Scottish Fish Farm Production Survey

2010 report

The Scottish Government

marinescotland science

SCOTTISH FISH FARM PRODUCTION SURVEY 2010

This report was prepared by Marine Scotland Science

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// FOREWORD

The annual production survey of fish farms in Scotland for 2010 was carried out by Marine Scotland Science (MSS). This survey collates annual production data from authorised Scottish fish farm sites. Surveys conducted by other organisations are produced independently of MSS and may not be directly comparable. The production tonnage obtained is for the wet weight of fish at harvest.

Responses to questionnaires from Scottish fish farming companies covering the period 1 January to 31 December 2010 are summarised in this survey. The questionnaires are given in Appendix 1a-d. The survey is structured to allow readers to follow industry trends within the trout, salmon and other farmed species sectors. Some statistics are given for the 21-year period 1990-2010. Data from previous years have been reassessed and updated where necessary. To allow direct comparison to data provided in previous surveys, production information by region is presented in defined areas.

The cooperation of the fish farming industry in completing the questionnaires is gratefully acknowledged.

A J Walker
J M McAlister

November 2011

// SUMMARY

The tables below summarise the results from the 2010 fish farms annual production survey.

Rainbow Trout (*Oncorhyncus mykiss*)

		2009	2010
Total production	(tonnes)	6,766	5,139
Production for the table	(tonnes)	5,995	4,458
Production for restocking	(tonnes)	770	681
Number of staff employed		138	129
Mean productivity	(tonnes/person)	49	39.8
Number of ova laid down to hatch	(millions)	17.8	15.1
Number of ova imported	(millions)	17	14.6

In 2010, rainbow trout production decreased by 1627 tonnes. Employment decreased by nine staff members, and productivity per person decreased to 39.8 tonnes. There was a decrease of 2.7 million ova laid down to hatch, and the number of ova imported also decreased.

Other Species

(including Arctic charr, *Salvelinus alpinus*; Brown trout, *Salmo trutta*; Cod, *Gadus morhua*; Halibut, *Hippoglossus hippoglossus*)

		2009	2010
Total production	(tonnes)	390	194
Number of staff employed	(full-time)	23	19
	(part-time)	22	24
Number of ova laid down to hatch	(millions)	4.6	2.2
Number of ova imported	(millions)	1	0.02

In 2010 the production of other species decreased by 196 tonnes on the 2009 total. Overall, employment decreased by two. There was a decrease in the number of ova laid down to hatch.

Number of Confirmed Escape Incidents from Fish Farms Notified to the Scottish Government

Species	Number of reported incidents which could have led to an escape of farmed fish	Number of reported incidents which did lead to an escape of farmed fish	Number of fish escaped
Rainbow trout	1	3	19,976
Atlantic salmon (freshwater stages)	1	2	10,885
Atlantic salmon (seawater stages)	1	5	7,102
Other species	0	0	0

Atlantic salmon (*Salmo salar*)

Smolts

		2009	2010
Number of ova produced	(millions)	92	91.6
Number of ova laid down to hatch	(millions)	67.6	69.6
Number of ova exported	(millions)	7.5	0.8
Number of ova imported	(millions)	35.4	28.7
Number of smolts produced	(millions)	36.9	36.9
Number of smolts put to sea	(millions)	38.5	38.5
Number of staff employed		270	289
Mean productivity (000s smolts/person)		136.5	127.6

The production of ova decreased by just over 0.3 million in 2010, and the number of ova laid down to hatch increased by two million. Exports and imports of ova decreased. The number of smolts produced remained steady. The number of staff employed increased by 19, whilst mean productivity decreased.

Production fish

		2009	2010
Total production	(tonnes)	144,247	154,164
Production of 0-year fish	(tonnes)	178	268
Production of grilse	(tonnes)	23,857	29,733
Production of pre-salmon	(tonnes)	53,764	56,093
Production of salmon	(tonnes)	66,448	68,070
Mean fish weight 0-year	(Kg)	2.2	2.1
Mean fish weight grilse	(Kg)	4.2	4.3
Mean fish weight pre-salmon	(Kg)	5	4.9
Mean fish weight salmon	(Kg)	4.7	5.0
Number of staff employed		963	1,064
Mean productivity	tonnes/person	149.8	144.9

Production tonnage increased by just under 7% with an increase in mean weight of grilse and salmon at harvest but a decrease in mean weight of 0-year fish and pre-salmon at harvest. Staff numbers increased by 101. Mean productivity showed a decrease of just under 5 tonnes/person.

Smolt survival (percentage harvested)

Survival (%)	Years 0+1	Year 2	Total
2007 input year class	34.5	37.3	71.8
2008 input year class	44.9	37.3	82.2

Overall smolt survival increased by 10.4% compared with the 2007 year class.

// 1. RAINBOW TROUT *(ONCORHYNCHUS MYKISS)*

Production survey information was collected from all 25 companies actively involved in rainbow trout production, farming 51 active sites. This figure represents the entire industry operating in Scotland.

Production

Table 1a:
Total production (tonnes) of rainbow trout during 1997-2010

Year	Tonnes	Year	Tonnes
1997	4,653	2004	6,352
1998	4,913	2005	6,989
1999	5,834	2006	7,492
2000	5,154	2007	7,414
2001	5,466	2008	7,670
2002	6,659	2009	6,766
2003	7,085	2010	5,139

Production decreased in 2010 by 1,627 tonnes, a decrease of 24.0%. Within the table trade, a decrease was observed in the small, medium and large sized fish. In the restocking trade, the production of small and medium sized fish showed a decrease, while large fish production showed an increase.

Table 1b:
Production (tonnes) for the table trade during 2000-2010 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
2000	3,005	203	1,103	4,311
2001	3,053	404	1,217	4,674
2002	2,937	1,056	1,718	5,711
2003	2,531	1,181	2,477	6,189
2004	1,553	1,946	1,917	5,416
2005	2,856	1,203	2,111	6,170
2006	2,182	1,810	2,636	6,628
2007	2,499	1,663	2,407	6,569
2008	2,375	1,950	2,487	6,812
2009	2,232	1,143	2,620	5,995
2010	2,125	727	1,606	4,458

Production for the table in 2010 was 4,458 tonnes, a decrease of 1,537 tonnes (25.6%) on the 2009 total, and accounted for 86.7% of the total rainbow trout production, a similar proportion to that produced in 2009. Supply was mainly of fish weighing up to 900g, encompassing 64.0% of total production for the table.

Table 1c:
Production (tonnes) for the restocking trade during 2000-2010 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
2000	41	609	193	843
2001	18	526	248	792
2002	28	484	436	948
2003	63	490	343	896
2004	64	509	363	936
2005	21	390	408	819
2006	36	357	471	864
2007	24	413	408	845
2008	27	351	480	858
2009	32	294	444	770
2010	19	201	461	681

Production for the restocking of angling waters decreased in 2010 and accounted for 13.3% of total rainbow trout production in 2010. In 2010, production totalled 681 tonnes, a decrease of 89 tonnes (11.6%) on the 2009 total. These figures represent the tonnage of fish supplied to angling waters for restocking purposes; they do not account for the catch taken by anglers.

Escapes

There were three incidents involving the loss of a total of 19,976 fish from rainbow trout sites in 2010. There was an additional one reported incident where the farm confirmed there was no loss of fish.

Production by Site

Table 2: Numbers of sites grouped by tonnage produced during 2000-2010

Year	Number of sites per production tonnage				Total number of sites
	<1-25	26-100	101-200	>200	
2000	16	12	8	8	44
2001	17	12	6	10	45
2002	16	13	4	12	45
2003	17	9	6	11	43
2004	14	14	5	10	43
2005	18	12	6	11	47
2006	16	15	6	13	50
2007	14	15	3	16	48
2008	8	15	7	14	44
2009	10	11	7	11	39
2010	7	13	9	7	36

Production was reported from 36 sites. The number of producers in the size bracket <1-25 and >200 tonnes decreased in 2010, while those producers in the size bracket 26-100 and 101-200 tonnes increased. These figures do not include those sites specialising in the production of ova or young fish for on-growing.

Production by Method

Table 3: Grouping of rainbow trout sites by production tonnages, main method of production in 2010, and comparison with production in 2009

Production method	Production grouping (tonnes) in 2010					Total tonnage and (%) by method		Number of sites	
	<10	10-25	26-50	51-100	>100	2009	2010	2009	2010
FW cages	1	0	0	0	4	2,029 (30%)	1,632 (31.8%)	6	5
FW ponds and raceways	1	1	8	5	7	2,115 (31.3%)	1,893 (36.8%)	23	22
FW tanks and hatcheries	3	0	0	0	0	1 (<1%)	8 (<1%)	2	3
SW cages	0	1	0	0	5	2620 (38.7%)	1,606 (31.2%)	8	6
SW tanks	0	0	0	0	0	0	0	0	0
Total	5	2	8	5	16	6,766	5,139	39	36

Freshwater production accounted for 3,533 tonnes (68.8%) and seawater production for the remaining 1,606 tonnes (31.2%). There was a decrease in production from freshwater ponds raceways and cages and seawater cages.

Company and Site Data

Table 4: Number of companies and sites in production during 1997-2010

Year	No. of companies	No. of sites
1997	51	69
1998	51	71
1999	54	68
2000	54	63
2001	50	57
2002	39	57
2003	37	56
2004	38	62
2005	42	70
2006	36	66
2007	38	70
2008	31	66
2009	27	56
2010	25	51

The number of companies authorised by the Scottish Government and actively engaged in rainbow trout production was 25 in 2010. The number of sites registered and in production during 2010 was 51.

Staffing and Productivity

Table 5: Number of staff employed, and productivity per person during 1997-2010

Year	Full-time	Part-time	Total	Productivity (tonnes/person)
1997	130	52	182	25.6
1998	137	49	186	26.4
1999	126	51	177	33.0
2000	121	47	168	30.7
2001	118	41	159	34.4
2002	114	46	160	41.6
2003	107	41	148	47.9
2004	115	37	152	41.8
2005	108	35	143	48.9
2006	112	35	147	51.0
2007	111	32	143	51.8
2008	107	34	141	54.4
2009	111	27	138	49.0
2010	98	31	129	39.8

The overall number of staff employed in 2010 decreased by nine to 129. During 2010 the number of full-time staff decreased by thirteen and the number of part-time employees increased by four.

Productivity, measured as tonnes produced per person, decreased by 18.8% in 2010. No distinction was made between full and part-time employees when calculating productivity.

Production by Area

Table 6: Production and staffing by area in 2010

Area	No. sites	Table production (tonnes)	Restocking production (tonnes)	Mean tonnes per site	Staffing			Productivity tonnes/ person
					F/T	P/T	Total	
North	9	1,084	67	127.9	17	6	23	50.0
East	15	842	245	72.5	30	6	36	30.2
West	13	1,743	63	138.9	28	11	39	46.3
South	14	789	306	78.2	23	8	31	35.3
All	51	4,458	681	100.8	98	31	129	39.8

Productivity per site was greatest in the west at 138.9 tonnes per site and productivity per person was greatest in the north, at 50.0 tonnes per person.

