The Scottish Government
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Marine Scotland Science

Scottish Fish Farm Production Survey 2012 Report

SCOTTISH FISH FARM PRODUCTION SURVEY 2012

Prepared by Marine Scotland Science

Written and compiled by : **L A Munro**
I S Wallace

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The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Artwork produced by K Mutch, Marine Scotland Communications Team
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// FOREWORD

The annual production survey of fish farms in Scotland for 2012 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 2012 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 1992-2012. 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.

L A Munro
I S Wallace

September 2013

// SUMMARY

The tables below summarise the results from the 2012 fish farms annual production survey.

Rainbow Trout (*Oncorhynchus mykiss*)

		2011	2012
Total production	(tonnes)	4,619	5,670
Production for the table	(tonnes)	3,858	5,059
Production for restocking	(tonnes)	761	611
Number of staff employed		118	107
Mean productivity	(tonnes/person)	39.1	53.0
Number of ova laid down to hatch	(millions)	15.1	13.0
Number of ova imported	(millions)	14.7	12.7

In 2012, the production of rainbow trout increased by 1,051 tonnes. Employment decreased by 11 staff and productivity per person increased to 53 tonnes. The number of ova laid down to hatch decreased by 2.1 million and the number of ova imported decreased by 2.0 million.

Other Species

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

		2011	2012
Total production	(tonnes)	146	115
Number of staff employed	(full-time)	24	25
	(part-time)	19	21
Number of ova laid down to hatch	(millions)	2.1	1.9[a]
Number of ova imported	(millions)	0	0[b]

[a] Excluding wrasse ova laid down to hatch from foreign sources.

[b] Excluding wrasse ova imported.

In 2012 the production of other species decreased by 31 tonnes on the 2011 total. Overall, employment increased by three in 2012. Inclusion of the wrasse ova from foreign sources means there was a small increase 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	2	3,434
Atlantic salmon (freshwater stages)	1	1	3,180
Atlantic salmon (seawater stages)	0	3	34,343
Other species	0	0	0

Atlantic salmon (*Salmo salar*)

Smolts

		2011	2012
Number of ova produced	(millions)	78.2	90.5
Number of ova laid down to hatch	(millions)	64.6	63.2
Number of ova exported	(millions)	0.8	0
Number of ova imported	(millions)	39.3	34.0
Number of smolts produced	(millions)	43.6	44.3
Number of smolts put to sea	(millions)	42.7	41.1
Number of staff employed		293	328
Mean productivity (000s smolts/person)		148.9	135.1

The production of ova increased by 12.3 million in 2012 and the number of ova laid down to hatch decreased by 1.4 million. There were no exports of ova and imports of ova decreased in 2012 . The number of smolts produced increased by 0.7 million. The number of staff employed increased by 35 and mean productivity decreased by 13.8 tonnes per person.

Production fish

		2011	2012
Total production	(tonnes)	158,018	162,223
Production of 0-year fish	(tonnes)	307	301
Production of grilse	(tonnes)	35,146	53,216
Production of pre-salmon	(tonnes)	55,959	44,528
Production of salmon	(tonnes)	66,606	64,178
Mean fish weight 0-year	(kg)	2.8	2.4
Mean fish weight grilse	(kg)	4.6	4.7
Mean fish weight pre-salmon	(kg)	5.0	4.4
Mean fish weight salmon	(kg)	4.8	4.9
Number of staff employed		1,013	1,059
Mean productivity	tonnes/person	156.0	153.2

Production tonnage increased by 2.7% with an increase in mean harvest weight of grilse and salmon but a decrease in mean weight of 0-year fish and pre-salmon. Staff numbers increased by 46. Mean productivity showed a decrease of 2.8 tonnes per person.

Smolt survival (percentage harvested)

Survival (%)	Years 0+1	Year 2	Total
2009 input year class	47.6	35.7	83.3
2010 input year class	48.9	33.9	82.8

Overall smolt survival decreased by 0.5% compared with the 2009 year class.

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

Production survey information was collected from all 25 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 1998-2012 and projected production in 2013

Year	Tonnes	Year	Tonnes
1998	4,913	2006	7,492
1999	5,834	2007	7,414
2000	5,154	2008	7,670
2001	5,466	2009	6,766
2002	6,659	2010	5,139
2003	7,085	2011	4,619
2004	6,352	2012	5,670
2005	6,989	2013	6,697*

Production increased in 2012 by 1,051 tonnes, an increase of 22.8%.

* Industry estimate based on stocks currently being on-grown.

Table 1b: Production (tonnes) for the table trade during 2002-2012 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
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
2012	1,195	1,655	2,209	5,059

Production for the table in 2012 was 5,059 tonnes, an increase of 1,201 tonnes (31.1%) on the 2011 total, and accounted for 89.2% of the total rainbow trout production, a

similar proportion to that produced in 2011. Supply was mainly of fish weighing up to 900g, encompassing 56.3% of total table production. Increases in the number of fish in the medium and large size ranges and a decrease in the number of fish in the small size range were highlighted.

Table 1c: Production (tonnes) for the restocking trade during 2002-2012 according to weight category

Year	<450 g <1 lb	450-900 g 1-2 lbs	>900 g >2 lbs	Total Tonnes
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
2012	22	266	323	611

In 2012, production for the restocking of angling waters decreased by 150 tonnes to 611 tonnes representing a decrease of 19.7% on the 2011 total. This accounted for 10.8% of total rainbow trout production in 2012. 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 medium and large sized fish showed decreases, while this increased for small sized fish.

Escapes

There were two incidents involving the loss of a total of 3,434 fish from rainbow trout sites in 2012.

