lose their jobs, and this can probably be achieved under existing schemes since the numbers involved are relatively low and very widespread.

For the vessel owners, whatever the size of vessel, decommissioning grants would be an immediate help. Other options might include funding to assist in converting a vessel to other uses, though the availability of other uses is very limited. The Scottish Executive expects 11 dredgers with a scallop entitlement to take advantage of the current round of decommissioning, subject to the owners' final decision.

For the farmers, assistance with converting to other products may be necessary and assistance with cashflow problems through soft loans may be beneficial, subject to their being permitted by the EU as part of regional aid. Otherwise compensation for the lost capital investment may be appropriate.

There is little that can be done to help the processing sector apart from some assistance with finding markets for white meat only product if that becomes necessary.

Grants to assist start-ups in businesses outside the fish production sector would help some re-direct their efforts, and a contribution through the EU PESCA initiative or other EU sources may be available.

For most of these the liability of the government would be relatively small and finite. Only with a situation of continuing temporary closures might the government's liability be indeterminate.

1 INTRODUCTION

This Report presents an assessment of the economic impact of algal toxin closures on shellfish dependent communities on the Scottish coast and implications for the sector's future structure. The study was commissioned by the Fisheries and Rural Development Group of the Scottish Executive Environment and Rural Affairs Department.

1.1 STUDY OBJECTIVES

The objective of this study was to assess the economic impact of algal toxin closures on shellfish dependent communities on the Scottish coast and implications for the sector's future. Four key objectives were identified for the study:

- ❖ To investigate how the Scottish shellfish industry has been affected by the closures and new circumstances;
- ❖ To identify the scale, nature, and location of any negative economic impacts on Scottish shellfish dependent communities in general and for farmers, catchers, divers and processors in particular;
- ❖ To consider the implications for the Scottish shellfish sector of future restrictions on fishing, processing and harvesting, including prospective changes in toxin monitoring and testing and the opportunities offered in roe-off scallop products; and
- ❖ To define any parts of the Scottish industry where the provision of targeted restructuring support would be of most benefit in the short, medium, and longer term.

1.2 STUDY METHOD

The methods employed to meet the study objectives included:

- ❖ Analysis of vessel and landings data produced by SEERAD;
- ❖ Review of previous studies undertaken on the Scottish Scallop sector;
- ❖ Face-to-face and telephone survey interviews with:
 - Scallop harvesters and farmers;
 - Scallop processors;
 - Representative groups including the Scallop Association, Scottish Shellfish Growers' Association, Scottish Fishermen' Federation, Local Fishermen's Associations, Fish Processor's Associations, Development Agencies including HIE, Local Authorities, SFIA, SEPA, and Food Standards Agency.

1.3 STRUCTURE OF THE REPORT

Chapter 2 provides a mapping of the scallop sector covering the scale, location and value of the sector. This provides the basis for understanding how the sector operates. **Chapter 3** reports on the industry's response to the bans and **Chapter 4** estimates the economic impact of the closures. Finally, **Chapter 5** considers the future of the sector and makes recommendations regarding possible future targeted support.

2 MAPPING THE SCALLOP INDUSTRY

2.1 INTRODUCTION

This chapter maps the scallop sector, providing the background (¹see notes at end of chapter) and an analysis of the sector's current position in terms of the relative importance and performance of vessels, divers and farmers in supplying scallops within each geographical area. Unless otherwise stated, scallops refers to both king and queen scallops.

2.2 CONTRIBUTION OF THE SCALLOP FISHING SECTOR

2.2.1 Value of Landings

Scallops have become an increasingly important fishery in the UK over the past ten years. There are extensive scallop grounds right around the coast of Scotland and the industry is important for the Highlands and Islands, in particular on the West and South-West coasts and the Islands. Vessels fish with anything from four to twenty dredges a side, the larger numbers being hauled by vessels in the region of 30m overall length. They fish over coarse sand and gravel beds which are the scallops' habitat.

Table 2.1 shows the recent history (between 1990 and 2001) of the scallops' fleet for Scottish vessels landing more than one tonne of scallops (the upper limit for which a licence would not be required)². It shows a substantial increase in the fleet during the mid-1990s throughout all size classes of vessel, but most notably in the smaller vessels. For example, the number of vessels of less than 10m grew by over 840% from 7 vessels in 1994 to 66 in 2001.

These significant increases are consistent with two features of fishing in the North Sea and West of Scotland but are clouded by the introduction of licensing for vessels

² Any UK registered vessel wishing to land more than one tonne of scallops a year requires a licence in order to fish for them. There are three classes of Licence: known as Category A, B, and C. These categories are subdivided to allow a vessel to fish on different stocks of fish. The species of fish are themselves categorised into pressure stocks, non-pressure stocks, and miscellaneous other species.

Pressure stocks are those stocks for which a Total Allowable Catch (TAC) was set as part of the CFP in 1984. They are called pressure stocks because they are thought to be depleted by over-fishing or at risk of depletion and the TAC was set below a level that would allow unrestricted fishing.

Non-pressure stocks were also set a Precautionary TAC in 1984 but at a level that would allow unrestricted fishing as they were not thought at the time to be at immediate risk.

Miscellaneous species includes all the other species for which the UK fleet is permitted to fish. Some, such as North Sea *nephrops* and monkfish, have been allocated Precautionary TACs and quotas since 1984.

In order to fish for scallops a vessel needs a licence within either of the Categories A and B, or a Category C Licence which explicitly names scallops among its fishing entitlements. The category of licence determines the alternative fishing opportunities available to the vessel should it choose not to or be unable to fish scallops.

Because no TAC and quota are set for scallops whether a vessel is part of the Sector - of 10 metres and over and owned by a member of a Producer Organisation (PO) - part of the non-Sector - of 10 metres and over but whose owner is not a member of a PO, or under 10 metres is immaterial to the management of catches. As such PO members have no Fixed Quota Allocation to allocate to a PO pool and POs have no direct role in management of the scallop fishery.

of under 10m. First, the profitability of around 40%, nett before depreciation, reported by the Sea Fish Industry Authority's Costs and Earnings survey in the Fishermen's Handbook³ would be expected to attract increased activity. Secondly, falling North Sea quotas and a lack of quotas for nephrops have acted as an incentive to switch fisheries.

The increase in total numbers of vessels appears to have peaked in 1995 and there has been a slight fall during the period of the closures. The numbers are shown diagrammatically in **Figure 2.1**.

| | <u><=10m</u> | <u>10m<15m</u> | <u>15m<20m</u> | <u>20m<30m</u> | <u>30m+</u> | <u>Total</u> |
|------|-----------------|-------------------|-------------------|-------------------|-------------|--------------|
| 1990 | 3 | 27 | 44 | 7 | 0 | 81 |
| 1991 | 1 | 34 | 41 | 11 | 0 | 87 |
| 1992 | 3 | 28 | 43 | 5 | 2 | 81 |
| 1993 | 0 | 27 | 52 | 9 | 0 | 88 |
| 1994 | 7 | 67 | 70 | 11 | 1 | 156 |
| 1995 | 34 | 103 | 108 | 16 | 0 | 261 |
| 1996 | 33 | 83 | 95 | 15 | 0 | 226 |
| 1997 | 27 | 75 | 74 | 15 | 1 | 192 |
| 1998 | 45 | 72 | 75 | 16 | 1 | 209 |
| 1999 | 39 | 60 | 61 | 14 | 2 | 176 |
| 2000 | 57 | 53 | 60 | 15 | 5 | 190 |
| 2001 | 66 | 44 | 63 | 11 | 5 | 189 |

Source: Scottish Fisheries Statistics

Between 1991 and 1998 there appears to have reasonably steady growth in the volume of landings into Scotland by UK vessels (see **Table 2.2**).

| <u>Year</u> | <u>Volume (Tonnes)</u> | <u>Value (£,000)</u> |
|-------------|------------------------|----------------------|
| 1990 | 9324 | 9,067 |
| 1991 | 8866 | 8,802 |
| 1992 | 10587 | 10,210 |
| 1993 | 11891 | 11,134 |
| 1994 | 11444 | 15,970 |
| 1995 | 11264 | 17,332 |
| 1996 | 11546 | 16,866 |
| 1997 | 15009 | 17,761 |
| 1998 | 16630 | 17,989 |
| 1999 | 13468 | 16,514 |
| 2000 | 12997 | 15,760 |
| 2001 | 15329 | 19,526 |

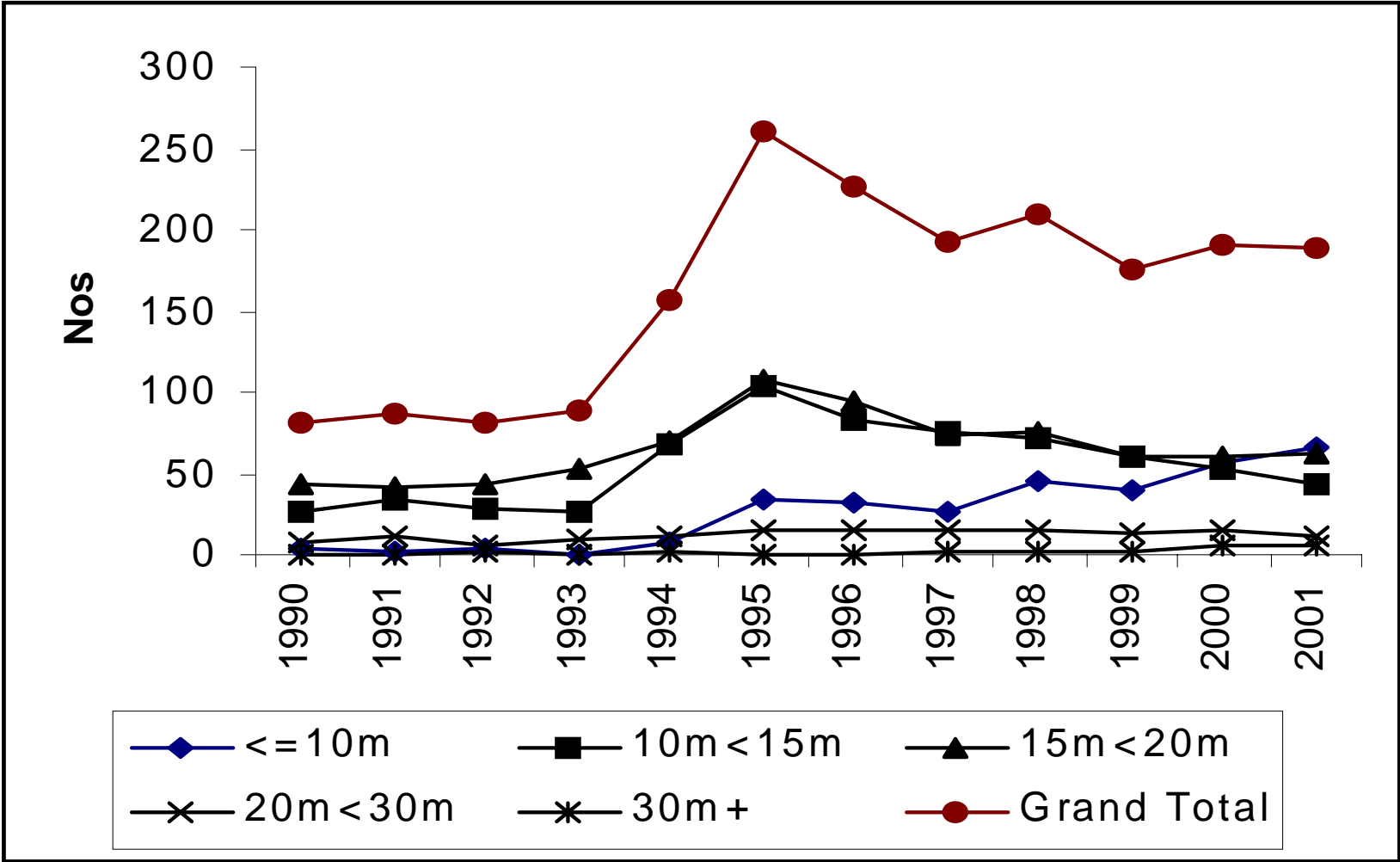
Source: Scottish Fisheries Statistics

Landings grew from a low of 8,866 tonnes in 1991 to 16,630 tonnes in 1998 an increase of almost 88% or an annual average growth rate of 9.5%. Over the same period the value of these landings grew from £8.8m to £18m, an increase of almost 105% or an annual average growth rate of around 11%. However, these figures include both king and queen scallops. The price fetched differs between the two, with queen scallops having an implied price of only 25% of that for king scallops.

³ *Fishermen's Handbook 1997/1998*, Sea Fish Industry Authority, Edinburgh, 1999

Therefore in understanding the value and volume of landings of scallops over time requires an awareness of the relative balance between the two types. Since 1991 the volume of king scallops being landed has been increasing, by 14% per annum between 1991 and 1998. This compares with an annual average growth rate of only 5% for queen scallops over the same period. Over the same period the implied price has fallen by around 1.5% per annum for king scallops and 1% per annum for queen scallops. Thus the growth in the value of scallop landings into Scotland over this period has largely been accounted for by the increase in the volume of scallops landed.

Figure 2.1: Length groups of vessels catching more than 1 ton of scallops in the year



There is clear evidence in the data of the impact of the scallop bans on the volume and value of landings in 1999 with reductions in the volume of landings by UK vessels into Scotland of 19%. However, because of some increase in the price of scallops in 1999 the reduction in the value of landings was only in the region of 8%. In contrast in 2000, while there was an increase in the volume of landings for king scallops the price fell relatively more resulting in a reduction in the value of king scallops landed, while both the volume and value of queen scallops declined. In 2001 landings recovered to over 15,300 tonnes (up 18%) valued at £19.5m (an increase of almost 24%). A more detailed analysis of landings by Scottish vessels into Scotland and the rest of the UK is reported in **Chapter 3** as part of the assessment of the sector's response to the fishing bans.

Although there is no one 'typical' year, data from 1998 provides as good an approximation to the performance of the sector prior to the harvesting bans. **Table 2.3** reports the share of total value of scallops landed for each District in Scotland by UK vessels in 1998, 1999 and 2000. In 1998, when the fishing bans were still only being imposed to the East of Orkney, almost 62% of landings were within the Highlands and Islands. Although Ayr accounted for over 21% of all scallop landings these landings include a large volume of queen scallops. In most of the other districts the majority of landings are of king scallops. Mallaig, Campbeltown and Oban accounted for over 35% of the scallops landed and are the three most important districts for landing scallops after Ayr⁴. Shetland, Orkney, Stornoway and Wick districts between them account for a further 25% of landings. On the East coast the most significant District is Aberdeen⁵ with over 6.5% of landings.