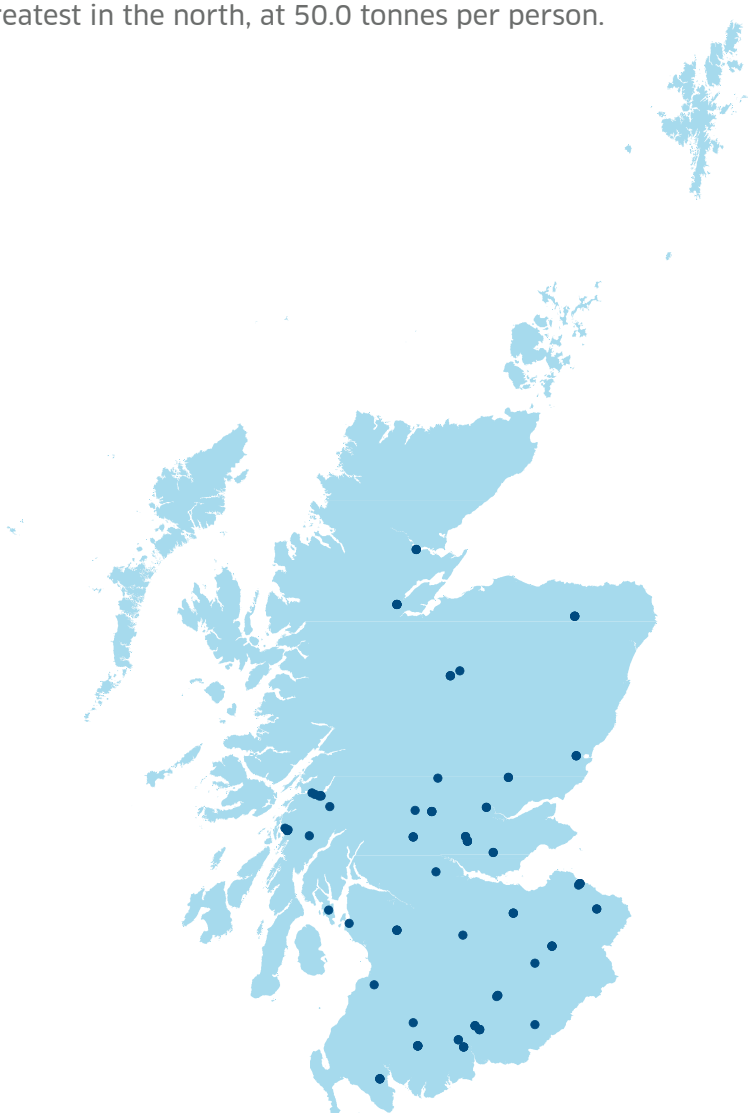

FIGURE 1: THE DISTRIBUTION OF ACTIVE RAINBOW TROUT SITES 2010

Type of Ova Laid Down

Table 7: Number (000s) and proportions (%) of ova types laid down to hatch during 1999-2010

Year	All female diploid no.(%)	Triploid no. (%)	Mixed sex diploid no. (%)	Total ova
1999	16,324 (88)	1,853 (10)	456 (2)	18,633
2000	17,264 (82)	1,202 (6)	2,513 (12)	20,979
2001	20,788 (90)	2,107 (9)	140 (1)	23,035
2002	19,733 (89)	1,822 (8)	570 (3)	22,125
2003	24,692 (94)	1,586 (6)	60 (<1)	26,338
2004	29,272 (90)	3,146 (10)	138 (<1)	32,556
2005	16,773 (83)	1,729 (8)	1,745 (9)	20,247
2006	22,378 (84)	2,804 (10)	1,626 (6)	26,808
2007	23,630 (83)	2,531 (9)	2,140 (8)	28,301
2008	22,978 (88)	2,526 (9)	725 (3)	26,229
2009	15,469 (87)	2,341 (13)	35 (<1)	17,845
2010	13,352 (89)	1,052 (7)	675 (4)	15,079

Source of Ova Laid Down

Table 8: Number (000s) and sources of ova laid down to hatch 1999-2010

Year	Ova produced in Great Britain (GB)			Imported ova			Total
	Own stock	Other stock	Total	Northern hemisphere	Southern hemisphere	Total	
1999	878	392	1,270	11,415	5,946	17,361	18,631
2000	1,397	900	2,297	10,161	8,525	18,686	20,983
2001	918	525	1,443	13,515	8,075	21,590	23,033
2002	530	200	730	12,385	9,010	21,395	22,125
2003	430	280	710	25,578	50	25,628	26,338
2004	330	320	650	31,906	0	31,906	32,556
2005	281	105	386	16,977	2,884	19,861	20,247
2006	541	2,169	2,710	22,588	1,510	24,098	26,808
2007	936	230	1,166	26,650	485	27,135	28,301
2008	582	487	1,069	25,160	0	25,160	26,229
2009	603	220	823	17,022	0	17,022	17,845
2010	415	50	465	14,614	0	14,614	15,079

In 2010, the total number of eyed-ova laid down to hatch decreased by under 2.8 million (15.5%) on the 2009 figure. The proportion of ova from GB broodstock decreased to 3.1% of the total, and the rainbow trout industry remained reliant on imported ova. Data on importation of ova into Scotland are also available from the health certificates, and are shown in Table 9a. Any discrepancy between the figures in Tables 8 and 9a is due to data being obtained from two independent sources.

Imports of Ova from Official Import Licences

Table 9a: Number (000s) and sources of ova imported into Scotland during 2003-2010

Source	2003	2004	2005	2006	2007	2008	2009	2010
N. Ireland	-	405	1,710	2,830	7,721	16,130	10,090	9,247
Isle of Man	6,855	8,012	1,700	3,480	3,767	775	290	1,400
Denmark	5,270	6,370	9,225	14,525	13,070	5,530	4,070	1,715
South Africa	50	-	-	-	485	-	-	-
USA	11,035	17,335	4,440	2,310	890	1,490	2,240	2,340
France	875	800	200	-	-	-	-	-
Australia	-	-	2,600	1,500	-	-	-	-
Norway	-	-	-	500	1,200	1,500	750	200
Totals	24,085	32,922	19,875	25,145	27,133	25,425	17,440	14,902

Table 9b: Seasonal variation in numbers (000s) and sources of ova imported into Scotland during 2010

Month	Norway	Isle of Man	Denmark	N. Ireland	USA
January	-	400	-	1,230	-
February	200	180	-	477	-
March	-	-	320	1,420	300
April	-	180	600	1,400	-
May	-	-	300	-	400
June	-	-	200	-	-
July	-	-	-	750	420
August	-	-	-	1,000	610
September	-	-	-	1,140	210
October	-	-	-	-	400
November	-	-	255	-	-
December	-	640	40	1,830	-
Totals	200	1,400	1,715	9,247	2,340

Suppliers within the EU accounted for 83.0% of ova imported into Scotland during 2010, with the USA accounting for 15.7% and Norway 1.3%. To maintain their ability to regulate production throughout the year and produce a constant supply of fish for their markets, producers have to rely upon supplies of out of season ova.

Trade in Fry and Fingerlings

Table 10: Number (000s) of fry and fingerlings traded during 1999-2010

Year	Fry and fingerlings bought			Total number bought	Total number sold
	All female diploid nos. (%)	Triploid nos. (%)	Mixed sex diploid nos. (%)		
1999	11,264 (94)	90 (1)	616 (5)	11,970	9,759
2000	13,410 (92)	287 (2)	892 (6)	14,589	12,505
2001	16,065 (96)	685 (4)	0	16,750	13,961
2002	10,031 (88)	670 (6)	667 (6)	11,368	10,101
2003	17,500 (94)	1,007 (5)	193 (1)	18,700	17,451
2004	18,859 (91)	1,536 (7)	364 (2)	20,759	19,166
2005	14,618 (83)	1,532 (9)	1,480 (8)	17,630	16,919
2006	19,731 (89)	1,675 (7)	790 (4)	22,196	20,460
2007	14,830 (89)	1,140 (7)	675 (4)	16,645	23,631
2008	24,298 (95)	1,082 (4)	118 (0.5)	25,498	31,036
2009	21,113 (94)	1,358 (6)	0	22,471	20,597
2010	15,539 (95)	585 (4)	141 (1)	16,265	14,686

The established trade between hatcheries and on-growing farms continued in 2010. Some companies specialised in the production of fry and fingerlings. The total number of fry and fingerlings purchased by producers decreased by 27.6%, and the total number sold by producers decreased by 28.7%. The disparity between supply and demand is due to trade with England and Wales.

Use of Vaccines

Table 11: Number of sites rearing fish vaccinated against enteric redmouth disease (ERM) during 1999-2010

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
No. of sites	40	35	33	34	38	42	37	31	28	28	31	27

Vaccines continued to be widely used as a preventative treatment against ERM, a potentially serious bacterial disease, caused by the bacterium Yersinia ruckeri. A total of 20 million fish were vaccinated on 27 sites. Vaccination is generally carried out as a bath treatment at the fingerling stage, although some vaccines were administered by intra-peritoneal injection.

Organic Production

Of the 51 sites recorded as being active in rainbow trout production in 2010, one was certified as organic. 2010 is the first year that data on organic production has been reported. It is not possible to detail this data without revealing the production of individual companies.

// 2. ATLANTIC SALMON (*SALMO SALAR*) – OVA AND SMOLTS

Production survey information was collected from all 31 companies actively involved in the freshwater production of Atlantic salmon, farming 104 active sites. This figure represents the entire freshwater industry operating in Scotland.

Company and Site Data

Table 12: Number of companies and sites in production during 2002-2010

Year	No. of companies	No. of sites
2002	55	173
2003	48	176
2004	48	172
2005	41	148
2006	39	135
2007	37	135
2008	38	130
2009	30	105
2010	31	104

In 2010 the number of companies authorised by the Scottish Government and actively engaged in the freshwater production of Atlantic salmon increased by one to 31. 104 sites were actively engaged in commercial production.

Production and Staffing

Table 13: Number (000s) of smolts produced, staff employed and smolt productivity during 2000-2010

Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number (000s) of smolts produced		45,583	47,546	47,161	44,414	39,999	36,326	40,827	38,125	36,450	36,868	36,872
Staffing	Full-time	341	317	312	291	259	200	209	217	209	216	233
	Part-time	103	111	93	82	60	74	62	62	54	54	56
	Total	444	428	405	373	319	274	271	279	263	270	289
Productivity, 000s of smolts per person		102.7	111.1	116.4	119.1	125.4	132.6	150.6	136.6	138.6	136.5	127.6

Smolt production in 2010 remained steady compared to 2009. The number of staff employed increased by 19 and productivity decreased by 6.5%, to a figure of 127,600 smolts produced per employee.

Escapes

There were two incidents involving the loss of 10,885 fish from freshwater Atlantic salmon sites in 2010. There was an additional one reported incident where the farm confirmed there was no loss of fish.

Smolts by Age Group

Table 14: Number of smolts (000s) produced by type during 1999-2010

Year	S½	S1	S1½	S2	Total
1999	10,770	28,345	586	62	39,763
2000	11,841	33,722	0	20	45,583
2001	14,684	32,732	110	20	47,546
2002	15,791	30,527	843	0	47,161
2003	14,907	28,836	671	0	44,414
2004	14,428	24,862	709	0	39,999
2005	12,639	22,197	1,489	1	36,326
2006	16,953	23,172	698	4	40,827
2007	15,431	22,694	0	0	38,125
2008	12,431	24,019	0	0	36,450
2009	13,837	23,031	0	0	36,868
2010	14,116	22,756	0	0	36,872

In 2010, production was dominated by S1 smolts, although numbers produced decreasing by 1.2%. The production of S½ smolts increased by 2.0%. There was no production of S1½ or S2 smolts.

