



## CONTENTS

<b>INTRODUCTION TO YEAR 2000 SURVEY</b> .....	<b>2</b>
PRODUCTION.....	3
TABLE 1 : Scottish shellfish production survey 2000. Regional production .....	3
FIGURE 1 : Company production 1991 – 2000 .....	4
TABLE 2 : Trends in production data for table and on-growing 1991-2000 .....	4
SITES AND COMPANIES .....	5
TABLE 3 : Registered and active companies 1991-2000 .....	5
TABLE 4 : Active and producing farm sites by region 2000 .....	5
FIGURE 2: Active shellfish farm sites by region 2000 .....	5
TABLE 5 : Number of companies by region and by species 2000 .....	6
TABLE 6: Company production by species 2000 .....	6
EMPLOYMENT .....	7
TABLE 7: Regional breakdown of employment .....	7
ENVIRONMENTAL AND HEALTH INFLUENCES ON THE INDUSTRY .....	7
<b>REGIONAL TRENDS IN PRODUCTION 1991 – 2000</b> .....	<b>8</b>
TABLE 8a-b: Regional Production 1991 - 2000 .....	9
FIGURE 3a-b : Regional Production 1991 - 2000 .....	9
TABLE 8c-e: Regional Production 1991 - 2000 .....	10
FIGURE 3c-e : Regional Production 1991 - 2000 .....	10
<b>SUMMARY</b> .....	<b>11</b>
GLOSSARY .....	12

## **INTRODUCTION TO THE YEAR 2000 SURVEY**

This report is based on an annual survey questionnaire of all registered Scottish shellfish farming companies. The cooperation of the shellfish farming industry is gratefully acknowledged.

Movement and production forms were sent to 189 companies registered as active before the survey. One hundred and eighty eight (99%) returns were received, the remaining company that could not be contacted made no contribution to production in 1999. A further company's production has been recorded in the survey although it had not been registered during 2000. Production returns were recorded from 176 companies, thirteen had ceased trading, and one 'wild' mussel fishery, registered as a shellfish farm has been excluded from this report.

The survey shows that 85 companies (48%) produced shellfish for sale, both for the table and for on-growing. The remaining 91 continued to operate, but had no sales during 2000. The number of active companies has decreased, from a peak of 229 in 1990 to 176 in 2000. These companies farmed 247 active sites, of which 132 (56%), from 158 in 1988, placed shellfish on the market.

DJ Pendrey  
DI Fraser  
July 2001

# PRODUCTION

The survey indicated that the shellfish species cultivated in Scottish waters in 2000 were:

<b>Common mussel:</b>	<b><i>Mytilus edulis</i></b>
<b>Pacific oyster:</b>	<b><i>Crassostrea gigas</i></b>
<b>Native oyster:</b>	<b><i>Ostrea edulis</i></b>
<b>Scallop:</b>	<b><i>Pecten maximus</i></b>
<b>Queen:</b>	<b><i>Chlamys opercularis</i></b>

Total production was dominated by mussels (2,003 tonnes) and Pacific oysters (247 tonnes). Small volumes of queens (58 tonnes), scallops (39 tonnes) and native oysters (4 tonnes) were also produced. The 2000 production data for each species by region is given in Table 1.