In 1999, extensive harvesting bans were applied around the Scottish coast, in particular the West coast was severely affected in terms of both the area covered by the bans and the length of the bans. Although there were closures off the East coast including parts of the Moray Firth area, these closures were less extensive and in force for a much shorter duration than occurred on the West coast. As a result the total value of scallops landed declined by 9% with the share landed in the Highlands and Islands falling by 39% and representing only 41% of the total. Reductions in landings in Orkney (-27%), Shetland (-27%), Stornoway (-64%), Mallaig (-61%), Oban (-59%) and Campbeltown (-21%) Districts were valued at £4.5m of which Oban accounted for 25%. These reductions were compensated to some degree by landings in the rest of Scotland growing by 40% and representing 59% of total landings. In particular there was growth in landings on the East coast in Aberdeen, Peterhead and Fraserburgh Districts as well as at Wick, the only District in the Highlands and Islands to post an increase in landings.

⁴ Ayr district vessels account for a significant proportion of landings in Mallaig and Oban. (Source: Industry Representative).

⁵ Kirkcudbright and Buckie based vessels are important in terms of landings in Aberdeen district. (Source: Industry Representative).

In 2000, although much of the West coast and areas around Orkney were affected by bans these were not as extensive or long lasting as in 1999. Although the total value of landed scallops declined by a further 5% (a combination of both lower volumes and lower prices, the latter partly the result of Scottish product now having to compete with cheaper imports), the balance of activity moved back towards the Highlands and Islands with a 48% increase in the value of landings in the area, compared to a 41% decline in the rest of Scotland. As a result the Highlands and Islands accounted for almost 64% of landings in Scotland. In both Oban and Campbeltown the value of scallops' landings grew significantly by 267% and 41% respectively, reaching levels well above those of 1998. At 18.4% of total Scottish landings, Oban reported the highest value of landings by a District in Scotland, the position usually reserved for Ayr. Ayr was in second place with 17.7%, down from its 1999 share and some 3.7 percentage points below its 1998 share. However, landings in both Orkney and Shetland continued to decline.

It is obvious that the value of landings of scallops has been significantly affected by the bans and pattern of change reflects the geographic distribution of the bans.

| <u>DISTRICT</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
|---------------------|--------------|--------------|--------------|
| Non-HIE | | | |
| Eyemouth | 0.1 | 0.5 | 0.31 |
| Pittenweem | 0.3 | 0.2 | 1.0 |
| Aberdeen | 6.6 | 12.9 | 3.7 |
| Peterhead | 2.0 | 6.6 | 3.0 |
| Fraserburgh | 3.5 | 7.5 | 2.7 |
| Buckie | 4.4 | 3.2 | 7.9 |
| Ayr | 21.4 | 28.0 | 17.7 |
| Non-HIE Area | 38.4 | 58.9 | 36.2 |
| | | | |
| HIE | | | |
| Wick | 5.6 | 7.3 | 4.3 |
| Orkney | 5.2 | 4.1 | 3.4 |
| Shetland | 7.3 | 5.8 | 2.8 |
| Stornoway | 7.4 | 2.9 | 6.4 |
| Kinlochbervie | - | - | 0.0 |
| Lochinver | 0.1 | - | 0.0 |
| Ullapool | 0.7 | 0.8 | 1.3 |
| Mallaig | 14.0 | 6.0 | 11.4 |
| Portree | - | - | 2.1 |
| Oban | 10.6 | 4.8 | 18.4 |
| Campbeltown | 10.7 | 9.3 | 13.7 |
| HIE Area | 61.6 | 41.1 | 63.8 |
| | | | |
| TOTAL | 100.0 | 100.0 | 100.0 |

Source: Scottish Fisheries Statistics

| TABLE 2.4: IMPORTANCE OF SCALLOPS TO EACH DISTRICT | | | |
|---|-------------|-------------|-------------|
| (Share of value of Scallops in total landings - %) | | | |
| <u>DISTRICT</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
| Non-HIE | | | |
| Eyemouth | 0.3 | 1.1 | 0.9 |
| Pittenweem | 1.4 | 1.3 | 6.7 |
| Aberdeen | 3.8 | 7.7 | 2.7 |
| Peterhead | 0.4 | 1.4 | 0.7 |
| Fraserburgh | 2.4 | 4.1 | 1.6 |
| Buckie | 15.7 | 15.6 | 30.0 |
| Ayr | 40.0 | 49.0 | 41.4 |
| Non-HIE Area | 4.2 | 6.1 | 4.1 |
| | | | |
| HIE | | | |
| Wick | 4.6 | 5.3 | 2.7 |
| Orkney | 18.6 | 13.6 | 12.3 |
| Shetland | 5.3 | 5.0 | 2.2 |
| Stornoway | 12.9 | 5.3 | 12.7 |
| Kinlochbervie | - | - | - |
| Lochinver | 0.2 | - | - |
| Ullapool | 1.7 | 1.4 | 2.4 |
| Mallaig | 15.8 | 4.8 | 13.0 |
| Portree | - | - | 7.3 |
| Oban | 26.9 | 13.1 | 36.9 |
| Campbeltown | 20.1 | 20.7 | 23.9 |
| HIE Area | 8.8 | 5.5 | 8.1 |
| | | | |
| TOTAL | 6.2 | 5.8 | 6.0 |

Source: Scottish Fisheries Statistics

The potential impact of the scallop bans will depend on the relative importance of scallops to total landings in each District. **Table 2.4** shows the share of scallops in total landings for each District in 1998, 1999 and 2000. In 1998 the value of scallops landings were particularly important for, in descending order of importance, Ayr, Oban, Campbeltown, Orkney, Mallaig, Buckie and Stornoway. Whereas the East coast ports seemed to be positively affected in terms of increasing their share of scallop landings as a share of their total fish landings, the ban had significant negative impacts on Highlands and Islands Districts with the share of scallops in total landings declining by 50% in Oban, 70% in Mallaig and 27% in Orkney and we would expect the more significant impacts to be focussed on these areas.

With the semi-recovery of the West coast fishery in 2000, the relative importance of scallops in the most seriously affected districts returned to or improved on the shares in 1998, although Orkney and Shetland did not appear to have recovered as well as the other Districts in the Highlands and Islands.

It is clear from this analysis that the areas most dependent on and, at least to date, the areas most severely hit by the bans are those on the West coast and Orkney. These communities tend to be more dependent on the scallop fishery and thus are more likely to suffer negative impacts from the fishing bans.

Tables 2.5 – 2.7⁶ report the value of scallop landings and total fish landings for each District in 1998, 1999 and 2000. These reveal the absolute importance of the scallop fishery to communities in the Highlands and Islands accounting for, in 1998, a value of just over £11m and representing some 8-9% of the value of fish landings in the region compared to just over 4% of the value of landings in the non-HIE area. However, as discussed below, it is often the case that the scallop fishery is a significant contributor to the viability of the smaller West coast communities.

| TABLE 2.5: ANALYSIS OF 1998 LANDINGS BY VALUE (£000) | | | |
|---|-----------------|----------------|------------------|
| <u>DISTRICT</u> | <u>Scallops</u> | <u>Total</u> | <u>Share (%)</u> |
| Non-HIE | | | |
| Eyemouth | 18 | 6,802 | 0.3 |
| Pittenweem | 47 | 3,368 | 1.4 |
| Aberdeen | 1,189 | 31,061 | 3.8 |
| Peterhead | 358 | 82,990 | 0.4 |
| Fraserburgh | 636 | 26,990 | 2.4 |
| Buckie | 797 | 5,064 | 15.7 |
| Ayr | 3,854 | 9,631 | 40.0 |
| Non-HIE Area | 6,899 | 165,906 | 4.2 |
| HIE | | | |
| Wick | 1,003 | 21,575 | 4.6 |
| Orkney | 936 | 5,034 | 18.6 |
| Shetland | 1,313 | 24,639 | 5.3 |
| Stornoway | 1,325 | 10,278 | 12.9 |
| Kinlochbervie | - | 15,368 | - |
| Lochinver | 21 | 8,838 | 0.2 |
| Ullapool | 131 | 7,899 | 1.7 |
| Mallaig | 2,518 | 15,907 | 15.8 |
| Portree | - | - | - |
| Oban | 1,897 | 7,065 | 26.9 |
| Campbeltown | 1,925 | 9,553 | 20.1 |
| HIE Area | 11,069 | 126,153 | 8.8 |
| TOTAL | 17,968 | 292,060 | 6.2 |

Source: Scottish Fisheries Statistics

⁶ It should be noted that a significant proportion of landings into HIE/non-HIE areas are made by visiting vessels. (Source: Industry Representative).

| <u>DISTRICT</u> | <u>Scallops</u> | <u>Total</u> | <u>Share (%)</u> |
|---------------------|-----------------|----------------|------------------|
| Non-HIE | | | |
| Eyemouth | 89 | 7,749 | 1.1 |
| Pittenweem | 39 | 3,080 | 1.3 |
| Aberdeen | 2,110 | 27,312 | 7.7 |
| Peterhead | 1,088 | 78,787 | 1.4 |
| Fraserburgh | 1,237 | 29,954 | 4.1 |
| Buckie | 519 | 3,332 | 15.6 |
| Ayr | 4,587 | 9,353 | 49.0 |
| Non-HIE Area | 9,669 | 159,567 | 6.1 |
| HIE | | | |
| Wick | 1,205 | 22,529 | 5.3 |
| Orkney | 679 | 4,983 | 13.6 |
| Shetland | 959 | 19,330 | 5.0 |
| Stornoway | 483 | 9,045 | 5.3 |
| Kinlochbervie | - | 10,659 | - |
| Lochinver | - | 13,304 | - |
| Ullapool | 125 | 9,018 | 1.4 |
| Mallaig | 978 | 20,335 | 4.8 |
| Portree | - | - | - |
| Oban | 782 | 5,989 | 13.1 |
| Campbeltown | 1,523 | 7,342 | 20.7 |
| HIE Area | 6,734 | 122,534 | 5.5 |
| TOTAL | 16,403 | 282,101 | 5.8 |

Source: Scottish Fisheries Statistics

| <u>DISTRICT</u> | <u>Scallops</u> | <u>Total</u> | <u>Share (%)</u> |
|---------------------|-----------------|----------------|------------------|
| Non-HIE | | | |
| Eyemouth | 49 | 5,590 | 0.9 |
| Pittenweem | 149 | 2,229 | 6.7 |
| Aberdeen | 576 | 21,694 | 2.7 |
| Peterhead | 474 | 70,563 | 0.7 |
| Fraserburgh | 427 | 26,955 | 1.6 |
| Buckie | 1,230 | 4,105 | 30.0 |
| Ayr | 2,764 | 6,683 | 41.4 |
| Non-HIE Area | 5,669 | 137,819 | 4.1 |
| HIE | | | |
| Wick | 669 | 24,815 | 2.7 |
| Orkney | 534 | 4,327 | 12.3 |
| Shetland | 444 | 20,592 | 2.2 |
| Stornoway | 1,000 | 7,898 | 12.7 |
| Kinlochbervie | - | 12,049 | - |
| Lochinver | - | 10,503 | - |
| Ullapool | 201 | 8,536 | 2.4 |
| Mallaig | 1,792 | 13,813 | 13.0 |
| Portree | 323 | 4,413 | 7.3 |
| Oban | 2,873 | 7,779 | 36.9 |
| Campbeltown | 2,151 | 8,993 | 23.9 |
| HIE Area | 9,987 | 123,718 | 8.1 |
| TOTAL | 15,656 | 261,537 | 6.0 |

Source: Scottish Fisheries Statistics

2.2.2 Employment

Tables 2.8 and **2.9** presents our estimates of employment by District which is attributable to scallop catching activity. This has been calculated by assuming that the share of total direct employment attributable to scallops within a District is identical to the species' share of total landings by value. While this gives us a rough indication of the number of jobs supported by the scallop fishery, changes in these numbers will directly mirror the changes in value of scallop landings by District.⁷ As such, these estimates are based on 'heroic' assumptions and thus must be treated with caution. At best they are only indicative at the broadest geographic level.

These estimates are notional, based on changes in the value of landings by District and aggregated to the HIE/non-HIE and Scottish levels. As such they provide, at best, an indication of potential employment impacts at the Scottish level. However these data can provide a fuller picture of the impact of the bans, if and when the sector regains the levels and fishing patterns of the pre-ban era. The data for 2001, once it is released, should provide some indication of the aggregate longer term impacts of the closures.

These estimates show that in 1998, in the region of 925 jobs were attributable to scallop activity or some 12% of fishing related jobs. These numbers were roughly evenly split between the Highlands and Islands and the rest of Scotland (47% versus 53%). Ayr accounts for 73% of those jobs outside of the Highlands and Islands. Within the Highlands and Islands the jobs are spread more evenly with Stornoway, Oban, Campbeltown, Mallaig and Orkney accounting for almost 89% of these jobs.

In terms of the importance of scallop fishing within particular Districts, the highest concentration, outside of Ayr, is within Oban where over one in four direct jobs can be attributed to scallops, followed by Campbeltown where the ratio is over one in five. As noted above, the potential impacts on employment of the ban is quite geographically concentrated.

Using the same method, in 1999 the total number of jobs attributable to scallops had fallen by almost 9% to 843. However, the notional distribution of these jobs reflects the pattern of landings. Thus jobs associated with scallops in the non-HIE area of Scotland appears to have grown by almost 18% while jobs in the Highlands and Islands had fallen by almost 39%. Effectively, these data could reflect nomadic vessels moving from the West coast to fish and land on the East coast during the ban periods rather than actual reductions in employment on the West coast.

