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Marine Scotland Science

Scottish Shellfish Farm Production Survey 2016



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// INTRODUCTION TO THE YEAR 2016 SURVEY

This report is based on the returns of an annual survey questionnaire sent to all active authorised shellfish farming businesses in Scotland. The cooperation of the shellfish farming industry is gratefully acknowledged. The report authors also acknowledge Alan Christie, Sonia Duguid, Helen Macgregor, Sandy Murray, Keith Mutch, Sarah Payne, Ronald Smith, Amanda Walker and Andrea Warwick for their contributions to the production of this report.

Production survey questionnaires were sent to 138 businesses registered as active during 2016 (*see Appendix 1, p.15*). All return forms were received. During 2016, three businesses became authorised and six businesses rescinded their authorisation.

The survey showed that, of the 138 businesses authorised at the end of 2016, 76 recorded sales during that year. These 138 authorised businesses farmed 333 active sites, of which 180 (54%) placed shellfish on the market. Shellfish production by business and site is presented.

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// PRODUCTION

The survey indicates that the shellfish species cultivated in Scottish waters in 2016 were:

Mussel:	<i>Mytilus</i> spp.
Pacific oyster:	<i>Crassostrea gigas</i>
Native oyster:	<i>Ostrea edulis</i>
Queen scallop:	<i>Aequipecten opercularis</i>
Scallop:	<i>Pecten maximus</i>

Production was dominated by mussel and Pacific oyster, although small quantities of scallop, queen scallop (queen) and native oyster were also produced. The 2016 production data for each species by region are given in Table 1.

TABLE 1
SCOTTISH SHELLFISH PRODUCTION BY REGION, 2016.

Region	Businesses	Mussel		Pacific oyster		Native oyster		Queen		Scallop	
		(tonnes)		(000s)		(000s)		(000s)		(000s)	
		Tonnes Table	Tonnes on-growing	000s Table	000s on-growing	000s Table	000s on-growing	000s Table	000s on-growing	000s Table	000s on-growing
Highland	47	703	0	1,321	3,527	0	3	1	0	32	20
Orkney	3	0	0	0	0	0	0	0	0	0	0
Shetland	25	5,686	2,331	0	0	0	0	0	0	0	0
Strathclyde	49	616	278	2,143	1,057	201	320	154	17	3	3
Western Isles	14	727	10	70	0	0	0	0	0	0	0
All Scotland	138	7,732	2,619	3,534	4,584	201	323	155	17	35	23
Weight (Tonnes)		7,732	2,619	283		16		6		4	

NB: THIS REPORT LISTS REGIONS WITH ACTIVE SHELLFISH FARMS OPERATED BY AUTHORISED AQUACULTURE PRODUCTION BUSINESSES.

CONVERSION TO WEIGHT USED THE FOLLOWING ASSUMPTIONS (BASED ON INDUSTRY FIGURES): INDIVIDUAL OYSTERS AVERAGED 80g; INDIVIDUAL SCALLOPS AVERAGED 120g; INDIVIDUAL QUEENS AVERAGED 40g.

TABLE = SALES DIRECTLY FOR HUMAN CONSUMPTION;
ON-GROWING = SALES TO OTHER BUSINESSES FOR ON-GROWING.

Table production by species is illustrated in Figure 1 (see page 4), while trends in production for the table market and on-growing in Scotland are presented in Table 2.

TABLE 2
TRENDS IN PRODUCTION DATA FOR THE TABLE AND ON-GROWING 2007-2016.

For the table	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	%change 15-16
Pacific oyster (000s)	2,603	3,093	2,900	3,008	3,136	2,706	1,891	3,392	2,693	3,534	31
Native oyster (000s)	273	250	490	350	350	317	260	242	200	201	0.5
Queen (000s)	384	687	138	184	27	9	33	18	33	155	370
Scallop (000s)	15	15	35	64	78	58	40	48	30	35	17
Mussel (tonnes)	4,806	5,869	6,302	7,199	6,996	6,277	6,757	7,683	7,270	7,732	6

For on-growing	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pacific oyster (000s)	945	26	45	1,633	1,400	3,190	6,216	6,792	5,864	4,584
Native oyster (000s)	10	0	0	300	1	677	1,015	749	13	323
Queen (000s)	0	0	30	0	0	0	1,490	500	900	17
Scallop (000s)	45	0	0	0	104	16	1,470	136	49	23
Mussel (tonnes)	44	30	391	175	282	309	1,281	1,263	1,841	2,619

Mussel production, for the table, increased by 6% in 2016 (see figure 1) to 7,732 tonnes. This is the highest level of mussel production recorded in Scotland. The greatest contribution in regional mussel production was from Shetland, accounting for 5,686 tonnes or 74% of Scotland's total. Pacific oyster production increased by 31% from 2015. The Strathclyde region produced 61% of Scotland's farmed Pacific oysters. Queen scallop production increased by 370% since 2015 and the production of farmed scallops increased by 17%, both these sectors continue to target small niche markets. Production of native oysters increased by 0.5% from 2015. Native oyster production accounts for a small percentage of total oyster production, however, demand for this species continues to be high. Historical data for all shellfish species show that production levels vary year on year, this can be due to a number of different factors such as poor spat fall, algal toxins, poor growth, adverse weather and fluctuations in market prices.

