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Marine Scotland Science

Scottish Shellfish Farm Production Survey 2017

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science

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// INTRODUCTION TO THE YEAR 2017 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, Sandy Murray, Keith Mutch, Sarah Payne, Ronald Smith and Andrea Warwick for their contributions to the production of this report.

Production survey questionnaires were sent to 132 businesses registered as active during 2017 (*see* Appendix 1, p.16). All return forms were received. During 2017, six businesses became authorised and four businesses rescinded their authorisation.

The survey showed that, of the 132 businesses authorised at the end of 2017, 73 recorded sales during that year. These 132 authorised businesses farmed 332 active sites, of which 176 (53%) placed shellfish on the market. Shellfish production by business and site is presented.

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May 2018

// PRODUCTION

The survey indicates that the shellfish species cultivated in Scottish waters in 2017 were:

Mussel:	*Mytilus* spp.
Pacific oyster:	*Crassostrea gigas*[1]
Native oyster:	*Ostrea edulis*
Queen scallop:	*Aequipecten opercularis*
Scallop:	*Pecten maximus*

Production was dominated by mussel and Pacific oyster, although small quantities of scallop, queen scallop (queen) and native oyster were also produced. The 2017 production data for each species by region are given in Table 1. Additionally in 2017 there was cultivation of whiteleg shrimp (*Litopenaeus vannamei*) and common periwinkle (*Littorina littorea*) however due to the small number of these species being produced it is not possible to summarise these without revealing commercially sensitive information.

TABLE 1
SCOTTISH SHELLFISH PRODUCTION BY REGION, 2017.

Region	Businesses	Mussel (tonnes)		Pacific oyster (000s)		Native oyster (000s)		Queen (000s)		Scallop (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	48	558	0	1,799	3,600	0	0	1	0	43	4
Orkney	2	0	0	0	0	0	0	0	0	0	0
Shetland	23	6,647	3,314	0	0	0	0	0	0	0	0
Strathclyde	45	631	1,123	3,086	249	200	481	272	300	4	5
Western Isles	14	396	0	149	0	0	0	0	0	0	0
All Scotland	132	8,232	4,437	5,034	3,849	200	481	273	300	47	9
Weight (Tonnes)		8,232	4,437	403		16		11		6	

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.

[1] A proposed name change to *Magallana gigas* remains controversial (Bayne et al. 2007, Journal of Shellfish Research. 36, 545-547)

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 2008-2017.

For the table	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	%change 16-17
Pacific oyster (000s)	3,093	2,900	3,008	3,136	2,706	1,891	3,392	2,693	3,534	5,034	42
Native oyster (000s)	250	490	350	350	317	260	242	200	201	200	-0.5
Queen (000s)	687	138	184	27	9	33	18	33	155	273	76
Scallop (000s)	15	35	64	78	58	40	48	30	35	47	34
Mussel (tonnes)	5,869	6,302	7,199	6,996	6,277	6,757	7,683	7,270	7,732	8,232	6

For on-growing	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Pacific oyster (000s)	26	45	1,633	1,400	3,190	6,216	6,792	5,864	4,584	3,849
Native oyster (000s)	0	0	300	1	677	1,015	749	13	323	481
Queen (000s)	0	30	0	0	0	1,490	500	900	17	300
Scallop (000s)	0	0	0	104	16	1,470	136	49	23	9
Mussel (tonnes)	30	391	175	282	309	1,281	1,263	1,841	2,619	4,437

Mussel production, for the table, increased by 6% in 2017 (*see* figure 1) to 8,232 tonnes. This is the highest level of mussel production recorded in Scotland. The greatest contribution in regional mussel production was from Shetland, accounting for 6,647 tonnes or 81% of Scotland's total. There was a 69% increase in the production of mussels for on-growing in 2017. This was largely due to increased exports of part grown mussels to Northern Ireland and the Republic of Ireland. Pacific oyster production increased by 42% from 2016. The Strathclyde region produced 61% of Scotland's farmed Pacific oysters. Queen scallop production increased by 76% since 2016 and the production of farmed scallops increased by 34%, both these sectors continue to target small niche markets. Production of native oysters decreased by 0.5% from 2016. 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.