⁷ These calculations assume a direct correlation between the proportion of landings attributable to scallops in a specific district and the percentage share of employment associated with the scallop fishery. However, they also imply that, for example, the value landed per fisherman into Aberdeen in 1998 was £108,000 per annum compared to £66,866 at Wick and £6,800 at Oban. This difference could in part reflect the likelihood that vessels landing at large East Coast ports will be larger and more efficient thus implying a higher value landed per fisherman compared to the greater proportion of smaller vessels and divers on the West Coast. However, industry representatives argue that vessels landing into Oban are as efficient (or more so) than those operating out of Wick and these implied landings per vessel are therefore suspect. As a consequence, the individual District employment estimates will be less accurate than those at a higher spatial level. Finally, there is an issue of whether the number of fishermen catching scallops could vary to such a degree from one year to the next. In part this variation is attributable to vessels moving from the West to the East Coast although it could be theoretically argued that at the margin fishermen will switch from one fishery to another to maximise marginal revenues and for a fishermen from Aberdeen to switch to scallop perhaps requires significantly higher revenue levels compared to a fisherman on the West Coast.

| TABLE 2.8: FISHERMEN EMPLOYED IN SCALLOP CATCHING | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|
| <u>DISTRICT</u> | <u>1998</u> | <u>1998</u> | <u>1998</u> | <u>1999</u> | <u>1999</u> | <u>1999</u> | <u>2000</u> | <u>2000</u> | <u>2000</u> |
| | <u>Scallops</u> <u>as %</u> <u>Total</u> <u>Landings</u> | <u>Total</u> <u>Fishermen</u> <u>Employed in</u> <u>District</u> | <u>Employment</u> <u>Related to</u> <u>Scallop</u> <u>catching</u> | <u>Scallops</u> <u>as %</u> <u>Total</u> <u>Landings</u> | <u>Total</u> <u>Fishermen</u> <u>Employed in</u> <u>District</u> | <u>Employment</u> <u>Related to</u> <u>Scallop</u> <u>catching</u> | <u>Scallops</u> <u>as %</u> <u>Total</u> <u>Landings</u> | <u>Total</u> <u>Fishermen</u> <u>Employed in</u> <u>District</u> | <u>Employment</u> <u>Related to</u> <u>Scallop</u> <u>catching</u> |
| Non-HIE | | | | | | | | | |
| Eyemouth | 0.3 | 270 | 1 | 1.1 | 289 | 3 | 0.9 | 289 | 3 |
| Pittenweem | 1.4 | 201 | 3 | 1.3 | 182 | 2 | 6.7 | 164 | 11 |
| Aberdeen | 3.8 | 293 | 11 | 7.7 | 247 | 19 | 2.7 | 219 | 6 |
| Peterhead | 0.4 | 638 | 3 | 1.4 | 865 | 12 | 0.7 | 638 | 4 |
| Fraserburgh | 2.4 | 1636 | 39 | 4.1 | 1265 | 52 | 1.6 | 1218 | 19 |
| Buckie | 15.7 | 476 | 75 | 15.6 | 390 | 61 | 30 | 399 | 120 |
| Ayr | 40.0 | 899 | 360 | 49 | 876 | 429 | 41.4 | 880 | 364 |
| Non-HIE Area | | 4413 | 492 | | 4114 | 579 | | 3807 | 527 |
| HIE | | | | | | | | | |
| Wick | 4.6 | 332 | 15 | 5.3 | 316 | 17 | 2.7 | 262 | 7 |
| Orkney | 18.6 | 365 | 68 | 13.6 | 342 | 47 | 12.3 | 376 | 46 |
| Shetland | 5.3 | 599 | 32 | 5 | 623 | 31 | 2.2 | 637 | 14 |
| Stornoway | 12.9 | 727 | 94 | 5.3 | 637 | 34 | 12.7 | 627 | 80 |
| Kinlochbervie | - | 41 | 0 | 0 | 32 | 0 | 0 | 33 | 0 |
| Lochinver | 0.2 | 78 | 0 | 0 | 78 | 0 | 0 | 61 | 0 |
| Ullapool | 1.7 | 93 | 2 | 1.4 | 94 | 1 | 2.4 | 86 | 2 |
| Mallaig | 15.8 | 490 | 77 | 4.8 | 439 | 21 | 13 | 212 | 28 |
| Portree | - | 0 | 0 | 0 | 0 | 0 | 7.3 | 210 | 15 |
| Oban | 26.9 | 280 | 75 | 13.1 | 281 | 37 | 36.9 | 285 | 105 |
| Campbeltown | 20.1 | 353 | 71 | 20.7 | 374 | 77 | 23.9 | 306 | 73 |
| HIE Area | | 3358 | 434 | | 3216 | 265 | | 3095 | 370 |
| TOTAL | | 7771 | 926 | | 7330 | 843 | | 6902 | 898 |

Source: Scottish Fisheries Statistics

Finally, in 2000, the jobs associated with scallops increased by 6.5% with a reduction of 9% in non-HIE areas (although the numbers were still some 7% above the levels in 1998) and an increase of almost 40% in the Highlands and Islands (although this is some 15% below 1998 levels). The largest percentage increases were associated with Oban and Stornoway with implied jobs increases of over 100%. However, no District in the Highlands and Islands regained their 1998 jobs levels. In two Districts, Wick and Shetland, there were implied reductions of over 50%.

The revival, in 2000, on the West Coast of the Highlands and Islands reflects the smaller geographic area covered by bans and the shorter duration of the bans in the traditional scallop areas on the West Coast and Islands.

| TABLE 2.9: FISHERMEN EMPLOYED IN SCALLOP CATCHING | | | |
|--|---|---|---|
| <u>DISTRICT</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
| | <u>Employment Related to Scallop catching</u> | <u>Employment Related to Scallop catching</u> | <u>Employment Related to Scallop catching</u> |
| Non-HIE | | | |
| Eyemouth | 1 | 3 | 3 |
| Pittenweem | 3 | 2 | 11 |
| Aberdeen | 11 | 19 | 6 |
| Peterhead | 3 | 12 | 4 |
| Fraserburgh | 39 | 52 | 19 |
| Buckie | 75 | 61 | 120 |
| Ayr | 360 | 429 | 364 |
| Non-HIE Area | 492 | 578 | 527 |
| HIE | | | |
| Wick | 15 | 17 | 7 |
| Orkney | 68 | 47 | 46 |
| Shetland | 32 | 31 | 14 |
| Stornoway | 94 | 34 | 80 |
| Kinlochbervie | 0 | 0 | 0 |
| Lochinver | 0 | 0 | 0 |
| Ullapool | 2 | 1 | 2 |
| Mallaig | 77 | 21 | 28 |
| Portree | 0 | 0 | 15 |
| Oban | 75 | 37 | 105 |
| Campbeltown | 71 | 77 | 73 |
| HIE Area | 434 | 265 | 370 |
| TOTAL | 926 | 843 | 897 |

Source: Scottish Fisheries Statistics

Note: The employment estimates are notional reflecting the relative value of scallop landings compared to other landings in each district. For example, the implied reduction in employment at Mallaig between 1998 and 1999 reflects the reduction in the value of landings and not the actual reduction in fishermen employed.

The trend over the period suggests that the estimated employment associated with scallop catching is returning towards the levels of 1998 and the pre-ban era. This should be confirmed, or otherwise, once data for 2001 is released. This assessment is made on the assumption that vessel/fisherman efficiency is relatively unchanged,

and any significant improvements could manifest themselves as lower scallop fishermen associated employment.

2.2.3 Scallop Farming

The employment estimates presented above do not encompass the full range of employment affected by the ban. First, there is employment supported in scallop farming and diving activity, not all of which is reported by the official statistics and assessment will rely on survey work and consultations undertaken previously and by the consultants.

| Shellfish | 1996 | 1997 | 1998 | 1999 | 2000 |
|-----------------|------|------|-----------------|------|------|
| Pacific Oysters | 224 | 224 | 261 | 232 | 247 |
| Native Oysters | 8 | 1 | 7 | 11 | 4 |
| Scallops | 36 | 27 | 40 ¹ | 15 | 39 |
| Queen Scallops | 51 | 46 | 147 | 114 | 58 |
| Mussels | 1072 | 1307 | 41 | 1400 | 2003 |

1. This figure is based on SFIA Report estimate.

Farmed shellfish production in Scotland is dominated by mussels and pacific oysters. Small volumes of queens and scallops are also produced. In 2000, 96% of Queen scallops were farmed in Strathclyde region. Of the 39 tonnes of king scallops, just over 60% were from Strathclyde with the remainder from Highland Region. Total scallop and queen scallop farmed production in Scotland in 2000 was only three quarters of one percent of total landings in Scotland.

The scallop farms are patches of seabed protected by Several Orders. Several Orders restrict the right to fish to specified enterprises. Harvesting often takes place by diving. Eight Several Orders were granted by 2000 for scallop fisheries, six for commercial companies and two for companies involved in research and development. According to the Scottish Shellfish Farms Annual Production Survey 2000, the growth in scallop production is likely to continue over the next few years and markets were maintained and demand remained high. Between 1997 and 1998 production of farmed scallops grew by 54%, between 1998 and 1999 production fell by 63%, growing again between 1999 and 2000 by 154%, albeit only to 1998 levels. This pattern is consistent with the intensity of fishing bans affecting farmed production in the same way as non-farmed harvesting.

2.2.4 Scallop Diving

Currently there are estimated to be in the region of 150-200 scallop divers in Scotland compared to in the region of 300 or so only a few years ago. In Orkney the numbers have dropped from 60 to around 20.

Divers tend to work from smaller boats and so are dependent on specific fishing areas and on weather conditions. Divers focus on larger scallops that, given the means of harvesting tend to command a premium price. In general, divers also work on shellfish farms at least part-time as well as having other occupations

2.2.5 Seasonality of Activity

In the past, the last quarter of the year was considered the most important season for scallop fishing. Demand and prices both increase at this time, reflecting in particular the importance of the Christmas market. The seasonality of the scallop landings is reported in **Table 2.11**.

| TABLE 2.11: ANALYSIS OF SEASONALITY OF SCALLOP LANDINGS: 1993-2000 | | |
|---|---|-------------------------|
| <u>Year</u> | <u>Share of Total Annual Scottish Landings By Value</u> | |
| | <u>July-November</u> | <u>October-December</u> |
| 1993 | 42% | 25% |
| 1994 | 41% | 26% |
| 1995 | 39% | 31% |
| 1996 | 36% | 27% |
| 1997 | 44% | 34% |
| 1998 | 41% | 28% |
| 1999 | 35% | 19% |
| 2000 | 37% | 27% |

Source: Scottish Fisheries Statistics

First, it shows that over the period July to November, which approximates to the core period of the fishing bans, that the share of landings by value, at least up to around 1998, are no more important than at other times of the year. If these five months had a share of scallop landings equal to its share of the calendar year, then the period between July and November would usually account for 41-42% of total annual landings. The simple average across the period 1993-1998 is 40.5%. However, over the next two years the share of landings for July-November falls to 35% in 1999 and 37% in 2000. While these percentages may not be significant in the long term, 1999 and 2000 were both characterised by severe fishing bans that probably account for the lower percentage shares.

The data in the table do point to the importance of the final quarter of the year. If the landings were equal in value throughout the year then this period would see 25% of total activity by value. In fact between 1993 and 1998 this figure was exceeded in every year bar one when it equalled 25%. However, in 1999, when the ban was at its most severe, the percentage fell to 19% reflecting the impact of the ban on the harvesters ability to obtain scallops at the time of the year when demand and prices are at their highest. With the easing of the restrictions in 2000, the percentage once again regained its earlier levels.

| TABLE 2.12: SEASONALITY OF SCALLOP LANDINGS: 1998-2000 | | | | |
|---|---|-------------------|------------------|----------------|
| <u>Year</u> | <u>Share of Total Annual Scottish Landings By Quarter</u> | | | |
| | <u>Jan-March</u> | <u>April-June</u> | <u>July-Sept</u> | <u>Oct-Dec</u> |
| 1998 | 23.9% | 25.9% | 22.8% | 27.5% |
| 1999 | 27.8% | 30.7% | 22.5% | 19.0% |
| 2000 | 22.7% | 29.4% | 20.6% | 27.3% |

Table 2.12 presents the seasonality of landings by quarter for 1998-2000. In particular, comparing 1998 (pre-ban) with 1999 (extensive bans) there is evidence of the impact on landings of the progressive incidence of the bans around Scotland. Specifically, it can be seen that the earlier part of the year ended up contributing a higher share of total landings in 1999 compared to 1998.

| Month | Share (%) of Total Annual Scottish Landings By Month | | |
|-----------|--|------|------|
| | 1998 | 1999 | 2000 |
| January | 9.4 | 9.3 | 6.2 |
| February | 5.9 | 8.3 | 5.4 |
| March | 8.6 | 10.2 | 11.1 |
| April | 9.0 | 10.7 | 8.1 |
| May | 9.3 | 10.8 | 12.6 |
| June | 7.6 | 9.2 | 8.7 |
| July | 7.5 | 9.5 | 7.5 |
| August | 6.7 | 7.0 | 7.6 |
| September | 8.5 | 6.0 | 5.5 |
| October | 7.7 | 6.2 | 6.4 |
| November | 10.2 | 6.6 | 9.8 |
| December | 9.6 | 6.2 | 11.1 |

Source: Scottish Fisheries Statistics

Finally, **Table 2.13** reports the share of total annual Scottish landings by month for 1998-2000. In particular, the reduced share of landings over the period September 1999 – February 2000 is especially noticeable – a time period that would usually account for over half of annual landings accounted for only around 37%.

2.2.6 Seasonality of Prices

Table 2.14 analyses price per tonne by month of the year for king scallops. These are calculated using the weight and value of scallop landings by month. As such these estimates will not necessarily equate to prices in specific markets but rather give an average indication of prices.

| Month | Monthly Price Per Tonne: Annual Mean = 100 ¹ | | | | |
|-----------|---|------------|------------|------------|------------|
| | 1996 | 1997 | 1998 | 1999 | 2000 |
| July | 88 | 95 | 87 | 96 | 89 |
| August | 88 | 98 | 93 | 72 | 76 |
| September | 84 | 97 | 94 | 84 | 76 |
| October | 109 | 99 | 103 | 94 | 95 |
| November | 120 | 97 | 115 | 102 | 115 |
| December | 123 | 111 | 137 | 148 | 126 |

Source: Scottish Fisheries Statistics

1. Figures in **bold** are equal to or above the annual average

The general finding is that prices in July, August and September are below the annual average and that prices in the last quarter are generally higher the closer to Christmas you get. For December, this was the case for every year between 1996 and 2000 (and in fact was similarly the case as far back as 1993 at least) with prices at over 20% above the annual average, other than in 1997. The prices in December 1998 and 1999 are particularly high compared to the annual average. In 1998 this was partly a function of the lower prices earlier in the year which pulled down the annual average. However, the greater variation in 1999 reflects the higher prices in the run up to Christmas in conjunction with the supply constraints caused by the

scale of the ban. A similar pattern is seen in 2000 although not as pronounced as in 1999.