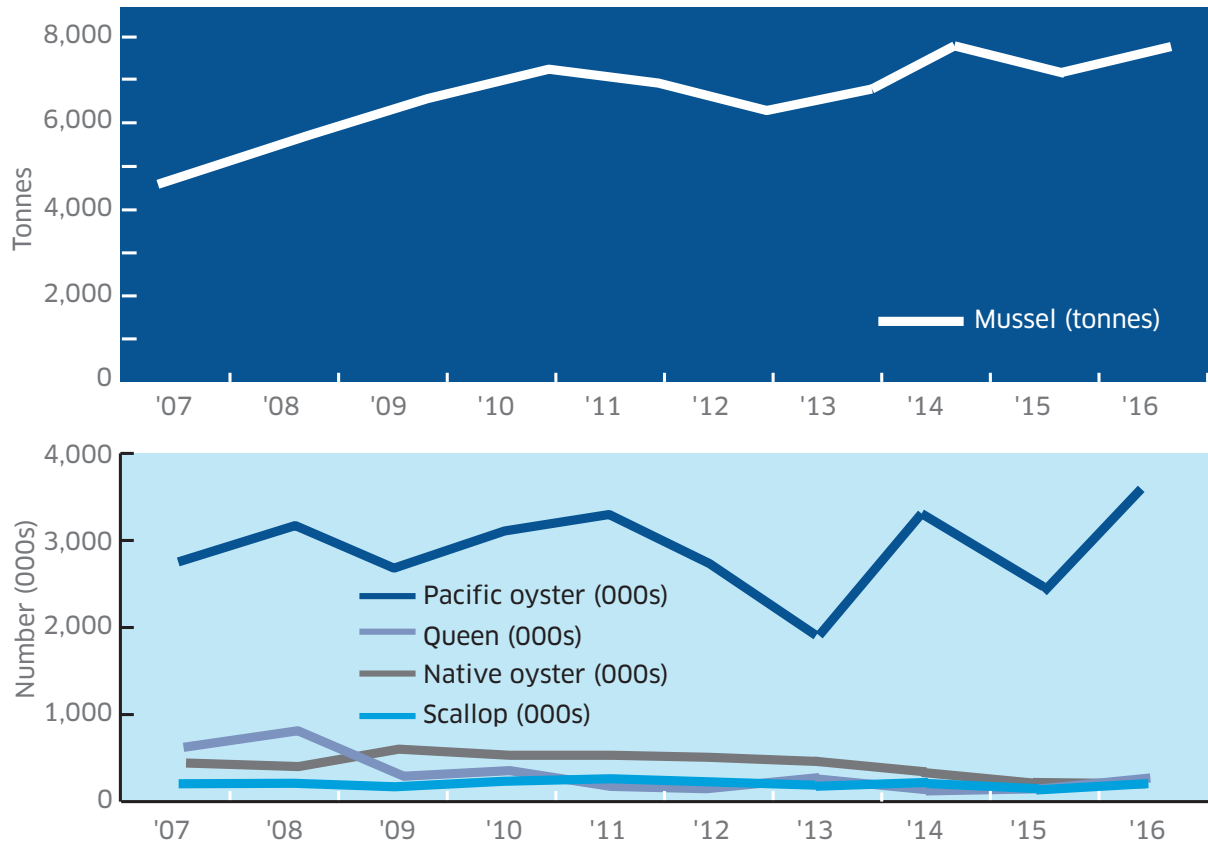


FIGURE 1
TABLE PRODUCTION BY SPECIES 2007-2016

Prices of farmed shellfish fluctuated throughout the year. Their value at first sale was estimated from the following figures (supplied by industry these vary with demand, level of production and geographical area of origin). The average price of Pacific oyster was £0.39 per shell; native oyster, £0.60 per shell; scallop, £2.03 per shell; queen scallop, £0.12 per shell and mussels £1300 per tonne. The value of the table trade is estimated from the production figures shown in Table 1 ([see page 2](#)).

Mussel:	£10.1 million	Pacific oyster:	£1.4 million
Native oyster:	£0.12 million	Scallop:	£0.07 million
Queen:	£0.02 million		

The 2016 total value, at first sale for all species, was calculated at approximately £11.7 million, an increase from £10.1 million estimated in 2015.

// SITES AND BUSINESSES

The numbers of authorised, active businesses and sites in operation are presented in Tables 3 and 4. There are many sites that held stock not yet ready for market, others were fallow, and some were located in remote areas where cost-effective production and marketing of shellfish proved difficult.

Historically, production data have been collected by business. However, since 2002, data have been collected for both business and site, enabling the provision of more accurate site information. In 2016, 180 sites produced shellfish for sale, an increase of 5% since 2015.

TABLE 3
AUTHORISED AND ACTIVE BUSINESSES 2007-2016.

	Number of Businesses									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Active	170	168	168	164	153	153	142	144	144	138

TABLE 4
ACTIVE AND PRODUCING FARM SITES BY REGION 2016.

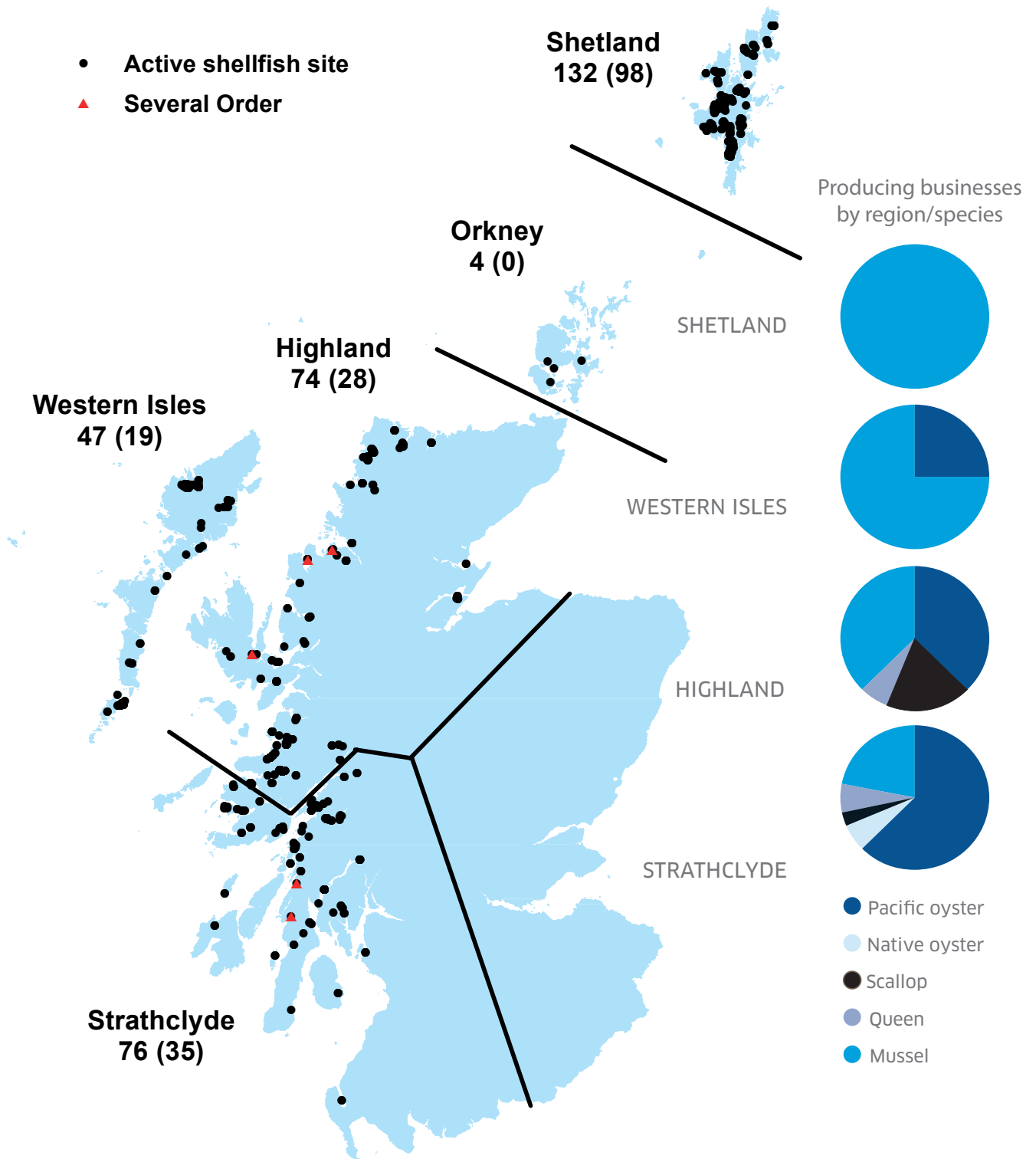
	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Sites						
Active	74	4	132	76	47	333
Producing	28	0	98	35	19	180