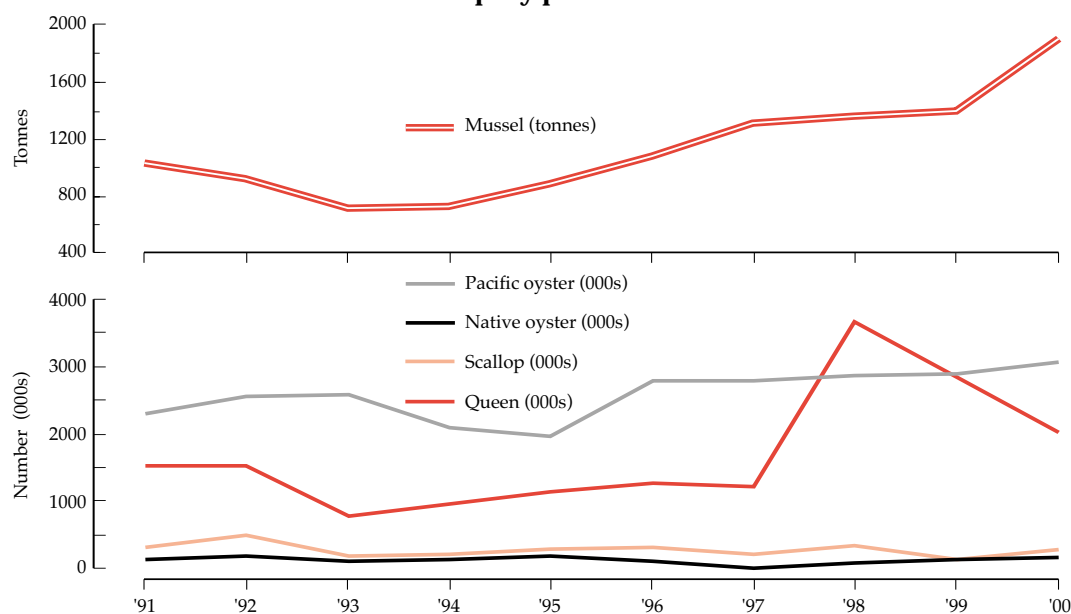
**TABLE 1 : Scottish shellfish production survey 2000. Regional production.**

Region	Companies	Pacific oysters (000s)		Native oysters (000s)		Mussels (tonnes)		Queens (000s)		Scallops (000s)	
		Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing
Highland	70	818	1,002	1	3	353	0	84	0	126	0
Orkney	11	25	0	0	0	0	0	0	0	0	0
Shetland	26	0	0	0	0	372	30	0	0	0	0
Strathclyde	62	2,241	313	50	0	1,080	0	2,000	0	197	9
Western Isles	21	4	0	0	0	198	3	0	0	0	0
<b>All Scotland</b>	<b>190</b>	<b>3,088</b>	<b>1,315</b>	<b>51</b>	<b>3</b>	<b>2,003</b>	<b>33</b>	<b>2,084</b>	<b>0</b>	<b>323</b>	<b>9</b>
<b>Weight (tonnes)</b>		<b>247</b>		<b>4</b>		<b>2,003</b>		<b>58</b>		<b>39</b>	

NB: These reports only list those regions from which annual survey returns were received.  
 Conversion to weight used the following assumptions: individual oysters averaged 80g; individual scallops averaged 120g;  
 individual queens averaged 40g.  
 On-growing = Sales for on-growing to other companies

Trends in production for the whole of Scotland are given in Table 2 for *table* and *on-growing* and for total production in Figure 1. Pacific oyster production increased by 7% as markets were maintained and demand remained high. Native oyster production decreased by 64% as the one major producer had an unforeseen marketing problem. Accounting for a small percentage of total oyster production, native oysters continued to supply a strong market. Mussel production increased by 43% as markets developed and prices remained high. Queen production decreased by 27%. Production of farmed scallops increased with the development of Several Order fisheries. Nine Several Orders have now been granted for scallop fisheries, seven for commercial companies, and two for companies involved in research and development (Fig. 2). This increase in scallop production is likely to continue over the next few years. Following consultation with growers and the Scottish Shellfish Marketing Group, it was revealed that markets were maintained and demand remained high.

**FIGURE 1 : Company production 1991 – 2000.**



**TABLE 2 : Trends in production data for table and on-growing 1991-2000.**

For the table	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	% increase 99-00
Pacific oyster (000s)	2,300	2,560	2,594	2,104	1,973	2,781	2,787	2,857	2,895	3,088	7
Native oyster (000s)	122	194	119	142	182	96	11	87	142	51	-64
Scallop (000s)	316	489	176	199	300	302	223	343	127	323	154
Queen (000s)	1,529	1,538	788	956	1,147	1,271	1,207	3,676	2,842	2,084	-27
Mussel (tonnes)	1,024	923	708	716	882	1,072	1,307	1,355	1,400	2,003	43