Table 2.15, below, provides estimates of the prices attained per tonne of scallops landed for each month during 1998, 1999 and 2000. These monthly averages are compared to the annual average price in each year.

| TABLE 2.15: SEASONALITY OF SCALLOP PRICES: 1998-2000 | | | |
|---|--|--------------|--------------|
| <u>Month</u> | <u>Monthly Price Per Tonne (£)¹</u> | | |
| | <u>1998</u> | <u>1999</u> | <u>2000</u> |
| January | 1,271 | 1,266 | 1,326 |
| February | 1,054 | 1,088 | 1,350 |
| March | 997 | 1,213 | 1,312 |
| April | 1,004 | 1,352 | 1,216 |
| May | 1,003 | 1,399 | 1,223 |
| June | 952 | 1,373 | 1,163 |
| July | 942 | 1,178 | 1,077 |
| August | 1,003 | 889 | 916 |
| September | 1,021 | 1,029 | 922 |
| October | 1,112 | 1,155 | 1,152 |
| November | 1,241 | 1,248 | 1,387 |
| December | 1,480 | 1,812 | 1,518 |
| Annual Average | 1,082 | 1,226 | 1,209 |

Source: Scottish Fisheries Statistics

1. Figures in **bold** are equal to or above the annual average price.

In many ways 1998 represents a typical pre-ban year, although there were severe restrictions off the East coast of Orkney, in terms of the pattern in the value of prices with above average prices from October into January, and below average prices basically from Easter, during the summer months until the end of September.

With the application of much wider bans, around the West coast in particular, this pattern changed. First, the average annual price increased by over 13% between 1998 and 1999 and this higher average price was largely maintained during 2000. Second, the number of months with above average prices increased from four in 1998 to six in 1999 and seven in 2000. Specifically, there was a seven month run of above average prices from November 1999 to May 2000. This is the period when, traditionally, demand for Christmas and Easter would push prices up. In this case the impact of the fishing restrictions has further added pressure to the price of those scallops landed.

Thus the potential impact of the ban in terms of earnings for vessels and processors will be more significant in the last quarter of the year in comparison to the core summer period (July-September).

Table 2.16 compares the value of monthly landings for 1998, 1999 and 2000 and reports the total percentage change in the value of landings between 1998 and 2000. The sector faced a decline in the value of total landings of 15% between 1998 and 2000. There was however a significant variation in the monthly value of landings from a reduction of (-) 45% in September to a growth of 15% in May.

| TABLE 2.16: VALUE OF LANDINGS: 1998-2000 | | | | |
|---|--------------------------------------|-------------------|-------------------|-------------------------------|
| <u>Month</u> | <u>Monthly Value of Landings (£)</u> | | | |
| | <u>1998</u> | <u>1999</u> | <u>2000</u> | <u>1998/2000 % Change</u> |
| January | 1,692,338 | 1,528,907 | 946,544 | -44 |
| February | 1,055,005 | 1,372,034 | 831,870 | -21 |
| March | 1,544,188 | 1,681,337 | 1,708,099 | 11 |
| April | 1,614,003 | 1,765,978 | 1,243,164 | -23 |
| May | 1,680,725 | 1,776,276 | 1,940,274 | 15 |
| June | 1,364,157 | 1,523,501 | 1,330,666 | -2 |
| July | 1,354,266 | 1,573,212 | 1,155,340 | -15 |
| August | 1,209,323 | 1,149,137 | 1,160,187 | -4 |
| September | 1,537,183 | 995,111 | 838,364 | -45 |
| October | 1,388,925 | 1,031,623 | 983,828 | -29 |
| November | 1,828,559 | 1,084,292 | 1,507,544 | -18 |
| December | 1,721,262 | 1,025,775 | 1,699,690 | -1 |
| Annual Average | 17,989,934 | 16,507,183 | 15,345,570 | -15 |

Source: Scottish Fisheries Statistics

This analysis suggests that, although during certain times of the year the value of landings fell significantly, values throughout the year reflected various combinations of reduced/increased weight of landings and increased/reduced price per tonne. These figures also hide the geographic variation in impact with the West Coast suffering disproportionately in 1999 but making a relative recovery in 2000.

Finally **Table 2.17** reports the estimated price per tonne of scallops landed by size of vessel.

| TABLE 2.17 ANNUAL AVERAGE PRICE BY VESSEL SIZE: 1998-2000 | | | |
|--|----------------------------|-------------|-------------|
| <u>Vessel Size</u> | <u>Value Per Tonne (£)</u> | | |
| | <u>1998</u> | <u>1999</u> | <u>2000</u> |
| All | 1,082 | 1,226 | 1,209 |
| Small (under 10m) | 1,827 | 1,732 | 1,566 |
| Large (over 10m) | 1,038 | 1,207 | 1,195 |
| Premium | 76% | 43% | 31% |

Source: Scottish Fisheries Statistics

Not surprisingly it appears that the smaller vessels (under 10m) achieve a significant premium over scallops landed by the larger vessels. These premiums ranged from 76% in 1998 to 31% in 2000. This will in part reflect the likely higher quality of scallops harvested by smaller vessels including divers. However, this premium has declined quite substantially over the three years to 2000 and it is not clear why this should be the case.

The smaller vessels appear to have experienced a reduction of over 50% in the total annual value of landings in 1999 and 2000 compared to 1998 while the larger vessels experienced reductions of only 4% and 7% respectively. In 1998, vessels <10m accounted for 5.6% of the weight of scallops landed into Scotland by UK vessels. In 1999 this had fallen to 3.6% indicating a greater relative impact on smaller compared to larger vessels. This may reflect the wider alternatives available to the larger vessels in fishing further afield whereas the smaller vessels and divers are much less mobile and thus have less opportunity to fish elsewhere.

The relative inability of the smaller vessels and divers to provide product to the market when the bans are being enforced could have implications for the potential premium and hence partly explain the reduction in the premium over the past two years.

2.3 CONCLUSIONS

Scallops have become an increasingly important fishery in the UK over the past ten years and there are extensive scallop grounds right around the coast of Scotland. Between 1991 and 1998 there has been reasonably steady growth in the volume of landings into Scotland by UK vessels. Landings grew from 8,900 tonnes in 1991 to over 16,600 by 1998, an annual average growth rate of 9.5%. Over the same period the value of these landings grew from £8.8m to £18m.

There is clear evidence of the impact of the scallop bans on the volume and value of landings in 1999 with reductions in the volume of landings of 19% and a reduction in the value of the landings of 8%. In contrast in 2000, while there was an increase in the volume of landings for king scallops the price fell relatively more resulting in a reduction in the value of king scallops landed, while both the volume and value of queen scallops declined. In 2001, landings recovered to over 15,300 tonnes (up 18%) valued at £19.5m.

Farmed shellfish production in Scotland is dominated by mussels and oysters with only small volumes of queen and king scallops being farmed. Total scallop and queen scallop farmed production in Scotland in 2000 was only three-quarters of one percent of total landings in Scotland.

Currently there are estimated to be in the region of 150-200 scallop divers in Scotland compared to in the region of 300 or so only a few years ago. Divers tend to work from smaller boats and so are dependent on specific fishing areas and on weather conditions.

Historically, the last quarter of the year was considered the most important season for scallop fishing. Between 1993 and 1998 the value of landings between October and December accounted for over 28% on average of the annual value of landings. In 1999, when the ban was at its most severe the percentage fell to 19%, reflecting the impact of the ban on ability to obtain scallops. With the easing of restrictions in 2000, the percentage once again regained its earlier levels.

3 RESPONSE TO THE SCALLOP BANS

3.1 INTRODUCTION AND HISTORY OF CLOSURES AROUND SCOTLAND

This Chapter reviews the range of responses by the industry and associated sectors to the bans on scallop fishing. This analysis is based on published data, the consultations undertaken as well as a review of previous analyses of the impacts of the bans.

The majority of the closures around the Scottish coast have been caused by the presence of ASP toxins. The majority of these closures have been on the West Coast, around Orkney and within the Moray Firth area. The extent and intensity of the bans are represented in **Maps 1 - 7** which report the closures over the period 1997 to end-March 2002. The final map shows those areas that were closed as at end-March 2002.

The first closures occurred in 1997 for a limited period around Orkney. In 1998 more intensive closures occurred to the east of Orkney lasting between 200 and 300 days. However, it was during 1999 that extensive harvesting bans were applied around the Scottish Coast, with the West Coast of Scotland from Cape Wrath down to the Northern Irish Coast severely affected in terms of both the area covered by the bans and the length of the bans. The area from Orkney down through the Moray Firth was also affected although these closures were less extensive and in force for a much shorter duration than occurred on the West Coast.

Some of the closures on the West Coast lasted from September 1999 through to the end of May 2000. In some cases areas were only open for two months before being closed again in August 2000. Despite this, the extent and duration of the bans were less than in 1999 with areas around Orkney and along the West Coast being most affected but with the number of days that areas were closed often being only half that of 1999.

During 2001, while the geographic extent of closures further reduced with only 35 boxes being affected compared to 43 in 2000 and 66 in 1999 the intensity (i.e. number of days closed) of the ban increased in a number of areas. The evidence for 2002 (to end-March) shows further reductions with only 18 boxes having been affected so far and currently bans are in operation in only six boxes.

The evidence to date therefore suggests that the intensity and spread of ASP was dramatic and very rapid, but since its height in 1999 there has been a clear downward trend to the current situation, barring any further flare up this year, perhaps reflecting something more akin to 'normal' levels of impact of ASP. However this conclusion is tentative until a longer period without further outbreaks is observed.

3.2 POTENTIAL RESPONSES TO CLOSURE

The ways in which the different segments of the scallop harvesting sector respond to the closures will interact to create potentially complex results. For example, the fishing of inshore areas by dredgers previously favoured by divers is likely to both create conflict and the depletion, perhaps long-term, of scallop resources in certain

areas. Because the divers are restricted in the areas they harvest, such an impact is likely to have consequences for the future viability of the affected divers¹.

Each of the participants in the sector has a number of possible options available to them. For vessels, and to a lesser degree divers, there are a limited number of responses to closure of the scallops fisheries. These include:

- ❖ Stop fishing;
- ❖ Fish in other areas; and/or
- ❖ Fish for other species.

These responses are not mutually exclusive and may be either temporary or permanent responses. The first option will have a direct impact on the sector in terms of employment and income as well as knock-on effects on suppliers and their customers, whether processors or final users.

If vessels move to other areas to fish they will compete with 'local' vessels and, depending on the area, with divers². Increased activity could potentially conflict with any attempts at stock management and at the very least will put pressure on unaffected areas perhaps compromising the longer-term sustainability of the fishery.

Investment in vessels is significant and the dredging equipment used cannot easily be used for other fisheries. Previous research by Ekos³ suggests that the cost of gear to allow vessels to switch to *nephrops* is in the region of £9,000. Unless the vessel already has this dual capability, as is the case in Mallaig for example, where of the 20 Mallaig and North West Fishermen's Association member vessels involved in scalloping (1999), 16 of them are also involved in *nephrops*, then to a large degree the long-term viability of vessels relies on being able to return to sufficiently high levels of scallop fishing. In addition, the ability of vessels to switch to other species will also depend on whether they have the appropriate licence and the quota to do so⁴.

In addition, the move to a prawn fishery places greater pressure on these stocks which already face quota-related difficulties. The increased effort in prawns will also reduce the grossings of vessels already involved full-time in the fishery.

Divers face similar choices although their room for manoeuvre in terms of fishing in other areas is restricted, not least because they operate from small vessels and RIBs that would be unsuitable for fishing further offshore or in travelling to other open grounds. In addition, if divers were to move to other areas they would face additional costs including, for example, accommodation and storage costs. Divers also tend to have other sources of income, including part time work on fish farms, and so could not easily leave their home areas for diving for scallops.

Scallop farmers have similar options in the long run but they do not readily have the option of switching to other species. The fixed nature of farmers' capital input

¹ However, it has also been suggested by industry representatives that divers fish areas that are inaccessible to vessels and take brood scallops that re-stock surrounding areas.

² It has also been suggested that the scallop fisheries have always been nomadic and that the idea of a 'local' fishery is a recent concept.

³ Economic Impacts of Scallop Fishery Closure: Update Study, EKOS, 1999.

⁴ In general, scallop fishermen rarely have a viable quota for *nephrops* whilst *nephrops* fishermen can prosecute the scallop fisheries which are non-quota. This can create a glut and thus lower scallop prices.

constrains their response in the short run to delaying harvesting until their stocks are clear of the toxin. Although the stock in hand is not lost, a closure imposes the serious and potentially terminal risk of creating cash flow difficulties. In this case the key issue is one of funding the scallop farmers' cash flows until they were able to re-present stock to the market. However, there will be longer-term issues in timing and extent of restocking. Effectively the farmers would suffer a loss proportionate to the delay in harvesting and any reduction in price if the actual or perceived quality of their produce were consequently reduced. In addition, there are longer-term consequences for the viability of the sector if consumer preferences are adversely affected. Whatever happens to the farmers will also impact on the divers, many of whom rely on part time work with the farmers.

Finally, processors have the choice of either establishing new supply sources from elsewhere in Scotland, UK and abroad or reducing their level of activity. Security of supply is an issue for processors and they will often buy all they can from regular suppliers even if this is excess to their requirements just to ensure that the vessel continues to supply them. It is uncertain whether processors contracting with new suppliers will have a longer-term negative impact on Scottish vessels.

In summary, the choices facing the different parts of the industry vary. For vessels these include moving to other areas, targeting other species, or laying-up (permanently or temporarily). For divers the options include moving to other areas or leaving the industry. For farmers they include accepting the loss of sales or closing. For processors they include reducing the scale of operations, sourcing from elsewhere in Scotland, the UK, or perhaps abroad, or closing.

3.3 FISHERMEN RESPONSE TO CLOSURE

Table 3.1 presents data for the years 1997 to 2000 on the location and landings into Scotland of all Scottish vessels of 10m and over registered length and shows that there have been few changes in the general numbers of vessels involved in the fishery.

| <u>Vessels</u> | <u>1997</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
|---|-------------|-------------|-------------|-------------|
| Active vessels licensed to fish scallops | 203 | 220 | 227 | 222 |
| Vessels landing king scallops or queenies | 139 | 152 | 139 | 133 |
| Vessels landing only king scallops ¹ | 108 | 126 | 113 | 99 |
| Vessels landing only queenies ¹ | 7 | 6 | 4 | 6 |
| Vessels landing king scallops and queenies | 24 | 20 | 22 | 28 |
| Registered Base District of vessels | 16 | 15 | 14 | 14 |
| Reported Landing Districts | 18 | 19 | 17 | 18 |

¹ These vessels may also have landed whitefish or *nephrops*
Source: SEERAD

Only about two-thirds of active vessels licensed to fish scallops actually did so. The remainder did not use their entitlement but fished for whitefish or *nephrops* instead. Most vessels landing scallops or queenies landed only king scallops but between 20 and 28 fished for both scallops and queenies and a few landed only queenies. (Many of these vessels may also have landed whitefish or *nephrops* at some time during the year. For example, 20 of the 34 vessels landing queenies did so.)