ACTIVE = FARMS IN A PRODUCTION GROWING CYCLE WHICH MAY CONTAIN STOCK OR BE FALLOW.

PRODUCING = PLACING ON THE MARKET FOR THE TABLE AND ON-GROWING.

NB: A BUSINESS MAY PRODUCE MORE THAN ONE SPECIES AND IN MORE THAN ONE REGION.

FIGURE 2
 REGIONAL DISTRIBUTION OF ACTIVE SHELLFISH SITES IN 2016 (NUMBER PRODUCING GIVEN IN BRACKETS) AND NUMBER OF PRODUCING BUSINESSES BY REGION/SPECIES.



There were five Several Orders in place for scallop fisheries in 2016 (see Fig. 2). Three of these Orders are in the Highland region and two in Strathclyde.

Table 5 depicts the number of businesses by region and by species: A) in table production, B) in on-growing production and C) showing no production. Many businesses cultivate more than one species on site, a practice made possible by similar cultivation techniques. For example, scallop can be grown together with queen, Pacific oyster with native oyster, and mussel with Pacific oyster.

TABLE 5
NUMBER OF BUSINESSES BY REGION AND BY SPECIES 2016.

A) PRODUCTION FOR THE TABLE

	Highland	Orkney	Region Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	6	0	0	20	2	28
Native oyster	0	0	0	2	0	2
Scallop	3	0	0	1	0	4
Queen	1	0	0	2	0	3
Mussel	6	0	22	7	6	41
Total	16	0	22	32	8	78

B) PRODUCTION FOR ON-GROWING TO OTHER PRODUCERS

	Highland	Orkney	Region Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	1	0	0	4	0	5
Native oyster	1	0	0	2	0	3
Scallop	1	0	0	1	0	2
Queen	0	0	0	1	0	1
Mussel	0	0	15	3	1	19
Total	3	0	15	11	1	30

C) NO PRODUCTION, ACTIVELY ON-GROWING OR FALLOW

	Highland	Orkney	Region Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	11	0	1	11	3	26
Native oyster	7	0	1	3	0	11
Scallop	8	0	0	3	0	11
Queen	2	0	0	1	0	3
Mussel	16	3	2	10	5	36
Total	44	3	4	28	8	87

TABLE 6
BUSINESS PRODUCTION LEVELS BY SPECIES 2016.

Species	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-200	>200	Total
Pacific oyster (000s)	11	1	1	0	2	2	2	0	0	1	2	6	28
Native oyster (000s)	1	0	0	0	0	0	0	0	0	0	1	0	2
Scallop (000s)	2	2	0	0	0	0	0	0	0	0	0	0	4
Queen (000s)	2	0	0	0	0	0	0	0	0	0	1	0	3
Mussel (tonnes)	4	1	5	4	0	2	4	1	2	2	4	11	40
Total	20	4	6	4	2	4	6	1	2	3	8	17	77

Business production levels by species are shown in Table 6. There were 15 businesses producing more than 100 tonnes of mussels, a decrease of four businesses since 2015. Out of these 15 companies, 11 produced more than 200 tonnes. These 11 companies produced 79% of the total mussel production in Scotland. There were six businesses that produced more than 200,000 Pacific oysters. The production from these businesses accounted for 78% of the Scottish total.

// SPAT SETTLEMENT

Following anecdotal industry reports of poor spat settlement and mortality in 2010, Marine Scotland Science developed a questionnaire which was sent to all authorised aquaculture production businesses farming mussels. The results of this 2011 investigation indicated that poor spat settlement and mortality were not widespread in Scottish waters, although they had major impacts on certain individual producers. The causes were associated with environmental variables, guiding the industry to consider focused spat fall monitoring. As a result of talks between the Association of Scottish Shellfish Growers, Marine Scotland policy and Marine Scotland scientists, to determine the focus of possible research and development, a spat collection question was introduced to the 2013 survey. This question focused on mussel spat collection and was in two parts: is this a spat collection site; if yes, was spat settlement sufficient for production purposes?

Responses were received from 248 (100%) of the sites authorised for mussel production in 2016. One hundred and eight (44%) of these were spat collection sites, 68 (63%) of which reported that they had sufficient spat settlement for production purposes. To identify trends a longer time series is required.

// EMPLOYMENT

The industry employed 157 full-time and 158 part-time and casual workers during 2016. The number of full-time staff decreased by nine and the number of part-time and casual employees decreased by 20 compared with 2015. The regional breakdown of employment is given in Table 7. The number of people employed by the shellfish farming industry in Scotland decreased by 8% from the 2015 total of 344.

TABLE 7
REGIONAL EMPLOYMENT 2016.

Region	Businesses	Staff						Total
		Full-time Male	Full-time Female	Part-time Male	Part-time Female	Casual Male	Casual Female	
Highland	47	22	1	24	8	9	0	64
Orkney	3	0	0	0	0	1	0	1
Shetland	25	52	4	18	8	19	1	102
Strathclyde	49	46	6	30	8	19	3	112
Western Isles	14	24	2	6	1	3	0	36
Scotland	138	144	13	78	25	51	4	315

// SCOTTISH MARINE REGIONS

The Marine (Scotland) Act 2010 introduces integrated management of Scotland's seas. The creation of a National Marine Plan, as required by the Act, sets the wider context for planning within Scotland including what should be considered when creating regional marine plans. Eleven Scottish Marine Regions have been created under the Act (*see Appendix 2 map, page 17*) which cover sea areas extending out to 12 nautical miles.

To support the development of Regional Marine Plans by Regional Marine Planning Partnerships, tonnages/shell numbers and financial values of annual shellfish production for mussels and Pacific oysters have been calculated for the regions defined under the Act. These regional data are presented in *Appendix 2, page 17*.

