

CEM.

ANNUAL SURVEY OF FISH FARMS - 1990

Your attention is drawn to a revised edition of
the survey due to the late inclusion of
some returns in the smolt data



REVISED REPORT OF THE SOAFD ANNUAL SURVEY OF FISH FARMS FOR 1990

Responses to a Departmental questionnaire from Scottish rainbow trout and salmon farming companies are summarised in the following paragraphs and attached Tables 1-15. The cooperation of the fish farming industry in completing these questionnaires is gratefully acknowledged.

RAINBOW TROUT

A total of 59 returns were received including five from companies which had no trout production in 1990. Returns received from the remaining 54 companies (59 in 1989) operating 71 farm sites (82 sites in 1989) showed that trout production was 3,182 tonnes (3,512 tonnes in 1989) a decrease of 330 tonnes (9.3%) on the previous year. Some 1,015 tonnes (1,123 tonnes in 1989) of production were fish greater in weight than 1 lb and 431 tonnes (475 in 1989) were used for restocking angling waters.

Comparison by system of production showed that ponds and raceways produced 1,090 tonnes (1,166 tonnes in 1989); fresh water tanks produced 366 tonnes (382 in 1989); fresh water cages produced 1,188 tonnes (1,482 in 1989); and sea cages produced 537 tonnes (482 in 1989).

Purchases of fry and fingerlings totalled 13.3 million (9.32 in 1989). Of the purchased fish 10.6 million (6.77 in 1989) were all female and 0.45 million (0.1 million in 1989) were triploids. A total of 28.68 million ova were laid down for hatching (29.62 million in 1989)

comprising 3.4 million from own broodstock, 9.1 million from other UK farms and the rest imported under licence from foreign sources. Of these ova 21.42 million (16.40 in 1989 and 12.8 million in 1988) were all female. The manpower employed was 138 full time and 68 part time (151 and 83 respectively in 1989).

Analyses of production by region shows that Dumfries and Galloway has most trout production followed by Strathclyde.

The reduction in the tonnage of trout harvested last year may have been due to a fall in demand rather than a shortfall in supply. It is therefore likely that these fish are still growing and that the shortfall will be recouped next year.

ATLANTIC SALMON - SMOLTS AND OVA

A total of 86 returns were received showing 176 sites (168 in 1989) of which 152 were in operation comprising 66 cage sites and 86 tank sites (70 and 98 respectively in 1989). Production of smolts was 24.875 million (25.825 in 1989) of which 23.067 million were S1's and 1.808 million were S2's (23.97 and 1.85 respectively in 1989). Some 9.970 million (41.11% compared to 36.4% in 1989) were sold. Anticipated production in 1991 is 24.060 million (compared to estimates of 28.011 million last year). Estimates for 1992 are 26.363 million indicating a plateau in production. Movements of fry and parr into and out of farms were 34.883 and 27.421 respectively.

Numbers of ova laid down for hatching were 64.559 million (35.3 in 1989; corrected value) of which 0.6 million were of Scottish wild stock (3.67 million in 1989) the rest were from farmed stock. It is estimated 50.406 million ova will hatch in 1991. Numbers of ova stripped were estimated at 224 million. The vast majority of these are rejected but a small proportion are exported. The number of sites vaccinating fish was 59 (65 in 1989 and 29 in 1988).

Comparing smolt production by region shows Highland (14.10 million) well ahead of the nearest rivals Strathclyde (4.89 million) and the Western Isles (3.37 million) followed by England and Shetland (1.3 and 1.2 million respectively). Numbers of staff employed were 285 full time and 93 part time (330 and 87 respectively in 1989).

ATLANTIC SALMON PRODUCTION

A total of 171 companies contributed (176 in 1989) of which seven indicated no production. Some 298 sites were in operation and 47 not in use. Production was 32,350 tonnes (28,553 in 1989). The return showed that 17,459 tonnes comprising 7.683 million fish, average weight 2.27 kg, were from the 1989 smolt intake and 14,891 tonnes comprising 5.382 million fish average weight 2.77 kg were from the 1988 smolt intake.

