

Scottish Fish Farm Production Survey

2011 report



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SCOTTISH FISH FARM PRODUCTION SURVEY 2011

This report was prepared by Marine Scotland Science

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// FOREWORD

The annual production survey of fish farms in Scotland for 2011 was carried out by Marine Scotland Science (MSS). This survey collates annual production data from Scottish fin fish farm sites operated by authorised aquaculture production businesses. 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 1st January to 31st December 2011 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 1991-2011. 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
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September 2012

// SUMMARY

The tables below summarise the results from the 2011 fish farms annual production survey.

Rainbow Trout (*Oncorhynchus mykiss*)

		2010	2011
Total production	(tonnes)	5,139	4,619
Production for the table	(tonnes)	4,458	3,858
Production for restocking	(tonnes)	681	761
Number of staff employed		129	118
Mean productivity	(tonnes/person)	39.8	39.1
Number of ova laid down to hatch	(millions)	15.1	15.1
Number of ova imported	(millions)	14.6	14.7

In 2011, the production of rainbow trout decreased by 520 tonnes. Employment decreased by 11 staff and productivity per person decreased to 39.1 tonnes. The number of ova laid down to hatch remained the same and the number of ova imported increased by 0.1 million.

Other Species

(including Arctic charr, *Salvelinus alpinus*; brown trout, *Salmo trutta*; cod, *Gadus morhua* and halibut, *Hippoglossus hippoglossus*)

		2010	2011
Total production	(tonnes)	194	146
Number of staff employed	(full-time)	19	24
	(part-time)	24	19
Number of ova laid down to hatch	(millions)	2.2	2.1
Number of ova imported	(millions)	0	0

In 2011 the production of other species decreased by 48 tonnes on the 2010 total. Overall, employment remained the same in 2011. There was a small 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	0	5	12,820
Atlantic salmon (freshwater stages)	0	1	1,500
Atlantic salmon (seawater stages)	2	9	402,134
Other species	0	0	0

Atlantic salmon (*Salmo salar*)

Smolts

		2010	2011
Number of ova produced	(millions)	91.6	78.2
Number of ova laid down to hatch	(millions)	69.6	64.6
Number of ova exported	(millions)	0.8	0.8
Number of ova imported	(millions)	28.7	39.3
Number of smolts produced	(millions)	36.9	43.6
Number of smolts put to sea	(millions)	38.5	42.7
Number of staff employed		289	293
Mean productivity (000s smolts/person)		127.6	148.9

The production of ova decreased by 13.4 million in 2011 and the number of ova laid down to hatch decreased by five million. Exports of ova remained the same while imports increased. The number of smolts produced increased by 6.7 million. The number of staff employed increased by four and mean productivity increased by 21.3 tonnes per person.

Production fish

		2010	2011
Total production	(tonnes)	154,164	158,018
Production of 0-year fish	(tonnes)	268	307
Production of grilse	(tonnes)	29,733	35,146
Production of pre-salmon	(tonnes)	56,093	55,959
Production of salmon	(tonnes)	68,070	66,606
Mean fish weight 0-year	(kg)	2.1	2.8
Mean fish weight grilse	(kg)	4.3	4.6
Mean fish weight pre-salmon	(kg)	4.9	5.0
Mean fish weight salmon	(kg)	5.0	4.8
Number of staff employed		1,064	1,013
Mean productivity	tonnes/person	144.9	156.0

Production tonnage increased by 2.5% with an increase in mean harvest weight of 0-year fish, grilse and pre-salmon but a decrease in mean weight of salmon. Staff numbers decreased by 51. Mean productivity showed an increase of just over 11 tonnes per person.

Smolt survival (percentage harvested)

Survival (%)	Years 0+1	Year 2	Total
2008 input year class	44.9	37.3	82.2
2009 input year class	47.6	35.7	83.3

Overall smolt survival increased by 1.1% compared with the 2008 year class.

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

Production survey information was collected from all 23 companies actively involved in rainbow trout production, farming 48 active sites. This figure represents the entire industry operating in Scotland.

Production

Table 1a: Total production (tonnes) of rainbow trout during 1998-2011

Year	Tonnes	Year	Tonnes
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
2004	6,352	2011	4,619

Production decreased in 2011 by 520 tonnes, a decrease of 10.1%.

Table 1b: Production (tonnes) for the table trade during 2001-2011 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
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
2011	1,421	1,004	1,433	3,858

Production for the table in 2011 was 3,858 tonnes, a decrease of 600 tonnes (13.5%) on the 2010 total, and accounted for 83.5% of the total rainbow trout production, a similar proportion to that produced in 2010. Supply was mainly of fish weighing up to 900g, encompassing 62.9% of total table production. Decreases in the number of fish in the small and large size ranges and an increase in the number of fish in the medium size range were highlighted.

Table 1c: Production (tonnes) for the restocking trade during 2001-2011 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
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
2011	8	419	334	761

In 2011, production for the restocking of angling waters increased by 80 tonnes to 761 tonnes representing an increase of 11.7% on the 2010 total. This accounted for 16.5% of total rainbow trout production in 2011. These figures represent the tonnage of fish supplied to angling waters for restocking purposes; they do not account for the catch taken by anglers. The production of small and large sized fish showed decreases, while this increased for medium sized fish.

Escapes

There were five incidents involving the loss of a total of 12,820 fish from rainbow trout sites in 2011.

Production by Site

Table 2: Numbers of sites grouped by tonnage produced during 2001-2011

Year	Number of sites per production tonnage				Total number of sites
	<1-25	26-100	101-200	>200	
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
2011	9	10	6	8	33

Production was reported from 33 sites. The number of producers in the size bracket <1-25 and >200 tonnes increased in 2011, while those producers in the size bracket 26-100 and 101-200 tonnes decreased. 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 2011 and comparison with production in 2010

Production method	Production grouping (tonnes) in 2011					Total tonnage and (%) by method		Number of sites	
	<10	10-25	26-50	51-100	>100	2010	2011	2010	2011
FW cages	1	0	0	0	5	1,632 (31.8%)	1,835 (39.7%)	5	6
FW ponds and raceways	1	3	7	2	6	1,893 (36.8%)	1,619 (35.1%)	22	19
FW tanks and hatcheries	3	0	0	0	0	8 (<1%)	9 (<1%)	3	3
SW cages	0	1	1	0	3	1,606 (31.2%)	1,156 (25.0%)	6	5
SW tanks	0	0	0	0	0	0	0	0	0
Total	5	4	8	2	14	5,139	4,619	36	33

Freshwater production accounted for 3,463 tonnes (75.0%) and seawater production for the remaining 1,156 tonnes (25.0%). Production from freshwater cages increased whilst there was a decrease in production from freshwater ponds raceways and seawater cages.