Production Systems

Table 15: Number and capacity of production systems during 2006-2010

System	No. of sites with system					Total capacity, 000s cubic metres				
Year	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Cages	58	56	53	47	45	365	327	385	388	409
Tanks and Raceways	77	79	77	58	59	36	37	41	37	38
Total	135	135	130	105	104	401	364	426	425	446

The principal types of facility used for the production of smolts in fresh water are cages or tanks and raceways. In 2010, the number of farms using tanks and raceways increased by one, and the number of farms using cages decreased by two. In terms of volume, tank and raceway capacity increased to 38,000 m^3, and cage volume increased by 21,000 m^3. This resulted in a net increase in volume of 21,000 m^3 available for the production of smolts in Scotland during 2010.

Table 16: Number (000s) of smolts produced, and stocking densities by production system during 2006-2010

	Number of smolts produced (000s)					Stocking densities (smolts /m^3)				
Year	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Cages	18,700	19,440	17,065	17,041	20,333	51	59	44	44	50
All others	22,127	18,685	19,385	19,827	16,539	615	505	472	536	435
Total	40,827	38,125	36,450	36,868	36,872	-	-	-	-	-

The average stocking densities of cages increased from 44 to 50 fish per m^3 in 2010 compared to 2009 while densities in tanks and raceways decreased from 536 to 435 fish per m^3.

Ova Production

Table 17: Number (000s) of salmon ova produced during 2003-2010

Year	2003	2004	2005	2006	2007	2008	2009	2010
No. of ova	115,569	128,866	73,211	60,941	83,822	135,230	91,964	91,655

Just over 91.6 million ova were stripped in 2010, a decrease of over 0.3 million (0.3%) on the 2009 season.

Table 18: Source, number (000s) and previous year's estimate of ova laid down to hatch during 1999-2011

Year	In-house broodstock	Out-sourced GB broodstock	GB wild broodstock	Foreign ova	Total	Previous year's estimate
1999	52,122	25,804	4,291	500	82,717	68,644
2000	38,674	33,592	1,605	4,660	78,531	69,220
2001	40,086	32,002	615	10,720	83,423	83,458
2002	40,732	30,664	120	15,184	86,700	80,679
2003	38,766	21,138	0	20,822	80,726	73,193
2004	31,390	20,024	27	19,138	70,579	74,464
2005	43,261	22,465	71	9,896	75,693	65,741
2006	19,063	17,768	63	27,157	64,051	58,385
2007	18,837	14,366	78	42,022	75,303	68,032
2008	19,831	14,261	171	26,409	60,672	75,302
2009	17,148	20,158	65	30,200	67,571	64,693
2010	13,744	26,220	0	29,657	69,621	61,011
2011						54,526

The number of ova laid down to hatch was 69.6 million, an increase of just over 2 million (3.0%) on the 2009 figure. The majority of the ova (42.6%) were derived from foreign sources, this was a decrease of 0.5 million (1.8%) on the 2009 figure. Supplies derived from GB broodstock increased by 2.7 million, this was a 7.1% increase on the 2009 figure. Producers' estimates for the number of ova to be laid down in 2011 has decreased from the actual number of ova laid down in 2010. The ova derived from wild stocks are generally held and hatched for wild stock enhancement by the aquaculture industry in cooperation with wild fisheries managers.

Smolts Produced and Put to Sea

Table 19: Actual and projected smolt production and smolts put to sea (millions) during 2001-2012

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Actual smolts put to sea	48.6	50.1	43.8	39.1	37.2	41.1	37.8	36.6	38.5	38.5		
Smolts produced	47.5	47.2	44.4	40.0	36.3	40.8	38.1	36.4	36.9	36.9		
Estimated production	50.2	49.3	44.2	40.0	36.2	33.2	41.2	34.9	32.6	28.7	35.9	40.3
Ratio of ova laid down to smolts produced	1.8	1.8	1.8	1.8	2.1	1.6	2.0	1.7	1.8	1.9		

The figure for the number of smolts put to sea includes smolts produced in England and fish imported from elsewhere, whereas smolt production data relate only to those produced in Scotland. Farmers estimate putting 35.9 million smolts to sea in 2011.

The ratio of ova laid down to hatch to smolts produced in 2010 was more than the ratio in 2009.

Scale of Production

Table 20: Smolt-producing sites grouped by numbers (000s) of smolts produced during 1998-2010

Year	Scale of production								No. of sites in production	Total smolts produced
	1-10	11-25	26-50	51-100	101-250	251-500	501-1,000	>1,000		
1998	1	3	12	24	33	29	20	8	130	44,853
1999	1	1	15	25	29	24	21	7	123	39,763
2000	1	2	10	17	36	24	24	9	123	45,583
2001	0	1	7	19	30	26	13	14	110	47,546
2002	1	1	11	17	29	34	17	10	120	47,161
2003	2	0	7	20	32	31	12	10	114	44,414
2004	3	3	9	14	31	22	18	7	107	39,999
2005	2	1	4	15	25	22	21	4	94	36,326
2006	1	4	2	9	19	21	18	10	84	40,827
2007	2	2	4	7	21	21	14	11	82	38,125
2008	2	1	5	8	21	20	15	9	81	36,450
2009	0	0	3	7	14	18	10	12	64	36,868
2010	1	0	4	4	16	15	10	14	64	36,872

Note: This data refer only to sites producing smolts. The sites holding only ova, fry or parr are excluded.

The number of sites producing smolts has remained the same since 2009. The number of sites producing less than 101,000 smolts has decreased by one and there has also been a decrease of one in the number of sites producing more than 100,000 but less than one million smolts. The number of sites producing in excess of one million smolts per year has increased by two.

Production of Ova and Smolt by Production Area

Table 21: Staffing, and ova laid down to hatch 2009-2010, smolt production 2009-2010 and estimated production 2011-2012 by region

Region	Number of staff employed in 2000		Ova laid down to hatch (000s)		Smolt production (000s)		Estimated smolt production (000s)	
	F/T	P/T	2009	2010	2009	2010	2011	2012
Northwest	123	16	30,735	34,316	18,857	21,927	20,965	21,944
Orkney	2	0	0	0	100	100	100	100
Shetland	11	14	1,600	2,010	1,407	1,300	1,243	1,565
West	42	14	17,138	15,395	8,996	7,328	6,060	9,090
Western Isles	38	2	13,124	10,580	5,691	4,099	5,071	5,280
East and South	17	10	4,974	7,320	1,817	2,118	2,506	2,300
All Scotland	233	56	67,571	69,621	36,868	36,872	35,945	40,279

The north West, West and the Western Isles were the main ova and smolt producing areas in Scotland in 2010, and employed the greatest number of staff.

International Trade in Ova

Since the introduction of the EU single market on 1 January 1993 and the associated Fish Health Regulations common to all EU member states, a trade in live salmon and ova has been established.

In addition, the European Economic Area (EEA) Agreement allows trade between the EU and the member states of the European Free Trade Association (EFTA). Until 2003, trade under the EEA Agreement was restricted to halibut alevins and salmonid eggs or gametes. With the cessation of these restrictions, trade became based on the same rules as are established within the EU regarding approval of farms and zones for listed diseases. Areas of Norway have equivalent status to Great Britain with regard to non exotic diseases, but additional guarantees granted to Great Britain in respect of Gyrodactylus salaris has meant trade in live fish has not occurred. Changes to these protective measures in 2003 mean the importation of salmonid ova is permitted from Norway.

Trade with Third Countries has also been established, but only from sites that have met the same health standards as are established within the EU regarding the approval of farms and zones for listed diseases. Exports to countries outside the EU are subject to the health conditions placed by the importing country. MSS advises potential exporters to ascertain with the importing country any specific health testing requirements that may be a condition of import.

FIGURE 2: THE DISTRIBUTION OF ACTIVE SMOLT SITES 2010

Imports and Exports

Table 22a: Source and number (000s) of ova, parr and smolts imported during 1999-2010 derived from health certificates

Import Year	Ova						Parr and Smolts
	EU Member States	EFTA		Third Countries		Total	EU Member States
		Iceland	Norway	Australia	USA		
1999	244	-	-	500	-	744	900
2000	0	4,610	-	500	-	5,110	3,436
2001	8,173	10,833	-	1,620	-	20,626	2,475
2002	8,650	11,623	-	1,800	500	22,573	2,879
2003	7,820	9,518	2,900	550	400	21,188	2,570
2004	4,450	3,475	6,750	1,860	450	16,985	824
2005	2,610	570	13,210	-	450	16,840	150
2006	11,575	300	15,940	2,400	-	30,215	375
2007	10,511	0	33,555	0	0	44,066	420
2008	5,600	0	22,703	0	0	28,303	519
2009	5,460	0	29,938	0	0	35,398	328
2010	2,150	0	26,533	0	0	28,683	452

The numbers of ova imported decreased by 19%. The number of parr and smolts imported increased by 38%.

Table 22b: Destination and number (000s) of salmon ova exported during 2000-2010 derived from health certificates

Export year	Farmed origin				Total	Wild origin total
	Chile	EU	Norway	Others		
2000	9,740	25,311	0	0	35,051	50
2001	2,675	8,542	0	0	11,217	0
2002	1,600	6,627	0	0	8,227	0
2003	0	2,171	0	0	2,171	0
2004	2,215	3,699	0	0	5,914	0
2005	8,560	3,130	0	1,566	13,256	0
2006	26,930	4,312	0	0	31,242	0
2007	32,150	164	0	0	32,314	0
2008	62,185	130	0	15	62,330	0
2009	7,181	317	0	0	7,498	0
2010	0	189	600	0	789	0

In 2010, a total of 0.79 million ova were exported. Exports of ova to other EU member states decreased by 40% to 0.19 million in 2010. Overall, exports decreased by 89.5% on the 2009 figure.

Vaccines

Table 23: Number of sites using vaccines and number (millions) of fish vaccinated during 2002-2010

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
No. of sites	108	104	98	84	79	73	80	68	70
No. of fish (millions) vaccinated	47.5	41.7	39.4	33.8	43.5	41.0	36.7	39.6	42.6

Vaccines were used to provide protection against furunculosis, a disease caused by the bacterium Aeromonas salmonicida, which was the cause of serious losses within the fish farming industry in the late 1980s and early 1990s. Vaccination is normally carried out at the pre-smolt stage by intra-peritoneal injection. In addition, some sites vaccinated fish against enteric redmouth disease (ERM), infectious pancreatic necrosis (IPN), pancreas disease (PD) and Vibriosis. A total of 42.6 million fish were vaccinated across 70 sites.

// 3.ATLANTIC SALMON – PRODUCTION

Production

Production survey information was collected from all 30 companies actively involved in Atlantic salmon production, farming 249 active sites. This figure represents the entire industry operating in Scotland.