The results show a further and large drop in the mean weight of salmon from 3.156 to 2.766 kg. The reasons for this may be a mixture of marketing decisions based on the need for cash flow and the urge to remove marketable fish before disease reduces numbers. Grilse and pre-salmon weights were similar to last year. Survival of salmon was similar to last year but grilse and pre-salmon survivals were again very significantly reduced from

37.7% to 32.2%. The overall survival for the 1988 year class of smolts was 63.4% compared to 65.5% for the 1987 year class and it is estimated that survival in the 1989 year class will be approximately 58%. The combination of the bacterial disease furunculosis and lice infestation are the major causes of this loss. Grilse percentages for the 1988 smolt class and estimates for the 1989 smolt class were the lowest on record at 22% and 21% respectively. The estimated production for 1991 is 33,000 tonnes and 31,500 for 1992. Loss of confidence in the market for salmon and fears about the inability to control disease are believed to be major factors for the projected plateau in production.

Production by region shows that Highland is the biggest producer with 47.6% followed by Shetland at 20.0%. Shetland produces the biggest fish in all categories, grilse, pre-salmon and salmon suggesting that more northern waters favour salmon growth. Production by tonnage per site shows that sites producing >500 tonnes (14) produced the greatest proportion at 32.3% with sites producing 100-200 tonnes second producing 25%. Although fallowing of sites to allow year class separation is strongly recommended for disease control purposes only 64 of 286 (22%) sites recorded such an action. In fresh water cage culture of 46 responses 29 (63%) used fallowing periods. Some 35 sites produced broodstock (44 in 1989). Staff employed were 1,165 full time and 326 part time (1,102 and 316 respectively in 1989).

Some 21.4 million smolts were placed in sea water (23.8 million in 1989) of which 1.1 million came from England (a 94% increase from 1989). Smolt numbers were for S1's 19.5 million (91%) and for S2's 1.8 million (9%) similar to 1989 ratios.

For the immediate future salmon production is likely to plateau. Losses from disease and a continuing uncertainty about disease control coupled with poorer market conditions are important influencing factors. It is probable that some significant alleviation of the former can be anticipated in the shorter term but there is less certainty about improvements in the latter.

TABLE 1

Rainbow trout production - 1990 data

No of companies	No of sites*	Staff		
		Full time	Part time	Total
59	82	138	68	208

* 11 sites not in production

Egg sources and numbers ('000s)

Own broodstock	Other UK farms	Foreign	Total	All female	Triploids
3,451.50	9,074.80	16,155.00	28,681.30	21,424.80	860.00

Fry and fingerlings ('000s)

Bought	All female	Triploids	Sold
13,307.50	10,596.50	450.00	13,605.50

Production (tonnes)

Table	Restocking	Total	Fish >1 lb
2,751.55	431.15	3,182.70	1,014.90

Use of vaccines
27

TABLE 2

Rainbow trout production by region

Region code	Staff		Eyed eggs ('000s)			Ova all female	Total production (tonnes)		Fish >1 lb (tonnes)	Vaccines used
	F/T	P/T	Own	UK	Foreign		Table	Restocking		
Borders	6	3	1,212	330	-	330	270.0	4.0	4.0	1
Central & Fife	18	15	-	-	-	-	304.3	91.0	95.8	2
Dumfries & Galloway	27	13	1,065	1,600	7,165	6,725	733.8	180.4	79.5	5
Grampian	4	7	20	110	-	100	16.9	8.9	6.5	-
Highland	13	7	-	116	50	91	471.8	16.0	273.6	2
Lothian	6	3	225	360	200	360	25.0	36.5	51.0	-
Strathclyde	47	13	850	1,335	900	2,685	756.9	47.5	483.5	11
Tayside	17	7	-	5,224	7,840	11,074	159.9	46.9	21.0	6
Western Isles	1	-	80	-	-	60	13.0	-	-	-
All Scotland	139	68	3,452	9,075	16,155	21,425	2,751.6	431.1	1,014.9	27