Company and Site Data

Table 4: Number of companies and sites in production during 1998-2011

Year	No. of companies	No. of sites
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
2011	23	48

In 2011 the number of companies authorised by the Scottish Government and actively engaged in rainbow trout production was 23. The number of sites registered and in production was 48.

Staffing and Productivity

Table 5: Number of staff employed and productivity per person during 1998-2011

Year	Full-time	Part-time	Total	Productivity (tonnes/person)
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
2011	95	23	118	39.1

The overall number of staff employed in 2011 decreased by 11 to 118. The numbers of full and part-time staff decreased by three and eight respectively. Productivity, measured as tonnes produced per person, decreased by 1.8% in 2011 with no distinction between full and part-time employees being made for this calculation.

Production by Area

Table 6: Production and staffing by area in 2011

Area	No. of sites	Table production (tonnes)	Restocking production (tonnes)	Mean tonnes per site	Staffing			Productivity (tonnes/person)
					F/T	P/T	Total	
North	7	104	55	22.7	2	3	5	31.8
East	15	986	232	81.2	39	3	42	29.0
West	12	2,207	39	187.2	32	9	41	54.8
South	14	561	435	71.1	22	8	30	33.2
All	48	3,858	761	96.2	95	23	118	39.1

Productivity was greatest in the West at 187.2 tonnes per site and productivity per person was greatest in the West at 54.8 tonnes.

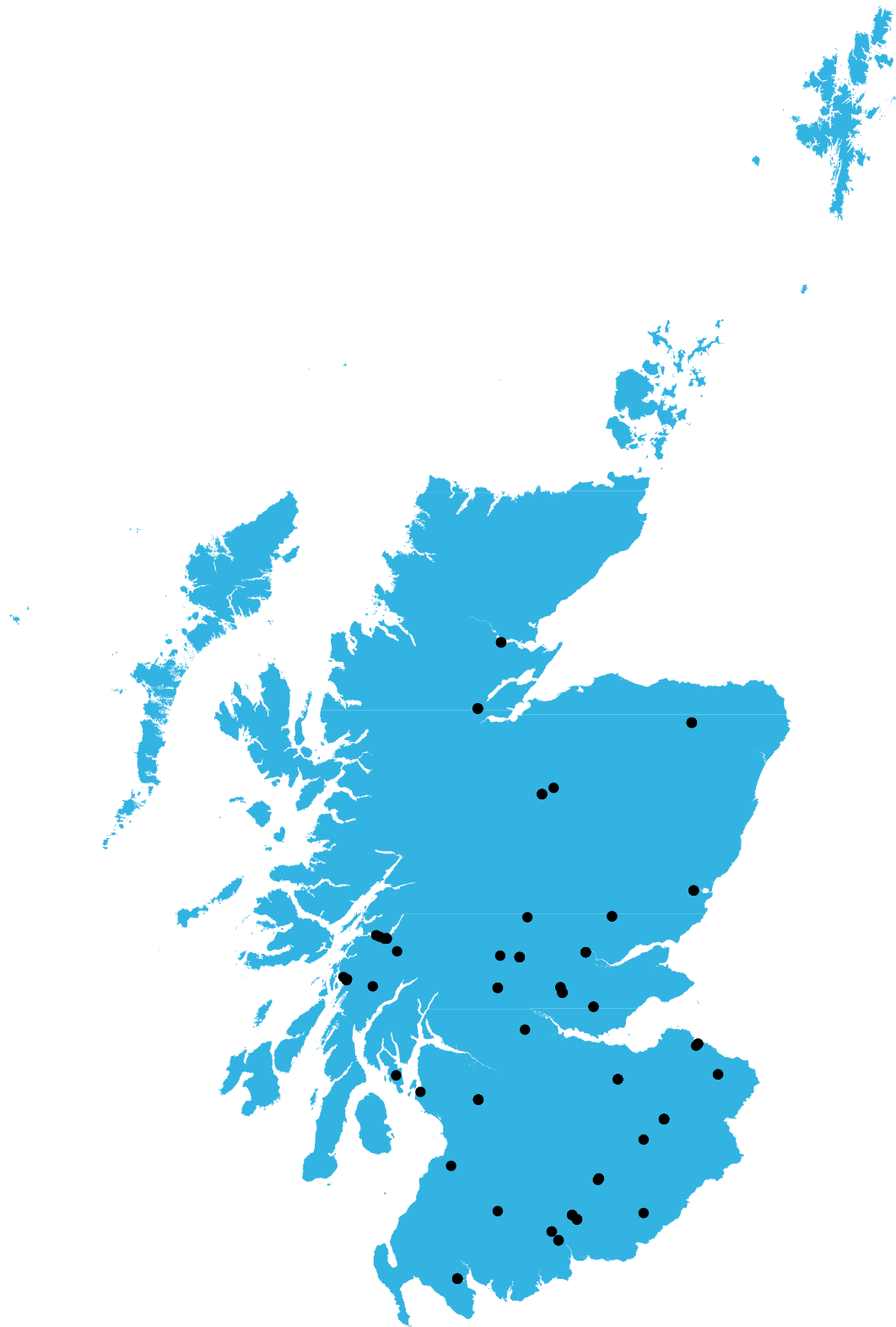


FIGURE 1: THE DISTRIBUTION OF ACTIVE RAINBOW TROUT SITES IN 2011

Type of Ova Laid Down

Table 7: Number (000s) and proportions (%) of ova types laid down to hatch during 2000-2011

Year	All female diploid no.(%)	Triploid no. (%)	Mixed sex diploid no. (%)	Total ova
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
2011	12,673(84)	2,254 (15)	215 (1)	15,142

Source of Ova Laid Down

Table 8: Number (000s) and sources of ova laid down to hatch 2000-2011

Year	Ova produced in Great Britain (GB)			Imported ova			Total
	Own stock	Other stock	Total	Northern hemisphere	Southern hemisphere	Total	
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
2011	215	189	404	14,738	0	14,738	15,142

The total number of eyed-ova laid down to hatch in 2011 was similar to that in 2010. The proportion of ova from GB broodstock decreased to 2.7% of the total and the rainbow trout industry remained reliant on imported ova. Data on the 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 Health Certificates

Table 9a: Number (000s) and sources of ova imported into Scotland during 2004-2011

Source	2004	2005	2006	2007	2008	2009	2010	2011
N. Ireland	405	1,710	2,830	7,721	16,130	10,090	9,247	7,320
Isle of Man	8,012	1,700	3,480	3,767	775	290	1,400	520
Denmark	6,370	9,225	14,525	13,070	5,530	4,070	1,715	5,250
South Africa	-	-	-	485	-	-	-	-
USA	17,335	4,440	2,310	890	1,490	2,240	2,340	1,580
France	800	200	-	-	-	-	-	-
Australia	-	2,600	1,500	-	-	-	-	-
Norway	-	-	500	1,200	1,500	750	200	130
Totals	32,922	19,875	25,145	27,133	25,425	17,440	14,902	14,800