Production by Site

Table 2: Numbers of sites grouped by tonnage produced during 2002-2012

Year	Number of sites per production tonnage				Total number of sites
	<1-25	26-100	101-200	>200	
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
2012	10	10	6	8	34

Production was reported from 34 sites. The number of producers in the size bracket <1-25 tonnes increased in 2012, while those producers in the other size brackets remained the same. 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 2012 and comparison with production in 2011

Production method	Production grouping (tonnes) in 2012					Total tonnage and (%) by method		Number of sites	
	<10	10-25	26-50	51-100	>100	2011	2012	2011	2012
FW cages	1	0	0	0	5	1,835 (39.7%)	2,220 (39.2%)	6	6
FW ponds and raceways	2	3	3	6	4	1,619 (35.1%)	1,362 (24.0%)	19	18
FW tanks and hatcheries	3	0	0	0	0	9 (<1%)	12 (<1%)	3	3
SW cages	1	0	1	0	5	1,156 (25.0%)	2,076 (36.6%)	5	7
SW tanks	0	0	0	0	0	0	0	0	0
Total	7	3	4	6	14	4,619	5,670	33	34

Freshwater production accounted for 3,594 tonnes (63.4%) and seawater production for the remaining 2,076 tonnes (36.6%). Production from freshwater cages and seawater cages increased whilst there was a decrease in production from freshwater ponds and raceways.

Company and Site Data

Table 4: Number of companies and sites in production during 1999-2012

Year	No. of companies	No. of sites
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
2012	25	48

In 2012 the number of companies authorised by the Scottish Government and actively engaged in rainbow trout production was 25. The number of sites registered and in production was 48.

Staffing and Productivity

Table 5: Number of staff employed and productivity per person during 1999-2012

Year	Full-time	Part-time	Total	Productivity (tonnes/person)
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
2012	79	28	107	53.0

The overall number of staff employed in 2012 decreased by 11 to 107. The numbers of full-time staff decreased by 16 while the number of part-time staff increased by five. Productivity, measured as tonnes produced per person, increased by 35.5% in 2012 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 2012

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	3	39	6.0	7	5	12	3.5
East	15	821	236	70.5	24	8	32	33.0
West	12	3,621	41	305.2	22	10	32	114.4
South	14	614	295	64.9	26	5	31	29.3
All	48	5,059	611	118.1	79	28	107	53.0

Productivity was greatest in the West at 305.2 tonnes per site and productivity per person was greatest in the West at 114.4 tonnes.

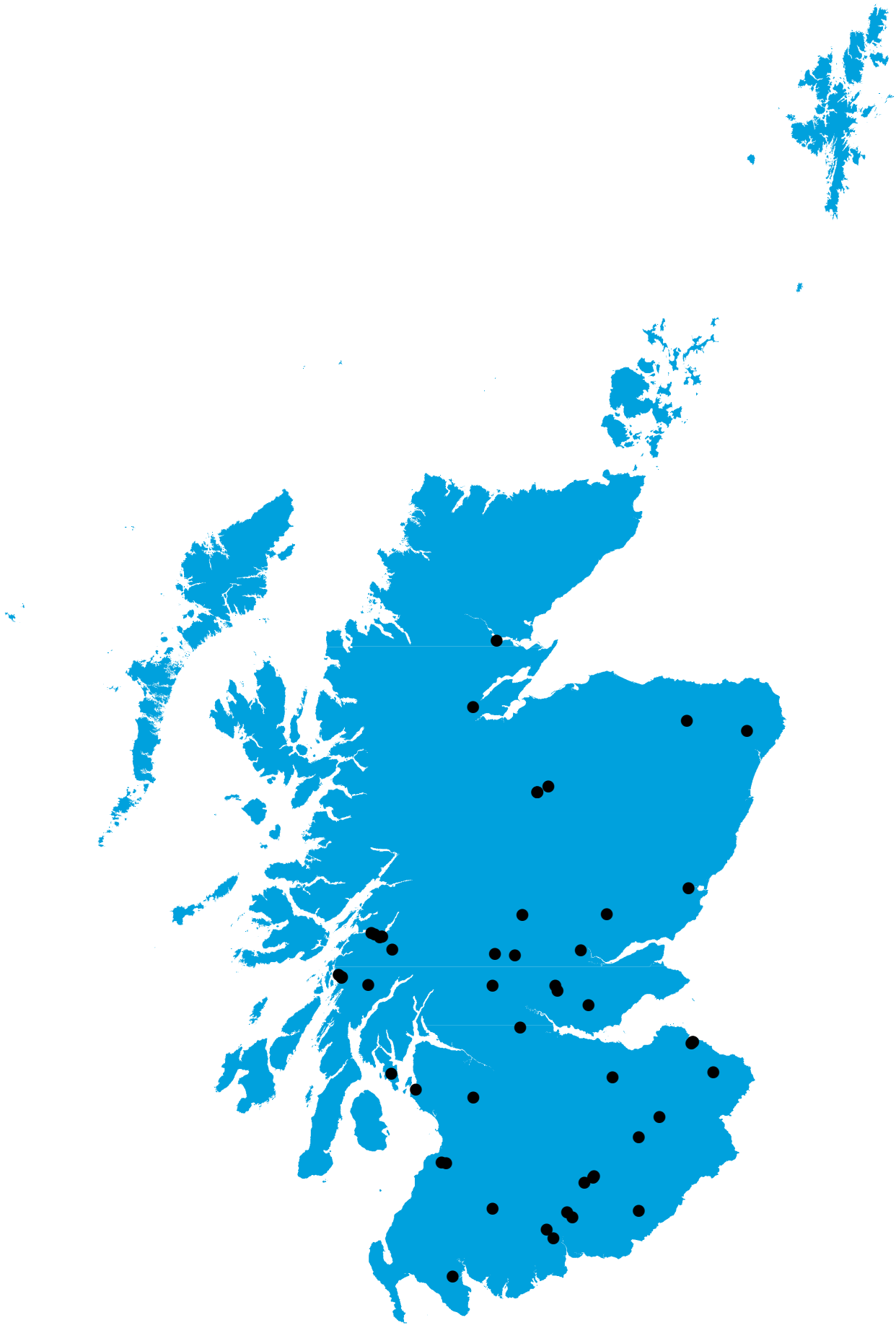

FIGURE 1: THE DISTRIBUTION OF ACTIVE RAINBOW TROUT SITES IN 2012

Type of Ova Laid Down

Table 7: Number (000s) and proportions (%) of ova types laid down to hatch during 2001-2012

Year	All female diploid no.(%)	Triploid no. (%)	Mixed sex diploid no. (%)	Total ova
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
2012	10,967 (85)	2,005 (15)	7 (<1)	12,979

Source of Ova Laid Down

Table 8: Number (000s) and sources of ova laid down to hatch 2001-2012

Year	Ova produced in Great Britain (GB)			Imported ova			Total
	Own stock	Other stock	Total	Northern hemisphere	Southern hemisphere	Total	
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
2012	14	230	244	12,735	0	12,735	12,979