In order to maintain commercial confidentiality figures for the West Highlands, Moray Firth and the North Coast have been merged for mussel production and the West Highlands and the North Coast for Pacific oyster. Other shellfish species including Native oyster (Argyll & Solway), scallop (Argyll & West Highlands) and queen scallop (Clyde & West Highlands) were produced, however these figures cannot be attributed to Scottish Marine Regions due to commercial confidentiality.

// HEALTH INFLUENCES ON THE INDUSTRY

In accordance with Council Directive 2006/88/EC, a risk based surveillance programme targeting 131 shellfish site inspections was undertaken during 2016. On these visits, facilities, stock health, bio-security measures plans, movement records and details required for authorisation were checked. Movement restrictions placed due to confirmation of the presence of *Bonamia ostrea*, remained in force in Loch Sunart and in West Loch Tarbert, Argyll during 2016. These movement restrictions covering both sea lochs prevent the relaying of native oyster from them ([see Appendix 3, p.21 for maps of areas under movement restrictions](#)). Approved zone status for bonamiasis, marteiliasis and Ostreid Herpes Virus-1 Microvariant (OsHV-1 μ var) continued to protect the health of both wild and farmed susceptible shellfish stocks for the remainder of Scotland's waters.

Most of the reported mortalities during 2016 were attributed to: predation from wild ducks, starfish, crabs and oyster catchers; fouling by sea squirts; adverse weather conditions including storms and temperature extremes; damage due to grading and handling and from natural causes. Reports of high, unexplained shellfish mortalities generated two shellfish diagnostic cases during 2016, at sites holding Pacific and native oysters. Results of diagnostic investigations showed no association with listed (notifiable) diseases. It is the responsibility of shellfish farmers to inform Marine Scotland of any abnormal or unexplained shellfish mortality on their sites ([see guidance on shellfish mortality in appendix 1, p.15](#)).

In 2016, there was a continued demand for imported mussel seed into Scotland to supplement the vagaries in natural settlement. The industry should be aware of the increased disease risk with the introduction, movement and deposit of stock on site and the importance of ensuring good bio-security practices when sourcing shellfish from other areas.

Following completion of a targeted surveillance programme, the UK has been granted disease free status for OsHV-1 μ var (Decision 2014/12/EU). This includes the territory of Great Britain except the River Roach, River Crouch, Blackwater Estuary and River Colne in Essex, the north Kent Coast, Poole Harbour in Dorset and the River Teign in Devon. In addition, Guernsey and the territory of Northern Ireland (except Dundrum Bay, Killough Bay, Lough Foyle, Carlingford Lough and Strangford Lough) have also been granted disease free status for OsHV-1 μ var.

The whole of the UK is recognised as free from infection with *Marteilia refringens*.

The whole coastline of Great Britain is recognised as free from infection with *Bonamia ostreae* except for the following areas; the south coast of Cornwall from Lizard to Start Point; the coast of Dorset, Hampshire and Sussex from Portland Bill to Selsey Bill; the area along the coast of North Kent and Essex from North Foreland to Felixstowe; the area along the coast in south-west Wales from Wooltack Point to St Govan's Head, including Milford Haven and the tidal waters of the East and West Cleddau river; Loch Sunart and West Loch Tarbert, Argyll. The whole coastline of Northern Ireland is recognised as free apart from Lough Foyle and Strangford Lough. Guernsey, Jersey, Herm and the Isle of Man are all recognised as *Bonamia ostreae* free areas.

In 2015 six compartments in Ireland were also recognised as free from OshV-1 μ var: compartment 1 - Sheephaven Bay, compartment 3 - Killala, Broadhaven and Blacksod Bays, compartment 4 - Streamstown Bay, compartment 5 - Bertraghboy and Galway Bays, compartment 6 - Poulnisharry Bay and compartment A - Tralee Bay Hatchery.

Movements of Pacific oysters into an area recognised as free from OshV-1 μ var must originate from another disease free area. Movements are still allowed from disease free areas to non-approved areas.

<http://www.gov.scot/Topics/marine/Fish-Shellfish/aquaculture/diseases/notifiableDisease/oshvdec>

// SUMMARY


- In 2016, 7,732 tonnes of mussels were produced for the table market, this is the highest level of mussel production recorded in Scotland;
- Mussel and Pacific oyster remain the main species produced in terms of value and tonnage with production increasing by 6% and 31% respectively during 2016;
- During 2016, 4.6 million Pacific oyster shells were produced for on-growing showing that markets both home and abroad are well established;
- There has been an increase in both queen scallop production (33,000 to 155,000 shells) and scallop production (30,000 to 35,000 shells) since 2015;
- Native oyster production increased very slightly from 200,000 to 201,000 shells in 2016. The sector continues to target a strong niche market;
- Employment levels showed a decrease of 8% from the previous year, with 315 full, part-time and casual staff being employed during 2016.
- The Scottish shellfish farming industry is estimated to be worth approximately £11.7 million at first sale value.
- Active surveillance for bonamiasis, marteiliasis and OshV-1 μ var continued in 2016;
- For shellfish health purposes, 131 out of 333 sites were inspected during 2016 as part of a risk based surveillance programme implemented under Council Directive 2006/88/EC. Details of this can be found at <http://www.gov.scot/Topics/marine/Fish-Shellfish/FHI/surveillance>;
- Movement restrictions remain in place for the presence of *Bonamia ostreae* at Loch Sunart and West Loch Tarbert, Argyll;
- The UK maintained disease free status with regard to bonamiasis, marteiliasis and OshV-1 μ var, (See page 11 for details of disease free areas for OshV-1 μ var and *Bonamia ostreae*). Immediate notification of increased mortality on farm sites must be reported to Marine Scotland Science, Fish Health Inspectorate (see *Contact details page II*).

// GLOSSARY

Active sites	Farms in a production growing cycle which may contain stock or be fallow
Inactive sites	Farms not in a production cycle, without stock and not to be used by the company in the foreseeable future
Authorised business	Any shellfish production business authorised under Regulation 6 of the Aquatic Animal Health (Scotland) Regulation 2009 (as amended). <i>See</i> the Marine Scotland website for more details www.gov.scot/Topics/marine/Fish-Shellfish
Several Order	An area of the seabed severed from the public right to fish, in order to conserve or enhance named shellfish stocks

// APPENDIX 1

Covering Letter and Guidance Notes



19th December 2016

ANNUAL RETURNS OF SHELLFISH FARM PRODUCTION – 2016

Dear Sir/Madam

As part of the annual survey of Scottish shellfish farms we seek production data from your business and site(s) for the year 2016.

I enclose forms requesting information on your shellfish farming enterprise and a self-addressed pre-paid envelope for their return. Alternatively these forms can be issued electronically upon request by contacting MS.Productionsurvey@gov.scot or by telephoning me on 01224 425535.