Table 24: Annual production of Atlantic salmon (tonnes) during 1990-2010 and projected production in 2011

Year	Tonnes	Percentage difference	Year	Tonnes	Percentage difference
1990	32,351	13	2001	138,519	7
1991	40,593	25	2002	144,589	4
1992	36,101	-11	2003	169,736	17
1993	48,691	35	2004	158,099	-7
1994	64,066	32	2005	129,588	-18
1995	70,060	9	2006	131,847	2
1996	83,121	19	2007	129,930	-1.4
1997	99,197	19	2008	128,606	-1
1998	110,784	12	2009	144,247	12
1999	126,686	14	2010	154,164	6.9
2000	128,959	2	2011	157,385*	

*industry estimate of projected tonnage based on stocks currently being on-grown

The total production of Atlantic salmon during 2010 was 154,164 tonnes, an increase of 9,917 tonnes (6.9%) on the 2009 production.

Escapes

There were five incidents involving the loss of a total of 7,102 fish from seawater Atlantic salmon sites in 2010. There was one additional reported incident where the farm confirmed there was no loss of fish.

Table 25: Number (000s) and production (tonnes) of salmon harvested, and mean fish weight (Kg) per year class during 2000-2010

	Year of smolt input	Year of harvest	Number (000s)	Production (tonnes)	Mean weight at harvest (Kg)
Harvest in year 0 (i.e. in year of input)	2000	2000	765	2,673	3.5
	2001	2001	557	1,227	2.2
	2002	2002	272	824	3.0
	2003	2003	82	276	3.4
	2004	2004	168	319	1.9
	2005	2005	0	0	0
	2006	2006	115	211	1.8
	2007	2007	23	40	1.7
	2008	2008	116	216	1.9
	2009	2009	81	178	2.2
	2010	2010	128	268	2.1
Harvest in year 1	1999	2000	23,077	89,963	3.9
	2000	2001	22,726	96,539	4.2
	2001	2002	23,528	90,230	3.8
	2002	2003	22,602	96,205	4.3
	2003	2004	19,596	85,792	4.4
	2004	2005	15,075	67,738	4.5
	2005	2006	14,036	64,099	4.6
	2006	2007	13,787	60,890	4.4
	2007	2008	13,011	54,759	4.2
	2008	2009	16,338	77,621	4.7
	2009	2010	18,266	85,826	4,7
Harvest in year 2	1998	2000	8,450	36,323	4.3
	1999	2001	9,096	40,754	4.5
	2000	2002	11,354	53,535	4.7
	2001	2003	15,619	73,255	4.7
	2002	2004	15,555	71,988	4.6
	2003	2005	13,920	61,850	4.4
	2004	2006	14,237	67,537	4.7
	2005	2007	14,999	69,000	4.6
	2006	2008	15,881	73,631	4.6
	2007	2009	14,132	66,448	4.7
	2008	2010	13,666	68,070	5.0

Table 26: Number (000s) and production (tonnes) of grilse and pre-salmon harvested during 2000-2010

Year	Grilse (January-August)			Pre-salmon (September-December)		
	Number	Tonnes	Average weight (Kg)	Number	Tonnes	Average weight (Kg)
2000	12,561	45,229	3.6	10,516	44,734	4.2
2001	11,072	42,065	3.8	11,654	54,474	4.7
2002	9,872	33,609	3.4	13,656	56,621	4.1
2003	8,560	32,977	3.8	14,042	63,228	4.5
2004	6,824	27,710	4.1	12,772	58,082	4.5
2005	5,662	22,972	4.1	9,413	44,766	4.7
2006	4,357	18,162	4.2	9,679	45,937	4.7
2007	3,823	15,811	4.1	9,964	45,079	4.5
2008	3,716	15,296	4.1	9,295	39,463	4.2
2009	5,631	23,857	4.2	10,707	53,764	5.0
2010	6,877	29,733	4.3	11,389	56,093	4.9

Table 27: Percentage (by weight) of annual production by growth stage harvested during 2002-2010

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Growth stage	-	-	-	-	-	-	-	-	-
Input year fish	<1	<1	<1	0	<1	<1	<1	<1	<1
Grilse	23	19	17	18	13	12	12	16	19
Pre-salmon	39	37	37	34	35	34	31	37	36
Salmon	37	43	45	48	51	53	57	46	44

Survival and Production in Smolt Year Classes

Table 28: Survival and production in smolt year classes during 1993-2010

Year of smolt input	Smolt input (000s)	Harvest year 0				Harvest year 1				Harvest year 2				Total % of year class harvested	Year class weight (tonnes)	Yield per smolt (Kg)
		Number (000s)	Weight (tonnes)	Mean weight (Kg)	% harvest	Number (000s)	Weight (tonnes)	Mean weight (Kg)	% harvest	Number (000s)	Weight (tonnes)	Mean weight (Kg)	% harvest			
1993	20,541	46	78	1.7	0.2	13,446	41,865	3.1	65.5	5,135	21,916	4.2	25.0	90.7	63,859	3.10
1994	21,953	260	388	1.5	1.2	14,420	47,775	3.3	65.7	5,408	24,485	4.5	24.6	91.5	72,629	3.31
1995	26,786	206	269	1.8	0.8	17,132	57,998	3.4	64.0	6,195	27,263	4.4	23.1	87.8	85,530	3.19
1996	32,906	315	638	2.0	1.9	20,245	71,349	3.5	61.5	5,148	21,953	4.3	15.6	78.1	93,940	2.85
1997	42,766	282	585	2.1	0.7	29,014	86,783	3.0	67.8	9,027	40,098	4.4	21.1	89.6	127,466	2.98
1998	45,870	696	2,048	2.9	1.5	22,556	83,823	3.7	49.2	8,450	36,323	4.3	18.4	69.1	122,194	2.66
1999	41,106	1,000	2,763	2.8	2.4	23,077	89,963	3.9	56.1	9,096	40,754	4.5	22.1	80.6	133,480	3.25
2000	45,185	765	2,673	3.5	1.7	22,726	96,539	4.2	50.3	11,354	53,535	4.7	25.1	77.1	152,747	3.38
2001	48,643	557	1,227	2.2	1.1	23,528	90,230	3.8	48.4	15,619	73,255	4.7	32.1	81.6	164,712	3.39
2002	50,086	272	824	3.0	0.5	22,602	96,205	4.3	45.1	15,555	71,988	4.6	31.1	76.7	169,017	3.37
2003	43,083	82	276	3.4	0.2	19,596	85,792	4.4	45.5	13,920	61,850	4.4	32.3	78.0	147,918	3.43
2004	39,041	168	319	1.9	0.4	15,075	67,738	4.5	38.6	14,237	67,537	4.7	36.5	75.5	135,594	3.47
2005	37,168	-	-	-	-	14,036	64,099	4.6	37.8	14,999	69,000	4.6	40.3	78.1	133,099	3.58
2006	41,091	115	211	1.8	0.3	13,787	60,890	4.4	33.5	15,881	73,631	4.6	38.6	72.5	134,732	3.28
2007	37,853	23	40	1.7	0.06	13,011	54,759	4.2	34.4	14,133	66,448	4.7	37.3	71.8	121,247	3.20
2008	36,626	116	216	1.9	0.3	16,338	77,621	4.7	44.6	13,666	68,070	5.0	37.3	82.2	145,907	3.98
2009	38,548	81	178	2.2	0.2	18,266	85,826	4.7	47.4							
2010	38,490	128	268	2.1	0.3											

In 2008, the last year for which survival can be calculated, the survival rate from smolt input to harvest was 82.2%. The 2008 year class displayed a higher survival rate than that noted in 2007, and was higher than the survival averaged over the last 15 year-classes.

Of the 2009 year class, 47.6% of the input has been harvested, 2.7% higher than the average harvest of fish one year after input in the 2008 year class. The average weight remained steady at 4.7 Kg.

In 2010, the harvest of fish from the 2010 smolt input was 0.3%, an increase compared with the proportion of fish harvested from the same year class in 2009.

Smolts to Sea

Table 29: Number (000s) and origin of smolts put to sea during 1998-2010

Year	Smolts put to sea (000s)				Total (000s)	Scottish Origin	English Origin		Other Origin	
	S½	S1	S1½	S2		%	(000s)	%	(000s)	%
1998	12,796	32,649	190	235	45,870	92	2,714	6	1,080	2
1999	11,585	29,119	335	68	41,107	94	2,221	5	600	1
2000	9,517	35,176	399	93	45,185	92	3,396	8	0	0
2001	14,118	34,321	171	33	48,643	98	1,183	2	0	0
2002	15,850	32,761	1,475	0	50,086	94	1,564	3	1,676	3
2003	14,534	28,283	986	0	43,803	93	2,590	6	325	>1
2004	14,044	23,776	1,221	0	39,041	97	634	2	541	>1
2005	13,051	22,501	1,616	0	37,168	96	1,594	4	0	0
2006	15,578	23,733	1,779	0	41,090	96	1,257	3	272	>1
2007	14,665	23,188	0	0	37,853	94	1,747	5	420	1
2008	10,903	25,723	0	0	36,626	96	1,418	4	0	0
2009	14,967	23,581	0	0	38,548	95	1,700	4	105	<1
2010	14,069	24,421	0	0	38,490	95	1,541	4	120	<1

The total number of smolts put to sea in 2010 was 38.5 million. The smolt input comprised mainly S1 smolts (63%), and the proportion of photoperiod adjusted fish (S½ smolts) input decreased to 37%. Approximately 5% of smolts input into Scottish salmon farms were sourced from outwith Scotland. This is the same proportion observed in 2009.

Survival and Production in Smolt Year Classes by Production Area

Table 30: Number (000s) of smolts put to sea and year class survival by area during 1999-2010