The total number of eyed-ova laid down to hatch in 2012 was less than that in 2011. The proportion of ova from GB broodstock decreased to 1.9% 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 2005-2012

Source	2005	2006	2007	2008	2009	2010	2011	2012
N. Ireland	1,710	2,830	7,721	16,130	10,090	9,247	7,320	8,332
Isle of Man	1,700	3,480	3,767	775	290	1,400	520	300
Denmark	9,225	14,525	13,070	5,530	4,070	1,715	5,250	1,950
South Africa	-	-	485	-	-	-	-	-
USA	4,440	2,310	890	1,490	2,240	2,340	1,580	1,800
France	200	-	-	-	-	-	-	-
Australia	2,600	1,500	-	-	-	-	-	-
Norway	-	500	1,200	1,500	750	200	130	300
Totals	19,875	25,145	27,133	25,425	17,440	14,902	14,800	12,682

Table 9b: Seasonal variation in numbers (000s) and sources of ova imported into Scotland during 2012

Month	Norway	Isle of Man	Denmark	N. Ireland	USA
January	120	-	225	1,000	-
February	180	-	575	1,160	-
March	-	300	435	1,000	-
April	-	-	-	-	-
May	-	-	390	500	-
June	-	-	-	1,350	800
July	-	-	-	-	200
August	-	-	-	1,050	200
September	-	-	-	-	600
October	-	-	125	462	-
November	-	-	-	750	-
December	-	-	200	1,060	-
Totals	**300**	**300**	**1,950**	**8,332**	**1,800**

Suppliers within the European Union (EU) accounted for 83.4% of ova imported into Scotland during 2012 with the USA and Norway accounting for 14.2% and 2.4% 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 2001-2012

Year	Fry and fingerlings bought			Total number bought	Total number sold
	All female diploid no. (%)	Triploid no. (%)	Mixed sex diploid no. (%)		
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
2012	12,543 (91)	1,226 (9)	0	13,769	12,088

The established trade between hatcheries and on-growing farms continued in 2012. Some companies specialised in the production of fry and fingerlings. The total number of fry and fingerlings purchased and sold decreased by 25.2% and 27.2% respectively. 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 2001-2012

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
No. of sites	33	34	38	42	37	31	28	28	31	27	26	24

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 20.4 million fish were vaccinated on 24 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 2012, 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 100 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 2004-2012

Year	No. of companies	No. of sites
2004	48	172
2005	41	148
2006	39	135
2007	37	135
2008	38	130
2009	30	105
2010	31	104
2011	28	98
2012	28	100

In 2012 the number of companies authorised by the Scottish Government and actively engaged in the freshwater production of Atlantic salmon remained at 28. A total of 100 sites were actively engaged in commercial production.

Production and Staffing

Table 13: Number (000s) of smolts produced, staff employed and smolt productivity during 2002-2012

Year		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number (000s) of smolts produced		47,161	44,414	39,999	36,326	40,827	38,125	36,450	36,868	36,872	43,626	44,324
Staffing	Full-time	312	291	259	200	209	217	209	216	233	225	235
	Part-time	93	82	60	74	62	62	54	54	56	68	93
	Total	405	373	319	274	271	279	263	270	289	293	328
Productivity, 000s of smolts per person		116.4	119.1	125.4	132.6	150.6	136.6	138.6	136.5	127.6	148.9	135.1

Smolt production in 2012 increased by 1.6% compared to 2011. The number of staff employed increased by 35 and productivity decreased by 9.3%, to a figure of 135,100 smolts produced per employee.

Escapes

There was one incident involving the loss of 3,180 fish from a freshwater Atlantic salmon site in 2012. There was one additional 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 2001-2012

Year	S½	S1	S1½	S2	Total
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
2012	18,795	25,239	290	0	44,324

In 2012, production was dominated by S1 smolts, although numbers produced decreased by 4.4%. The production of S½ smolts increased by 9.1%. A small amount of S1½ smolts were produced and there was no production of S2 smolts.

Production Systems

Table 15: Number and capacity of production systems during 2008-2012

System	No. of sites with system					Total capacity, 000s cubic metres				
Year	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Cages	53	47	45	44	43	385	388	401	325	349
Tanks and Raceways	77	58	59	54	57	41	37	38	49	51
Total	130	105	104	98	100	426	425	439	374	400

The principal types of facility used for the production of smolts in fresh water are cages or tanks and raceways. In 2012, the number of farms using tanks and raceways increased by three and the number of farms using cages decreased by one. In terms of volume, tank and raceway capacity increased by 2,000 m^3 and cage volume increased by 24,000 m^3. This resulted in a net increase in volume of 26,000 m^3 available for the production of smolts in Scotland during 2012.

Table 16: Number (000s) of smolts produced, and stocking densities by production system during 2008-2012

	Number of smolts produced (000s)					Stocking densities (smolts/m³)				
Year	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Cages	17,065	17,041	20,333	23,135	26,882	44	44	51	71	77
All others	19,385	19,827	16,539	20,491	17,442	472	536	435	418	342
Total	36,450	36,868	36,872	43,626	44,324	-	-	-	-	-

The average stocking densities of cages increased from 71 to 77 fish per m^3 in 2012 compared to 2011 while densities in tanks and raceways decreased from 418 to 342 fish per m^3.

Ova Production

Table 17: Number (000s) of salmon ova produced during 2005-2012

Year	2005	2006	2007	2008	2009	2010	2011	2012
No. of ova	73,211	60,941	83,822	135,230	91,964	91,655	78,208	90,489

Just over 90.4 million ova were stripped in 2012, an increase of nearly 12.3 million (15.7%) on the 2011 season.