Table 9b: Seasonal variation in numbers (000s) and sources of ova imported into Scotland during 2011

Month	Norway	Isle of Man	Denmark	N. Ireland	USA
January	-	-	370	1,000	-
February	-	300	280	950	-
March	-	220	1,475	1,700	-
April	-	-	900	-	500
May	130	-	265	650	-
June	-	-	650	500	300
July	-	-	-	-	270
August	-	-	-	900	-
September	-	-	210	250	510
October	-	-	700	70	-
November	-	-	250	650	-
December	-	-	150	650	-
Totals	130	520	5,250	7,320	1,580

Suppliers within the European Union (EU) accounted for 88.4% of ova imported into Scotland during 2011, with the USA and Norway accounting for 10.7% and 0.9% respectively. 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 2000-2011

Year	Fry and fingerlings bought			Total number bought	Total number sold
	All female diploid no. (%)	Triploid no. (%)	Mixed sex diploid no. (%)		
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
2011	16,288 (88.5)	1,970 (10.7)	138 (0.8)	18,396	16,612

The established trade between hatcheries and on-growing farms continued in 2011. Some companies specialised in the production of fry and fingerlings. The total number of fry and fingerlings purchased and the total number sold by producers both increased by 13.1%. 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 2000-2011

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
No. of sites	35	33	34	38	42	37	31	28	28	31	27	26

Vaccines continued to be widely used as a preventative treatment against enteric redmouth disease (ERM), a potentially serious bacterial disease, caused by the bacterium *Yersinia ruckeri*. A total of 20.3 million fish were vaccinated on 26 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 48 sites recorded as being active in rainbow trout production in 2011, none were certified as organic.

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

Production survey information was collected from all 28 companies actively involved in the freshwater production of Atlantic salmon, farming 98 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 2003-2011

Year	No. of companies	No. of sites
2003	48	176
2004	48	172
2005	41	148
2006	39	135
2007	37	135
2008	38	130
2009	30	105
2010	31	104
2011	28	98

In 2011 the number of companies authorised by the Scottish Government and actively engaged in the freshwater production of Atlantic salmon decreased by three to 28. A total of 98 sites were actively engaged in commercial production.

Production and Staffing

Table 13: Number (000s) of smolts produced, staff employed and smolt productivity during 2001-2011

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Number (000s) of smolts produced	47,546	47,161	44,414	39,999	36,326	40,827	38,125	36,450	36,868	36,872	43,626	
Staffing	Full-time	317	312	291	259	200	209	217	209	216	233	225
	Part-time	111	93	82	60	74	62	62	54	54	56	68
	Total	428	405	373	319	274	271	279	263	270	289	293
Productivity, 000s of smolts per person	111.1	116.4	119.1	125.4	132.6	150.6	136.6	138.6	136.5	127.6	148.9	

Smolt production in 2011 increased by 18.3% compared to 2010. The number of staff employed increased by four and productivity increased by 16.7%, to a figure of 148,900 smolts produced per employee.

Escapes

There was one incident involving the loss of 1,500 fish from a freshwater Atlantic salmon site in 2011.

Smolts by Age Group

Table 14: Number of smolts (000s) produced by type during 2000-2011

Year	S½	S1	S1½	S2	Total
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
2011	17,233	26,393	0	0	43,626

In 2011, production was dominated by S1 smolts, numbers produced increased by 16.0%. The production of S½ smolts increased by 22.1%. There was no production of S1½ or S2 smolts.

Production Systems

Table 15: Number and capacity of production systems during 2007-2011

System	No. of sites with system					Total capacity, 000s cubic metres				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
Cages	56	53	47	45	44	327	385	388	401	325
Tanks and Raceways	79	77	58	59	54	37	41	37	38	49
Total	135	130	105	104	98	364	426	425	439	374

The principal types of facility used for the production of smolts in fresh water are cages or tanks and raceways. In 2011, the number of farms using tanks and raceways decreased by five and the number of farms using cages decreased by one. In terms of volume, tank and raceway capacity increased by 11,000 m³ and cage volume decreased by 76,000 m³. This resulted in a net decrease in volume of 65,000 m³ available for the production of smolts in Scotland during 2011.

Table 16: Number (000s) of smolts produced, and stocking densities by production system during 2007-2011

Year	Number of smolts produced (000s)					Stocking densities (smolts/m ³)				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2010
Cages	19,440	17,065	17,041	20,333	23,135	59	44	44	51	71
All others	18,685	19,385	19,827	16,539	20,491	505	472	536	435	418
Total	38,125	36,450	36,868	36,872	43,626	-	-	-	-	-

The average stocking densities of cages increased from 51 to 71 fish per m³ in 2011 compared to 2010 while densities in tanks and raceways decreased from 435 to 418 fish per m³.

Ova Production

Table 17: Number (000s) of salmon ova produced during 2004-2011

Year	2004	2005	2006	2007	2008	2009	2010	2011
No. of ova	128,866	73,211	60,941	83,822	135,230	91,964	91,655	78,208

Just over 78.2 million ova were stripped in 2011, a decrease of over 13.4 million (14.7%) on the 2010 season.

Table 18: Source, number (000s) and previous year's estimate of ova laid down to hatch during 2000-2012

Year	In-house broodstock	Out-sourced GB broodstock	GB wild broodstock	Foreign ova	Total	Previous year's estimate
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	15,664	14,630	0	34,322	64,616	54,526
2012						55,723

The number of ova laid down to hatch was 64.6 million, a decrease of just over five million (7.2%) on the 2010 figure. The majority of the ova (53.1%) were derived from foreign sources, this being an increase of 4.7 million (15.7%) on the 2010 figure. Supplies derived from GB broodstock decreased by 9.7 million, this being a 24.2% decrease on the 2010 figure. Producers' estimates for the number of ova to be laid down in 2012 has decreased from the actual number of ova laid down in 2011. No ova from GB wild broodstock were laid down in 2011, however, in previous years the ova derived from wild stocks were 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 2002-2013

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual smolts put to sea	50.1	43.8	39.1	37.2	41.1	37.8	36.6	38.5	38.5	42.7		
Smolts produced	47.2	44.4	40.0	36.3	40.8	38.1	36.4	36.9	36.9	43.6		
Estimated production	49.3	44.2	40.0	36.2	33.2	41.2	34.9	32.6	28.7	35.9	31.3	43.6
Ratio of ova laid down to smolts produced	1.8	1.8	1.8	2.1	1.6	2.0	1.7	1.8	1.9	1.5		

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 31.3 million smolts to sea in 2012.