Region	Smolts put to sea (000s)		Harvest in year 0			Harvest in year 1			Harvest in year 2			Total Harvest (=survival)	
	Year	No	Year	No	%	Year	No	%	Year	No	%	No	%
North West	1999	11,393	1999	288	2.5	2000	9,422	82.7	2001	1,198	10.5	10,908	95.7
	2000	11,308	2000	457	4.0	2001	6,754	59.7	2002	2,144	19.0	9,355	82.7
	2001	13,767	2001	93	0.7	2002	8,112	58.9	2003	2,455	17.8	10,660	77.4
	2002	12,634	2002	135	1.1	2003	7,007	55.5	2004	3,113	24.6	10,255	81.2
	2003	13,103	2003	-	-	2004	7,667	58.5	2005	2,847	21.7	10,514	80.2
	2004	9,642	2004	168	1.7	2005	4,516	46.8	2006	2,978	30.9	7,662	79.5
	2005	10,888	2005	-	-	2006	5,796	53.2	2007	2,914	26.8	8,710	80.0
	2006	10,403	2006	115	1.1	2007	4,300	41.3	2008	3,664	35.2	8,079	77.7
	2007	9,563	2007	23	0.2	2008	5,394	56.4	2009	1,850	19.3	7,267	75.9
	2008	9,099	2008	69	0.8	2009	4,897	53.8	2010	2,687	29.5	7,653	84.1
	2009	9,986	2009	42	0.4	2010	7,045	70.5					
	2010	9,924	2010	117	1.2								
Orkney	1999	3,235	1999	10	0.3	2000	1,614	49.9	2001	782	24.2	2,406	74.4
	2000	2,604	2000	-	-	2001	670	25.7	2002	597	22.9	1,267	48.6
	2001	2,932	2001	-	-	2002	1,369	46.7	2003	1,464	49.9	2,833	96.6
	2002	2,741	2002	-	-	2003	1,169	42.6	2004	742	27.1	1,911	69.7
	2003	2,964	2003	-	-	2004	1,141	38.5	2005	980	33.1	2,121	71.6
	2004	1,842	2004	-	-	2005	480	26.0	2006	416	22.6	896	48.6
	2005	2,192	2005	-	-	2006	598	27.3	2007	602	27.4	1,200	54.7
	2006	1,622	2006	-	-	2007	433	26.7	2008	586	36.1	1,019	62.8
	2007	1,408	2007	-	-	2008	594	42.2	2009	741	52.6	1,335	94.8
	2008	1,912	2008	-	-	2009	507	26.5	2010	1,120	58.6	1,627	85.1
	2009	1,154	2009	-	-	2010	741	64.2					
	2010	2,557	2010	-	-								
Shetland	1999	12,663	1999	65	0.5	2000	5,576	44.0	2001	4,139	32.7	9,780	77.2
	2000	15,096	2000	-	-	2001	5,102	33.8	2002	4,578	30.3	9,680	64.1
	2001	17,398	2001	123	0.7	2002	6,465	37.2	2003	7,973	45.8	14,561	83.7
	2002	17,260	2002	-	-	2003	5,850	33.9	2004	5,675	32.9	11,525	66.8
	2003	14,446	2003	-	-	2004	6,031	41.7	2005	4,071	28.2	10,102	69.9
	2004	12,372	2004	-	-	2005	4,220	34.1	2006	4,040	32.7	8,260	66.8
	2005	10,824	2005	-	-	2006	4,162	38.4	2007	4,175	38.6	8,337	77.0
	2006	13,180	2006	-	-	2007	4,578	34.7	2008	5,349	40.6	9,927	75.3
	2007	14,947	2007	-	-	2008	4,530	30.3	2009	4,930	33.0	9,460	63.3
	2008	13,929	2008	47	0.3	2009	4,992	35.8	2010	4,659	33.4	9,698	69.6
	2009	10,031	2009	29	0.3	2010	4,201	41.9					
	2010	11,573	2010	-	-								
South West	1999	5,370	1999	226	4.2	2000	1,626	30.3	2001	2,131	39.7	3,983	74.2
	2000	7,851	2000	110	1.4	2001	4,554	58.0	2002	2,925	37.3	7,589	96.7
	2001	7,667	2001	-	-	2002	3,014	39.3	2003	3,022	39.4	6,036	78.7
	2002	7,403	2002	-	-	2003	3,761	50.8	2004	2,808	37.9	6,569	88.7
	2003	6,834	2003	-	-	2004	2,110	30.9	2005	3,646	53.3	5,756	84.2
	2004	6,786	2004	-	-	2005	3,281	48.4	2006	2,722	40.1	6,003	88.5
	2005	6,589	2005	-	-	2006	2,054	31.2	2007	4,175	63.3	6,229	94.5
	2006	7,032	2006	-	-	2007	2,677	38.1	2008	3,427	48.7	6,104	86.8
	2007	6,135	2007	-	-	2008	980	16.0	2009	3,289	53.6	4,269	69.6
	2008	6,507	2008	-	-	2009	4,153	63.8	2010	2,969	45.6	7,122	109.4*
	2009	8,200	2009	10	0.1	2010	2,700	32.9					
	2010	6,565	2010	12	0.2								
Western Isles	1999	8,445	1999	411	4.9	2000	4,839	57.3	2001	847	10.0	6,097	72.2
	2000	8,325	2000	198	2.4	2001	5,646	67.8	2002	1,110	13.3	6,954	83.5
	2001	6,879	2001	341	5.0	2002	4,568	66.4	2003	705	10.2	5,614	81.6
	2002	10,048	2002	137	1.4	2003	4,815	47.9	2004	3,217	32.0	8,169	81.3
	2003	6,456	2003	82	1.3	2004	2,647	41.0	2005	2,377	36.8	5,106	79.1
	2004	8,399	2004	-	-	2005	2,578	30.7	2006	4,081	48.6	6,659	79.3
	2005	6,675	2005	-	-	2006	1,426	21.4	2007	3,133	46.9	4,559	68.3
	2006	8,853	2006	-	-	2007	1,799	20.3	2008	2,855	32.2	4,654	52.6
	2007	5,800	2007	-	-	2008	1,513	26.1	2009	3,320	57.2	4,833	83.3
	2008	5,214	2008	-	-	2009	1,789	34.3	2010	2,231	42.8	4,020	77.1
	2009	9,177	2009	-	-	2010	3,579	39.0					
	2010	7,870	2010	-	-								

* The survival of the 2008 smolt input in the South West is over 100% due to the practice of putting smolts to sea in one region and subsequently moving them to another sea water site in another region for harvest.

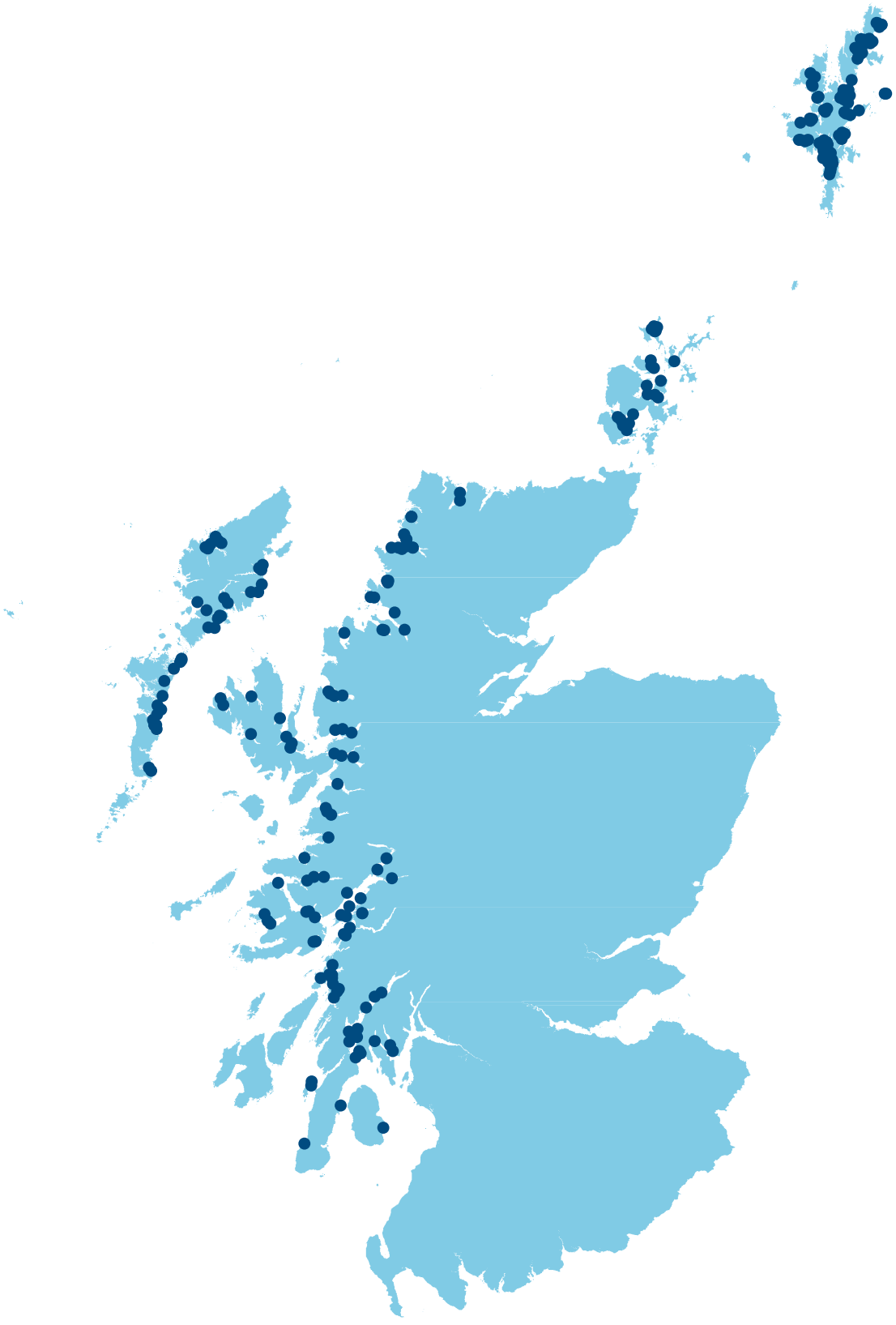

FIGURE 3: THE DISTRIBUTION OF ACTIVE SALMON PRODUCTION SITES 2010

Staffing

Table 31: Number of staff employed in salmon production during 2000-2010

Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Staff	F/T	1,141	1,066	1,083	1,066	1,019	851	790	798	849	874	944
	P/T	356	191	223	151	142	128	81	118	100	89	120
Total staff		1,397	1,257	1,306	1,217	1,161	979	871	916	949	963	1,064
Productivity (tonnes person)		92.3	110.2	110.7	139.5	136.2	132.4	151.4	141.8	135.5	149.8	144.9

The total number of staff employed in salmon production in 2010 was 1,064, an increase of 101 compared with 2009. The staffing figures collected refer specifically to the production of salmon, and do not include figures for staff involved with processing or marketing activities. Productivity decreased from 149.8 to 144.9 tonnes production per person.

Production Methods

Table 32: Production methods, capacity, tonnage and average stocking densities (Kg/m^3) during 2008-2010

Method	Number of sites			Total capacity (000s cubic metres)			Production (tonnes)		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Seawater tanks	1	1	2	5.9	5.9	6.3	21	88	195
Seawater cages	256	253	247	14,769	16,515	16,894	128,585	144,159	153,969
For cage sites: ratio of production (Kg) to cage capacity (m^3)							8.7	8.7	9.1

The vast majority of the fish were produced in seawater cages. There were 195 tonnes of production from seawater tank sites in 2010. This reflects the continued high installation and running costs incurred in operating seawater tank systems. Seven active seawater tank sites were registered in Scotland, and only two were actively producing salmon. Most seawater tank capacity has now been re-deployed for the production of other species or salmon broodstock.

Sea cage capacity increased by 379,000 m3 during 2010. The number of sea cage sites in production decreased by six. Production efficiency in cages, measured as the ratio of fish weight in kilograms produced per cubic metre increased to 9.1Kg/m3 in 2010. In cage sites, the ratio of production, expressed in kilograms, to cage capacity, expressed in cubic metres, was 8.7, 8.7 and 9.1 in 2008, 2009 and 2010 respectively.

Scale of Production by Site

Table 33: Number of sites shown in relation to their production grouping and percentage share of production 2000-2010

Production grouping (tonnes)	0	1-50	51-100	101-200	201-500	501-1,000	>1,000	Total	
								Sites*	Tonnes
2000	183	8	20	15	40	40	40	346	128,959
2001	148	9	4	28	41	39	51	320	138,519
2002	131	10	10	25	50	51	51	328	144,589
2003	125	6	14	13	53	45	70	326	169,736
2004	122	10	7	25	41	55	55	315	158,099
2005	112	8	13	16	41	37	51	278	129,588
2006	95	10	10	16	29	30	62	252	131,847
2007	89	9	8	19	33	34	55	247	129,930
2008	118	7	9	15	22	29	57	257	128,606
2009	104	12	12	10	33	25	58	254	144,247
2010	109	5	6	10	33	22	64	249	154,164
2000	0	0.6	1.4	1.9	10.9	25.1	60.5	-	-
2001	0	0.2	0.2	2.9	10.0	20.8	65.9	-	-
2002	0	0.2	0.5	2.7	12.8	26.5	57.3	-	-
2003	0	0.1	0.6	1.2	10.4	19.7	68	-	-
2004	0	0.1	0.4	2.4	9.4	26.1	61.6	-	-
2005	0	0.2	0.7	1.9	10.8	20.5	65.9	-	-
2006	0	0.2	0.6	1.8	7.9	15.9	73.6	-	-
2007	0	0.2	0.4	2.3	8.3	19.0	69.8	-	-
2008	0	0.1	0.5	1.6	5.8	15.9	76	-	-
2009	0	0.2	0.6	1.0	7.7	13.0	77.5	-	-
2010	0	0.1	0.3	0.9	7.3	10.8	80.6	-	-

*Includes farms stocked but having no production.