TABLE 3

Analysis of rainbow trout farms by system and scale of production

System	Production (tonnes)							Totals			
	0*	<10	10-25	26-50	51-100	101-200	>200	Tonnes	>1 lb	Number of sites*	% contribution
FW cages	3	2	2	1	1	2	3	1,188.04	350.30	14	37.33
FW ponds and raceways	7	3	4	4	4	4	0	1,090.72	145.50	26	34.27
FW tanks	14	11	5	1	3	0	0	366.94	132.75	34	11.53
SW cages	1	2	1	1	2	0	1	537.00	386.35	8	16.87
All methods	25	18	12	7	10	6	4	3,182.70	1,014.90	82	100.00

* includes 11 sites not in production

TABLE 4

Atlantic salmon ova and smolts - 1990 data

No of companies	No of sites	Staff		
		Full time	Part time	Total
86	176	285	93	378

* 21 sites not in operation

Method of production

41,000

	No	Total capacity (cubic metres)	Production ('000s)
Tanks	86	140,950	11,974
Cages	66	223,519	12,901

Eggs produced ('000)

224,416

Egg sources and numbers ('000s) laid down for hatching

Own broodstock	Other UK farms	UK wild	Foreign	Total	Estimate 1990-91
38,643	25,292	624	-	64,559	50,406.5

Movements of fry and parr ('000s)

In	Out
34,883.6	27,421

Use of vaccines

59

Smolt production ('000s)

Produced as			Sold as		
S1	S2	Total	S1	S2	Total
23,066.50	1,808.3	24,875	9,276.6	693	9,970.10

Estimated production ('000s) - 1991

S1	S2	Total
23,376.30	682.60	24,058.90

- 1992

Total
26,363.00

TABLE 5

Atlantic salmon - ova and smolt production records and estimates

	1985	1986	1987	1988	1989	1990
<u>Hatching ova ('000)</u>						
Actual	16,151	38,652	60,107	80,386	75,327	64,559
Producers estimate for following year	None	58,573	67,475	85,077	90,839	50,406
<u>Smolts ('000)</u>						
Growers data	5,585	6,595	12,858	20,921	23,839	21,408
Producers current data	6,177	7,030	13,294	22,499	25,825	24,874
Producers estimate for following year	None	15,119	23,094	28,740	26,242	24,058
Producers estimate for two years ahead	None	21,697	28,213	33,621	28,011	26,363

TABLE 6

Grouping of smolt sites by the scale of their production

Production (Nos '000s)	0	<10	10-25	26-50	51-100	101-250	251-500	501-1000	>1,000	No of sites*	Annual No of smolts
No of sites in 1990	58	3	15	19	20	29	19	9	4	176	24,874
Same sites estimates for 1991	63	2	9	21	22	30	18	9	2	176	24,058
Some sites estimates for 1992	63	1	4	18	23	34	19	13	1	176	26,363