The ratio of ova laid down to hatch to smolts produced in 2011 was less than the ratio in 2010.

Scale of Production

Table 20: Smolt-producing sites grouped by numbers (000s) of smolts produced during 1999-2011

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		
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
2011	1	0	4	5	11	14	9	17	61	43,626

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 decreased to 61 in 2011. The number of sites producing less than 101,000 smolts has increased by one and there has also been a decrease of seven 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 three.

Production of Ova and Smolt by Production Area

Table 21: Staffing 2011, ova laid down to hatch 2010-2011, smolt production 2010-2011 and estimated production 2012-2013 by region

Region	Number of staff employed in 2011		Ova laid down to hatch (000s)		Smolt production (000s)		Estimated smolt production (000s)	
	F/T	P/T	2010	2011	2010	2011	2012	2013
North West	132	31	34,316	31,950	21,927	23,420	16,665	23,615
Orkney	2	0	0	0	100	118	120	120
Shetland	12	13	2,010	1,710	1,300	1,706	1,185	1,560
West	36	9	15,395	16,501	7,328	9,631	7,000	9,660
Western Isles	30	2	10,580	9,868	4,099	6,459	4,788	6,850
East and South	13	13	7,320	4,587	2,118	2,292	1,554	1,790
All Scotland	225	68	69,621	64,616	36,872	43,626	31,312	43,595

The North West, the West and the Western Isles were the main ova and smolt producing areas in Scotland in 2011 and employed the greatest number of staff.

International Trade in Ova

Since the introduction of the EU single market on 1st 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 compartments and zones declared free from listed diseases. Areas of Norway have equivalent status to Great Britain with regard to non exotic diseases, but approved National Control Measures 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.

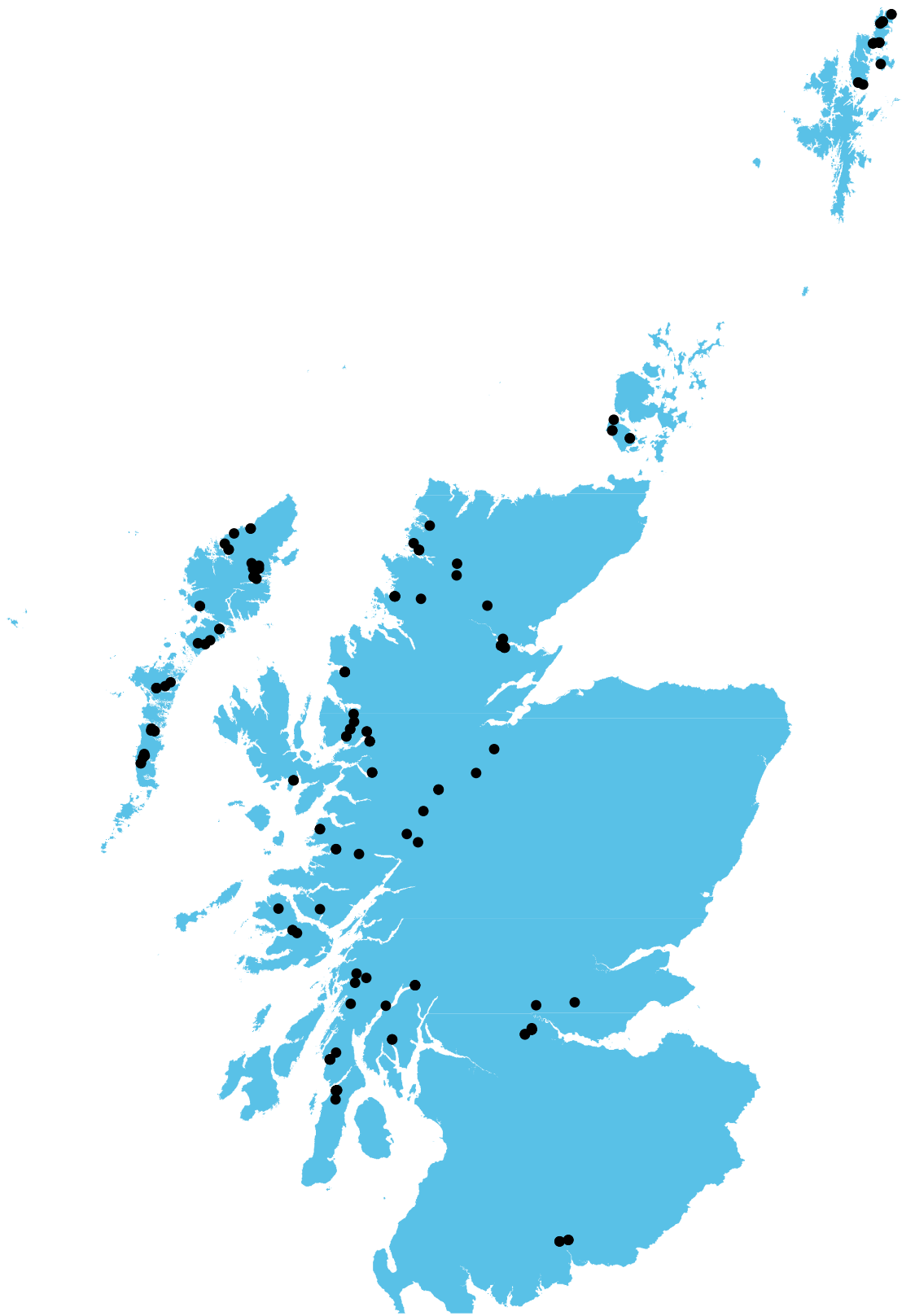


FIGURE 2: THE DISTRIBUTION OF ACTIVE SMOLT SITES IN 2011

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. Marine Scotland Science advises potential exporters to ascertain with the importing country any specific health testing requirements that may be a condition of import.

Imports and Exports

Table 22a: Source and number (000s) of ova, parr and smolts imported during 2000-2011 derived from health certificates

Import Year	Ova					Total	Parr and Smolts EU Member States
	EU Member States	EFTA		Third Countries			
		Iceland	Norway	Australia	USA		
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
2011	3,400	0	35,851	0	0	39,251	800

The numbers of ova imported increased by 36.8%. The number of parr and smolts imported increased by 77%.