Table 3.2 reports the annual percentage change in these vessel numbers.

| <u>Vessels</u> | <u>% Change</u> | | |
|---|------------------|------------------|------------------|
| | <u>1997/1998</u> | <u>1998/1999</u> | <u>1999/2000</u> |
| Active vessels licensed to fish scallops | 8.4 | 3.2 | -2.2 |
| Vessels landing king scallops or queenies | 9.4 | -8.6 | -4.3 |
| Vessels landing only king scallops ¹ | 16.7 | -10.3 | -12.4 |
| Vessels landing only queenies ¹ | -14.3 | -33.3 | 50.0 |
| Vessels landing king scallops and queenies | -16.7 | 10.0 | 27.3 |

¹ These percentage changes are based on very small vessel numbers and thus very small changes in vessel numbers results in a very high proportionate change.

Source: SEERAD

This data suggests that between 1997 and 1998 there was growth in the number of vessels both licensed to fish for scallops and actually landing king scallops. There was a decline of 14.3% in vessels landing only queenies but this actually translates into one less vessel. The change into 1999 is more revealing and appears to reflect the extended coverage and intensity of fishing bans around the coast of Scotland. Specifically, there was a 10.3% decline in vessels landing only king scallops and a further 12.3% decline between 1999 and 2000 reflecting the continuation of the bans into the early part of 2000. Interestingly, the number of vessels licensed to fish for scallops did not fall until 2000 when it was still almost 1% greater than the level for 1998.

The data was analysed to ascertain whether and how the sector responded to the widespread closures of the scallop fisheries in 1999 compared to 1998 (used as a benchmark when the closures were much fewer in area, duration and frequency).

Hence the objective was to determine whether vessels:

- ❖ Left the fishery;
- ❖ Were sold and continued in the fishery;
- ❖ Moved area by chasing the open grounds; or
- ❖ Switched to fishing for other species.

Table 3.3 reports the activity of vessels and suggests that there was no immediate large decline in the number of vessels, 10 metres and over, actually prosecuting the fishery (as opposed to holding a licence). There only appears to have been some switching between supporting activities.

| <u>Activity</u> | <u>1998</u> | <u>1999</u> |
|-------------------------------|-------------|-------------|
| Scallops only | 57 | 57 |
| Scallops & Nephrops only | 8 | 10 |
| Scallops & Demersal only | 21 | 24 |
| Scallops, Nephrops & Demersal | 57 | 46 |
| TOTAL | 143 | 137 |

Source: SEERAD (Compared to Table 3.1, less vessels are identified because only those vessels landing more than 1 tonne p.a. are recorded)

Table 3.3 reflects the apparent discreteness of the scallop fishery and the barriers to entry to other fishing activities built by the quota and licencing systems, their associated costs to vessels, and the cost of learning new techniques. It may also suggest that there were sufficient grounds open for the stocks to sustain vessels at their current levels, at least in the short run.

Analysis of the base districts reported for the vessels and shown in **Table 3.4** indicates whether vessels may have been sold. While within the data there are a several vessels which changed their base district and almost all continued to fish for scallops, there does not appear, intuitively, to have been the inordinately high change in numbers that would have suggested a flight of capital from the fishery. Such changes as there have been have tended to cancel each other out.

| TABLE 3.4: REPORTED BASE PORTS OF SCOTTISH VESSELS 10M AND OVER LANDING SCALLOPS: 1998-1999 | | | | |
|--|---------------|------------|---------------|------------|
| <u>Base Port</u> | <u>1998</u> | | <u>1999</u> | |
| | <u>Number</u> | <u>%</u> | <u>Number</u> | <u>%</u> |
| Aberdeen | 6 | 4 | 6 | 4 |
| Ayr | 30 | 20 | 29 | 21 |
| Buckie | 5 | 3 | 3 | 2 |
| Campbeltown | 24 | 16 | 23 | 17 |
| Mallaig | 12 | 8 | 10 | 7 |
| Oban | 14 | 9 | 12 | 9 |
| Orkney | 9 | 6 | 7 | 5 |
| Peterhead | 3 | 2 | 3 | 2 |
| Pittenweem | 5 | 3 | 3 | 2 |
| Shetland | 18 | 12 | 21 | 15 |
| Stornoway | 11 | 7 | 8 | 6 |
| Wick | 9 | 6 | 11 | 8 |
| Others | 6 | 4 | 3 | 2 |
| TOTAL | 152 | 100 | 139 | 100 |

Source: SEERAD

Figures 1a and 1b show base districts declared by percentage of vessels. A comparison of the two Figures does not indicate any significant move away from particular ports except perhaps the minor ones. In addition, the distribution of the base ports around the length of the Scottish coast persisted.

Figure 1a: Base Districts of Scottish Vessels >10m, 1998

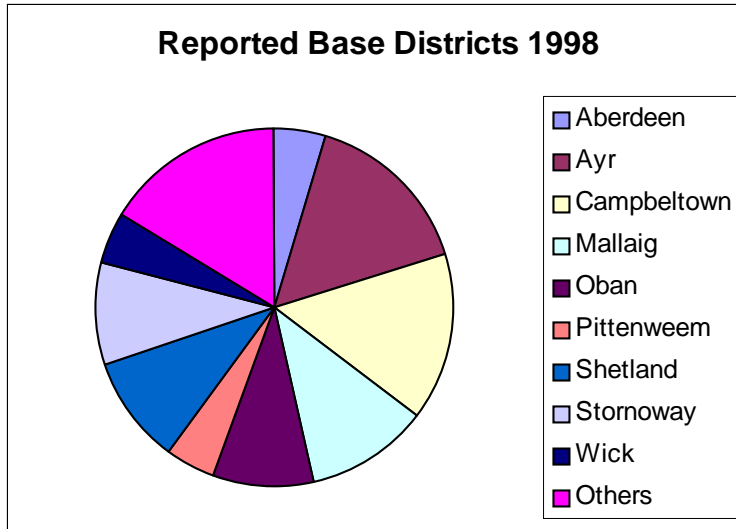
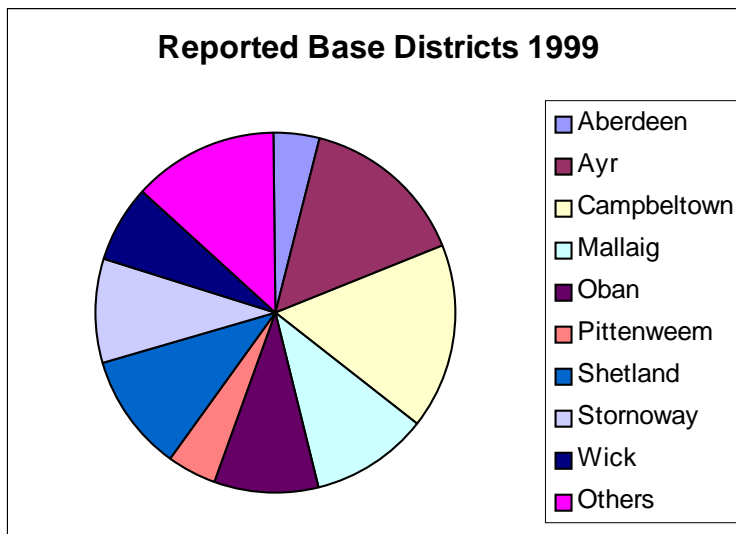


Figure 1b: Base Districts of Scottish Vessels >10m, 1999



Given that the cost of fuel is an important single component of costs faced by fishing vessels in general, including scallopers, for whom it represents around 7% of grossings, vessels may be expected to minimise their costs by landing into the nearest port. This assertion may be less true for scallopers who tend to supply specific processors. However, a shift in area might appear as an increase in the average number of landing ports used per vessel. For 1998, the average number of landing districts reported per vessel was 2.45 and for 1999, 2.46. This suggests that either vessels tied up during closures with the implication that has for fixed costs and

profitability, or they extended their range of travelling, which has implications for variable costs and profitability.

Thus the data rule out a widespread departure from the fishery and where there were sales of vessels others appear to have been willing to take them over. Similarly, it appears that there has been no shift in the base location of the fleet though it may well have been fishing in a different pattern dictated in part by the closures.

It is suspected that these figures do not reveal the true extent of the impact on the catching sector and consequentially on the downstream sectors. Most business enterprises faced with unfavourable trading conditions will soldier on, despite making losses, for as long as they can in order to preserve their trading links, sources of supply and customer goodwill, until times improve.

In this respect fishing enterprises are no different from others and as a rough general rule they appear to be able to run with losses for about two years before their position becomes untenable in large numbers. Thus the impact of the 1999 closures would not be expected to show significantly until the 2001 figures. The amelioration of the difficulties in subsequent years will have staved off the most damaging results for all but the more marginal enterprises without allowing them any recovery of strength, but nevertheless will have left most enterprises in a precarious position should they have to face another year like 1999.

Although there are more than 200 Scottish vessels licensed to fish for scallops in UK waters, in practice only about 135 do so. The Scallop Association represents about 70 vessels, 65 of these are vessels of 10m and over overall length and the remaining 5 are under 10m vessels. The larger vessels represent an itinerant fleet which moves its fishing location according to the fishing opportunities, fishing anything up to 200 miles off the coast, while the smaller vessels are more restricted both by the absence of living accommodation aboard and by safety factors.

Some vessels are dedicated to scallop fishing while others fish for *nephrops* during the summer. For example, the vessels from Mull, which is the hub of the West coast fishery with small vessels, small processors, divers and farmers, fish only for scallops.

Vessels prevented from fishing for scallops have turned to fishing for *nephrops* if they have a licence to do so, and if they have quota. A TAC and national quota is set for *nephrops* by the EU. The UK *nephrops* quotas for 2001 totalled 30,680 tonnes, 13,410 tonnes for ICES Areas IIa and IV, 11,070 tonnes for Areas Vb and VI, and 6,200 tonnes for Area VII. The comparable figures for 2002 are 14,398, 11,072, and 5,836, totalling 31,306.

There is no TAC or quota imposed by the EU or UK on either King Scallops or Queenies. The Queenies fishery is small with landings in Scotland worth only £1.77m in 2000 compared to the King Scallop fishery which had landings of £13.93m. This understates the importance of the industry in that several Scottish vessels fish off the SW coast of England and land there, but nevertheless earn profits and crew share for the Scottish economy. Total landings by Scottish vessels were £15.56m for scallops and £1.81m for queenies.

In the face of closures, vessels may lay up, fish for scallops elsewhere or fish for another species.

Laying up has cost implications in that the fixed costs of the vessel continue to have to be met. These include basic maintenance, mooring fees, and repayments on loans and ship mortgages. Thus laying up is by definition a loss-making strategy. Based on one example in 1999 the losses to vessels tied-up appeared to be in the region of £12,000 per month although this figure can really only be taken as indicative of the situation today.

If however, the variable costs of fishing are not met by grossings then laying up will be a loss minimising strategy. It does not appear that this is a strategy that has been followed where the vessel has been capable, by virtue of size and location, of moving to open grounds. Thus it has been restricted as a strategic response to the smallest vessels.

Moving elsewhere is not necessarily an easy solution, however, as it has both cost and conservation implications. There are two principal costs. First, the fuel costs and loss of fishing time associated with travelling further afield. Secondly, the effect of having to learn the fishing characteristics of unfamiliar grounds. Both of these are potentially significant.

Closing a sea area to scallop fishing can be expected to have specific behavioural responses observed from time to time elsewhere. Open areas face increased fishing pressure. As the closures become more extensive so the pressure on open areas becomes more intense leading to undesirable effects on the future of the fishery arising from over-fishing and damage to the habitat.

In the closed areas, however, the stock may continue to grow thus creating a more than usually valuable fishery in the area if the closure is of sufficient duration. When the area re-opens this invites not only vessels displaced from closed areas but also extra fishing activity attracted by the enhanced quality and scale of the fishing. The effect on stock conservation for the future of the fishery is thus potentially disastrous as the apparent equilibrium is seriously disturbed.

While vessel owners can react to the economic implications of increased costs, they can do little individually to reduce overfishing for the same reasons that permit overfishing in other fisheries. This makes it difficult for the amount of fishing to be controlled in a crisis.

The consultation with industry representatives suggest that such behaviour has occurred as a result of vessels being displaced from closed grounds although there is some question as to whether there have been noticeable increases in the stocks in the closed areas during the closures. It might have been expected that the scallops would have been allowed to grow during the closures only to provide a better harvest when the fishery was re-opened. However, the length of some closures has been insufficient for a noticeable increase in size of individual shellfish, which have done most of their growing by the time they reach the minimum landing size of 100mm for the UK, except for 110mm for scallops from the Irish Sea (ICES sub-area VIIa). Both these impressions are supported by the landings figures for scallops for 1998 to 2000. The decline in each year after 1998 suggests that the closures reduced fishing rather than created an incentive to increase activity by virtue of larger stocks. It also suggests that fisheries which were open sustained some damage due to over-fishing which reduced the potential for future landings. There is some fear that the damage may be, if not permanent, at least long-lasting as the ground may be damaged.

Although overall levels of landings declined there was a clear shift in 1999 to landings on the East Coast, as the West was closed and a shift back towards the West Coast in 2000 as the bans became less extensive. In addition, evidence from 1999 suggest that vessels from Mull tended to move southwards to other grounds, initially in the Clyde and then into the Irish Sea, with landings being made into ports on the Cumbrian coast. In the past the Orkney vessels, which tend to be of a smaller length than others in the Highlands and Islands, have been constrained in where they could fish as an alternative and there was a greater likelihood of vessels having to tie-up.

It is normal for several Scottish vessels seasonally to work the English Channel but ASP forced more vessels to fishing there. However, this strategy does not necessarily provide the same returns. Returns for some of these vessels were poorer because of unsuitability of the vessels and a lack of knowledge of the grounds. It does not appear that all fishermen can simply move to other waters or other species and be confident that the same levels of return will be made.

Tables 3.5 and **3.6** analyse the volume, value and broad location of landings by Scottish vessels in Scotland and into the rest of the UK. As noted above, one strategy to fishing bans is to move elsewhere to fish and there is evidence from this data that in 1999 and 2000, in particular, this was the strategy adopted by a part of the sector.