The data you supply to Marine Scotland Science is of great assistance to your industry and the Scottish Government. It is our intention to continue to publish these data annually and in a summarised form. The Scottish Shellfish Farm Production Survey 2016 report will be available in May 2017.

Although MSS would be obliged to consider any request it receives in relation to this under the Freedom of Information (Scotland) Act 2002 (FOISA) and the Environmental Information (Scotland) Regulations 2004 (EISRs) a recent decision by the information commissioner determined that the survey returns are protected.

FORM (a) requests data on production by business.
FORM (b) requests data on production, facility size and number of shellfish movements by site(s) and by species. Guidance notes are enclosed.

Please note production recorded by business must equal total production recorded by site(s). If the business has a nil return please place an X against the species registered as cultured, in FORM (a).


Please note that it is your duty to notify a competent authority or a veterinarian if you know or suspect that increasing mortality has occurred or is occurring in aquaculture animals in accordance with the Aquatic Animal Health (Scotland) Regulations 2009. **See guidance notes** for reporting of mortality events where appropriate and registration changes.


Thank you for your co-operation. If you have any queries regarding the survey, please do not hesitate to contact me at the address given below, or telephone 01224 425535 or e-mail MS.Productionsurvey@gov.scot


Please send returns to me by post, or electronically, before **31st January 2017**. I would also like to remind you that the Scottish Shellfish Farm Production Survey 2015 is available on the Marine Scotland website, <http://www.gov.scot/topics/marine/fish-shellfish/fishsurvey>

Yours faithfully,

Lorna Munro
Marine Scotland Science







SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2016

FORM (a) – BUSINESS PRODUCTION

Please use BLOCK LETTERS and write in INK unless completing electronically.
 Please indicate production of shellfish for business in 2016 and an estimate of production in 2017 for:

A) the table (which should include any shellfish sent for depuration or cleansing, or temporarily held in other waters or tanks etc, prior to consumption or processing), AND
 B) depositing in other waters (ie for restocking or growing-on, including in tanks etc).

SPECIES	PRODUCTION OF SHELLFISH FOR 2016				PRODUCTION OF SHELLFISH FOR 2017 (Estimate)			
	A) for the table		B) for depositing in other waters		A) for the table		B) for depositing in other waters	
	No.	Weight*	No.	Weight*	No.	Weight*	No.	Weight*
Mussels <i>M. edulis</i>								
Pacific oysters <i>C. gigas</i>								
Native Oysters <i>O. edulis</i>								
Scallops <i>P. maximus</i>								
Queens <i>C. opercularis</i>								
Lobsters								
Other (Specify)								

*Please state unit of measurement, eg tonnes, kilograms.

Please state the number of persons employed by your business in 2016

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


Please detail any accreditation schemes you are a member of: None


Was any of your production certified as organic (circle appropriate option)? Yes No

Signature: _____ Date: _____

Thank you for your cooperation. Please return the completed form in the envelope provided, or electronically, by 31st January 2017.

Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB
MS.Productionsurvey@scotland.gsi.gov.uk
 01224 425 535





SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2016

FORM (b) – SITE PRODUCTION, SIZE and MOVEMENTS

Site name / Site No: _____

SPECIES	PRODUCTION OF SHELLFISH FOR 2016 (EXCLUDES HATCHERIES AND NURSERIES)				HIGHEST MORTALITY	
	A) for the table		B) for depositing in other waters		% of facilities type / period	Reason
	No.	Weight*	No.	Weight*		
Mussel <i>M. edulis</i>						
Pacific oyster <i>C. gigas</i>						
Native oyster <i>O. edulis</i>						
Scallop <i>P. maximus</i>						
Queen <i>C. opercularis</i>						
Lobster						
Other (specify)						

*Please state the unit of measurement, e.g. tonnes, kilograms.

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2016			
	Molluscs			
	On bottom (lease area in hectares or m ²)	Off bottom		Other methods (specify no, type and size)
Total rope length (m) (No. of droppers x dropper length)		Leasing area containing trestles (lease area in hectares or m ²)		
Mussel				
Pacific oyster				
Native oyster				
Scallop				
Queen				
Other (specify)				

SPECIES	INPUT TO CAPTURE BASED AQUACULTURE		SHELLFISH PRODUCTION FOR 2016 (HATCHERIES AND NURSERIES)			
	No.	Weight*	Transferred to a controlled environment for on growing		Released to the wild	
			No. Eggs	No. Juveniles	No. Eggs	No. Juveniles
Mussel						
Pacific oyster						
Native oyster						
Scallop						
Queen						
Lobster						
Other (specify)						

*Please state the unit of measurement, e.g. tonnes, kilograms.

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2016			
	Crustaceans			
	Ponds (hectares or m ²)	Enclosures and pens (hectares or m ²)	Tanks and raceways (m ²)	Other methods (specify no, type and size)
Lobster				
Others (specify)				

SHELLFISH MOVEMENTS BY SITE AND SPECIES
 (Record live shellfish movements on or off-site where they are for on-growing, **NOT** for the table.)

Site name: _____		Site name: _____		Site name: _____		Site name: _____	
Site number: _____		Site number: _____		Site number: _____		Site number: _____	
No of movements		No of movements		No of movements		No of movements	
Species	On-site	Off-site	Species	On-site	Off-site	Species	On-site

2016 SPAT SETTLEMENT

Is this a spat collection site? (Please circle appropriate option)	Yes	No
If yes, was spat settlement sufficient for production purposes? (Please circle appropriate option)	Yes	No

GUIDANCE ON COMPLETING THE SURVEY FORMS

FORM (a) - BUSINESS PRODUCTION

Production of shellfish for 2016: Please provide your total business production for 2016 next to the relevant species (the individual site(s) production total(s) should add up to the business production total). The 'for the table' column is for shellfish sold for human consumption (which should include any shellfish sent for depuration or cleansing, or temporarily held in other waters or tanks etc. prior to consumption or processing). The column 'for depositing in other waters' should be filled in when shellfish have been partially grown and then sold or transferred to another business for on-growing. Please state the unit of measurement used in your total business production (e.g. kilograms, tonnes etc.). If your business has not produced any shellfish then please put an X next to the species of shellfish that is authorised to be grown on site.

Production of shellfish for 2017 (estimate): Please provide estimates of production for 2017 'for the table' and 'for depositing in other waters'. Please state the unit of measurement used in your total business production (e.g. kilograms, tonnes etc.).

Employment: Please state the number of people employed in the business under: full time male; full time female; part-time male; part-time female; casual (occasionally employed) male; or casual female.

Please finish the form by signing and dating.