* 21 sites not in operation

TABLE 7

Atlantic salmon - ova and smolt production by region

Region code	Staff		Eggs ('000s) 1990				Female triploid ova ('000s)	Total eyed eggs ('000s) 1991	1990 smolts ('000s)				1991 smolts ('000s)		1992 smolts ('000s) estimate
	F/T	P/T	Own farmed	Farmed UK	Wild UK	Foreign source			Produced as		Sold as		S1	S2	
									S1	S2	S1	S2			
*Combined regions	14	5	-	2,200	-	-	650	3,200	863	150	728	40	1,314	100	1,850
Highland	136	44	27,706	13,172	272	-	1,021	30,865	13,330	778	3,755	342	12,440	101	12,595
Orkney	7	5	266	645	-	-	-	780	295	-	163	-	325	18	405
Shetland	12	6	-	1,730	-	-	-	1,910	1,186	12	1,068	-	885	10	1,217
Strathclyde	60	16	5,811	5,228	-	-	300	8,372	4,828	64	2,700	3	5,162	17	5,466
Western Isles	56	17	4,860	2,317	352	-	1,087	5,280	2,565	805	865	309	3,250	437	4,830
All Scotland	285	93	38,643	25,292	624	-	3,058	49,107	23,066	1,808	9,279	694	23,376	683	26,363
England*	-	-	-	-	-	-	-	-	1,300	-	-	-	-	-	-

* Combined regions consist of Central, Dumfries and Galloway and Tayside
+ sold to Scotland

TABLE 8

Salmon and grilse production - 1990 data

No of Companies	No of sites	Staff		
		Full time	Part time	Total
171	345*	1,165	326	1,491

* 47 not in use

Method of production

	No	Total capacity (cubic metres)	Production (tonnes)
Sea water tanks	11	56,463	758.90
Sea water cages	287	5,420,096	31,592.04

Smolts to sea ('000s)

S1	S2	Total	From England
19,539	1,868	21,408	1,104

No of broodstock sites
35

Production - from the 1989 smolt intake harvested in 1990

Jan-Aug			Sep-Dec			Jan-Dec		
Nos ('000s)	Tonnes	Average weight	Nos ('000s)	Tonnes	Average weight	Nos ('000s)	Tonnes	Average weight
2,913	5,638	1.94	4,769	11,821.47	2.48	7,683	17,459.66	2.27

Production - from the 1988 smolt intake harvested in 1990

Jan-Dec		
Nos ('000s)	Tonnes	Average weight
5,382	14,891	2.77

Total production in 1990

Tonnes
32,350.94

TABLE 9

Atlantic salmon - production record and estimates of future production

Year	No of smolts ('000)	Year harvested	Nos of grilse and pre salmon ('000)	Weight (tonnes)	Mean fish wt (kg)	% of fish recovered	Year harvested	No of salmon ('000)	Weight (tonnes)	Mean fish wt (kg)	% of fish recovered	% total recovery	Year class weight (tonnes)	Grilse Nos ('000)	% grilse	Annual production (tonnes)	
1984	3,628	1985	1,970	4,262	2.163	54.3	1986	1,168	4,350	3.723	32.2	86.5	8,612	1,084	34.5	85	6,921
1985	5,586	1986	2,409	5,988	2.486	43.1	1987	1,522	5,521	3.627	27.3	70.4	11,508	1,090	27.7	86	10,333
1986	6,595	1987	3,285	7,200	2.143	49.8	1988	1,750	6,086	3.480	26.5	76.3	13,286	1,526	30.3	87	12,721
1987	12,858	1988	5,167	11,866	2.300	40.2	1989	3,267	10,312	3.156	25.3	65.5	22,178	2,247	26.6	88	17,951
1988	20,921	1989	7,890	18,240	2.312	37.7	1990	5,382	14,891	2.770	25.7	63.4	33,131	2,923	22.0	89	28,553
1989	23,839	1990	7,683	17,459	2.272	32.2	1991	6,126	17,154	2.800	25.7	57.9	34,613	2,913	21.1	90	32,350
1990	21,402	1991	6,893	15,853	2.300	32.2	1992	5,501	15,405	2.800	25.7	57.9	31,258			91	33,007
1991	21,801	1992	7,020	16,146	2.300	32.2	1993	5,603	15,688	2.800	25.7	57.9	31,834			92	31,551

Figures in this box are based on estimates

TABLE 10

Account of the difference between the 1989 estimate of production and 1990 outturn of production

	Tonnes
Estimated tonnage for 1990	37,079
Actual tonnage for 1990	32,350
Difference	4,729