Scottish vessels landed over 21% less scallops by weight and 11% less by value into the UK in 1999 compared to 1998. The reductions were higher for landings into Scotland (23.3% by volume) compared to landings by Scottish vessels in the rest of the UK (7.2% reduction). Scottish landings into the rest of the UK as a percentage of all Scottish landings into the UK was 13% in 1999 compared to 11% in 1998. This suggests that although there was relatively more effort put into fishing elsewhere in the UK the volume of landings still fell. Another indicator of increased effort by Scottish vessels outside of Scottish waters is revealed in the number of districts in the rest of the UK that reported Scottish landings. These stood at 15 Districts in 1998 rising to 16 in 1999. Overall this evidence suggests that although the intensity and extent of the bans were worse in 1999 the sector did not seem to respond by increasing their effort elsewhere. Alternatively, the sector did try but was not particularly successful in new waters.

This picture changes in 2000 when the volume and value of landings by Scottish boats into Scotland was still in decline (by 5% in volume terms and 4% in value terms) but there was a significantly greater effort by Scottish vessels in rest of UK areas with volumes landed by Scottish vessels in the rest of the UK increasing by 26% and values growing by over 45%. At the same time the number of Districts reporting landings by Scottish vessels increased from 16 in 1999 to 27. Similarly in 2001 there was a further increase in activity by Scottish vessels in rest of UK areas with landings of scallops worth over £4.5m, more than double the value in 1998 and 1999.

| Year | Scottish Vessels Landing in Scotland | | | Scottish Vessels Landing in Rest UK | | | Total Scottish Vessels Landing in UK | | |
|------|--------------------------------------|----------------|----------------|-------------------------------------|----------------|----------------|--------------------------------------|----------------|----------------|
| | Volume Change % | Value Change % | Price Change % | Volume Change % | Value Change % | Price Change % | Volume Change % | Value Change % | Price Change % |
| 1998 | 11.7 | 1.2 | -9.5 | 0.5 | -16.6 | -17.0 | 10.3 | -1.2 | -10.5 |
| 1999 | -23.3 | -12.2 | 14.4 | -7.2 | -2.5 | 5.0 | -21.4 | -11.1 | 13.1 |
| 2000 | -5.1 | -4.3 | 0.8 | 26.1 | 45.6 | 15.5 | -0.8 | 1.9 | 2.8 |
| 2001 | 16.3 | 25.9 | 8.3 | 112.5 | 49.3 | -29.8 | 33.2 | 30.1 | -2.3 |

| Year | Volume (tonnes) | Value (£,000) | Price (£/tonne) | As % of Value of Total Scottish Landings into the UK |
|------|-----------------|---------------|------------------|--|
| 1998 | 2,103 | 2,197 | 1,045 | 11 |
| 1999 | 1,952 | 2,142 | 1,098 | 13 |
| 2000 | 2,462 | 3,119 | 1,267 | 18 |
| 2001 | 5,232 | 4,656 | 890 ¹ | 21 |

1. Lower implied price in 2001 reflects the balance shifting from king to queen scallops and thus reducing the implied average price per tonne.

Many vessels hold scallop licences but do not use them, despite this fishery being untrammelled by quotas. This suggests that the fishery is operating at an economic equilibrium (which need not imply a permanent conservation equilibrium with steady stocks). For those vessels which fish for other species for some part of the year, or for those people for whom fishing is a part-time activity, it may be that scalloping provides the marginal return that keeps both activities viable. As such the implications of a loss of scalloping will be more severe than the size of the fishery suggests.

There are now reported⁵ to be some 150-200 divers compared to 300 or so only a few years ago. In Orkney the numbers have dropped from 60 to around 20. The divers have been the first to leave the industry as they have a low level of investment and are often part-timers with incomes from other sources. Often they have moved away from the area.

Certainly there is anecdotal evidence to support this with a number of divers in the Mull area moving away over the past two years and examples of existing diver operations scaling down to smaller vessels that support less divers. Similarly, in the Western Isles, divers have had to sell their product to processors rather than direct to the live market where higher prices would have been paid.

However, they have benefited from the shucking operation as they would have had no return for their product had the fishery been completely closed. Shucking, retrieval of the white meat and roe from the discarded shell and offal, has been permitted in some cases where provision of the entire shellfish has been prohibited. This is because, when the shellfish is affected by toxins, the white meat and roe are generally less toxic than the offal.

3.4 SURVEY OF FISHERMEN

Nine fishermen/skippers were interviewed by telephone. The respondents were based from Orkney to Campbeltown. Vessel sizes ranged from 12m to 26m with anywhere between 10 and 20 dredges. Crews ranged from 3 on the smaller boats to a minimum of 5 on the larger boats. Most of the vessels had a crew of 3 or 4. Larger boats seemed to be more likely to be dedicated to scallops whereas a number of the smaller boats also fished for prawns. In general scallops were essential to the viability of the vessel providing a steady income over winter.

The fishermen responded to the bans by either spending more time at sea travelling around trying to find open fishing areas or by switching species if they had the necessary licences. In general, the larger the vessel the further afield they were able to go. In some areas, smaller vessels were not able to travel too far afield and then when their areas were re-opened they were overrun with stranger vessels who effectively 'hammered' the grounds.

Estimates of reductions in earnings associated with the bans varied from 15% to 30% depending on whether they were able to recoup some of their losses by fishing for other species. It was also suggested that the larger vessels, in particular, were able to maintain their earnings by being able to travel further afield and because they would be fishing 24 hours a day, seven days a week.

⁵ Source: Scallops Association

While there was evidence of a number of vessels either switching to other species or leaving the sector, in general, the bans affected crews through reduced earnings rather than unemployment.

Although imposing the bans allowed a number of areas to increase their stock, when the bans were lifted the general view was that the grounds would attract 30-40 boats and be subjected to 'saturation' fishing that effectively destroyed the stock. In part this was because the boxes were being opened one at a time and therefore became the focus for fishing effort. A number of areas were described as being fragile with little evidence of younger scallops developing.

In terms of tiered testing the general view was that fishing for the whole scallop and white meat with roe were viable. However it was believed that a white meat only fishery would not be viable for the majority of vessels – only the very largest commercial boats would be viable. Basically the product loses around 30% of its value without the roe. Therefore to maintain the viability of the vessel would either require a 30% reduction in crew costs or a 30% increase in effort. It was felt that increasing the effort by 30% was not viable and would certainly put pressure on the stocks. Where possible (i.e. where the boat had the appropriate licence) white meat would be pursued but in conjunction with a greater effort on prawns. Obviously with a total ban vessels would either have to switch species or tie-up.

Finally, there were a number of views expressed about the desirability for introducing some form of stock conservation and management. This is especially important for the smaller vessels that fish 4/5 days a week in local waters and would be essential for the long term sustainability of local fishermen and small local communities.

3.5 PROCESSORS RESPONSE TO CLOSURE⁶

The reaction of processors to the closures has been mixed. Some of the smaller processors have been forced to close as their supplies have stopped. This has particularly been the case among the very small vertically integrated operations where the enterprise processed its own catch. For many, scallops provide only a relatively small proportion of their output and they have relied on their other products, especially crabs, to keep them going. They have not been able completely to transfer labour and other inputs into other species and so there have been job losses on a small if widespread scale and some loss of output in individual processors.

Larger processors have been able to source supplies from elsewhere, especially from the south-west of England, but one processor reported that while he had continued to be able to find supplies the situation had forced him to maintain links with more suppliers than he felt desirable, imposing lower than ideal sizes of shipment from each.

⁶ This section is based on interviews with three processors as well as with industry representatives.

The largest processors have managed to maintain production, if at lower levels, by importing supplies particularly from France.

| TABLE 3.7: UK FOREIGN TRADE IN SCALLOPS: 1998 – 2000 | | | |
|---|-------------|-------------|-------------|
| <u>Scallops: Fresh, Frozen & Chilled</u> | <u>1998</u> | <u>1999</u> | <u>2000</u> |
| Imports (Tonnes) | 480 | 832 | 609 |
| Imports (£m) | £3.4 | £5.3 | £3.7 |
| Imports Constant Prices ¹ (£m) | £3.1 | £5.4 | £3.9 |
| Exports (Tonnes) | 5353 | 5497 | 6653 |
| Exports (£m) | £31.6 | £27.9 | £29.9 |
| Exports Constant Prices ¹ (£m) | £27.3 | £28.1 | £34.0 |

¹ Average 1998-2000

Source: SFIA

The foreign trade figures for scallops set out in **Table 3.7** reflect clearly what has occurred. In 1998 the number of closures was relatively limited, but the extensive closures during 1999 led to a doubling of the quantity of imports. These subsequently declined, although to levels still some 27% higher than imports in 1998, as the number and duration of closures decreased in 2000.

However, it appears that the quantity of exports continued to rise throughout the period. The slight increase, only some 2%, in 1999 over the previous year appears to reflect the impact of the closures including the loss of the farmed production. Given the increase in exports of more than 20% from 1998 to 2000 a greater increase in 1999 might have been expected if the export market were growing smoothly. Further, if exports were held back in 1999, it is unlikely that the damage done would have been completely overcome within a year, and so the year 2000 figure may also still be reflecting some depression. The fact that the export market continued to grow despite the decline in Scottish landings and the shortfall for domestic processors is another indication that fresh Scottish-caught scallops are a premium product.

The deterioration in the balance of trade figures reflect a world decline in scallop prices of 10% in 1999 and 6% in 2000. The decline in prices experienced by UK exports was even greater at 14% in 1999 and 11% in 2000 perhaps showing some loss of confidence in the UK product.

While the values given in **Table 3.7** have been affected by price movements and foreign exchange fluctuations it is reasonable to conclude that the Scottish balance of external trade has worsened. Applying the mean value of the three-year period 1998 to 2000 suggests that the balance deteriorated by about £5m in 1999 as a result of the problems to supply caused by algal toxins. There appear to have been continuing losses since then though on a smaller scale, perhaps £2.5m in 2000. This decay in the impact implies a total cost to the end of 2000 of the current outbreak of algal toxins of about £7.5m to the balance of payments.

The rapid reversion in 2000 towards prior levels of imports reflects the reputation for premium quality enjoyed by Scottish produced and processed scallops. One processor expressed the view that he preferred locally caught scallops because he had greater control over the methods used in processing from the very beginning of the production chain, whereas with imports he could be forced to accept a product that might have been less well handled.

3.6 CONCLUSIONS

The majority of the closures around the Scottish coast have been caused by the presence of ASP toxins. The first closures occurred in 1997 for a limited period around Orkney. In 1998 more intensive closures occurred to the east of Orkney lasting between 200 and 300 days. However, it was during 1999 that extensive harvesting bans were applied around the Scottish Coast, with the West Coast of Scotland from Cape Wrath down to the Northern Irish Coast severely affected in terms of both the area covered by the bans and the length of the bans.

In 2000, the extent and duration of the bans were less than in 1999 with areas around Orkney and along the West Coast being most affected but with the number of days that areas were closed often being only half that of 1999. During 2001, while the geographic extent of closures further reduced the intensity (i.e. number of days closed) of the ban increased in a number of areas. The evidence for 2002 (to end-March) shows further reductions with only 18 boxes having been affected so far and currently bans are in operation in only six boxes.

The choices to the ban facing the different parts of the industry vary. For vessels these include moving to other areas, targeting other species, or laying-up (permanently or temporarily). For divers the options include moving to other areas or leaving the industry. For farmers they include accepting the loss of sales or closing. For processors they include reducing the scale of operations, sourcing from elsewhere in Scotland, the UK, or perhaps abroad, or closing.

Although overall levels of landings declined there was a clear shift in 1999 to landings on the East Coast, as the West was closed and a shift back towards the West Coast in 2000 as the bans became less extensive. There does not seem to be any evidence of a widespread departure from the fishery and it appears that there has been no shift in the base location of the fleet though it may well have been fishing in a different pattern dictated in part by the closures.

It is suspected, however, that the data does not reveal the true extent of the impact on the catching sector and consequentially on the downstream sectors. Most business enterprises faced with unfavourable trading conditions will soldier on, despite making losses, for as long as they can in order to preserve their trading links, sources of supply and customer goodwill, until times improve. In this respect fishing enterprises are no different from others and as a rough general rule they appear to be able to run with losses for about two years before their position becomes untenable in large numbers.

There are currently reported to be 150-200 divers compared to 300 or so only a few years ago. In Orkney the numbers have dropped from 60 to around 20. The divers have been the first to leave the industry as they have a low level of investment and are often part-timers with incomes from other sources.

The reaction of processors to the closures has been mixed. Some smaller processors have been forced to close as their supplies have stopped. For many, scallops only account for a relatively small part of their output and they have relied on other products, especially crabs, to keep them going. Larger processors have been able to source supplies from elsewhere, especially the south-west of England and the largest processors have maintained production, if at lower levels, by importing supplies particularly from France.

4 ECONOMIC IMPACT OF CLOSURES

4.1 INTRODUCTION

This chapter attempts to provide an indication of the scale of the economic impact of the scallop fishing closures on the scallop sector. In Chapters 2 and 3, data and analysis was presented that provided an indication of a range of facets of the impact of the closure on the sector. These included:

- ❖ Changes in the volume and value of scallop landings;
- ❖ Changes in landings by District reflecting changing fishing patterns;
- ❖ Estimates of fisheries employment dependent on scallops by District;
- ❖ Estimates of the number of vessels registered and actively engaged in harvesting scallops;
- ❖ Estimates of the impact on balance of payments; and
- ❖ Evidence of the impacts from consultations with sector representatives, fishermen, and harvesters/processors.

In addition, there is evidence of changes in vessel profitability and turnover/income that provides an indication of the ways and extent to which the sector is 'coping' in the short term – i.e. two-three year time horizon.

While there is no one simple and quantitative measure that provides conclusive evidence of the impact of the fishing bans, a general picture can be built up from this diverse range of evidence to provide a general picture of the impacts.

Despite the range of evidence, at this stage, the estimated impacts are only indicative. Further data is required to allow a more in-depth estimate. Some of this data is not yet available. It is likely that, if the extent and intensity of the bans continues to reduce, then the long term impacts, at least this time, may not have been as severe as first feared. This is not to deny that people have left the sector and that incomes and in some cases vessel and processor viability were adversely affected.

4.2 MULTIPLIERS USED FOR THE IMPACT ASSESSMENT

Table 4.1 reports the multipliers for Scotland to be used in the impact assessment.

| TABLE 4.1: MULTIPLIERS FOR UK AND SCOTLAND, SUPPLY-DRIVEN TYPE II | | | | |
|--|----------------|------------|----------|------------|
| | United Kingdom | | Scotland | |
| | Fishing | Processing | Fishing | Processing |
| Output | 3.90 | 3.59 | 1.87 | 1.35 |
| Income | 3.19 | 7.53 | 1.44 | 1.90 |
| Employment | 2.45 | 4.50 | 1.55 | 1.43 |

Source: SFIA¹

Supply-driven multipliers record the impact on the economy of a unit change in supply of a product through the influence of the downstream linkages whereby one sector of the economy sells to another. Supply in the primary producing sectors of an economy creates further supply downstream through the secondary and tertiary sectors by adding value through processing and distribution to the consumer.