Table 18: Source, number (000s) and previous year's estimate of ova laid down to hatch during 2001-2013

Year	In-house broodstock	Out-sourced GB broodstock	GB wild broodstock	Foreign ova	Total	Previous year's estimate
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	18,556	9,981	0	34,700	63,237	55,723
2013						49,249

The number of ova laid down to hatch was 63.2 million, a decrease of just over one million (2.1%) on the 2011 figure. The majority of the ova (54.9%) were derived from foreign sources this being an increase of 0.3 million (1.1%) on the 2011 figure. Supplies derived from GB broodstock decreased by 1.8 million this being a 5.8% decrease on the 2011 figure. Producers' estimates for the number of ova to be laid down in 2013 has decreased from the actual number of ova laid down in 2012. No ova from GB wild broodstock were laid down in 2012, 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 2003-2014

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Actual smolts put to sea	43.8	39.1	37.2	41.1	37.8	36.6	38.5	38.5	42.7	41.1		
Smolts produced	44.4	40.0	36.3	40.8	38.1	36.4	36.9	36.9	43.6	44.3		
Estimated production	44.2	40.0	36.2	33.2	41.2	34.9	32.6	28.7	35.9	31.3	28.1	42.1
Ratio of ova laid down to smolts produced	1.8	1.8	2.1	1.6	2.0	1.7	1.8	1.9	1.5	1.4		

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 28.1 million smolts to sea in 2013.

The ratio of ova laid down to hatch to smolts produced in 2012 was less than the ratio in 2011.

Scale of Production

Table 20: Smolt-producing sites grouped by numbers (000s) of smolts produced during 2000-2012

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		
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
2012	0	0	1	3	19	14	11	13	61	44,324

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 remained at 61 in 2012. The number of sites producing less than 101,000 smolts has decreased by six while there has been an increase of ten 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 decreased by four.

Production of Ova and Smolt by Production Area

Table 21: Staffing 2012, ova laid down to hatch 2011-2012, smolt production 2011-2012 and estimated production 2013-2014 by region

Region	Number of staff employed in 2012		Ova laid down to hatch (000s)		Smolt production (000s)		Estimated smolt production (000s)	
	F/T	P/T	2011	2012	2011	2012	2013	2014
North West	131	44	31,950	29,998	23,420	27,271	15,841	24,077
Orkney	1	1	0	0	118	130	140	140
Shetland	9	17	1,710	1,250	1,706	1,681	765	1,050
West	24	10	16,501	8,375	9,631	6,582	3,087	6,401
Western Isles	28	5	9,868	10,053	6,459	5,034	5,873	4,475
East and South	42	16	4,587	13,561	2,292	3,626	2,356	6,000
All Scotland	235	93	64,616	63,237	43,626	44,324	28,062	42,143

The North West, the West and the Western Isles were the main smolt producing areas in Scotland in 2012; whilst the North West, the Western Isles and the East and South were the main ova producing areas. The greatest number of staff were employed in the North West and the East and South regions. An increase in the ova laid down in the East and South region was observed.

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.

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.

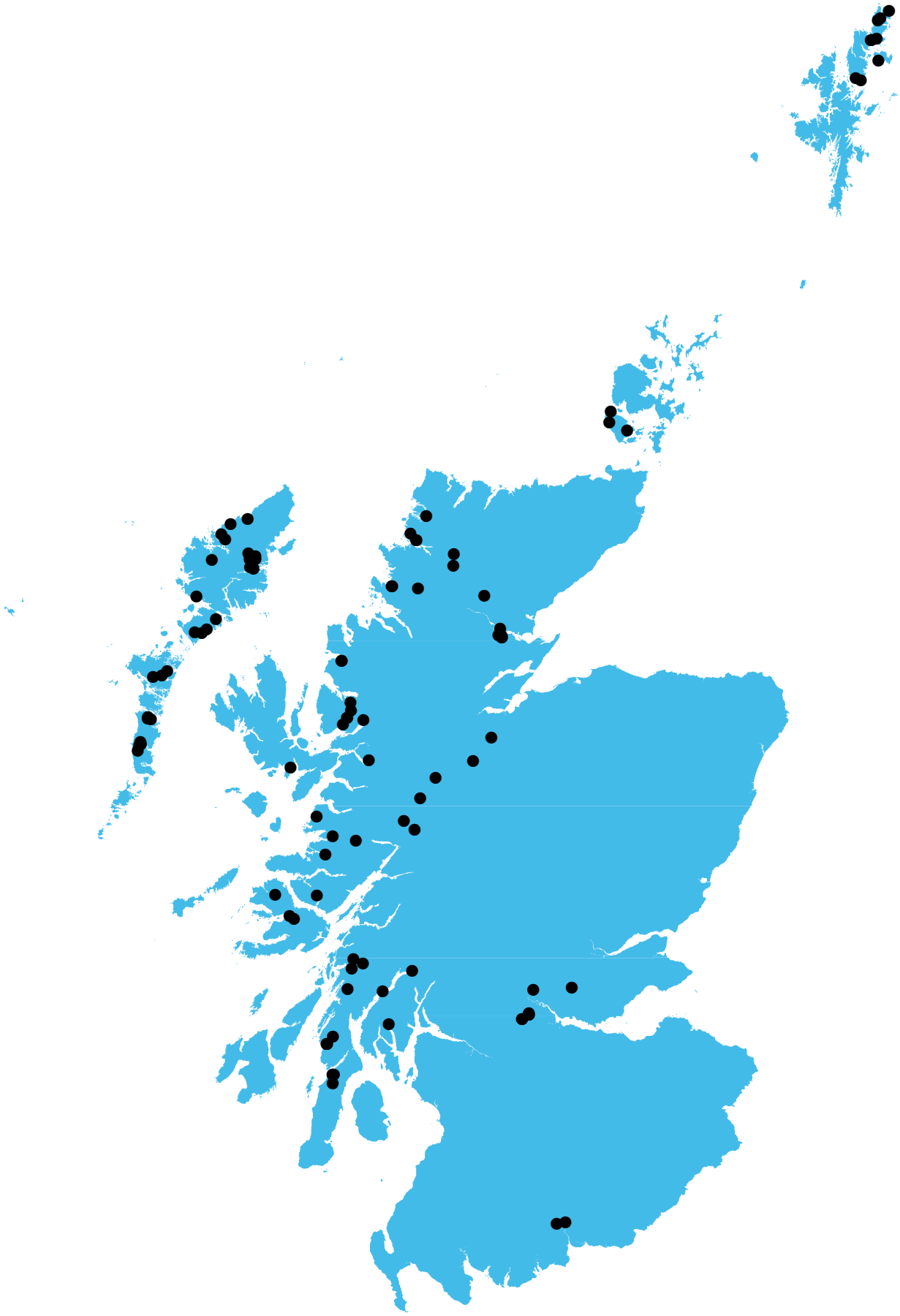

FIGURE 2: THE DISTRIBUTION OF ACTIVE SMOLT SITES IN 2012

Imports and Exports

Table 22a: Source and number (000s) of ova, parr and smolts imported during 2001-2012 derived from health certificates

Import Year	Ova						Parr and Smolts
	EU Member States	EFTA		Third Countries		Total	EU Member States
		Iceland	Norway	Australia	USA		
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
2012	10,134	0	23,849	0	0	33,983	0

The numbers of ova imported decreased by 13.4%. No parr and smolts were imported in 2012.