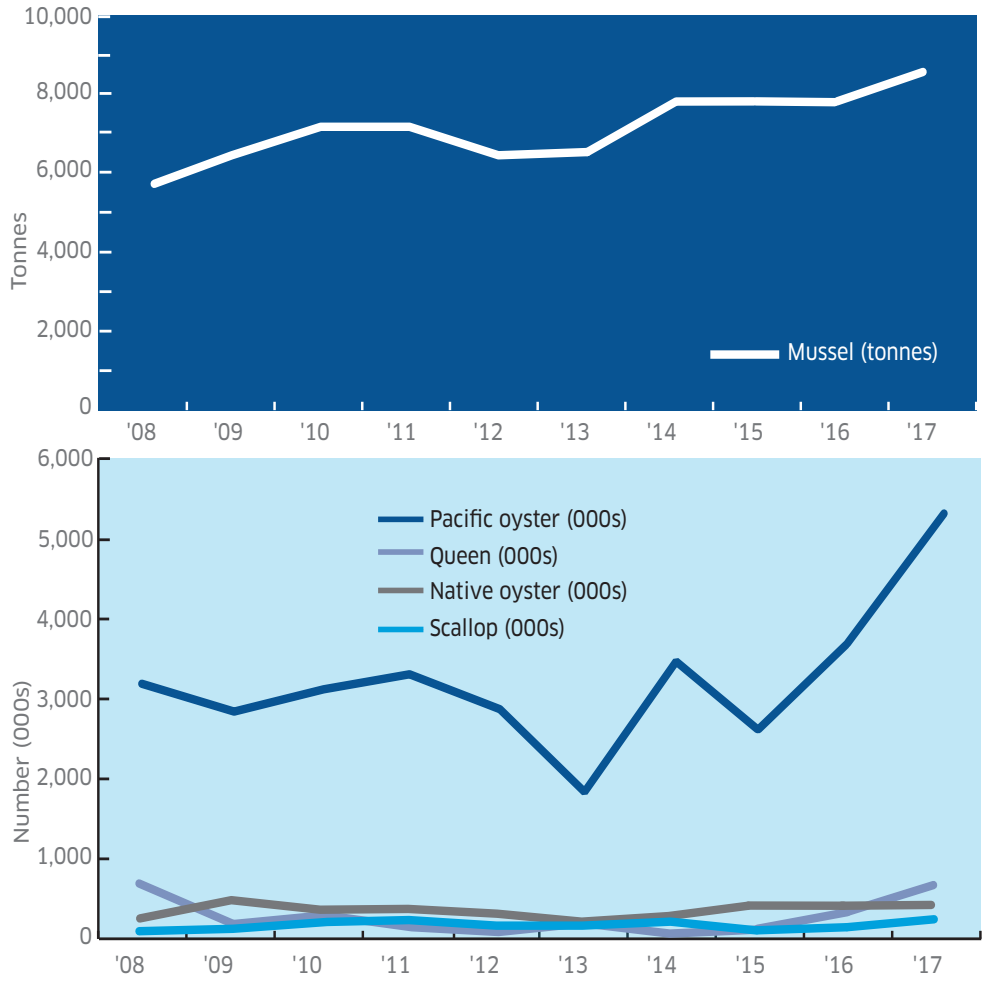


FIGURE 1
TABLE PRODUCTION BY SPECIES 2008-2017.

Prices of farmed shellfish fluctuated throughout the year. Their value at first sale was estimated from the following figures obtained from the shellfish farming industry. These vary with demand, level of production and geographical area of origin. The average price of Pacific oyster was £0.40 per shell; native oyster, £0.60 per shell; scallop, £1.84 per shell; queen scallop, £0.12 per shell and mussel £1,226 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:	£2.01 million
Native oyster:	£0.12 million	Scallop:	£0.09 million
Queen:	£0.03 million		

In 2017, the total value at first sale for all species was calculated at approximately £12.4 million, an increase of 6% from the £11.7 million estimated in 2016.

// 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 2017, 176 sites produced shellfish for sale, a decrease of 2% since 2016.

TABLE 3
AUTHORISED AND ACTIVE BUSINESSES 2008-2017.