Lost production is accounted as follows

	Tonnes
1. Salmon production estimate was 5,293,000 fish at 3.10 kg	16,408
Salmon production outturn was 5,382,000 fish at 2.77 kg	14,908
Difference	1,500
2. Grilse and pre-salmon estimate was 8,987,000 fish at 2.3 kg	20,670
Grilse and pre-salmon outturn was 7,683,140 fish at 2.27 kg	17,440
Difference	3,229
Sum 1 and 2	4,729

TABLE 11

Production and manpower of sea sites by region

Region	Staff		Annual production (tonnes)	Tonnes produced/man	Grilse			Pre-salmon			Salmon		
	F/T	P/T			Tonnes	('000s)	Mean wt (kg)	Tonnes	('000s)	Mean wt (kg)	Tonnes	('000s)	Mean wt (kg)
Highland	495	73	15,423.7	27	3,276.4	1,788	1.83	4,827.1	2,241	2.15	7,320.2	2,863	2.56
Orkney	40	24	848.8	14	103.5	50	2.07	306.1	103	2.97	439.2	149	2.95
Shetland	218	133	6,461.1	18	886.7	354	2.50	3,186.6	1,039	3.07	2,387.8	670	3.56
Strathclyde	218	45	5,484.4	21	618.8	319	1.94	1,689.9	654	2.58	3,175.7	1,097	2.90
Western Isles	194	51	4,132.8	17	752.9	402	1.87	1,811.7	734	2.47	1,568.2	604	2.60
All Scotland	1,165	326	32,350.8	-	5,638.3	2,913	-	11,821.4	4,771	-	14,891.1	5,383	-

TABLE 12

Recovery of 1988 and 1989 smolt year classes by region ('000)

Region	Smolts to sea		Grilse and pre salmon		Salmon		Total recovered	% recovery		
				%		%				
Western Isles	(88)	2,382	(89)	1,070	44.9	(90)	604	25.4	1,674	70.3
	(89)	3,467	(90)	1,136	32.8					
Orkney	(88)	449	(89)	144	32.1	(90)	149	33.2	293	65.3
	(89)	518	(90)	153	29.5					
Highland	(88)	10,942	(89)	3,294	30.1	(90)	2,863	26.2	6,157	56.3
	(89)	10,831	(90)	4,029	37.2					
Strathclyde	(88)	4,095	(89)	1,928	47.1	(90)	1,097	26.8	3,025	73.9
	(89)	4,969	(90)	973	19.6					
Shetland	(88)	3,010	(89)	1,454	48.3	(90)	670	22.3	2,124	70.6
	(89)	4,055	(90)	1,393	34.4					

TABLE 13

Grilse, pre-salmon and salmon production by number and region for the 1988 smolt intake

Harvested in Region	1989				1990	
	Grilse		Pre-salmon		Salmon	
	Nos ('000)	%	Nos ('000)	%	Nos ('000)	%
Western Isles	395	23.6	675	40.3	604	36.1
Orkney	38	12.9	106	36.2	149	50.1
Highland	1,218	19.8	2,076	33.7	2,863	46.5
Strathclyde	856	28.3	1,072	35.4	1,097	36.2
Shetland	416	19.6	1,038	48.8	670	31.5

TABLE 14

Grouping of Atlantic salmon sea farm sites by the scale of production

Production	0	<10	10-25	26-50	51-100	101-200	201-300	301-400	401-500	>500	Totals	
											Sites	Tonnes
No of sites in 1990	1.02	19	42	37	49	55	14	10	3	14	345	32,350.9
% share of production	0.00	0.22	2.24	4.13	11.09	24.97	10.35	10.40	4.31	32.28		

TABLE 15

Record of numbers of cage sites employing fallow periods and the length of the period

Period (weeks)	0	<4	4-8	8-26	26-51	>=52
No of sea water sites	222	4	13	39	8	0
No of fresh water sites	23	5	8	16	12	1