In 2010, there was a decrease of 13 in the number of sites producing 1 to 500 tonnes, and a increase of three in those sites producing over 500 tonnes. The trend showing the concentration of production in larger sites was maintained in 2010.

Company Productivity

Table 34: Number of companies grouped by production (tonnes), manpower and productivity (tonnes per person) during 2009-2010

Total Tonnage		0-100	101-200	201-400	401-700	701-1,000	1,001-2,000	>2,000	Total
No. of companies	2009	11	3	2	1	3	2	9	31
	2010	11	3	1	2	1	3	9	30
No. of tonnes	2009	134	404	660	687	2,688	2,290	137,384	144,247
	2010	41	509	385	870	955	3,911	147,493	154,184
Manpower (total)	2009	21	14	9	7	39	39	834	963
	2010	7	21	12	6	8	62	948	1,064
Productivity (tonnes/person)	2009	6	29	73	98	69	59	165	150
	2010	6	24	32	145	119	63	156	145

The greatest productivity (156 tonnes per person) was achieved in the companies having a production greater than 2,000 tonnes, and the least (six tonnes per person) in the companies producing the smallest tonnages. In comparison with 2009, the average company productivity decreased from 150 to 145 tonnes per person.

Overall production was dominated by 9 companies in 2010, which between them accounted for over 95% of the salmon production in Scotland.

Manpower and Production by Production Area

Table 35: Manpower and production (tonnes) by area 2001-2010, and projected production in 2011

Region	Year	Staff		Annual Production	Productivity (t/person)	Year of input		Grilse		Pre salmon		Salmon	
		F/T	P/T			Tonnes	Mean weight (Kg)	Tonnes	Mean weight (Kg)	Tonnes	Mean weight (Kg)	Tonnes	Mean weight (Kg)
North west	2001	373	38	34,120	83	130	1.4	14,062	3.5	13,334	4.8	6,594	5.5
	2002	366	77	40,156	91	437	3.2	11,819	3.2	17,772	4.0	10,128	4.7
	2003	259	32	40,425	139	-	-	12,250	3.7	15,971	4.3	12,204	5.0
	2004	321	38	48,609	135	319	1.9	10,912	4.0	22,586	4.6	14,792	4.7
	2005	267	31	32,439	109	-	-	8,816	3.9	10,608	4.7	13,015	4.6
	2006	203	23	40,219	178	211	1.8	8,742	4.2	16,995	4.6	14,271	4.8
	2007	277	44	33,541	104	40	1.7	6,674	4.1	13,212	4.9	13,615	4.7
	2008	280	34	41,250	131	125	1.8	7,817	4.2	15,997	4.5	17,311	4.7
	2009	256	32	35,295	122	75	1.8	9,777	4.7	15,860	5.6	9,583	5.2
	2010	294	44	47,353	140	239	2.0	15,895	4.4	17,837	5.1	13,382	5.0
	2011			37,771*									
Orkney	2001	75	15	5,588	62	-	-	810	4.2	1,892	4.0	2,886	3.7
	2002	80	11	6,565	72	-	-	1,949	3.2	2,649	3.5	1,967	3.3
	2003	121	15	10,740	79	-	-	1,016	3.6	3,508	4.0	6,216	4.2
	2004	68	10	6,600	85	-	-	1,877	3.3	2,107	3.6	2,616	3.5
	2005	47	4	5,183	102	-	-	989	3.5	805	4.1	3,389	3.5
	2006	72	3	3,724	50	-	-	509	3.1	1,689	3.9	1,526	3.7
	2007	41	7	4,432	92	-	-	196	3.9	1,657	4.3	2,579	4.3
	2008	60	5	5,716	88	-	-	811	4.2	1,747	4.3	3,158	5.4
	2009	47	2	6,220	127	-	-	754	4.6	1,793	5.2	3,673	4.9
	2010	58	2	9,388	156	-	-	1,221	4.1	2,279	5.1	5,888	5.3
	2011			5,967*									
Shetland	2001	227	52	39,745	142	130	1.1	4,905	3.7	16,441	4.3	18,269	4.4
	2002	238	46	49,341	174	-	-	7,107	3.6	19,646	4.4	22,588	4.9
	2003	222	48	61,685	228	-	-	3,898	3.9	21,698	4.5	36,089	4.5
	2004	185	27	53,101	250	-	-	6,732	4.2	20,543	4.6	25,826	4.5
	2005	162	33	38,946	200	-	-	3,424	4.4	16,296	4.7	19,226	4.7
	2006	190	18	39,278	189	-	-	3,765	4.3	16,134	4.9	19,379	4.8
	2007	182	25	40,795	197	-	-	2,663	4.5	17,838	4.5	20,294	4.9
	2008	202	26	42,593	187	91	1.9	3,970	4.1	13,982	3.9	24,550	4.6
	2009	188	22	43,785	208	65	2.3	4,873	3.3	16,183	4.6	22,664	4.6
	2010	178	23	45,439	226	-	-	3,624	4.9	17,179	5.0	24,636	5.3
	2011			43,317*									
South West	2001	165	48	32,574	153	-	-	9,113	4.2	13,166	5.4	10,295	4.8
	2002	196	54	26,351	105	-	-	2,992	3.5	9,112	4.2	14,247	4.9
	2003	218	35	33,583	133	-	-	4,329	4.1	13,407	4.9	15,847	5.2
	2004	219	34	23,911	95	-	-	2,733	4.1	6,832	4.7	14,346	5.1
	2005	188	36	33,056	148	-	-	4,675	4.7	11,430	5.0	16,951	4.6
	2006	181	22	25,460	125	-	-	2,467	4.4	7,920	5.3	15,073	5.5
	2007	162	36	31,353	158	-	-	4,309	4.1	7,069	4.3	19,975	4.8
	2008	173	21	20,584	106	-	-	1,212	4.0	3,108	4.6	16,264	4.7
	2009	199	23	35,726	161	38	3.5	4,615	4.6	15,988	5.1	15,085	4.6
	2010	231	39	27,751	103	29	2.5	6,032	4.2	7,118	5.7	14,572	4.9
	2011			37,069*									
Western Isles	2001	226	38	26,493	100	967	2.8	13,176	3.8	9,640	4.4	2,710	3.2
	2002	203	35	22,176	93	387	2.8	9,742	3.6	7,442	4.0	4,605	4.2
	2003	246	21	23,303	87	276	3.4	11,484	3.9	8,644	4.6	2,899	4.1
	2004	226	33	25,878	100	-	-	5,456	4.1	6,014	4.5	14,408	4.5
	2005	187	24	19,964	95	-	-	5,068	3.8	5,627	4.5	9,269	3.9
	2006	144	15	23,166	146	-	-	2,679	4.0	3,199	4.3	17,288	4.2
	2007	136	6	19,809	140	-	-	1,969	3.8	5,303	4.2	12,537	4.0
	2008	134	14	18,463	125	-	-	1,486	3.8	4,629	4.1	12,348	4.3
	2009	184	10	23,221	120	-	-	3,838	4.1	3,940	4.6	15,443	4.6
	2010	183	12	24,233	124	-	-	2,961	3.7	11,680	4.2	9,592	4.3
	2011			33,261*									
All Scotland	2001	1,066	191	138,520	110	1,227	2.2	42,066	3.8	54,473	4.7	40,754	4.5
	2002	1,083	223	144,589	111	824	3.0	33,609	3.4	56,621	4.1	53,535	4.7
	2003	1,066	151	169,736	139	276	3.4	32,977	3.8	63,228	4.5	73,255	4.7
	2004	1,019	142	158,099	136	319	1.9	27,710	4.1	58,082	4.5	71,988	4.6
	2005	851	128	129,588	132	-	-	22,972	4.1	44,766	4.7	61,850	4.4
	2006	790	81	131,847	151	211	1.8	18,162	4.2	45,937	4.7	67,537	4.7
	2007	798	118	129,930	142	40	1.7	15,811	4.1	45,079	4.5	69,000	4.6
	2008	849	100	128,606	135	216	1.9	15,296	4.1	39,463	4.2	73,631	4.6
	2009	874	89	144,247	150	178	2.2	23,857	4.2	53,764	5.0	66,448	4.7
	2010	944	120	154,164	145	268	2.1	29,733	4,3	56,093	4.9	68,070	5.0
	2011			157,385*									

*Estimated production in 2011

Company and Site Data

Table 36: Number of companies and sites engaged in salmon production during 2000-2010

Year	Number of companies			Number of sites		
	Producing	Non-producing	Total	Producing	Non- producing	Total
2000	68	22	90	163	183	346
2001	81	6	87	238	82	320
2002	73	11	84	197	131	328
2003	63	18	81	201	125	326
2004	57	12	69	193	122	315
2005	40	10	50	166	112	278
2006	32	12	44	157	95	252
2007	28	10	38	158	89	247
2008	26	9	35	139	118	257
2009	25	6	31	104	150	254
2010	20	10	30	140	109	249

The number of companies authorised and actively producing salmon in 2010 was 20, a decrease of five on the 2009 figure. Ten companies remained active and authorised, although not producing salmon for harvest in 2010. This continued the trend of salmon production being concentrated within fewer companies. These 30 companies have 249 registered active sites, although not all active sites may have produced fish for harvest in 2010.

Fallowing

Table 37: Number of seawater cage sites employing a fallow period during 2001-2010

Year	Fallow Period (weeks)						Total
	0	<4	4-8	9-26	27-51	52	
2001	80	10	76	94	15	45	320
2002	99	8	85	85	24	27	328
2003	95	14	68	80	40	29	326
2004	82	9	52	95	42	35	315
2005	75	11	36	86	37	33	278
2006	67	10	44	74	37	20	252
2007	67	16	41	61	38	24	247
2008	53	16	28	92	40	28	257
2009	51	3	30	86	46	37	253
2010	53	8	26	83	41	36	247

Of the 247 seawater cage sites recorded as being active in 2010, 158 farms were fallow for a variable period, whilst 36 farms were fallow for the whole of 2010. The normal production cycle in sea water varies in length between 18 months and two years, and a fallow period at the end of production can break the cycle of disease or parasitic infections. There were 53 sites that had no fallow period in 2010.

Broodstock Sites

Table 38: Number of sites holding broodstock during 1999-2010

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Broodstock sites	20	18	15	19	20	15	15	17	20	20	11	10

In 2010, the number of freshwater and seawater sites holding broodstock decreased to 10. The number of sites holding broodstock in any one year can be variable, as can be seen from the previous years' figures, which indicate no obvious trend. 10,895 fish were stripped, yielding just under 92 million ova, a similar yield compared to 2009, which can be calculated to show an average ova yield per fish of 8,413.