Table 22b: Destination and number (000s) of salmon ova, parr and smolts exported during 2002-2012 derived from health certificates

Export year	Farmed origin				Total	Parr and Smolts
	Chile	EU	Norway	Others		
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	0	0	820	820	183
2012	0	0	0	0	0	55

In 2012, no ova were exported. Parr and smolt exports decreased by 69.9% on the 2011 figure.

Vaccines

Table 23: Number of sites using vaccines and number (millions) of fish vaccinated during 2004-2012

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
No. of sites	98	84	79	73	80	68	70	67	63
No. of fish (millions) vaccinated	39.4	33.8	43.5	41.0	36.7	39.6	42.6	49.2	48.1

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 1980's and early 1990's. 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 48.1 million fish were vaccinated across 63 sites.

// 3.ATLANTIC SALMON – PRODUCTION

Production

Production survey information was collected from all 22 companies actively involved in Atlantic salmon production, farming 257 active sites. This figure represents the entire industry operating in Scotland.

Table 24: Annual production of Atlantic salmon (tonnes) during 1992-2012 and projected production in 2013

Year	Tonnes	Percentage difference	Year	Tonnes	Percentage difference
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	162,223	2.7
2002	144,589	4	2013	152,507*	

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

The total production of Atlantic salmon during 2012 was 162,223 tonnes, an increase of 4,205 tonnes (2.7%) on the 2011 production.

Escapes

There were three incidents involving the loss of a total of 34,343 fish from seawater Atlantic salmon sites in 2012.

Table 25: Number (000s), production (tonnes) of salmon harvested and mean fish weight (kg) per year class during 2002-2012

	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)	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
	2012	2012	127	301	2.4
Harvest in year 1	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
	2011	2012	21,502	97,744	4.5
Harvest in year 2	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
	2010	2012	13,053	64,178	4.9

Table 26: Number (000s) and production (tonnes) of grilse and pre-salmon harvested during 2002-2012

Year	Grilse (January-August)			Pre-salmon (September-December)		
	Number	Tonnes	Average weight (kg)	Number	Tonnes	Average weight (kg)
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
2012	11,337	53,216	4.7	10,165	44,528	4.4

Table 27: Percentage (by weight) of annual production by growth stage harvested during 2004-2012

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
Growth stage	-	-	-	-	-	-	-	-	-
Input year fish	<1	0	<1	<1	<1	<1	<1	<1	<1
Grilse	17	18	13	12	12	16	19	22	33
Pre-salmon	37	34	35	34	31	37	36	35	27
Salmon	45	48	51	53	57	46	44	42	39

Survival and Production in Smolt Year Classes

Table 28: Survival and production in smolt year classes during 1995-2012

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			
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	13,772	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	13,053	64,178	4.9	33.9	82.8	155,551	4.04
2011	42,733	109	307	2.8	0.3	21,502	97,744	4.5	50.3							
2012	41,094	127	301	2.4	0.3											

In 2010, the last year for which survival can be calculated, the survival rate from smolt input to harvest was 82.8%. The 2010 year class displayed a lower survival rate than that noted in 2009.

Of the 2011 year class, 50.6% of the input has been harvested, 1.7% higher than the average harvest of fish one year after input in the 2010 year class. The average harvest weight decreased to 4.5 kg.

In 2012, the harvest of fish from the 2012 smolt input remained the same at 0.3%.

Smolts to Sea

Table 29: Number (000s) and origin of smolts put to sea during 2000-2012

Year	Smolts put to sea (000s)				Total (000s)	Scottish Origin	English Origin		Other Origin	
	S½	S1	S1½	S2		%	(000s)	%	(000s)	%
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
2012	17,334	23,480	280	0	41,094	96	1,510	4	0	0

The total number of smolts put to sea in 2012 was 41.1 million. The smolt input comprised mainly S1 smolts (57.1%). The proportion of photoperiod adjusted fish (S½ smolts) input was 42.2% while a small amount (0.7%) of S1½ smolts were also put to sea in 2012. Four percent of smolts input into Scottish salmon farms were sourced from outwith Scotland. This is the same proportion observed in 2011.

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 2001-2012

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	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	2012	3,107	31.3	9,548	96.2
	2011	12,605	2011	53	0.4	2012	7,937	63.0					
	2012	11,988	2012	127	1.1								
Orkney	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	2012	936	36.6	2,062	80.6
	2011	2,718	2011	-	-	2012	1,203	44.3					
	2012	2,727	2012	-	-								
Shetland	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	2012	4,292	37.1	8,426	72.8
	2011	11,206	2011	49	0.4	2012	4,911	43.8					
	2012	11,389	2012	-	-								
South West	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	2012	2,648	40.3	5,660	86.2
	2011	7,493	2011	-	-	2012	2,673	35.7					
	2012	7,363	2012	-	-								
Western Isles	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	2012	2,070	26.3	6,180	78.5
	2011	8,711	2011	7	0.1	2012	4,778	54.9					
	2012	7,627	2012	-	-								

* 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 2002-2012

Year		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Staff	F/T	1,083	1,066	1,019	851	790	798	849	874	944	923	944
	P/T	223	151	142	128	81	118	100	89	120	90	115
Total staff		1,306	1,217	1,161	979	871	916	949	963	1,064	1,013	1,059
Productivity (tonnes/person)		110.7	139.5	136.2	132.4	151.4	141.8	135.5	149.8	144.9	156.0	153.2

The total number of staff employed in salmon production in 2012 was 1,059, an increase of 46 compared with 2011. 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 156.0 to 153.2 tonnes production per person.