Table 22b: Destination and number (000s) of salmon ova, parr and smolts exported during 2001-2011 derived from health certificates

Export year	Farmed origin				Total	Parr and Smolts
	Chile	EU	Norway	Others		
2001	2,675	8,542	0	0	11,217	349
2002	1,600	6,627	0	0	8,227	0
2003	0	2,171	0	0	2,171	941
2004	2,215	3,699	0	0	5,914	1,488
2005	8,560	3,130	0	1,566	13,256	1,362
2006	26,930	4,312	0	0	31,242	998
2007	32,150	164	0	0	32,314	2,169
2008	62,185	130	0	15	62,330	551
2009	7,181	317	0	0	7,498	89
2010	0	189	600	0	789	130
2011	0	3	0	820	823	183

In 2011, a total of 0.82 million ova were exported. Exports of ova to other EU member states decreased by 98% to 0.003 million in 2011. Overall ova exports increased by 4.3% on the 2010 figure. Parr and smolt exports also increased.

Vaccines

Table 23: Number of sites using vaccines and number (millions) of fish vaccinated during 2003-2011

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
No. of sites	104	98	84	79	73	80	68	70	67
No. of fish (millions) vaccinated	41.7	39.4	33.8	43.5	41.0	36.7	39.6	42.6	49.2

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 ERM, infectious pancreatic necrosis (IPN), pancreas disease (PD) and *Vibriosis*. A total of 49.2 million fish were vaccinated across 67 sites.

// 3. ATLANTIC SALMON – PRODUCTION

Production

Production survey information was collected from all 27 companies actively involved in Atlantic salmon production, farming 254 active sites. This figure represents the entire industry operating in Scotland.

Table 24: Annual production of Atlantic salmon (tonnes) during 1991-2011 and projected production in 2012

Year	Tonnes	Percentage difference	Year	Tonnes	Percentage difference
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	110,897	12	2009	144,247	12
1999	126,686	14	2010	154,164	6.9
2000	128,959	2	2011	158,018	2.5
2001	138,519	7	2012	158,026*	

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

The total production of Atlantic salmon during 2011 was 158,018 tonnes, an increase of 3,854 tonnes (2.5%) on the 2010 production.

Escapes

There were nine incidents involving the loss of a total of 402,134 fish from seawater Atlantic salmon sites in 2011. There were two additional reported incidents where farms confirmed there was no loss of fish.

Table 25: Number (000s), production (tonnes) of salmon harvested and mean fish weight (kg) per year class during 2001-2011

	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)	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
	2011	2011	109	307	2.8
Harvest in year 1	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
	2010	2011	18,694	91,105	4.9
Harvest in year 2	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
	2009	2011	13,772	66,606	4.8

Table 26: Number (000s) and production (tonnes) of grilse and pre-salmon harvested during 2001-2011

Year	Grilse (January-August)			Pre-salmon (September-December)		
	Number	Tonnes	Average weight (kg)	Number	Tonnes	Average weight (kg)
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
2011	7,604	35,146	4.6	11,090	55,959	5.0

Table 27: Percentage (by weight) of annual production by growth stage harvested during 2003-2011

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
Growth stage	-	-	-	-	-	-	-	-	-
Input year fish	<1	<1	0	<1	<1	<1	<1	<1	<1
Grilse	19	17	18	13	12	12	16	19	22
Pre-salmon	37	37	34	35	34	31	37	36	35
Salmon	43	45	48	51	53	57	46	44	42

Survival and Production in Smolt Year Classes

Table 28: Survival and production in smolt year classes during 1994-2011

Year of smolt input	Harvest year 0				Harvest year 1				Harvest year 2				Yield per smolt (kg)			
	Smolt input (000s)	Number (000s)	Weight (tonnes)	Mean weight (kg)	% harvest	Number (000s)	Weight (tonnes)	Mean weight (kg)	% harvest	Number (000s)	Weight (tonnes)	Mean weight (kg)		% harvest	Total % of year class harvested	Year class weight (tonnes)
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	36,662	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	13,722	66,606	4.8	35.7	83.3	152,610	3.96
2010	38,490	128	268	2.1	0.3	18,694	91,105	4.9	48.6							
2011	42,733	109	307	2.8	0.3											

In 2009, the last year for which survival can be calculated, the survival rate from smolt input to harvest was 83.3%. The 2009 year class displayed a higher survival rate than that noted in 2008 and was higher than the survival averaged over the last 15 year-classes.

Of the 2010 year class, 48.9% of the input has been harvested, 1.3% higher than the average harvest of fish one year after input in the 2009 year class. The average weight increased to 4.9 kg.

In 2011, the harvest of fish from the 2011 smolt input remained the same at 0.3%.

Smolts to Sea

Table 29: Number (000s) and origin of smolts put to sea during 1999-2011

Year	Smolts put to sea (000s)				Total (000s)	Scottish Origin %	English Origin		Other Origin	
	S½	S1	S1½	S2			(000s)	%	(000s)	%
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	11,101	25,561	0	0	36,662	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
2011	17,721	25,012	0	0	42,733	96	1,765	4	0	0

The total number of smolts put to sea in 2011 was 42.7 million. The smolt input comprised mainly S1 smolts (59%) and the proportion of photoperiod adjusted fish (S½ smolts) input increased to 41%. Four percent of smolts input into Scottish salmon farms were sourced from outwith Scotland. This is the same proportion observed in 2010.

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 2000-2011

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	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	2011	2,003	20.1	9,090	91.0
	2010	9,924	2010	117	1.2	2011	6,324	63.7					
2011	12,605	2011	53	0.4									
Orkney	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	2011	95	8.2	836	72.4
	2010	2,557	2010	-	-	2011	1,126	44.0					
2011	2,718	2011	-	-									
Shetland	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	2011	3,234	32.2	7,464	74.4
	2010	11,573	2010	-	-	2011	4,134	35.7					
2011	11,206	2011	49	0.4									
South West	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	2011	4,697	57.3	7,407	90.3
	2010	6,565	2010	12	0.2	2011	3,000	45.7					
2011	7,493	2011	-	-									
Western Isles	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	2011	3,743	40.8	7,322	79.8
	2010	7,870	2010	-	-	2011	4,110	52.2					
2011	8,711	2011	7	0.1									

* 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

Staffing

Table 31: Number of staff employed in salmon production during 2001-2011

Year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Staff	F/T	1,066	1,083	1,066	1,019	851	790	798	849	874	944	923
	P/T	191	223	151	142	128	81	118	100	89	120	90
Total staff		1,257	1,306	1,217	1,161	979	871	916	949	963	1,064	1,013
Productivity (tonnes/person)		110.2	110.7	139.5	136.2	132.4	151.4	141.8	135.5	149.8	144.9	156.0

The total number of staff employed in salmon production in 2011 was 1,013, a decrease of 51 compared with 2010. 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 increased from 144.9 to 156.0 tonnes production per person.