Organic Production

Of the 247 seawater cage sites recorded as being active in Atlantic salmon production in 2010, 14 were certified as organic. These sites produced 6,122 tonnes. 2010 is the first year that data on organic production has been reported.

// 4.OTHER SPECIES

There has been a continued interest in the farming of other species. Brown trout (*Salmo trutta*) production has again decreased in 2010. The majority of the production was for the restocking market. The reduction observed in production is due to a drop in the number of fish grown in sea water for the table. Cod (*Gadus morhua*) production has remained low and a there has been a decrease in halibut (*Hippoglossus hippoglossus*) production. Arctic charr (*Salvelinus alpinus*) production remained the same. Employment provided by these sectors showed a small decrease.

Staffing

Table 39: Number of staff employed in farming other species during 2002-2010

Year	Full-time	Part-time	Total
2002	69	30	99
2003	73	24	97
2004	61	18	79
2005	73	18	91
2006	92	17	109
2007	75	29	104
2008	80	44	124
2009	23	22	45
2010	19	24	43

Company, Site and Production Data

Table 40: Number of companies and sites producing other species, and production of other species (tonnes) during 2007-2010, and estimated production in 2011

Species	No. of companies	No. of sites	2007 Production tonnage	2008 Production tonnage	2009 Production tonnage	2010 Production tonnage*	2011 Production tonnage*
Arctic charr	5	5	6.5	0.9	1.5	1.5	3
Brown trout/ Sea trout	15	23	124	311	199	53	69
Cod	2	2	1,111	1,822	0.1	0.7	0
Halibut	3	5	147	206	189	139	150

*Industry estimates based on stocks currently being on-grown

Not all of this production is for the table market. There is some production of brown trout for the angling restocking market.

Escapes

There are no reported escapes from sites rearing other species in 2010.

Ova Laid Down to Hatch

Table 41: Source of other species' ova laid down to hatch during 2010

Species	Source of ova laid down to hatch (000s)		
	Own broodstock	Other GB broodstock	Foreign ova
Arctic charr (*Salvelinus alpinus*)	60	10	0
Cod (*Gadus morhua*)	0	0	0
Brown trout/Sea trout (*Salmo trutta*)	215	523	0
Halibut (*Hippoglossus hippoglossus*)	1,400	0	0

Trade in Small Fish

Table 42: Trade in other species' small fish in 2010

Species	Bought (000s)	Sold (000s)
Cod (*Gadus morhua*)	0	0
Halibut (*Hippoglossus hippoglossus*)	130	45
Brown trout / Sea trout (*Salmo trutta*)	35.7	29.6

There were also sites stocked with brook charr (*Salvelinus fontinalis*), carp (*Cyprinus carpio*), haddock (*Melanogrammus aeglefinus*), sheepshead minnow (*Cyprinodon variegatus variegatus*), turbot (*Psetta maximus*) and ballan wrasse (*Labrus bergylta*). There was production of brook charr and turbot, but due to the small number of companies in production, it is not possible to summarise these data without revealing the production of individual companies.

Organic Production

Of the 35 sites recorded as producing other species in 2010, one brown trout/sea trout producer was certified as organic. 2010 is the first year that data on organic production has been reported. It is not possible to detail this data without revealing the production of individual companies.

// 5.CONCLUSIONS

Rainbow trout (*Oncorhynchus mykiss*)

The production of rainbow trout decreased by 24.0% in 2010 to 5,139 tonnes and was directed at the table (86.7%) and restocking (13.3%) markets. This decrease follows on from a 12% decrease in 2009 and is the lowest recorded production since 1998. The total numbers of staff employed by the sector decreased by nine to 129. There was an overall decrease in the productivity of the industry to 39.8 tonnes per person.

The number of ova laid down to hatch decreased by 2.8 million and was mainly all-female diploid stock (89%). The proportion of ova that were sourced within GB decreased to 3.1%, resulting from a decrease in the number of ova sourced both from own stock and elsewhere in GB. There were no imports from the Southern hemisphere during 2010. There was an increase in the trade with USA (15.7% of total ova imported). Northern Ireland was the largest source of imported ova with 62% of the total ova imported. There is a continued high dependence of the Scottish trout industry on imported ova.

Atlantic salmon (*Salmo salar*)

The production of Atlantic salmon increased by 6.9% in 2010 to 154,164 tonnes. This follows on from a 12% increase in 2009 and is the highest production recorded since 2004. The survey shows an increase in the production of salmon but productivity of tonnes produced per person has decreased. The number of smolts produced and the number of ova produced remained steady.

Smolt production remained steady at 36.9 million, with the majority (61.7%) being S1, and the remainder being S½ smolts (38.3%). The number of staff directly employed on freshwater sites increased by nineteen. Productivity decreased to 127,600 fish per person. The number of ova laid down to hatch has increased by 3%. The ratio of ova laid down to smolts produced has increased to 1.9 in 2010. Projected estimates for 2011 suggest a decreased number of ova were laid down to hatch, and that fewer smolts will be produced in 2011, followed by an increase in 2012.

The majority of ova for the production of Scottish salmon were derived from Great British sources (57.4%) in 2010. Foreign sources supplied 42.6% of the ova laid down. The export of ova to other countries decreased by 89% mainly due to the cessation of trade with Chile.

The production tonnage in sea water increased by 6.9% in 2010. The number of staff directly employed on site increased, with the development of 101 jobs in the seawater industry. The estimated smolt placement in 2011 has decreased to 35.9 million. The estimated harvest forecast for 2011 is 157,385 tonnes, an increase of 2% on the 2010 total.

The production tonnage increased in 2010 and the number of sites in production decreased from 254 to 249. The trend towards concentrating production in larger sites was maintained, with 80.6% of production being concentrated in the sites producing over 1,000 tonnes per annum.

Other Species

Diversification of aquaculture was maintained in 2010. There has been a decrease in brown/ sea trout production from 199 tonnes in 2009 to 53 tonnes in 2010. This can be mainly attributed to reduction in number of fish grown in seawater for the table. Halibut production decreased by 26.4% on the 2009 figure and Arctic charr production remained steady. Cod production remained low at 0.7 tonnes and it is estimated that there will be no cod production in 2011.

// APPENDIX 1

Questionnaires sent to Fish Farmers

ANNUAL RETURN OF INFORMATION FROM SCOTTISH FISH FARMS FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 2010

ATLANTIC SALMON - PRODUCTION DATA

Please complete and return by 31 January 2011 to A J Walker, Marine Scotland Science
PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

Name of site	Please correct site name here (if necessary)	Please correct main method of production on each site (if necessary), ie sea water cages or tanks

1 How many staff were employed in salmon production (company total), excluding post-harvest processing staff
Full time male ☐☐☐ **Part time male** ☐☐☐
Full time female ☐☐☐ **Part time female** ☐☐☐

2 Please detail any accreditation schemes this company is a member of;

		Site 1	Site 2	Site 3	Site 4
3	**How many smolts were put into the site in 2010 as:**				
a	**S$^{1}/_{2}$s** (ie from 2010 hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	**S1s** (ie from 2009 hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c	**S1$^{1}/_{2}$s** or S2s (ie from 2009 or 2008hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
4	**How many of above came from England**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
5	**Total smolt input proposed in 2011**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
6	**HARVEST of 2010 SMOLT INPUT in 2010**				
a	Number of tonnes (wet weight at harvest)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	Number of fish	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
7	**HARVEST of 2009 SMOLT INPUT from 1 JANUARY to 31 AUGUST**				
a	Number of tonnes (wet weight at harvest)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	Number of fish	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
8	**HARVEST of 2009 SMOLT INPUT from 1 SEPTEMBER to 31 DECEMBER**				
a	Number of tonnes (wet weight at harvest)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	Number of fish	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
9	**HARVEST of 2008 SMOLT INPUT**				
a	Number of tonnes (wet weight at harvest)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	Number of fish	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
10	**From the total production what amount In TONNES was certified as organic**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
11	**How many tonnes of fish do you expect to harvest in 2011**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
12a	**Were brood fish produced in 2010**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**
b	**How many fish were stripped**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
13	**What is the current fish holding capacity of each site in cubic metres**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
14	**Duration of FALLOW PERIOD in WEEKS (cage sites; MAX = 52)**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
15	**Is a management agreement in place**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**

ANNUAL PRODUCTION SURVEY 2010

GUIDANCE NOTES FOR QUESTIONNAIRE

ATLANTIC SALMON

GENERAL NOTES

1. Please check that the pre-printed information on the sheet is correct.
2. If a site is inactive and **not part of a fallowing cycle**, please enter "INACTIVE" after the site name.
3. All harvest tonnages should be supplied for the wet weight of fish at harvest.
4. If a site was used **only to hold broodstock** for stripping please enter "BRD" after the site name.
5. When completing the boxes please start from the right eg for 250 tonnes enter as | | | | 2 | 5 | 0 | or if NONE then enter as | | | | | | 0 |

Hopefully all questions are self explanatory but you should note that:

Q1. How many staff

Please enter the total number of full and part-time workers employed in salmon production; this includes site staff, veterinary and maintenance staff, vaccination teams, administrative and harvesting staff but NOT processing or marketing staff

Please ensure that the same staff are NOT included more than once if the company operates more than one site, especially if your company operates both salmon grower and smolt sites.

Q2. Accreditation Schemes

Please include membership to trade associations, quality schemes or organic certification schemes.

Q3. How many smolts put to sea

The definitions used for the survey are:

S$^1/_2$ **<12 months old**, ie put to sea in year of hatch
S1 **12-18 months old**, ie put to sea in January-June in the year post hatch
S1$^1/_2$ **19-24 months old**, ie put to sea in July-December in the year post hatch
S2 **>24 months old**, ie when put to sea

Q12. Broodstock production

Please circle **YES** if broodfish were produced on the site

Q13. Fish holding capacity

Please enter the total cubic metre capacity for all tanks and cages combined or, if not known, give the size of tanks or cages (area or circumference plus depth x nos tanks or cages)

Q14. Fallow period

For cage sites only; please enter any number of weeks a site was fallow in 2010; the total number of fallow weeks should not exceed 52

It will be appreciated if the questionnaires are returned promptly and not later than 31 January 2011 to allow the Annual Survey Report for 2010 to be produced.