Type II multipliers measure not only the direct impact of the supply within the initial industry and the indirect effects in the downstream industries, but also the induced effects caused by the impact on the economic behaviour of households in supplying labour.

The method of input-output analysis used for estimating the multipliers makes two main assumptions. First, that there are constant returns to scale; a given decrease of inputs leads to the same constant decrease in output. Secondly, that the proportions of input factors are fixed over time; there are no substitution effects between inputs arising from changes in their supply or demand.

For estimating supply-driven multipliers it is assumed additionally that the market is capable of absorbing the increased output at each stage of production which creates the downstream effects and that the distribution pattern remains unchanged; where an industry increases its output its customers each take a part of the increase proportionate to their previous purchases.

The values of the multipliers for Scotland are rather low compared to those for the United Kingdom as a whole because the Scottish fleet and processors export (from Scotland) a larger share of their output. This reduces the opportunity for creation of output and employment in the domestic economy. The employment multipliers for the catching sector are higher than those for processors because the catching sector is less labour-intensive than the processing sector. The generally lower values of the multipliers for Scotland compared to the rest of the UK are reinforced by the assumption, used in estimating the multipliers, that the value of sales by the catching sector directly to households was zero. This has been compounded by the use of partially closed models. The impact of these on the values of the multipliers is, nevertheless, minimal.

¹ Greig G (2000) Multiplier Values for the Fishing and Fish Processing Industries in the United Kingdom and in Scotland – An input-output analysis, SFIA, Edinburgh.

4.3 ESTIMATES OF EMPLOYMENT IMPACTS

A number of methods were explored to try and estimate the employment impacts attributable to the fishing bans. To do so requires that we have an estimate of the numbers of fishermen in the scallop sector and of changes in these numbers over time.

Estimates of the number of fishermen employed in scallop catching was made in **Chapter 2** by assuming that the share of total direct employment attributable to scallops within a District is identical to the species' share of total landings by value. However, such estimates depend on a range of 'heroic' assumptions including that all sectors of the fishing industry have the same output per head ratios; that jobs in the catching sector occur where vessels land rather than where they are based; and that output per head in the scallop sector is the same over time and space. The results of this method basically mirrored changes in landing patterns and did not provide any real indication of employment and employment changes in the sector.

An alternative approach involved relating employment to base rather than landing districts. This required knowledge of the number and size of vessels active in each base district and assuming average crewing levels by size of vessel. This methodology primarily suffered from the limited availability of the required data.

Finally, based on discussions with industry representatives and the survey of fishermen it was felt that more of the impact of the fishing bans would be manifested through changes in earnings rather than changes in employment. This is not to deny that vessels were tied up or sold and that fishermen were unable to remain in the sector. Rather it is likely that a more accurate picture can be built up by investigating changes in turnover and earnings.

4.4 ESTIMATES OF INCOME IMPACTS

In this section the impact on incomes associated with the harvesting bans are estimated based on more general data regarding vessel earnings. The Sea Fish Industry Authority has recently completed a review of its Costs and Earnings Survey, last published in the Fishermen's Handbook 1997/98. The data on scallops vessels is not strictly comparable with the earlier period as the new survey now divides the UK fleet into vessels on the West Coast of Scotland and those in the South West of England.

Although there are differences between the two regions, in general they are not too great and allow some comparison of the averages for a vessel. Average vessel earnings are down from £389,000 for the UK fleet in 1998/9 to £280,000 for the Scottish West Coast vessels in 2000/1 or a reduction of around 28% per vessel.

Table 4.2 below, estimates the impact of a range of reductions in earnings based on the value of landings by Scottish vessels into the UK in 1998 and 1999. The value of landings fell by around 11% over this period from £19.2m to £16.2m. This data is used to estimate the total income impact, although this will only relate to reduced income from lower prices. Based on the information from the survey of fishermen two further reductions of 15% and 30% are also estimated². These provide an

² The higher percentage reduction estimated from the survey of fishermen will include allowances for increased costs of fuel, effort and retaining crew and will thus reflect income net of costs.

indication of the potential impact within Scotland of the reduction in earnings of Scottish vessels.

TABLE 4.2: ESTIMATED INCOME IMPACT

| Reduction in Value of landings (%) | Value of Landings | | Change over 1998-1999 | |
|---------------------------------------|-------------------|--------|-----------------------|--------------------|
| | 1998 | 1999 | Income | Total ¹ |
| Actual (11%) | £19.2m | £17.1m | -£2.1m | -£3.0m |
| 15% | £19.2m | £16.3m | -£2.9m | -£4.2m |
| 30% | £19.2m | £13.4m | -£5.8m | -£8.4m |

(1) Income multiplier 1.44 (Table 4.1).

First, the reduction in earnings over the period is likely to be caused by a number of factors including reduced earnings arising from bans on harvesting scallops. Thus the estimates are likely to overestimate the income impact.

Second, a range of estimated impacts have been calculated. The lowest estimate is based on the actual reduction in the value of scallops landed by Scottish vessels into the UK. The other estimates reflect the range of income reductions identified in the survey of fishermen.

The loss in direct income is therefore estimated as being in the range £2.1m - £5.8m. Applying the Scottish income multiplier for fishing results in an estimated reduction in direct, indirect and induced income in the range of £3.0m - £8.4m.

4.5 CONCLUSIONS

Reviewing all of the evidence for the nature and scale of the impact of the scallop fishing bans associated with algal toxins the following conclusions can be drawn:

- ❖ There has been a significant impact in terms of reductions in the value of scallops landed in Scotland as a result of the fishing bans. The total value of landings into the UK by Scottish vessels fell by 11% between 1998 and 1999.
- ❖ The negative impact was primarily focused on West coast ports, with increases of landings at East coast ports in 1999 compared to 2000. This does not imply a reduction in fishing employment on the West coast although it will imply some local output impacts as stores, fuel etc are bought at East coast ports.
- ❖ While there appears to be evidence that the number of registered vessels over 10m that were landing king scallops in 1999 were some 8.6% down on 1998 (**Table 3.2**), other evidence (**Table 3.3**) points to similar numbers of vessels fishing for scallops over 1998 and 1999. Furthermore there is little evidence of vessels being sold and removed from scallop fishing as a result of the bans. However, more recently, evidence from fishermen themselves suggests that a number of vessels have been decommissioned or sold.
- ❖ Average vessel earnings are down from £389,000 for the UK fleet in 1998/9 to £280,000 for the Scottish West Coast vessels in 2000/1 or some 28% per vessel. At the same time, fuel costs have risen from 7.6% of earnings to 12.5%. As a result, owners' expenses are now £65,000 compared to £47,000 three years ago. This has meant a decline in profitability from 40% of earnings before depreciation and interest, an unsustainable and perhaps exceptional figure, to about 20%.

When depreciation and interest are taken into account this suggests that the West of Scotland fleet is currently just breaking even.

- ❖ Based on an income multiplier analysis, it is estimated that direct, indirect and induced income fell by £3.0m - £8.4m.
- ❖ Estimates suggest that currently there are around 150-200 scallop divers operating in Scotland compared to 300 a few years ago. There is anecdotal evidence that divers are the first to leave the industry with a scaling down in some diving operations evident.
- ❖ The reaction of processors to the closures has been mixed. Some smaller processors have been forced to close as their supplies have stopped. For many, scallops only account for a relatively small part of their output and they have relied on other products, especially crabs, to keep them going. Larger processors have been able to source supplies from elsewhere, especially the south-west of England and the largest processors have maintained production, if at lower levels, by importing supplies particularly from France.
- ❖ It has also been estimated (based on **Table 3.7**) that the Scottish balance of payments deteriorated by about £5m in 1999 as a result of the problems to supply caused by algal toxins. In addition, a further loss in the region of £2.5m is likely for 2000.

On balance therefore, it would appear that the Scottish scallop sector has survived the catching bans imposed because of the presence of algal toxins. There is some evidence that the number of divers has reduced. It is also likely that vessels have been operating on reduced profits and incomes which is possible in the short term but not sustainable in the long term.

5 FUTURE FOR THE SECTOR

5.1 INTRODUCTION

This chapter considers both possible future scenarios for the sector based on observed trends and the potential impacts on these trends of current and future Government and EU¹ interventions. The chapter also considers a number of potential interventions that could be considered by the government under various scenarios.

5.2 FUTURE OF THE SECTOR

Forecasting the future of the scallop fishery is bedevilled by the uncertainty currently surrounding the EU Directive on permitted levels of algal toxin, compounded by ignorance of the biological and ecological mechanisms in operation.

It may be that the surge in toxin levels which peaked in 1999 was an isolated occurrence and that the apparent decline in the numbers of closures since then is an indication that the problem will fade away and disappear at least for a few years. Alternatively, environmental conditions may have changed so that the toxins will now be a permanent feature of the fishery, albeit at varying levels.

Economic equilibrium appears to be limiting activity in the fishery by imposing the opportunity cost of fishing elsewhere as the minimum acceptable return for vessels. Vessels able to fish in other fisheries are hence doing so. The current decommissioning scheme may serve to remove some capacity from the scallop fleet. This will not correct the impact of the loss of fishing opportunities on employment for the redundant crews but may serve to provide an assisted departure from the industry for the vessel owners. Typically a scalloper has a crew of five, but may have any number from two to eight depending on the size of the vessel. For example, the 24 metre *King Explorer* launched in May 2001 to prosecute the queenie fishery from the Irish Sea north to the Western Isles, and owned by a large processor, has a crew of six².

The scallop fishery is specialised. Scallop gear is markedly different from *nephrops* and whitefish gear and there appears to be a steep learning curve for vessels wishing to switch to the other species. There are further barriers to what at first consideration would be an obvious move. Few species of economic importance other than shellfish can be fished without the necessary licence and quota. Among the shellfish only the fishery for crabs is large and it is by no means certain that there is room for extra capacity. Other “miscellaneous” are not important already because they are scarce. There are virtually none within the compass of most scalloping vessels which by virtue of their size cannot venture far out into the Atlantic.

The premium product for the market is the roe-on white meat, and the offal is used only occasionally (mainly in France and Belgium) for making soup.

¹ See Annex 1: “A Brief Guide to the Proposed Tiered System Sampling Regime for Testing Amnesic Shellfish Poisoning (ASP) Levels in King Scallops”, Food Standards Agency Scotland.

² *Fishing News*, 18th May 2001, pg 10

If the levels of toxicity were to continue to show the apparent oscillating decline since the 1999 peak, there may come a time when the industry could re-open the market for roe-on premium product.

This, however, is easier said than done. The example of the impact of the North Sea herring fishing moratorium from 1977 to 1983 must not be overlooked. When fishing was permitted on the herring stocks, which had substantially recovered, fishing enterprises found that they had little or no market left in the UK. The distribution channels for the fish had disappeared as those involved had had to find another way of making a living during the closure. In Holland a possibly more serious change occurred. The market for salted herring – a premium product – was destroyed and replaced only by one for frozen herring, considered inferior³. This could prove analogous to the situation facing Scottish scallops should the industry resort to supplying white meat only while the roe-on product is proscribed.

Given that there are few opportunities for vessels, divers or farmers to diversify, the white-meat only product will be a necessary resort to survive. The potential impact is therefore that the primary producers will experience lower grossings for their product if they are able to remain operational. Remaining operational will be all the more difficult with lower sales revenues. The processing sector will experience similar difficulties in loss of trading links and markets.

If the algal toxin problem simply subsides then the prospects for the fishery appear good. The damage to the grounds caused by excessive activity directed to open areas may not yet have reached an irreversible stage. Farming has been increasing its output and may continue to do so within the constraints of the sites available mainly on the west coast of Scotland.

If the problem persists and a white-meat market does not develop then the fishery, farms, and dependent on-shore activities all face a difficult future.

5.3 POSSIBLE FUTURE SUPPORT TO THE SECTOR

The impression exists that though there have been serious problems for the fishery the worst of the impact may have passed. However, there is currently insufficient evidence to be able to predict either that the problem has passed or that it will re-appear at the 1999 levels or worse. The effect to date has been two-fold; there has been a sharp fall in the numbers of divers, and there has been a loss of income to the other enterprises operating in the fishery and using its product.

The divers who have been lost have already found alternative work or left the locality where they fished. As such their position is irretrievable and they are no longer likely to be offered support. The damage to their communities has already been done and absorbed. To try to recover the previous position would be unrealistic.

The position of the surviving enterprises is less clear and really depends on future events both in the fishery and in government which are impossible to predict.

³ Smit W. (1988) 'The Dutch Herring Fishery: A Case Study of the Effects of Stock Management on the Structure of the Industry and its Market', *Proceedings of the 4th Biennial Conference of the International Institute of Fisheries Economics and Trade*, DIFER, Esbjerg, pp 757-761.

If the level of problems experienced in 1999 is gradually fading away, then it is possible to argue that they represented a normal business risk and that no further support is needed. If, instead, they continue then an assessment will be needed later in the year or even sometime in the next couple of years to consider the situation. Two factors preclude an assessment at present. It is not clear how severely the fishery will be affected by the introduction of trigger levels. This is because it is unclear whether the algal bloom phenomenon is temporary or permanent.

If a trigger is introduced, the situation may call for more rapid action to assist the communities affected. Industry representatives appear to think that a trigger level of 4.6 micrograms will lead to extensive closures of the fishery. If this is so then the pattern of behaviour noted in 1999 may be expected to continue; namely, demise of the weaker enterprises with the associated loss of employment and population in the sensitive areas, loss of output for the vessels and smaller processors, increased levels of importing to cover the shortfall in supply and a loss of value-added.

The question then arises as to the objectives of any support. Where the industry faces what is judged to be temporary difficulty, the objective will be to tide the industry over, maintaining its size and location and preserving the contribution it makes to local communities. Where the industry faces a new and permanent situation the objective will be to allow enterprises to diversify in order to create as little disruption as possible to local communities, if such an objective can be met with economically and politically tenable support.

One response to the closures has been generally observed. It is the concentration of fishing in newly re-opened areas. This has led to a congestion externality causing conflict of use between divers and scalloping vessels and potential damage to the future of the fishery by over-fishing. A solution to the conflict of use might be to reserve certain areas, say those within the three-mile limit, to divers and smaller vessels but such a measure would need to be carefully constructed. Too many divers or small vessels could cause as much of a problem of over-intensive fishing as larger vessels.