Production Methods

Table 32: Production methods, capacity, tonnage and average stocking densities (kg/m³) during 2009-2011

Method	Number of sites			Total capacity (000s cubic metres)			Production (tonnes)		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Seawater tanks	1	2	2	5.9	6.3	6.1	88	195	141
Seawater cages	253	247	252	16,515	16,894	17,152	144,159	153,969	157,877
For cage sites: ratio of production (kg) to cage capacity (m ³)							8.7	9.1	9.2

The vast majority of the fish were produced in seawater cages. There were 141 tonnes of production from seawater tank sites in 2011. This reflects the continued high installation and running costs incurred in operating seawater tank systems. Most seawater tank capacity has now been re-deployed for the production of other species or salmon broodstock.

Sea cage capacity increased by 258,000 m³ during 2011. The number of sea cage sites in production increased by five. Production efficiency in cages, measured as the ratio of fish weight in kilograms produced per cubic metre increased to 9.2 kg/m³ in 2011. In cage sites the ratio of production (expressed in kilograms) to cage capacity (expressed in cubic metres), was 8.7, 9.1 and 9.2 in 2009, 2010 and 2011 respectively.

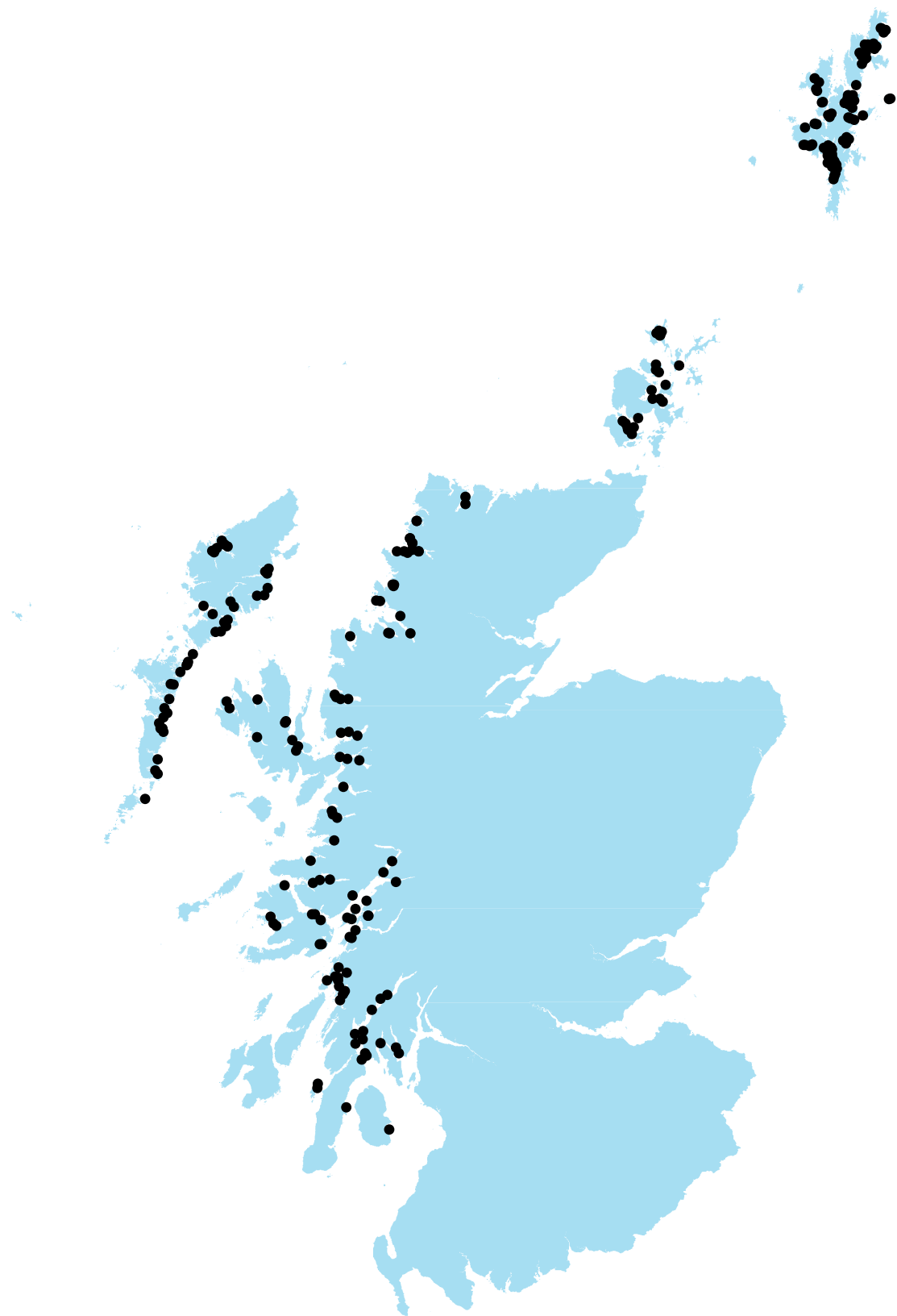


FIGURE 3: THE DISTRIBUTION OF ACTIVE SALMON PRODUCTION SITES IN 2011

Scale of Production by Site

Table 33: Number of sites shown in relation to their production grouping and percentage share of production 2001-2011

Production grouping (tonnes)	0	1-50	51-100	101-200	201-500	501-1,000	>1,000	Total	
								Sites*	Tonnes
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
2011	106	9	7	9	28	29	66	254	158,018
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	-	-
2011	0	0.2	0.3	0.8	6.4	13.4	78.9	-	-

*Includes farms stocked but having no production.

In 2011, there was a decrease of one in the number of sites producing one to 500 tonnes and an increase of nine in those sites producing over 500 tonnes. This shows a continuing trend towards production in larger sites.

Company Productivity

Table 34: Number of companies grouped by production (tonnes), manpower and productivity (tonnes per person) during 2010-2011

Total Tonnage		0-100	101-200	201-400	401-700	701-1,000	1,001-2,000	>2,000	Total
No. of companies	2010	11	3	1	2	1	3	9	30
	2011	10	2	1	2	1	2	9	27
No. of tonnes	2010	41	509	385	870	955	3,911	147,493	154,164
	2011	48	245	209	1,021	753	2,277	153,465	158,018
Manpower (total)	2010	7	21	12	6	8	62	948	1,064
	2011	14	13	6	12	5	42	921	1,013
Productivity (tonnes/person)	2010	6	24	32	145	119	63	156	145
	2011	3	19	35	85	151	54	167	156

The greatest productivity (167 tonnes per person) was achieved in the companies having a production greater than 2,000 tonnes and the least (three tonnes per person) in the companies producing the smallest tonnages. In comparison with 2010, the average company productivity increased from 145 to 156 tonnes per person.

Overall production was dominated by nine companies in 2011 which between them accounted for over 97% of Scotland's salmon production.