Production Methods

Table 32: Production methods, capacity, tonnage and average stocking densities (kg/m^3) during 2010-2012

Method	Number of sites			Total capacity (000s cubic metres)			Production (tonnes)		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Seawater tanks	2	2	2	6.3	6.1	5.9	195	141	64
Seawater cages	247	252	255	16,894	17,152	17,889	153,969	157,877	162,159
For cage sites: ratio of production (kg) to cage capacity (m^3)							9.1	9.2	9.1

The vast majority of the fish were produced in seawater cages. There were 64 tonnes of production from seawater tank sites in 2012. 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 737,000 m^3 during 2012. The number of sea cage sites in production increased by three. Production efficiency in cages, measured as the ratio of fish weight in kilograms produced per cubic metre decreased to 9.1 kg/m^3 in 2012. In cage sites, the ratio of production (expressed in kilograms) to cage capacity (expressed in cubic metres) was 9.1, 9.2 and 9.1 in 2010, 2011 and 2012 respectively.

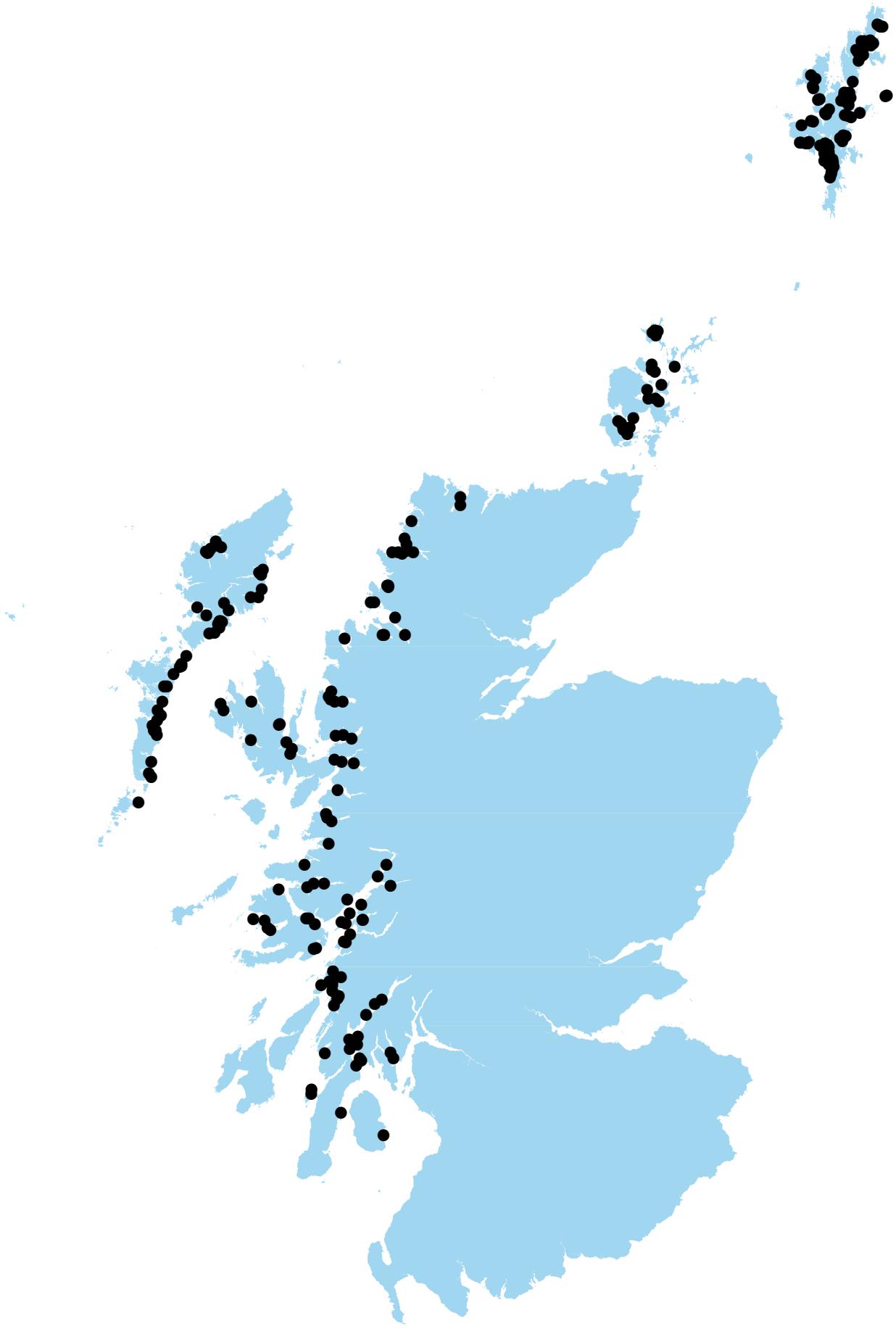

FIGURE 3: THE DISTRIBUTION OF ACTIVE SALMON PRODUCTION SITES IN 2012

Scale of Production by Site

Table 33: Number of sites shown in relation to their production grouping and percentage share of production 2002-2012

Production grouping (tonnes)	0	1-50	51-100	101-200	201-500	501-1,000	>1,000	Total	
								Sites*	Tonnes
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
2012	115	3	5	9	25	33	67	257	162,223
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	-	-
2012	0	<0.1	0.2	0.9	5.0	15.0	78.8	-	-

*Includes farms stocked but having no production.

In 2012, there was a decrease of 11 in the number of sites producing 1 to 500 tonnes and an increase of five 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 2011-2012

Total Tonnage		0-100	101-200	201-400	401-700	701-1,000	1,001-2,000	>2,000	Total
No. of companies	2011	10	2	1	2	1	2	9	27
	2012	9	2	1	0	1	1	8	22
No. of tonnes	2011	48	245	209	1,021	753	2,277	153,465	158,018
	2012	84	353	219	0	951	1,064	159,552	162,223
Manpower (total)	2011	14	13	6	12	5	42	921	1,013
	2012	14	12	6	0	6	5	1,016	1,059
Productivity (tonnes/person)	2011	3	19	35	85	151	54	167	156
	2012	6	29	37	0	159	213	157	153

The greatest productivity (213 tonnes per person) was achieved in the companies having a production between 1001-2,000 tonnes and the least (six tonnes per person) in the companies producing the smallest tonnages. In comparison with 2011, the average company productivity decreased from 156 to 153 tonnes per person.