Given the current EU and UK fishery management system, an alternative would be to set a Fixed Quota Allocation. There would be some benefit in that these would limit fishing to what had been done in the past. At present FQAs could be set at levels which were not restrictive. However, since French vessels also prosecute the fishery and the agreement of the Council of Ministers would be needed, the problems in instituting such a measure appear insurmountable.

Farmers, like the smallest vessels, are unable to move location when toxins strike. However, the problem they face is of cash flow. Their production remains intact but its use is simply delayed. It might be possible to construct soft-loans as a temporary measure, if these could be made to correspond to EU rules, but great care would be needed to develop a system that correctly evaluated the length of closures. If these were underestimated the system would collapse.

Small Processors face an uncertain future particularly if they specialise in scallops. There is little that can be offered directly to assist. They would benefit most by seeing a continuing healthy local production of the raw material.

Larger Processors can continue to source scallops from imports if need be though there will continue to be a loss of value-added in so far as they are forced to do so. They also have the opportunity to concentrate on their other products though the contribution of scallops to their sales should not be dismissed as insignificant.

5.4 FUTURE SCENARIOS FOR THE SECTOR

To examine the potential future impact of algal toxins on those dependent on the scallop fishery, several scenarios are developed below which correspond to the presence of different levels of toxin in the shellfish.

Given the uncertainty surrounding future interpretation of EU Regulations and the potential for different management of the responses determining what levels of toxin could be described as high, medium or low is impossible.

A better way is to allow the impact on the fishery to define conditions since the impact of management measures may then be interpreted by the effect they have on the fishery and the final impact calculated from that point. Thus four potential levels of impact are envisaged:

1. Closure of the fishery
2. White meat-only fishery
3. Roe-on fishery
4. Whole shellfish fishery

These may be seen to correspond with the presence of high (1), medium (2), low (3) and negligible (4) levels of algal toxin.

A further question arises as to the nature of the problem. The levels of toxin present have potentially different impacts depending on whether the poisoning is permanent or temporary.

The impact of various frequencies and variabilities of the toxins threatens to impose an infinite number of scenarios. To constrain the analysis to a practical level we have assumed that closure of the fishery (1) and an open wholefish fishery (4) may be either a permanent or temporary, but that the roe-off and roe-on fisheries are only temporary in their nature. The potential impact for each of the sectors, their probable response, and the options for government are set out for each scenario below in Tables A to F.

It is assumed that a temporary wholefish fishery is the obverse of the temporary closures, roe-on and roe-off fisheries and hence no separate scenarios are developed for that situation. Similarly, there is no progression by stages from the wholefish fishery to temporary closures via roe-on and roe-off fisheries. Discussion of the impact of a permanently open wholefish fishery is deemed unnecessary for obvious reasons.

The Economic Impact of Algal Toxin Closures

| A. Permanent Closure of the Fishery | | | |
|--|--|---|---|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| Divers | Loss of output and of self-employed jobs. | Movement out of fishing, possibly relocation away from their localities. | Re-training and provision of start-up grants to encourage them to remain in localities. |
| Small Vessels | Loss of output compensated for by gains in whitefish and nephrops, subject to quota. Loss of some jobs, given that there is little room in other fisheries. | Switch to other species. If this is not viable leave fishing. | Decommissioning grants. Retraining for crews. Grants for conversion of vessels to other uses such as tourism, though the opportunities are limited. |
| Large Vessels | Loss of output compensated for by gains in whitefish and nephrops, subject to quota. Higher steaming costs. Loss of some jobs, given that there is little room in other fisheries. Less impact than for smaller vessels. | Switch to other areas. Switch to other species. Where these are not viable leave fishing. | Decommissioning grants. Retraining for crews. Grants for conversion of vessels to other uses such as tourism, though the opportunities are limited. |
| Scallop Farmers | Loss of output. Capital investment written off. Loss of jobs. | Closure. | Compensation. Retraining. |
| Small Processors | Loss of value added. Loss of jobs. | Closure. | Few options as often the same families as small vessels. |
| Large Processors | Loss of value added. Loss of premium product. | Import supplies. | None. |
| Local Communities | Loss of jobs and population in fragile areas. | Some multiplier effects. | Above. |

The Economic Impact of Algal Toxin Closures

| B. Temporary Closures of the Fishery | | | |
|---|--|--|---|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| Divers | Loss of some output. higher travelling costs and lower profits. More competition from vessels fishing inshore. | Switch to open areas. Temporarily cease fishing. If not viable or possible leave industry. | Re-training and provision of start-up grants to encourage them to remain in localities. |
| Small Vessels | If cease fishing, lower output and lower crew share. Exposed to fixed costs. If switching species, learning curve effects on output and lower comparative advantage. Lower profits. | Temporarily cease fishing. Switch to other species. If not viable leave industry. | Short term support is not an option owing to uncertainty of size of commitment. Otherwise as for permanent closure. |
| Large Vessels | Higher steaming costs. Learning curve effects on output and lower comparative advantage. If sufficiently widespread and frequent, possible negative conservation effects. Lower profits. | Switch to other areas. Switch to other species. Where these are not viable leave fishing. | Decommissioning grants. Retraining for crews. Grants for conversion of vessels to other uses such as tourism, though the opportunities are limited. |
| Scallop Farmers | Cashflow problems. Capital investment written off. Loss of jobs. | If severe leave industry. Decline in future investment and expansion. | Soft loans. Compensation if close. Retraining. |
| Small Processors | Severe disruption to market and risk of loss of customers. Loss of value added. | Temporary closure. | Few options as often the same families as small vessels. |
| Large Processors | Severe disruption to supply. Loss of premium product. | Import supplies. Maintain more suppliers than desirable. | None. |
| Local Communities | Loss of income and some jobs. | | Above. |

The Economic Impact of Algal Toxin Closures

| C. Permanent White Meat Only (Roe Off) Fishery | | | |
|---|---|--|--|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| Divers | Lower demand. Loss of sales revenue from lower prices. Lower profits. | Departures from the fishery. | Re-training and provision of start-up grants to encourage them to remain in localities. |
| Small Vessels | Lower demand. Loss of sales revenue from lower prices. Lower profits, many making losses. | Switching to other Scottish areas. Departures from the fishery. | Decommissioning. Retraining. |
| Large Vessels | Lower demand. Loss of sales revenue from lower prices. More activity and higher costs. Lower profits. | Switching to other areas. Departures from the fishery. Switching to other species. | Decommissioning. Retraining. |
| Scallop Farmers | Lower demand. Loss of sales revenue from lower prices. Lower profits, many making losses. | Widespread closures. | Compensation to remove debts and return to viability. Assistance with changing products. Retraining. |
| Small Processors | Lower demand. Lower profits, many making losses. | Seek marketing opportunities Widespread closures. Some switching to other species. | Assistance with marketing perhaps through SFIA. |
| Large Processors | Loss of value added. Higher costs and lower profits. Extreme difficulty in convincing buyers of virtues of a product only produced because rest of product is allegedly poisoned. | Imports. Switching to other species. | Assistance with marketing perhaps through SFIA. |
| Local Communities | Loss of income. Loss of jobs. | | Above. |

The Economic Impact of Algal Toxin Closures

| D. Temporary White Meat Only (Roe Off) Fishery | | | |
|---|---|---|---|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| Divers | Loss of sales revenue. Lower profits. | Departures from the fishery. | Re-training and provision of start-up grants to encourage them to remain in localities. |
| Small Vessels | Loss of sales revenue. Lower profits, some making losses. | Switching to other Scottish areas. Departures from the fishery. Switching to other species. | Decommissioning. Retraining. |
| Large Vessels | Loss of sales revenue. More activity and higher costs. Lower profits. | Switching to other areas. Switching to other species. | Decommissioning. Retraining. |
| Scallop Farmers | Cashflow problems. Unstable production and sales. Lower profits, some making losses. | Some closures. | Soft loans. Assistance with changing products. Retraining. |
| Small Processors | Lower demand. Lower profits, some making losses. | Seek marketing opportunities. Some closures. Switching to other species. | Assistance with marketing perhaps through SFIA. |
| Large Processors | Loss of value added. Higher costs and lower profits. Unstable trading relationships and problem of convincing buyers. Absence of a white meat market and no real desire to replace the normal roe-on market with a permanent inferior white meat market. | Imports. Switching to other species. | Assistance with marketing perhaps through SFIA. |
| Local Communities | Loss of income. Some loss of jobs. | | Above. |

The Economic Impact of Algal Toxin Closures

| E. Permanent Shucked (Roe On) Fishery | | | |
|--|---|-------------------------------|-------------------------------|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| <i>Divers</i> | Loss of sales revenue. Lower profits. | Departures from industry. | None. |
| <i>Small Vessels</i> | Small loss of sales revenue. Lower profits. | None. | None. |
| <i>Large Vessels</i> | Small loss of sales revenue. More activity and higher costs. Some reduction in profitability. | None. | None. |
| <i>Scallop Farmers</i> | Loss of sales revenue. | Some closures. | None. |
| <i>Small Processors</i> | Small gain sales revenue from extra supplies. | None. | None. |
| <i>Large Processors</i> | Small loss of sales revenue from loss of premium product. | None. | None. |
| <i>Local Communities</i> | Small loss of income. | | Above. |

The Economic Impact of Algal Toxin Closures

| F. Temporary Shucked (Roe On) Fishery | | | |
|--|---|------------------------------------|-------------------------------|
| <i>Sector</i> | <i>Impact on the Sector</i> | <i>Response of the Sector</i> | <i>Options for Government</i> |
| Divers | Loss of sales revenue. Lower profits. | Some departures from the industry. | None. |
| Small Vessels | Small loss of sales revenue. Lower profits. | None. | None. |
| Large Vessels | Small loss of sales revenue. More activity and higher costs. Some reduction in profitability. | None. | None. |
| Scallop Farmers | Small loss of sales revenue. Cash-flow problems. | Some closures. | None. |
| Small Processors | Slight gain in sales revenue from extra supplies. | None. | None. |
| Large Processors | Small loss of sales revenue from loss of premium product. | None. | None. |
| Local Communities | Small loss of income. | | Above. |

5.5 CONCLUSIONS – OPTIONS FOR GOVERNMENT

From the scenarios presented in Tables A to F it is clear that the options for government are often repeated. In essence they reduce to assisting the industry reach a soft landing in the face of an inevitable situation. It is not the business of this report to consider the normative aspects of closure measures but only to analyse their potential impact.

The options include offering retraining for those who lose their jobs, and this can probably be achieved under existing schemes since the numbers involved are relatively low and very widespread.

For the vessel owners, whatever the size of vessel, decommissioning grants would be an immediate help. Other options might include funding to assist in converting a vessel to other uses, though the availability of other uses is very limited. The Scottish Executive expects 11 dredgers with a scallop entitlement to take advantage of the current round of decommissioning, subject to the owners' final decision.

For the farmers, assistance with converting to other products may be necessary and assistance with cashflow problems through soft loans may be beneficial, subject to their being permitted by the EU as part of regional aid. Otherwise compensation for the lost capital investment may be appropriate.

There is little that can be done to help the processing sector apart from some assistance with finding markets for white meat only product if that becomes necessary.

Grants to assist start-ups in businesses outside the fish production sector would help some re-direct their efforts, and a contribution through the EU PESCA initiative or other EU sources may be available.

For most of these the liability of the government would be relatively small and finite. Only with a situation of continuing temporary closures might the government's liability be indeterminate.

ANNEX 1:

**A BRIEF GUIDE TO THE PROPOSED TIERED SYSTEM
SAMPLING REGIME FOR TESTING AMNESIC SHELLFISH
POISONING (ASP) LEVELS IN KING SCALLOPS**

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Introduction

The effects of the Commission Decision which provides for the introduction of a tiered approach to the harvesting and processing of king scallops from waters affected by Amnesic Shellfish Poisoning (ASP) are complex. This advice note is intended to provide a simple guide to the key points insofar as they relate to the sampling requirements.

Key Points

- ❖ **There will be no change in the action level in respect of end product testing. End product testing will, however, have to be carried out on every 'batch' of product harvested under the tiered system.** Producers will continue to be required to ensure that the products they place on the market do not exceed the existing action level of 20 micrograms (mg/kg) of Domoic Acid per gram of flesh.
- ❖ **The new trigger level (set at 4.6 mg/kg) applies only to official monitoring samples, and will be used to establish the processing conditions which will apply to king scallops harvested from different production areas.** The scientific justification for the use of trigger levels is that individual scallops from the same location may vary considerably in their toxicity. Therefore, by applying a trigger level, the risk of anyone consuming scallops products with high levels of toxin, i.e. above 20 mg/kg, due to variability is significantly reduced. This new control measure was also felt necessary because the tiered system allows for the harvesting of animals with much higher toxin levels than is currently permitted.
- ❖ **A new upper limit will operate which will require production areas to be closed if official monitoring indicates toxin levels greater than 250 mg/kg in the whole animal.** This was proposed to help control the potential risk to public health associated with possible cross contamination between the different parts of the scallop which may be processed under the tiered regime.
- ❖ **For harvesting boxes to remain open under the tiered system one sample per box is required within the time period of 1-7 days. If no sample is taken, then the given box will be closed due to lack of evidence of toxin levels.** Once closed, a box can then be opened again by the submission of two samples taken no less than 24 hours apart that are found to be below the required levels of toxin.

Summary of Main Conditions

End Product Testing

Every batch of scallop products processed under this regime must be end product tested by the processor. If the test result indicates toxin levels in excess of 20 mg/kg, then the batch in question must be destroyed.

Official Sampling and Monitoring

- If ASP levels in the whole animal are below 20 mg/kg of Domoic Acid per gram of flesh (the action level) then there will be no restrictions on fishing activity.
- If ASP levels in the whole animal are between 20-250 mg/kg of Domoic Acid per gram of flesh, the following conditions will apply:
 - Marketing of whole animals is prohibited;
 - If the toxin level in both the roe and the white meat is below 4.6 mg/kg, then both can be marketed;
 - If the level of toxin in the roe is 4.6 mg/kg or above, but the white meat is below then only the white meat can be marketed;
 - If the toxin level in both the roe and the white meat is 4.6 mg/kg or above, then no harvesting is permitted, i.e. the affected production area will be closed.
- If ASP levels in the whole animal exceed 250 mg/kg, then the affected production area will be closed.
- If no samples are taken between within 7 days of the previous sample, production areas will be subject to precautionary closure.

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