For on-growing	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Pacific oyster (000s)	2,310	1,217	1,849	1,313	2,165	3,580	1,264	750	502	1,315
Native oyster (000s)	1,080	202	207	33	112	23	55	154	1	3
Scallop (000s)	1,743	1,046	636	198	896	822	647	49	86	9
Queen (000s)	312	1,128	2,620	746	3,415	2,657	3,050	0	13	0
Mussel (tonnes)	30	73	131	12	<1	30	0	3	0	33

Prices of farmed shellfish fluctuated throughout the year, however, the value at first sale of the species cultivated was estimated. The price of Pacific oysters varied between 15 and 25 pence per shell; native oysters 50 pence per shell; scallops and queens 50-60 and five pence per shell respectively; and mussels between £800-£1,300 per tonne. Approximate value of the table trade based on these prices and the production figures (Table 1) would be:

<b>Mussel:</b>	<b>£1.56 – 2.53 million</b>
<b>Pacific oyster:</b>	<b>£0.46 – 0.77 million</b>
<b>Native oyster:</b>	<b>£0.03 million</b>
<b>Scallop:</b>	<b>£0.16 – 0.19 million</b>
<b>Queen:</b>	<b>£0.06 million</b>

The total value at first sale for all species in the region of £3 million.

## SITES AND COMPANIES

The number of companies registered as active increased by 25 during 2000 (Table 3), and the number of active sites decreased by 4% (Table 4). This trend reflects the closure of inefficient sites. Many unproductive sites held stock not yet ready for market, others were fallow, and some were positioned in remote areas where the cost-effective production and marketing of shellfish proved difficult.

**TABLE 3 : Registered and active companies 1991-2000.**

	Number of companies									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Registered	310	321	332	348	353	360	366	377	386	407
Active	228	214	205	196	190	187	170	171	151	176

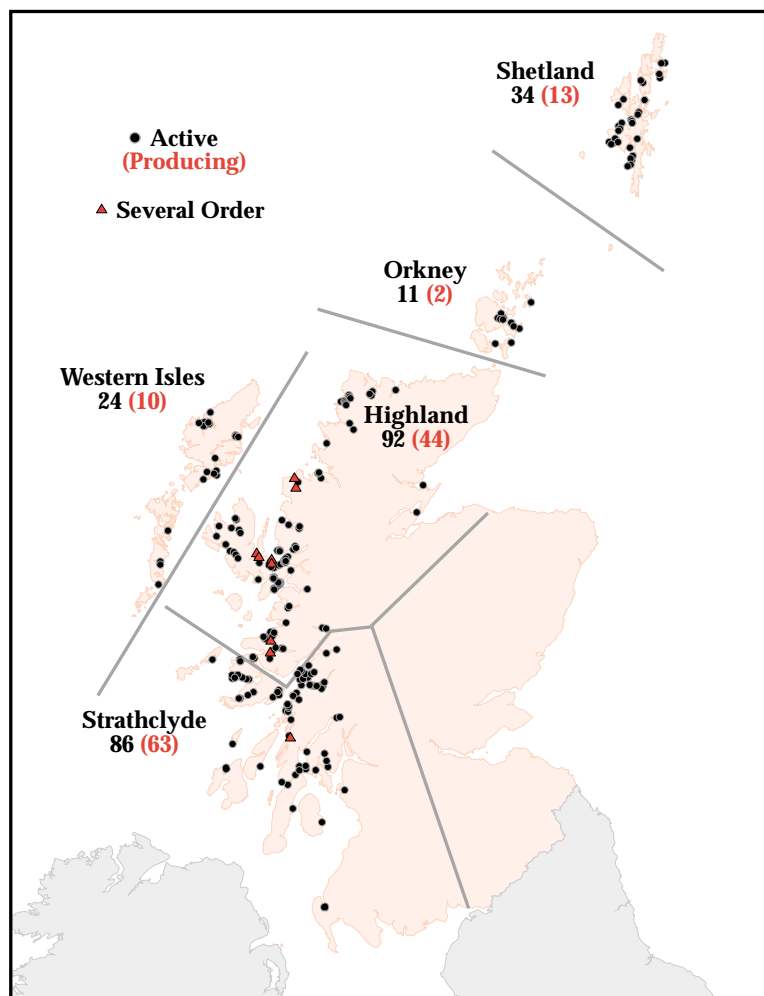
**TABLE 4 : Active and producing farm sites by region 2000.**