Overall, production was dominated by eight companies in 2012 which between them accounted for over 98% of Scotland's salmon production.

Manpower and Production by Production Area

Table 35: Manpower and production (tonnes) by area 2003-2012 and projected production in 2013

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	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	300	40	52,352	154	301	2.4	31,121	4.7	5,842	4.7	15,088	4.9
	2013			43,263*									
Orkney	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	65	6	11,694	165	-	-	3,532	5.3	2,720	5.1	5,442	5.8
	2013			10,381*									
Shetland	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	188	16	43,010	211	-	-	6,083	4.3	15,784	4.5	21,143	4.9
	2013			35,442*									
South West	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	221	24	26,850	110	-	-	9,315	5.4	4,508	4.8	13,027	4.9
	2013			31,800*									
Western Isles	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	170	29	28,317	142	-	-	3,165	3.7	15,674	4.0	9,478	4.6
	2013			31,621*									
All Scotland	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	944	115	162,223	153	301	2.4	53,216	4.7	44,528	4.4	64,178	4.9
	2013			152,507*									

*Estimated production in 2013.

Company and Site Data

Table 36: Number of companies and sites engaged in salmon production during 2002-2012

Year	Number of companies			Number of sites		
	Producing	Non-producing	Total	Producing	Non-producing	Total
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	150	104	254
2010	20	10	30	140	109	249
2011	21	6	27	148	106	254
2012	16	6	22	142	115	257

The number of companies authorised and actively producing salmon in 2012 was 16, a decrease of five on the 2011 figure. Six companies remained active and authorised, although not producing salmon for harvest in 2012. This continued the trend of salmon production being concentrated within fewer companies. These 22 companies have 257 registered active sites, although not all active sites may have produced fish for harvest in 2012.

Fallowing

Table 37: Number of seawater cage sites employing a fallow period during 2003-2012

Year	Fallow Period (weeks)						Total
	0	<4	4-8	9-26	27-51	52	
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
2012	58	4	31	97	28	37	255

Of the 255 seawater cage sites recorded as being active in 2012, 160 farms were fallow for a variable period, whilst 37 farms were fallow for the whole of 2012. 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 58 sites that had no fallow period in 2012.

Broodstock Sites

Table 38: Number of sites holding broodstock during 2001-2012

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Broodstock sites	15	19	20	15	15	17	20	20	11	10	11	7

In 2012, the number of freshwater and seawater sites holding broodstock decreased to seven. 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 6,042 fish were stripped, yielding just over 90 million ova, which can be calculated to show an average ova yield per fish of 14,896.

Organic Production

Table 39: Organic production of Atlantic salmon during 2010-2012

Year	Number of active cage sites	Number of cage sites certified as organic	Production (tonnes)
2010	247	14	6,122
2011	252	10	3,104
2012	255	7	4,597

Of the 255 seawater cage sites recorded as being active in Atlantic salmon production in 2012, seven were certified as organic producing 4,597 tonnes. This is the third year that data on organic production has been reported.

// 4. OTHER SPECIES

The Scottish aquaculture industry has continued to farm other species during 2012. Brown trout (*Salmo trutta*) production showed a decrease during the year with the majority of the production being for the restocking market. The production of Arctic charr (*Salvelinus alpinus*) and halibut (*Hippoglossus hippoglossus)* production also decreased. For the second consecutive year there was no cod (*Gadus morhua*) prodution for the table market. However, 2012 saw an increase in the number of companies active in the culture of several species of wrasse (*Labridae*). Employment provided by these sectors increased by three in 2012.

Staffing

Table 40: Number of staff employed in farming other species during 2004-2012

Year	Full-time	Part-time	Total
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
2012	25	21	46

Company, Site and Production Data

Table 41: Number of companies and sites producing other species in 2012, production of other species (tonnes) during 2009-2012 and estimated production in 2013

Species	No. of companies	No. of sites	2009 Production tonnage	2010 Production tonnage	2011 Production tonnage	2012 Production tonnage	2013 Production tonnage*
Arctic charr	1	1	1.5	1.5	1.5	0.2	0
Brown trout/ sea trout	14	20	199	53	61	42	47
Cod	0	0	0.1	0.7	0	0	0
Halibut	2	4	189	139	83	73	63
Wrasse	5	5	0	0	0	[c]	[c]

*Industry estimates based on stocks currently being on-grown.

[c] A small amount of wrasse production occurred and is estimated but it is not possible to summarise these data without potentially revealing the figure for individual companies.

Not all of this production is for the table market with the majority of brown trout production being for the angling restocking market. Wrasse production is targeted at the marine Atlantic salmon industry where they are used as a biological control for parasites.

Escapes

There are no reported escapes from sites rearing other species in 2012.

Ova Laid Down to Hatch

Table 42: Source of ova from other species laid down to hatch during 2012

Species	Source of ova laid down to hatch (000s)		
	Own broodstock	Other GB broodstock	Foreign ova
Brown trout/sea trout	527	0	0
Halibut	500	0	0
Wrasse	826	0	[d]

[d] A small number of companies laid down wrasse ova from foreign sources but it is not possible to summarise these data without potentially revealing the figure for individual companies.

Trade in Small Fish

Table 43: Trade in small fish of other species in 2012

Species	Bought (000s)	Sold (000s)
Halibut	33	13
Brown trout/sea trout	52	36
Wrasse	14	[e]

[e] A small number of companies sold wrasse but it is not possible to summarise these data without potentially revealing the figure for individual companies.

There were also sites stocked with brook charr (*Salvelinus fontinalis*), carp (*Cyprinus carpio*), lump sucker (*Cyclopterus lumpus*), seabass (*Dicentrarchus labrax*), sheepshead minnow (*Cyprinodon variegatus variegatus*), tiger trout (*Salmo trutta* cross *salvelinus fontinalis*), turbot (*Psetta maxima*), tilapia (*Tilapia* Spp) and zebrafish (*Danio rerio*). There was production of brook charr, carp, sheepshead minnow, tiger trout 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 26 sites recorded as producing other species in 2012, no organic production was reported.