Manpower and Production by Production Area

Table 35: Manpower and production (tonnes) by area 2002-2011 and projected production in 2012

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	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	303	38	41,656	122	174	3.3	13,152	4.3	16,879	5.1	11,451	5.7
2012	-	-	51,859*	-	-	-	-	-	-	-	-	-	-
Orkney	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	69	0	6,369	92	-	-	3,508	5.1	2,355	5.4	506	5.3
2012	-	-	11,469*	-	-	-	-	-	-	-	-	-	-
Shetland	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	189	22	35,493	168	118	2.4	4,611	4.7	16,071	5.1	14,693	4.5
2012	-	-	46,224*	-	-	-	-	-	-	-	-	-	-
South West	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	212	17	37,157	162	-	-	3,618	4.8	10,899	4.8	22,640	4.8
2012	-	-	22,247*	-	-	-	-	-	-	-	-	-	-
Western Isles	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	150	13	37,343	229	15	2.1	10,257	4.7	9,755	5.0	17,316	4.6
2012	-	-	26,227*	-	-	-	-	-	-	-	-	-	-
All Scotland	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	923	90	158,018	156	307	2.8	35,146	4.6	55,959	5.0	66,606	4.8
2012	-	-	158,026*	-	-	-	-	-	-	-	-	-	-

*Estimated production in 2012

Company and Site Data

Table 36: Number of companies and sites engaged in salmon production during 2001-2011

Year	Number of companies			Number of sites		
	Producing	Non-producing	Total	Producing	Non-producing	Total
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
2011	21	6	27	106	148	254

The number of companies authorised and actively producing salmon in 2011 was 21, an increase of one on the 2010 figure. Six companies remained active and authorised, although not producing salmon for harvest in 2011. This continued the trend of salmon production being concentrated within fewer companies. These 27 companies have 254 registered active sites, although not all active sites may have produced fish for harvest in 2011.

Following

Table 37: Number of seawater cage sites employing a fallow period during 2002-2011

Year	Fallow Period (weeks)						Total
	0	<4	4-8	9-26	27-51	52	
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
2011	60	10	31	85	27	39	252

Of the 252 seawater cage sites recorded as being active in 2011, 153 farms were fallow for a variable period, whilst 39 farms were fallow for the whole of 2011. The normal production cycle in seawater 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 60 sites that had no fallow period in 2011.

Broodstock Sites

Table 38: Number of sites holding broodstock during 2000-2011

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Broodstock sites	18	15	19	20	15	15	17	20	20	11	10	11

In 2011, the number of freshwater and seawater sites holding broodstock increased to 11. 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. A total of 5,263 fish were stripped, yielding just over 78 million ova, which can be calculated to show an average ova yield per fish of 14,820.

Organic Production

Of the 252 seawater cage sites recorded as being active in Atlantic salmon production in 2011, ten were certified as organic producing 3,104 tonnes. This is the second 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 showed a small increase in 2011. The majority of the production was for the restocking market. The production of Arctic charr (*Salvelinus alpinus*) remained the same whilst there was a decrease in halibut (*Hippoglossus hippoglossus*) production. There were no Cod (*Gadus morhua*) produced for the table market in 2011. Employment provided by these sectors has remained level.

Staffing

Table 39: Number of staff employed in farming other species during 2003-2011

Year	Full-time	Part-time	Total
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
2011	24	19	43

Company, Site and Production Data

Table 40: Number of companies and sites producing other species, production of other species (tonnes) during 2008-2011 and estimated production in 2012

Species	No. of companies	No. of sites	2008 Production tonnage	2009 Production tonnage	2010 Production tonnage	2011 Production tonnage	2012 Production tonnage*
Arctic charr	5	5	0.9	1.5	1.5	1.5	2
Brown trout/ sea trout	16	23	311	199	53	61	43
Cod	1	1	1,822	0.1	0.7	0	0
Halibut	3	5	206	189	139	83	133

*Industry estimates based on stocks currently being on-grown

Not all of this production is for the table market with the majority of brown trout production being for the angling restocking market.

Escapes

There are no reported escapes from sites rearing other species in 2011.

Ova Laid Down to Hatch

Table 41: Source of ova from other species laid down to hatch during 2011

Species	Source of ova laid down to hatch (000s)		
	Own broodstock	Other GB broodstock	Foreign ova
Arctic charr	60	0	0
Cod	30	0	0
Brown trout / sea trout	421	0	0
Halibut	1,600	0	0

Trade in Small Fish

Table 42: Trade in small fish of other species in 2011

Species	Bought (000s)	Sold (000s)
Cod	0	0
Halibut	71	53
Brown trout / sea trout	43.8	175.3

There were also sites stocked with ballan wrasse (*Labrus bergylta*), brook charr (*Salvelinus fontinalis*), carp (*Cyprinus carpio*), common sole (*Solea solea*), haddock (*Melanogrammus aeglefinus*), sheepshead minnow (*Cyprinodon variegatus variegatus*), turbot (*Psetta maxima*) and tilapia (*Tilapia* Spp). There was production of brook charr, carp, common sole and tilapia 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 34 sites recorded as producing other species in 2011, one brown trout/sea trout producer was certified as organic. It is not possible to detail this data without revealing the production of individual companies.

// 5. CONCLUSIONS

Rainbow trout

The production of rainbow trout decreased by 10.1% in 2011 to 4,619 tonnes and was directed at the table (83.5%) and restocking (16.5%) markets. This follows on from a 24% decrease in 2010 and is the lowest recorded production over the time series. The total numbers of staff employed by the sector decreased by 11 to 118. There was an overall decrease in the productivity of the industry to 39.1 tonnes per person.

The number of ova laid down to hatch (15.1 million) remained the same as in 2010 and was mainly all-female diploid stock (84%). The proportion of ova that were sourced within GB decreased to 2.7%, resulting from a decrease in the number of ova sourced from own stock. There were no imports from the Southern hemisphere during 2011. There was an increase in the trade with Denmark (35% of total ova imported). Northern Ireland was the largest source of imported ova with 49% of the total ova imported. There is a continued high dependence of the Scottish trout industry on imported ova.

Atlantic salmon

The total production of Atlantic salmon increased by 2.5% in 2011 to 158,018 tonnes. This follows on from a 6.9% increase in 2010 and is the highest production recorded since 2004. The survey shows increases in the production of grilse but a decrease in the production of pre-salmon and salmon. Overall there was an increase in the productivity of tonnes produced per person.

Smolt production increased to 43.6 million, with the majority (60.5%) being S1 and the remainder being S½ smolts (39.5%). The number of staff directly employed on freshwater sites increased by four. Productivity increased to 148,900 fish per person. The number of ova laid down to hatch decreased by 7.2%. The ratio of ova laid down to smolts produced has decreased to 1.5 in 2011. Projected estimates for 2012 suggest a decreased number of ova were laid down to hatch and that fewer smolts will be produced in 2012, followed by an increase in 2013. Ova were derived from both Great British (46.9%) and foreign (53.1%) sources in 2011. The export of ova to other countries remained steady.