	Highland	Orkney	Shetland	Strathclyde	Western Isles	Total
<b>Sites</b>						
Active	92	11	34	86	24	247
Producing	44	2	13	63	10	132

Active = growing and placing on the market; Producing = placing on the market

The distribution of the shellfish production sites is shown in Figure 2.

**FIGURE 2: Active shellfish farm sites by region 2000.**



The regional distribution of active farm sites and those companies producing shellfish for sale is shown in Tables 3 and 4, and in Figure 2. Many companies cultivate more than one species on site (Table 5), a practice made possible by similar cultivation techniques. For example, scallops are grown together with queens, Pacific oysters with native oysters and mussels with Pacific oysters.

**TABLE 5 : Number of companies by region and by species 2000.**

a) **Production for the table**

	Region					Total
	Highland	Orkney	Shetland	Strathclyde	Western Isles	
Pacific oyster	9	1	0	25	1	36
Native oyster	1	0	0	1	0	2
Scallop	8	0	0	4	0	12
Queen	3	0	0	1	0	4
Mussel	12	0	10	14	4	40
<b>Total</b>	<b>33</b>	<b>1</b>	<b>10</b>	<b>44</b>	<b>5</b>	<b>94</b>

b) **Production for on-growing to other producers**

	Region					Total
	Highland	Orkney	Shetland	Strathclyde	Western Isles	
Pacific oyster	1	0	0	2	0	3
Native oyster	1	0	0	0	0	1
Scallop	0	0	0	1	0	1
Queen	0	0	0	0	0	1
Mussel	0	0	1	0	1	2
<b>Total</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>7</b>

c) **No production but actively on-growing**

	Region					Total
	Highland	Orkney	Shetland	Strathclyde	Western Isles	
Pacific oyster	11	3	3	5	1	23
Native oyster	2	2	0	5	2	11
Scallop	14	4	2	7	2	29
Queen	14	1	2	4	1	22
Mussel	19	4	9	9	8	49
<b>Total</b>	<b>60</b>	<b>14</b>	<b>16</b>	<b>30</b>	<b>14</b>	<b>134</b>

Note: a company may produce more than one species

**TABLE 6: Company production by species 2000.**

Species	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	>100	Total
Pacific oyster (000s)	17	2	2	3	1	0	1	0	2	1	7	36
Native oyster (000s)	1	0	0	0	1	0	0	0	0	0	0	2
Scallop (000s)	5	3	2	0	0	0	0	0	1	1	0	12
Queen (000s)	1	0	1	0	1	0	0	0	0	0	1	4
Mussel (tonnes)	16	6	0	2	3	1	3	1	1	0	7	40
<b>Total</b>												<b>94</b>

## EMPLOYMENT

The industry employed 138 full-time and 225 part-time workers during 2000, an increase of 18% over the previous year. The regional breakdown of employment is given in Table 7.

**TABLE 7 Regional breakdown of employment.**

Region	Companies	Staff		
		Full-time	Part-time	Casual
Highland	70	36	43	22
Orkney	11	6	3	8
Shetland	26	16	21	16
Strathclyde	62	67	50	38
Western Isles	21	13	18	6
<b>All Scotland</b>	<b>190</b>	<b>138</b>	<b>135</b>	<b>90</b>

## ENVIRONMENTAL AND HEALTH INFLUENCES ON THE INDUSTRY

Approved Zone status for the notifiable diseases *Bonamia* and *Marteilia* was maintained in 2000 (under EC Directive 91/67) after testing confirmed the absence of these diseases in Scottish waters. Samples were taken from 10 sites holding native oysters, a species known to be susceptible to these shellfish diseases. Approved Zone status continued to offer benefits to both wild and farmed native oyster stocks in Scottish waters.