FORM (b) - SITE PRODUCTION, SIZE and MOVEMENTS

Each site form can accommodate one site return. You have been issued with forms appropriate to the details which we hold for your site(s).

Production of shellfish for 2016: Please provide your total site production for 2016 'for the table' and 'for depositing in other waters' for the respective species cultured. (This excludes hatcheries and nurseries). If you cultured shellfish species in 2016 which are not listed on the form please specify these in the row marked 'Other'.

Highest Mortality: Please indicate the highest mortality as a percentage (%) of the facility type, for each species registered as cultured. Mortality should be recorded over a defined period of time. Please also indicate the reason for this mortality (if known).

Example 1 – A mussel farmer has ten long lines and one line suffers total mortality through predation over one month. The highest % mortality recorded would be 10% / 1 month. Reason was eider duck predation.

Example 2 – An oyster farmer has 100 trestles and all the shellfish from 90 are lost through disease in spring. The highest % mortality recorded would be 90% / 3 months. Reason was suspect notifiable disease eg. Bonamia.

Example 3 – A scallop farmer has 50 long lines and one line is destroyed by storm damage during the year. The highest % mortality recorded would be 2% / 12 months. Reason was storm damage.

- In accordance with the Aquatic Animal Health (Scotland) Regulations 2009, it is your duty to notify the competent authority or a veterinarian if you know or suspect that increasing mortality has occurred or is occurring in aquaculture animals. This should be interpreted as being where mortality affects 15% or greater of stocks in a single facility, over a short period. It is also a requirement to maintain mortality records detailing the number of any aquaculture animals that have died in each epidemiological unit within the area. When significant abnormal mortalities occur the Fish Health Inspectorate must be informed immediately stating suspected cause (if known). The Fish Health Inspectorate can be contacted by telephone on 01224 295525 or by e-mail at MS.fishhealth@gov.scot

Size of production facilities in 2016 (molluscs): Please provide the size of the production facilities for the respective species cultured. If you cultured shellfish species in 2016 which are not listed on the form please specify the size of the facilities in the row marked 'Other'.

- Where molluscs are cultured on the seabed, or where a Several Order is in place, the total extent of the **lease area** should be recorded in hectares or metres squared (m²) (please specify) in the column titled 'On bottom'.
- Where molluscs are cultured on long lines / rafts please record the **total length** of rope used in metres (number of droppers x dropper length) in the column titled 'Off bottom' and subtitled 'Total rope length (m)'.
- Where molluscs are cultured in trestles please record the total extent of the **lease area** in hectares or metres squared (m²) (please specify) in the column titled 'Leasing area containing trestles'.
- If molluscs are cultured by more than one method on a site an entry should be recorded for both methods.
- If utilising types of culturing methods other than those specified please give details of the type, number and size in the column titled 'Other methods'.

Input to capture based aquaculture: Capture based aquaculture refers to the practice of collecting aquatic animals from the wild for aquaculture purposes prior to **placing them on the market**. For the purposes of this survey this **does not** include the natural settlement of mussel, oyster or scallop spat on long lines or the seabed. The active capture of animals from the wild which are then held for a period of time prior to being placed on the market should be recorded only **where those animals are being fed**. There is no requirement to record those animals which are intended for release back into the wild or are not being fed.

For example:

- Wild caught oysters held temporarily in depuration facilities **would not** be recorded.
- Wild caught lobsters held temporarily in holding facilities and being fed **would** be recorded.

Shellfish production for 2016 (hatcheries and nurseries): If applicable, please record the number of eggs and juveniles transferred to controlled environments for on growing or released into the wild.

Size of production facilities in 2016 (crustaceans): Please record the size of the facilities. For ponds, enclosures and pens, the **bottom area** should be recorded in hectares or m². For tanks and raceways the **volume** should be recorded in m³. On sites holding lobsters, either for release to the wild or for placing on the market, data is required only for those facilities where the animals are **being fed**.

Shellfish movements by site and species: Please only record live shellfish movements on or off-site where they are for on-growing, **not for table production**.

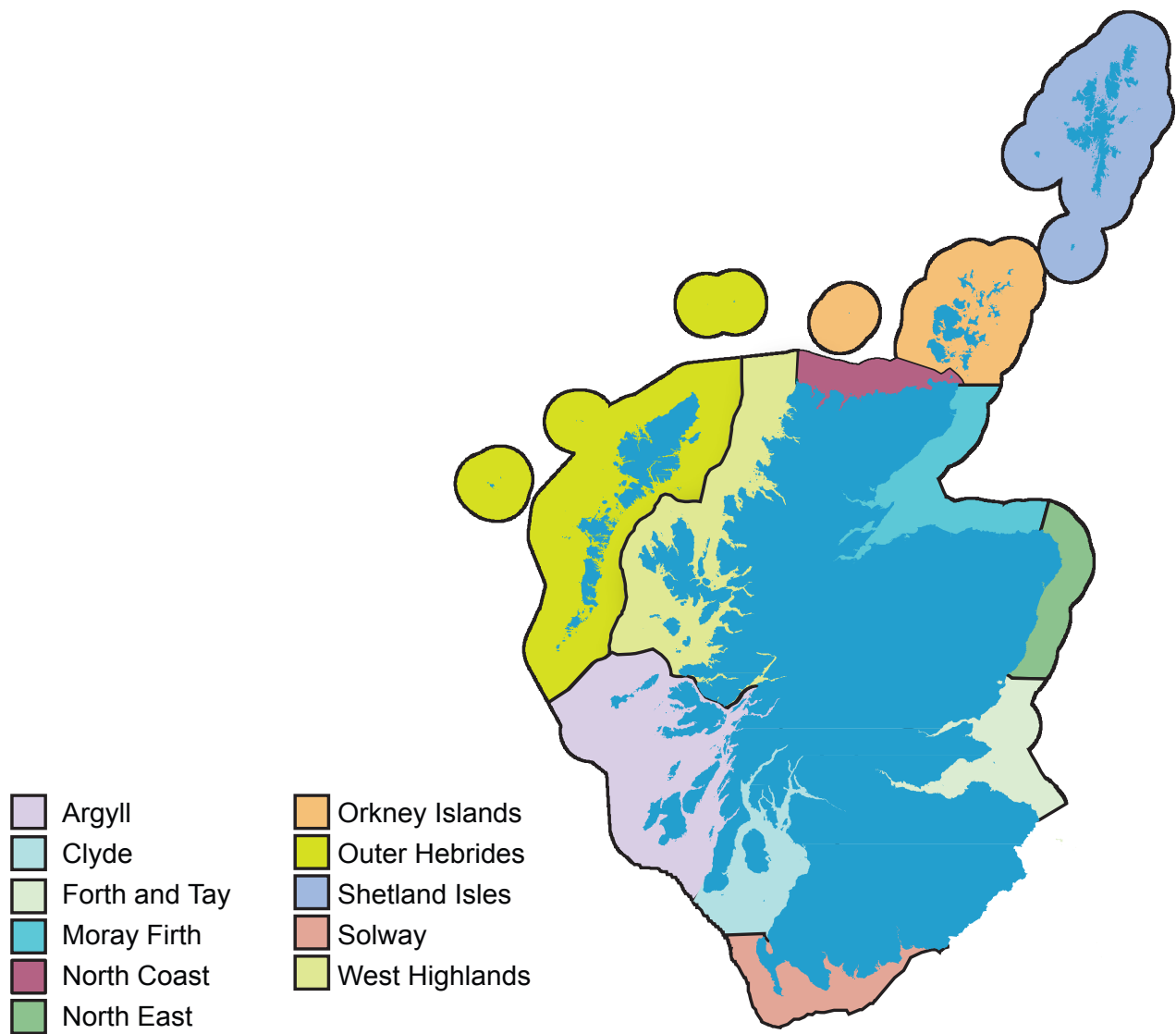
2016 spat settlement: Please indicate if this was a spat collection site and if so, was spat settlement sufficient for production purposes.