The production tonnage in seawater increased by 2.5% in 2011. The number of staff directly employed on the farms decreased by 51. The estimated smolt placement in 2012 has decreased to 31.3 million. The estimated harvest forecast for 2012 of 158,026 tonnes is similar to the actual production in 2011.

The production tonnage increased in 2011 and the number of sites in production increased from 249 to 254. The trend towards concentrating production in larger sites was maintained with 78.9% of production being concentrated in the sites producing over 1,000 tonnes per annum.

Other Species

There was a small increase in the production of brown/sea trout from 53 tonnes in 2010 to 61 tonnes in 2011. Halibut production decreased by 40.3% on the 2010 figure and there was no reported cod production for the table market 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 2011**

ATLANTIC SALMON - PRODUCTION DATA

Please complete and return by 31 January 2012 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 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Full time female <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Part time male <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Part time female <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
---	--	--

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 2011 as:				
a S ¹ / ₂ s (ie from 2011 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b S1s (ie from 2010 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
c S1 ¹ / ₂ s or S2s (ie from 2010 or 2009 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4 How many of above came from England	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5 Total smolt input proposed in 2012	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6 HARVEST of 2011 SMOLT INPUT in 2011				
a Number of tonnes (wet weight at harvest)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b Number of fish	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7 HARVEST of 2010 SMOLT INPUT from 1 JANUARY to 31 AUGUST				
a Number of tonnes (wet weight at harvest)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b Number of fish	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8 HARVEST of 2010 SMOLT INPUT from 1 SEPTEMBER to 31 DECEMBER				
a Number of tonnes (wet weight at harvest)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b Number of fish	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
9 HARVEST of 2009 SMOLT INPUT				
a Number of tonnes (wet weight at harvest)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b Number of fish	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
10 From the total production what amount in TONNES was certified as organic	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
11 How many tonnes of fish do you expect to harvest in 2012	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
12a Were brood fish produced in 2011	YES/NO	YES/NO	YES/NO	YES/NO
b How many fish were stripped	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
13 What is the current fish holding capacity of each site in cubic metres	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
14 Duration of FALLOW PERIOD in WEEKS (cage sites; MAX = 52)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
15 Is a management agreement in place	YES/NO	YES/NO	YES/NO	YES/NO

ANNUAL PRODUCTION SURVEY 2011

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:

- S¹/₂ <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
- S1¹/₂ 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 2011; 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 2012 to allow the Annual Survey Report for 2011 to be produced.

**ANNUAL RETURN OF INFORMATION FROM SCOTTISH FISH FARMS
FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 2011**

ATLANTIC SALMON - SMOLT DATA

Please complete and return by 31 January 2012 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	<input type="text"/>	<input type="text"/>	<input type="text"/>	Part time male	<input type="text"/>	<input type="text"/>	<input type="text"/>
Full time female	<input type="text"/>	<input type="text"/>	<input type="text"/>	Part time female	<input type="text"/>	<input type="text"/>	<input type="text"/>

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

3 How many ova were produced in the winter of 2010-2011 (company total)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

4 How many eyed ova were laid down for hatching in winter of 2010-2011

	Site 1	Site 2	Site 3	Site 4
a From own farmed broodstock	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b From other GB farmed broodstock	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
c From GB wild broodstock	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d From foreign sources	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

5 How many eyed ova do you expect to hatch this winter (2011-2012)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------

6 How many fry or parr were

a Transferred into the site	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b Transferred out of the site	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

7 How many smolts were produced as

a S ¹ / ₂ s (ie from 2011 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b S1s (ie from 2010 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
c S ¹ / ₂ s or S2s (ie from 2010 or 2009 hatch)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

8 How many smolts were sold as

a S1s (incl S ¹ / ₂ s)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b S2s (incl S ¹ / ₂ s)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

9 How many smolts do you expect to produce for sea winter on-growing next spring (2012) as

a S1s (incl S ¹ / ₂ s)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b S2s (incl S ¹ / ₂ s)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

10 How many smolts do you plan to produce in 2013

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

11 What is the fish holding capacity of each site in cubic metres

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

12 Duration of FALLOW PERIOD in WEEKS (cage sites only)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

13 How many fish did you vaccinate

a against furunculosis	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
b against ERM	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
c against IPN	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d against <i>Vibrio</i> spp.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ANNUAL PRODUCTION SURVEY 2011

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:

- S¹/₂ <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
- S1¹/₂ 19-24 months old, ie put to sea in July-December in year post hatch
- S2 >24 months old when put to sea

- Q8. } For S1s - combine numbers of S¹/₂s with S1s and
- Q9. } For S2s - combine numbers of S1¹/₂s 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 2012 to allow the Annual Survey Report for 2011 to be produced.

**ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2011
RAINBOW TROUT - DATA**

Please complete and return by 31 January 2012 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 2011				
a from own broodstock	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b from other GB broodstock	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c from abroad (Northern Hemisphere)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
d from abroad (Southern Hemisphere)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
4 How many of the above ova were				
a all female diploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b mixed sex diploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c all triploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
5 How many fry/fingerlings were				
a bought	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b sold	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
6 How many bought fry/fingerlings were				
a all female diploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b mixed sex diploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c all triploid	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
7 How many of these fish were vaccinated against ERM				
a vaccinated on site	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b bought vaccinated	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
8 What was your total production in TONNES for the TABLE TRADE				
a <450 g (<1 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b 450-900 g (1-2 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c >900 g (>2 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
9 What was your total production in TONNES for the RESTOCKING TRADE				
a <450 g (<1 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b 450-900 g (1-2 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c >900 g (>2 lb)	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
10 From the total production what amount in TONNES was certified as organic	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
11 What is the fish holding capacity of the holding units for each site in cubic metres				
a Tanks	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
b Ponds	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
c Raceways	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>
d Cages	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>	<table border="1" style="width: 100%; height: 15px;"></table>

ANNUAL PRODUCTION SURVEY 2011

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 2012 to allow the Annual Survey Report for 2011 to be produced.

**ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2011**

OTHER SPECIES - DATA

**Please complete and return by 31 January 2012 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	<input type="text"/>	Part time male	<input type="text"/>
Full time female	<input type="text"/>	Part time female	<input type="text"/>

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 2011				
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 2012 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 2011

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 2012 to allow the annual survey report for 2011 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 National Control Measures	Disease control measures in accordance with the Aquatic Animal Health (Scotland) Regulations 2009.
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 1 st January and 31 st August after one winter at sea
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 daylight regime.
Pre-salmon	Salmon harvested between 1 st September and 31 st 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.
IPN	Infectious pancreatic necrosis.



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