ANNUAL RETURN OF INFORMATION FROM SCOTTISH FISH FARMS FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 2010

ATLANTIC SALMON - SMOLT DATA

Please complete and return by 31 January 2011 to A J Walker, Marine Scotland Science
PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

Name of site	Please correct site name here (if necessary)	Please correct main method of production on each site (if necessary) ie fresh water cages or tanks

1 How many staff were employed in smolt production (company total) — **Full time male** ☐☐☐ **Full time female** ☐☐☐ **Part time male** ☐☐☐ **Part time female** ☐☐☐

2 Please detail any accreditation schemes this company is a member of;

3 How many ova were produced in the winter of 2009-2010 (company total) ☐☐☐☐☐☐☐☐

		Site 1	Site 2	Site 3	Site 4
4	**How many eyed ova were laid down for hatching in winter of 2009-2010**				
a	From own farmed broodstock	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	From other GB farmed broodstock	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c	From GB wild broodstock	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
d	From foreign sources	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
5	**How many eyed ova do you expect to hatch this winter (2010-2011)**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
6	**How many fry or parr were**				
a	Transferred into the site	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	Transferred out of the site	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
7	**How many smolts were produced as**				
a	**S$^{1}/_{2}$s** (ie from 2010 hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	**S1s** (ie from 2009 hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c	**S1$^{1}/_{2}$s or S2s** (ie from 2009 or 2008 hatch)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
8	**How many smolts were sold as**				
a	**S1s** (incl S$^{1}/_{2}$s)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	**S2s** (incl S1$^{1}/_{2}$s)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
9	**How many smolts do you expect to produce for sea winter on-growing next spring (2011) as**				
a	**S1s** (incl S$^{1}/_{2}$s)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	**S2s** (incl S1$^{1}/_{2}$s)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
10	**How many smolts do you plan to produce in 2012**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
11	**What is the fish holding capacity of each site in cubic metres**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
12	**Duration of FALLOW PERIOD in WEEKS (cage sites only)**	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
13	**How many fish did you vaccinate**				
a	against furunculosis	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b	against ERM	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c	against IPN	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
d	against *Vibrio* spp.	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐

ANNUAL PRODUCTION SURVEY 2010

GUIDANCE NOTES FOR QUESTIONNAIRE
ATLANTIC SALMON SMOLTS

GENERAL NOTES

1. Please check that the pre-printed information on the sheet is correct.
2. If a site is inactive and **not part of a fallowing cycle**, please write "INACTIVE" after the site name.
3. When completing the boxes please start from the right, if NONE then enter a **zero** in right hand box eg

					0

4. If the numbers for any box exceeds 6 figures please indicate the total number clearly in margin beside the appropriate box

Hopefully all questions are self explanatory but you may wish to note that:

Q1. How many staff

Please enter the total number of full and part-time staff employed in smolt production, this includes maintenance staff and staff seasonally employed for specific purposes, eg vaccination - please indicate clearly if you have contracted out vaccinating work to avoid duplication in numbers

Please ensure that the same staff are NOT included more than once if your company operates more than one site, especially for companies which operate both smolt and salmon grower sites

Companies are asked to use their discretion as to what they class as full and part-time staff

Q2. Accreditation Schemes

Please include membership to trade associations, quality schemes or organic certification schemes.

Q3. Number of ova produced

Enter the total number of ova produced by the company only once, if more than one form is used please enter **zero** or score out on subsequent forms

Q7. How many smolts produced as S1/2 or S1 etc

The definitions used for the survey are:

$S^1/_2$	<12 months old, ie put to sea in year of hatch
S1	12-18 months old, ie put to sea in January-June in year post hatch
$S1^1/_2$	19-24 months old, ie put to sea in July-December in year post hatch
S2	>24 months old when put to sea

Q7. } **For S1s** - combine numbers of $S^1/_2$s with S1s and
Q8. } **For S2s** - combine numbers of $S1^1/_2$s with S2s

Q10. Enter here the total number of smolts (any stage) likely to be produced

Q12 Please enter the total cubic metre capacity for all tanks or cages combined

Q13. Fallow period - applies to cage sites only

Please enter any weeks that the site was fallow in 2010 (maximum = 52)

It will be appreciated if the questionnaires are returned promptly and not later than 31 January 2011 to allow the Annual Survey Report for 2010 to be produced.

ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2010

RAINBOW TROUT - DATA

Please complete and return by 31 January 2011 to A J Walker, Marine Scotland Science
PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

Name of site	Please correct site name here (if necessary)	Please correct main method of production on each site (if necessary), ie fresh water cages or tanks

1 How many staff were employed in RAINBOW TROUT production (company total)

Full time male ☐☐☐ **Part time male** ☐☐☐
Full time female ☐☐☐ **Part time female** ☐☐☐

2 Please detail any accreditation schemes this company is a member of;

	Site 1	Site 2	Site 3	Site 4
3 How many eyed ova were laid down for hatching in 2010				
a from own broodstock	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b from other GB broodstock	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c from abroad (Northern Hemisphere)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
d from abroad (Southern Hemisphere)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
4 How many of the above ova were				
a all female diploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b mixed sex diploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c all triploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
5 How many fry/fingerlings were				
a bought	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b sold	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
6 How many bought fry/fingerlings were				
a all female diploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b mixed sex diploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c all triploid	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
7 How many of these fish were vaccinated against ERM				
a vaccinated on site	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b bought vaccinated	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
8 What was your total production in TONNES for the TABLE TRADE				
a <450 g (<1 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b 450-900 g (1-2 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c >900 g (>2 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
9 What was your total production in TONNES for the RESTOCKING TRADE				
a <450 g (<1 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b 450-900 g (1-2 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c >900 g (>2 lb)	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
10 From the total production what amount in TONNES was certified as organic	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
11 What is the fish holding capacity of the holding units for each site in cubic metres				
a Tanks	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
b Ponds	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
c Raceways	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
d Cages	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐

ANNUAL PRODUCTION SURVEY 2010

GUIDANCE NOTES FOR QUESTIONNAIRE

RAINBOW TROUT

GENERAL NOTES

1. Please check that the pre-printed information on the sheet is correct.
2. If a site is inactive and **not part of a fallowing cycle**, please write "INACTIVE" after the site name.
3. When completing the boxes please start from the right, if NONE then enter a **zero** in right hand box eg

					0

Hopefully all questions are self explanatory but you may wish to note that:

Q1. How many staff

a Please give the total number of full and part-time workers employed by the company in rainbow trout production

b Please ensure that the same staff are NOT included more than once if the company/business operates more than one site

c Staff employed solely in processing dead fish for marketing should NOT be included

Q2. Accreditation Schemes

Please include membership to trade associations, quality schemes or organic certification schemes.

Q3. Ova laid down for hatching

Give the TOTAL NUMBER of ova laid down, if the number exceeds six figures please indicate the total number clearly in margin beside the appropriate box - this also applies to questions 3-5 Ova from abroad- Northern Hemisphere includes those from Northern Ireland and Isle of Man.

Q8-9. Weight of fish sold for:

Please record the weight of fish sold to the nearest **tonne** (not in kgs), for part tonnes please indicate strongly using a decimal point, eg **31.5**

Q11. Fish Holding Capacity

Please enter the total cubic metre capacity for each type of production unit

It will be appreciated if the questionnaires are returned promptly and not later than 31 January 2011 to allow the Annual Survey Report for 2010 to be produced.

ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2010

OTHER SPECIES - DATA

Please complete and return by 31 January 2011 to A J Walker, Marine Scotland Science, PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Business address: ..... Business number: .....

	Name of site	Site no	Species code	Main method of production
1	.....	FS	.....	.....
2	.....	FS	.....	.....
3	.....	FS	.....	.....
4	.....	FS	.....	.....

1. How many staff in total were employed in other species production (company total)

Full time male		Part time male	
Full time female		Part time female	

2. Please detail any accreditation schemes this company is a member of;

	Site	Site	Site	Site .....
Species code	.....	.....	.....	.....
3. How many ova were laid down for hatching in 2010				
a) From own broodstock	.....	.....	.....	.....
b) From GB broodstock	.....	.....	.....	.....
c) From foreign sources	.....	.....	.....	.....
4. How many fry/small fish were				
a) Bought	.....	.....	.....	.....
b) Sold	.....	.....	.....	.....
5. What was your total production for the market in tonnes	.....	.....	.....	.....
6. From this production what amount in tonnes was certified as organic	.....	.....	.....	.....
7. What is your predicted production for the market in 2011 in tonnes	.....	.....	.....	.....
8. What is the holding capacity of the holding units for each site in cubic metres				
a) Tanks	.....	.....	.....	.....
b) Ponds	.....	.....	.....	.....
c) Raceways	.....	.....	.....	.....

SGMD ANNUAL PRODUCTION SURVEY 2010

GUIDANCE NOTES FOR QUESTIONNAIRE

OTHER SPECIES

GENERAL NOTES

1. The results of this survey will be made available to the FAO and will be published in the Annual Production Survey of Scottish Fish Farms produced by SGMD, in summary form only.

2. If a site is inactive, and not part of a fallowing cycle, or is no longer used to culture the species concerned, please score through the relevant site name or species code.

Species Codes			
ACH	Arctic Charr	BCH	Brook Charr
CAR	Carp	COD	Cod
HAD	Haddock	HAL	Halibut
LSO	Lemon Sole	TIL	Tilapia
TRO	Brown/sea trout	TUR	Turbot

Q1. How many staff

Please include those staff that were involved only in other species production. Please do not include staff that are involved in the production of Atlantic salmon or rainbow trout.

Q2. Accreditation Schemes

Please include membership to trade associations, quality schemes or organic certification schemes.

Q5 - 7. Weight of fish sold

Please record the wet weight of fish sold to the nearest **tonne** (not in kgs), for part tonnes please indicate strongly using a decimal point, e.g. **31.5**

It will be appreciated if the questionnaires are returned promptly and not later than 31 January 2011 to allow the annual survey report for 2010 to be produced.

// APPENDIX 2

Glossary and Abbreviations

Active	Fish farms in a production growing cycle which may contain stock or be fallow.
Alevin	Young fish, at stage from hatching to end of dependence on yolk sacs as primary source of nutrition.
Approved Zone Status	EU recognition of an area clear of listed disease(s).
Broodstock	Adult fish held until maturation for breeding purposes.
Diploid	Fish with the normal two sets of chromosomes.
EEA	European Economic Area.
EFTA	European Free Trade Association.
EU	European Union.
Eyed-ova/eggs	Fish egg(s) at the stage of development when the heavily pigmented eyes of the embryo are sufficiently developed to be clearly visible.
Fallow	Fish farm having no stock, but still part of a growing cycle.
Fingerling	A term commonly applied to young stages of salmonid fish.
Fry	Young salmon at stage from independence of yolk sac as primary source of nutrition to dispersal from the redd.
Gamete	Reproductive cells.
Grilse	Salmon harvested between 1st January and 31st August after one winter at sea
Inactive	Fish farms not in a production cycle and without stock.
Intra-peritoneal	Within the body cavity.
Non-producing	A site which is active, may be stocked with fish, but has produced no fish for harvest during the specified year.
On-growing	Farm producing fish for the table market.
Ova	Eggs.
0-year fish	Fish in their first year of life.
MSS	Marine Scotland Science.

Parr	Young salmon at stage from dispersal from redd to migration as a smolt.
Photoperiod	Alteration of light regime.
Pre-salmon	Salmon harvested between 1st September and 31st December after one winter at sea.
Raceway	Concrete or brick channels used for farming fish.
S½	Salmon or sea trout smolting at approximately six months from hatch (usually by photoperiod and/or temperature manipulation).
S1	Salmon or sea trout smolting at approximately one year from hatch.
S1½	Salmon or sea trout smolting at approximately 18 months from hatch.
S2	Salmon or sea trout smolting at approximately two years from hatch.
Smolt	Fully silvered juvenile salmon ready to be transferred or to migrate to sea.
Third Country	Country outside the EU.
Triploid	Genetically modified fish that have three sets of chromosomes instead of two.
Year Class	Fish hatched or put to sea in a given year.
ERM	Enteric redmouth.
IHN	Infectious haemopoeitic necrosis.
IPN	Infectious pancreatic necrosis.
ISA	Infectious salmon anaemia.
VHS	Viral haemorrhagic septicaemia.
RTFS	Rainbow trout fry syndrome.

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