CONVERSIONS

To convert	To	Multiply (X) or divide (/) by
Yards	Metres	X 0.9144
Miles	Kilometres	X 1.609
Acres	Hectares	X 0.4047
Square metres (m ²)	Hectares	/ 10000
Cubic feet (ft ³)	Cubic metres (m ³)	X 0.0283

// APPENDIX 2

Scottish Marine Regions

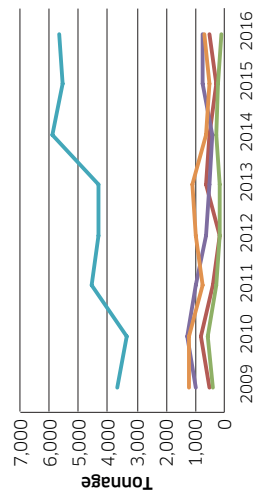


Mussel Production by Scottish Marine Region (Tonnage and Value)

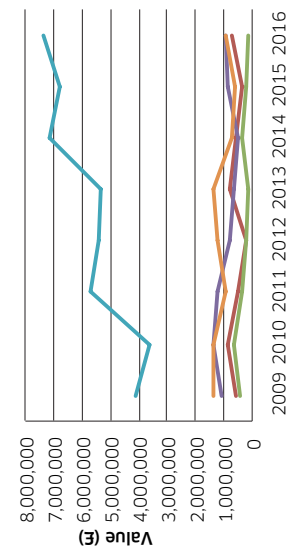
Scottish Marine Region	2009		2010		2011		2012		2013		2014		2015		2016	
	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll	511	569,254	781	844,261	412	517,472	144	179,280	637	780,962	483	581,532	301	366,317	532	691,600
Clyde	395	440,030	566	611,846	298	374,288	179	222,855	133	162,445	272	326,886	190	230,695	83	107,900
Outer Hebrides	955	1,063,870	1,264	1,366,384	1,001	1,257,256	629	783,105	528	647,836	411	494,964	718	873,429	727	945,100
Shetland Isles	3,698	4,119,572	3,349	3,620,269	4,567	5,736,152	4,340	5,403,300	4,337	5,316,841	5,919	7,126,717	5,565	6,773,001	5,686	7,391,800
West Highlands, Moray Firth & North Coast	1,197	1,333,458	1,239	1,339,359	718	901,808	985	1,226,325	1,122	1,375,572	598	719,992	496	603,632	704	915,200
All Scotland	6,756	7,526,184	7,199	7,782,119	6,996	8,786,976	6,277	7,814,865	6,757	8,283,655	7,683	9,250,091	7,270	8,847,073	7,732	10,051,600

Footnote – Figures for West Highlands, Moray Firth & the North Coast have been merged due to commercial confidentiality. Average prices (real) have been adjusted for inflation based on 2016 price estimates.

Mussel Production by Scottish Marine Region



Mussel Production Value (£) by Scottish Marine Region

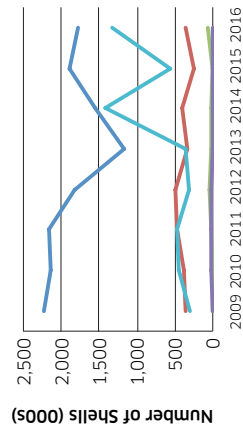


Pacific Oyster Production by Scottish Marine Region (Number of Shells and Value)

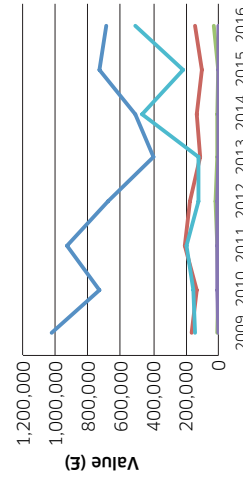
Scottish Marine Region	2009		2010		2011		2012		2013		2014		2015		2016	
	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £
Argyll	2,237	1,029,020	2,145	729,300	2,155	926,650	1,837	679,690	1,172	398,480	1,549	511,170	1,884	734,760	1,774	691,860
Clyde	356	163,760	384	130,560	480	206,400	485	179,450	331	112,540	404	133,320	249	97,110	369	143,910
Outer Hebrides	5	2,300	3	1,020	15	6,450	46	17,020	19	6,460	26	8,580	4	1,560	70	27,300
Shetland Isles	0	0	30	10,200	25	10,750	15	5,550	0	0	0	0	0	0	0	0
West Highlands & North Coast	302	138,920	446	151,640	461	198,230	323	119,510	369	125,460	1,413	466,290	556	216,840	1,321	515,190
All Scotland	2,900	1,334,000	3,008	1,022,720	3,136	1,348,480	2,706	1,001,220	1,891	642,940	3,392	1,119,360	2,693	1,050,270	3,534	1,378,260

Footnote – Figures for West Highlands & the North Coast have been merged due to commercial confidentiality. Average prices (real) have been adjusted for inflation based on 2016 price estimates.