EC Council Directive 95:70 maintains that minimum community measures for the control of certain diseases affecting bivalve molluscs are in place. A third of all shellfish sites are visited annually by the FRS Fish Health Inspectorate under this Directive. On these visits facilities, stocks, registration details, movement and mortality records will be inspected. It is the responsibility of farmers to inform FRS of any abnormal, unexplained mortalities on their sites.

Statutory marine biotoxin monitoring in Scotland continued during 2000. Examination of more than 3,675 shellfish flesh, and 646 phytoplankton samples from 38 sites revealed the presence of paralytic shellfish poisons (PSP), diarrhetic shellfish poisons (DSP) and amnesic shellfish poisons (ASP) in most of the important shellfish growing regions. Voluntary Closure Agreements (VCAs) were agreed, and Food and Environment Protection Act 1985 (FEPA) closure orders were imposed in scallop aquaculture and important scallop fishing grounds. The ASP problem continued to the end of the year.

Classification of bivalve mollusc production areas continued during 2000 under The Food Safety (Live Bivalve Molluscs and Other Shellfish) Regulations 1992, and areas were classified either A, A/B Seasonal, B, or C respectively. There are currently some 20 approved depuration systems: seven small scale oyster purification plants; six bulk bin systems for mussels; and seven medium-sized plants for the depuration of mussels or oysters. In an attempt to meet the End Product Standard at all times, the main buyers demand that all marketed stocks be depurated, including those classified as A (where purification is not essential).

## **REGIONAL TRENDS IN PRODUCTION 1991 – 2000**

Regional trends in production between 1991 and 2000 are given in Table 8a – e and Figures 3a – e.

### **Mussels**

In Scotland there has been a steady increase in the production of mussels over the last seven years. Strathclyde has been the most productive region with annual tonnage almost trebling since 1993, from 338 tonnes to over 1,000 tonnes. Shetland has seen a considerable growth in mussel culture over the last 5 years, with production rising from 10 tonnes in 1996, to 372 tonnes in 2000. Highland region has seen a general increase in production over the last ten years to 353 tonnes in 2000. In the Western Isles, 198 tonnes were produced in 2000, a recent increase, following a decline since 1996. Production in Orkney has declined from 50 tonnes in 1993 to nothing in the year 2000.

### **Pacific oysters**

Over the last 10 years the production of Pacific oysters in Scotland has gradually increased from 2.3 million shells to over 3 million in the year 2000. Strathclyde has consistently been the most productive region, currently generating over 70% of Scottish production. Production in the Highland region has fluctuated considerably, recently rising to 800,000 shells in 2000, representing over 25% of Scottish production. Orkney has seen production of Pacific oysters drop from almost 250,000 shells in 1993 to only 25,000 shells in 2000. In Shetland production has been low, with no production in 2000.

### **Queens**

In Scotland over the last eight years production of queens has generally increased from almost 0.8million shells in 1993 to over 2 million in 2000, from a peak of 3.7 million shells in 1998. Strathclyde dominates production of queens, generating over 95% of Scottish production. In the Highland region production has fallen from over 300,000 shells in 1991 to some 80,000 shells in 2000. In the remaining three areas production was low.

### **Scallops**

Scallop production in Scotland over the last ten years has been low, with current production being 323,000 shells. However, in both Strathclyde and Highland regions, there have been recent increases with the development of Several Order fisheries in those areas.

### **Native Oysters**

During the last decade few sites have cultivated native oysters and production has been low.