// 5. CONCLUSIONS

Rainbow trout

The production of rainbow trout increased by 22.8% in 2012 to 5,670 tonnes and was directed at the table (89.2%) and restocking (10.8%) markets. The total numbers of staff employed by the sector decreased by 11 to 107. There was an overall increase in the productivity of the industry to 53.0 tonnes per person.

The number of ova laid down to hatch (13 million) decreased by 2.1 million in 2012 and was mainly all-female diploid stock (85%). The proportion of ova that were sourced within GB decreased to 1.9%. There were no imports from the Southern hemisphere during 2012. There was an increase in the trade with USA (14.2% of total ova imported) and Norway (2.4% of total ova imported). Northern Ireland was the largest source of imported ova with 66% 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 2.7% in 2012 to 162,223 tonnes. This follows on from a 2.5% increase in 2011 and is the highest production recorded since 2003. The survey shows increases in the production of grilse but a decrease in the production of pre-salmon and salmon. Overall there was a decrease in the productivity of tonnes produced per person.

Smolt production increased to 44.3 million, with the majority (56.9%) being S1 and the remainder being S½ smolts (42.4%) and S1½ smolts (0.7%). The number of staff directly employed on freshwater sites increased by 35. Productivity decreased to 135,100 fish per person. The number of ova laid down to hatch decreased by 2.1%. The ratio of ova laid down to smolts produced has decreased to 1.4 in 2012. Projected estimates for 2013 suggest a decreased number of ova were laid down to hatch and that fewer smolts will be produced in 2013, followed by an increase in 2014. Ova were derived from both Great British (45.1%) and foreign (54.9%) sources in 2012. There was no export of ova to other countries in 2012.

The production tonnage in seawater increased by 2.7% in 2012. The number of staff directly employed on the farms increased by 46. The estimated smolt placement in 2013 has decreased to 28.1 million. The estimated harvest forecast for 2013 of 152,507 tonnes is 6.0% lower than production in 2012.

The production tonnage increased in 2012 and the number of sites in production increased from 254 to 257. The trend towards concentrating production in larger sites was maintained with 78.8% of production being concentrated in the sites producing over 1,000 tonnes per annum.

Other Species

There was a decrease in the production of brown/sea trout from 61 tonnes in 2011 to 42 tonnes in 2012. Halibut production decreased by 12% on the 2011 figure and there was no reported cod production for the table market in 2012. However, an increase in the number of companies active in the culture of several species of wrasse was noted in 2012.

// APPENDIX 1

Questionnaires sent to Fish Farmers

ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2012
RAINBOW TROUT - DATA

Please complete and return by 31 January 2013 to I S Wallace, Marine Scotland Science
PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

	Site No	Site Name
Site 1		
Site 2		
Site 3		
Site 4		

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 2012				
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 your predicted production in 2013 in TONNES	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐	☐☐☐☐☐☐
12 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 2012

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**

Q12. 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 2013 to allow the Annual Survey Report for 2012 to be produced.

ANNUAL RETURN OF INFORMATION FROM SCOTTISH FISH FARMS FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 2012

ATLANTIC SALMON - SMOLT DATA

Please complete and return by 31 January 2013 to I S Wallace, Marine Scotland Science PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

	Site No	Site Name
Site 1		
Site 2		
Site 3		
Site 4		

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 2011-2012 (company total)

		Site 1	Site 2	Site 3	Site 4
4	**How many eyed ova were laid down for hatching in winter of 2011-2012**				
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 (2012-2013)**				
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 2012 hatch)				
b	**S1s** (ie from 2011 hatch)				
c	**S1$^1/_2$s or S2s** (ie from 2011 or 2010 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 (2013) 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 2014**				
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.				
e	against SAV				

ANNUAL PRODUCTION SURVEY 2012

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

Q8. } **For S1s** - combine numbers of S$^1/_2$s with S1s and
Q9. } **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

Q11. Please enter the total cubic metre capacity for all tanks or cages combined

Q12. Fallow period - applies to cage sites only
Please enter any weeks that the site was fallow in 2012 (maximum = 52)

ANNUAL RETURN OF INFORMATION FROM SCOTTISH FISH FARMS FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 2012

ATLANTIC SALMON - PRODUCTION DATA

Please complete and return by 31 January 2013 to I S Wallace, Marine Scotland Science PO Box 101, Victoria Road, Aberdeen, AB11 9DB

Reg No FB/

	Site No	Site Name
Site 1		
Site 2		
Site 3		
Site 4		

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 2012 as:**				
a	**S$^1/_2$s** (ie from 2012 hatch)				
b	**S1s** (ie from 2011 hatch)				
c	**S1$^1/_2$s** or S2s (ie from 2011 or 2010hatch)				
4	**How many of above came from England**				
5	**Total smolt input proposed in 2013**				
6	**HARVEST of 2012 SMOLT INPUT in 2012**				
a	Number of tonnes (wet weight at harvest)				
b	Number of fish				
7	**HARVEST of 2011 SMOLT INPUT from 1 JANUARY to 31 AUGUST**				
a	Number of tonnes (wet weight at harvest)				
b	Number of fish				
8	**HARVEST of 2011 SMOLT INPUT from 1 SEPTEMBER to 31 DECEMBER**				
a	Number of tonnes (wet weight at harvest)				
b	Number of fish				
9	**HARVEST of 2010 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 2013**				
12a	**Were brood fish produced in 2012**	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 2012

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 2012; the total number of fallow weeks should not exceed 52

ANNUAL RETURN of INFORMATION from SCOTTISH FISH FARMS
for the PERIOD 1 JANUARY to 31 DECEMBER 2012

OTHER SPECIES - DATA

Please complete and return by 31 January 2013 to I S Wallace, 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 2012				
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 2013 in tonnes	.....	.....	.....	.....
8. What is the holding capacity of the holding units for each site in cubic metres				
a) Tanks	.....	.....	.....	.....
b) Ponds	.....	.....	.....	.....
c) Raceways	.....	.....	.....	.....
d) Cages	.....	.....	.....	

SGMD ANNUAL PRODUCTION SURVEY 2012

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 2013 to allow the annual survey report for 2012 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.
ERM	Enteric redmouth.
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
Intra-peritoneal	Within the body cavity.
IPN	Infectious pancreatic necrosis.
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.
PD	Pancreas disease.

Photoperiod	Alteration of daylight 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.

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