Pacific Oyster Production by Scottish Marine Region



Pacific Oyster Production Value (£) by Scottish Marine Region

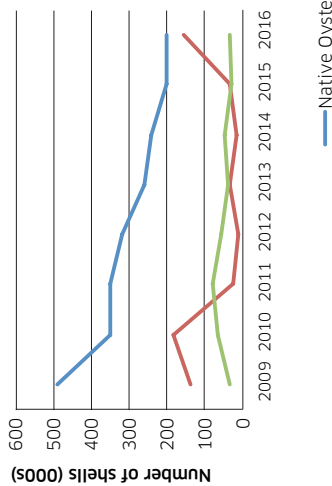


Other Shellfish, All Scotland Production (Number of Shells and Value)

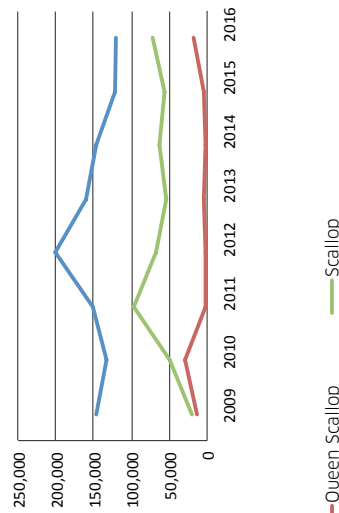
Species	2009		2010		2011		2012		2013		2014		2015		2016	
	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £
Native Oyster	490	147,000	350	133,000	350	150,500	317	199,710	260	161,200	242	147,620	200	122,000	201	120,600
Queen Scallop	138	13,800	184	29,440	27	2,970	10	1,200	33	4,950	18	2,700	33	3,630	155	18,600
Scallop	35	19,600	64	48,640	78	95,940	58	67,860	40	53,200	48	62,880	30	57,300	35	71,050
All Scotland	663	180,400	598	211,080	455	249,410	385	268,770	333	219,350	308	213,200	263	182,930	391	210,250

Footnote – Other shellfish species including native oyster (Argyll & Solway), queen scallop (Clyde & West Highlands) and scallop (Argyll & West Highlands) were also produced however these figures cannot be attributed to Scottish Marine Regions due to commercial confidentiality. Average prices (real) have been adjusted for inflation based on 2016 price estimates.

Other Shellfish – All Scotland Production

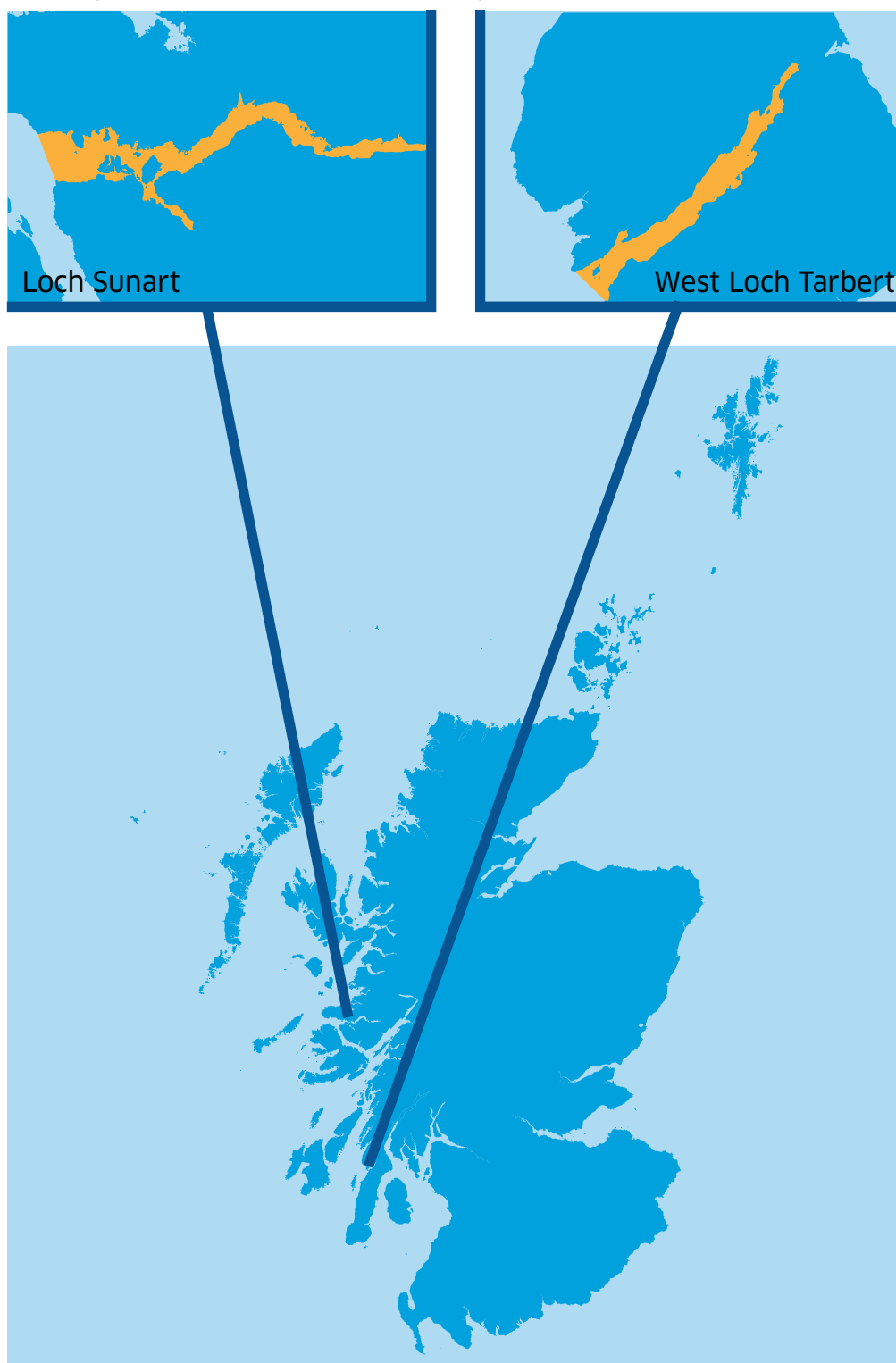


Other Shellfish Production Value (£) for All Scotland



// APPENDIX 3

MAP OF MOVEMENT RESTRICTIONS IN PLACE FOR THE PRESENCE OF *BONAMIA OSTREAE* (DESIGNATED AREAS IN ORANGE).



NOTE: OTHER CONFIRMED DESIGNATIONS ARE IN PLACE FOR THE PRESENCE OF *BONAMIA OSTREAE* IN THE GREAT BRITAIN ZONE. PLEASE CONTACT THE MSS FISH HEALTH INSPECTORATE IF YOU HAVE ANY QUERIES ABOUT SHELLFISH CONSIGNMENTS FROM ENGLAND AND WALES.

<https://www.gov.uk/prevent-fish-or-shellfish-diseases#control-areas-for-notifiable-disease-outbreaks>



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