# PRODUCTION REGIONS

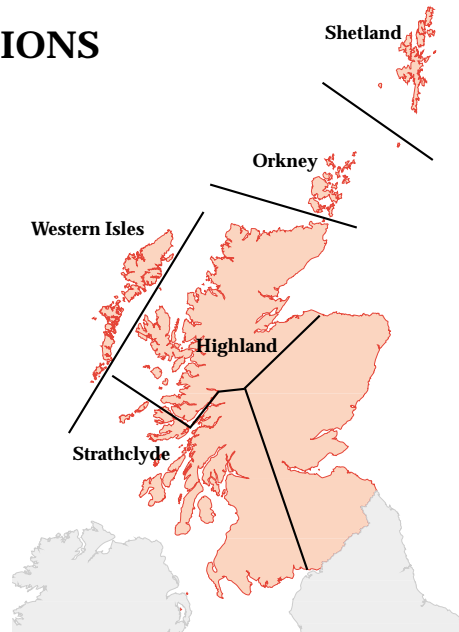
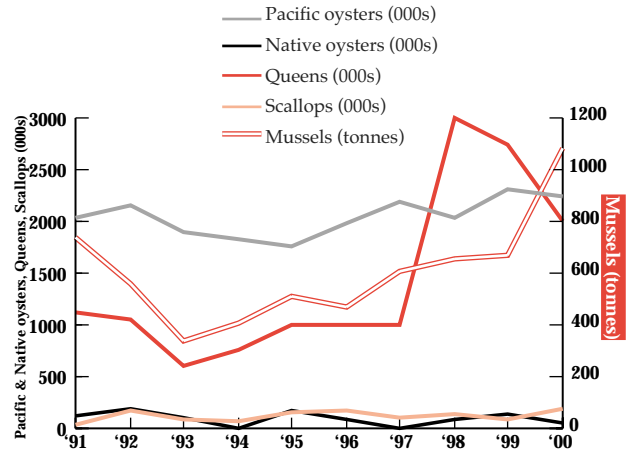


TABLE 8a-e : Regional Production 1991 - 2000.

FIGURE 3a-e : Regional Production 1991 - 2000.

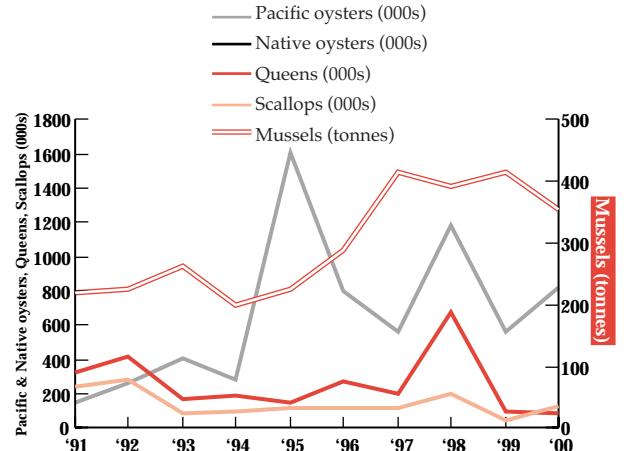
## a) Strathclyde Production 1991 - 2000.

Year	Pacific oysters (000s) Table	Native oysters (000s) Table	Mussels (tonnes) Table	Queens (000s) Table	Scallops (000s) Table
1991	2,036	121	737	1,120	39
1992	2,165	194	560	1,050	172
1993	1,904	109	338	605	87
1994	1,836	11	411	761	79
1995	1,764	181	509	1,000	163
1996	1,982	92	468	1,000	180
1997	2,187	11	609	1,000	110
1998	2,043	82	653	3,000	139
1999	2,306	139	670	2,750	85
2000	2,241	50	1,080	2,000	197
<b>Total Produced</b>					
1991-2000	<b>20,464</b>	<b>990</b>	<b>6,035</b>	<b>14,286</b>	<b>1,251</b>
Weight (tonnes)	<b>1,637</b>	<b>79</b>	<b>6,035</b>	<b>546</b>	<b>150</b>



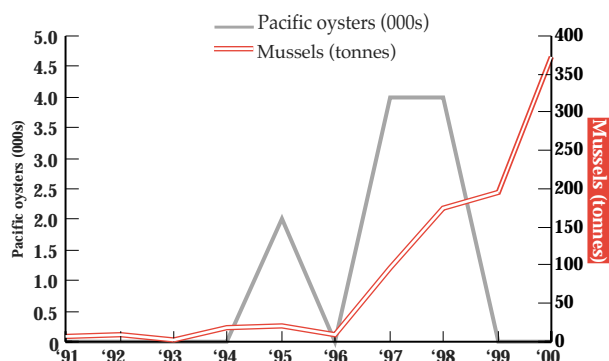
## b) Highland Production 1991 - 2000.

Year	Pacific oysters (000s) Table	Native oysters (000s) Table	Mussels (tonnes) Table	Queens (000s) Table	Scallops (000s) Table
1991	152	1	218	328	246
1992	264	0	226	413	278
1993	410	0	261	171	89
1994	283	1	199	194	92
1995	1,603	0	226	145	117
1996	797	4	287	270	122
1997	564	0	414	205	113
1998	1,182	5	391	676	204
1999	563	3	415	92	42
2000	818	1	353	84	126
<b>Total Produced</b>					
1991-2000	<b>6,635</b>	<b>14</b>	<b>2,990</b>	<b>2,577</b>	<b>1,428</b>
Weight (tonnes)	<b>531</b>	<b>1</b>	<b>2,990</b>	<b>103</b>	<b>171</b>



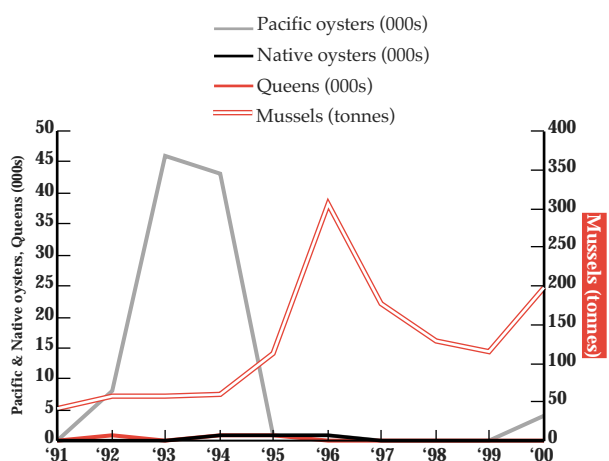
### c) Shetland Production 1991 - 2000.

Year	Pacific oysters (000s) Table	Native oysters (000s) Table	Mussels (tonnes) Table	Queens (000s) Table	Scallops (000s) Table
1991	0	0	6	0	0
1992	0	0	10	0	0
1993	0	0	2	0	0
1994	0	0	19	0	0
1995	2	0	21	0	0
1996	0	0	10	0	0
1997	4	0	96	0	0
1998	4	0	175	0	0
1999	0	0	196	0	0
2000	0	0	372	0	0
<b>Total Produced</b>					
<b>1991-2000</b>	<b>10</b>	<b>0</b>	<b>906</b>	<b>0</b>	<b>0</b>
<b>Weight (tonnes)</b>	<b>1</b>	<b>0</b>	<b>906</b>	<b>0</b>	<b>0</b>



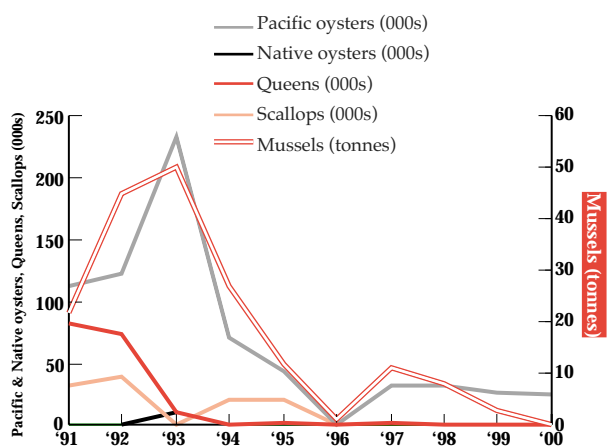
### d) Western Isles Production 1991 - 2000.

Year	Pacific oysters (000s) Table	Native oysters (000s) Table	Mussels (tonnes) Table	Queens (000s) Table	Scallops (000s) Table
1991	0	0	41	0	0
1992	8	0	58	1	0
1993	46	0	58	0	0
1994	43	1	60	1	0
1995	1	1	114	1	0
1996	1	1	306	0	0
1997	0	0	177	0	0
1998	0	0	128	0	0
1999	0	0	116	0	0
2000	4	0	198	0	0
<b>Total Produced</b>					
<b>1991-2000</b>	<b>103</b>	<b>3</b>	<b>1,256</b>	<b>3</b>	<b>0</b>
<b>Weight (tonnes)</b>	<b>8</b>	<b>&lt; 1</b>	<b>1,256</b>	<b>&lt; 1</b>	<b>0</b>



### e) Orkney Production 1991 - 2000.

Year	Pacific oysters (000s) Table	Native oysters (000s) Table	Mussels (tonnes) Table	Queens (000s) Table	Scallops (000s) Table
1991	112	0	22	82	32
1992	123	0	45	74	39
1993	233	10	50	11	0
1994	71	1	27	0	20
1995	44	1	12	2	20
1996	0	0	1	1	0
1997	32	0	11	2	0
1998	32	0	8	0	0
1999	26	0	3	0	0
2000	25	0	0	0	0
<b>Total Produced</b>					
<b>1991-2000</b>	<b>698</b>	<b>12</b>	<b>179</b>	<b>172</b>	<b>111</b>
<b>Weight (tonnes)</b>	<b>56</b>	<b>1</b>	<b>179</b>	<b>7</b>	<b>13</b>



## SUMMARY

### The 2000 survey has shown:

- Mussels and Pacific oysters are the main species produced in terms of value and tonnage;
- A small reduction in the number of producing sites;
- That only 53% of active sites produced shellfish for table sales;
- That manpower increased with an increased production;
- An increase in production of Pacific oysters;
- A substantial increase in the production of mussels;
- A substantial increase in the production of scallops although scale of production remained low;
- A decrease in the production of queens and native oysters;
- That approved zone status for the diseases *Bonamia* and *Marteilia* was maintained during the year;
- That the industry is still dominated by small producers, although a few large companies contribute significantly to the annual production of all species.

**The market for all species appeared to be buoyant and prices remained stable throughout the year. It is predicted that production will continue to increase steadily over the next few years.**

## REGIONAL TRENDS 1991 – 2000

**Trends over the last ten years have shown a significant increase in the production of mussels and Pacific oysters, whereas that of scallops and native oysters has been consistently low. Queen production has varied due to fluctuations in production by individual, large producers. Mussel and Pacific oyster growers have developed the ability to increase scale of production, driven by a healthy demand and increased price for these species. This is particularly true of mussels, owing to poor recruitment to certain European beds. The development of marketing groups in recent years has also led to increased production, notably in mussel production within Strathclyde and Shetland. A healthy demand has allowed niche markets to be developed for sales of scallops, queens and native oysters.**

# GLOSSARY

## Classification Categories and Criteria

*Production areas have been classified according to the following categories and criteria —*

<b>Category A</b>	Less than 230 <i>E.coli</i> /100g flesh or Less than 300 faecal coliforms/100g flesh	<i>May go direct for human consumption if End Product Standard met.</i>
<b>Category B</b>	Less than 4,600 <i>E.coli</i> /100g flesh (in 90% of samples)	<i>Must be depurated, heat treated or relayed to meet Category A requirements.</i>
<b>Category C</b>	Less than 60,000 faecal coliforms/100g flesh	<i>Must be relayed for long periods (at least two months) whether or not combined with purification, or after intensive purification to meet Category A or B.</i>
	Above 60,000 faecal coliforms	<i>Unsuitable for production.</i>
<b>Active</b>	Farms in a production growing cycle which may contain stock or be fallow.	
<b>Inactive</b>	Farms not in a production cycle, without stock and not to be used by the company again.	
<b>End Product Standard</b>	A requirement to be met before a product can be marketed.	
<b>Severed Order</b>	Application to sever an area of the sea-bed from the public right to fish which prohibits the use of demersal fishing gear, in order to conserve or enhance named shellfish stocks.	
<b>Voluntary Closure Agreement</b>	A temporary closure of a fishery, agreed between the Scottish Executive Rural Affairs Department (SERAD) and farmer(s), to cease harvesting shellfish for human consumption.	