	Number of Businesses									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Active	168	168	164	153	153	142	144	144	138	132

TABLE 4
ACTIVE AND PRODUCING FARM SITES BY REGION 2017.

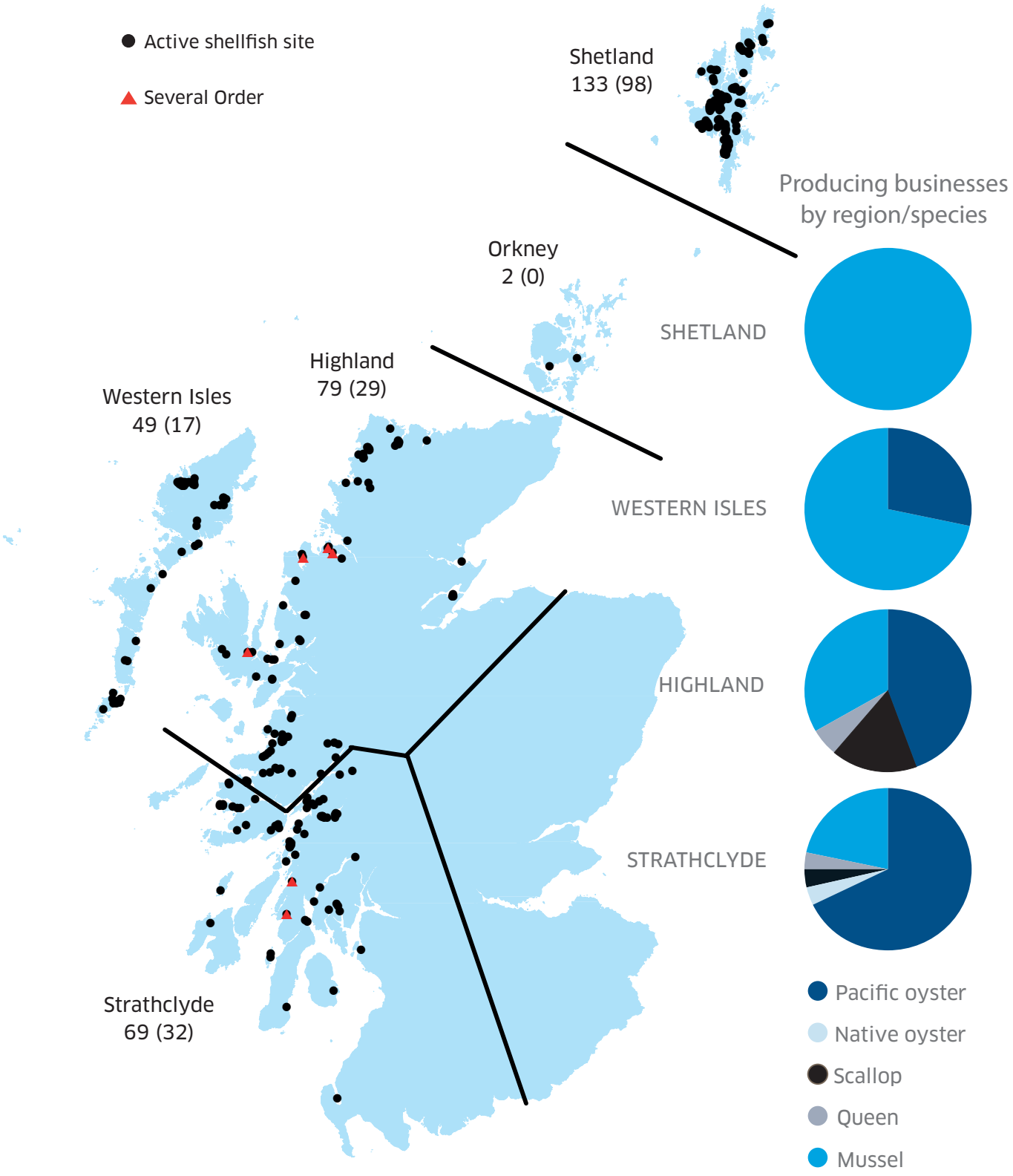
	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Sites						
Active	79	2	133	69	49	332
Producing	29	0	98	32	17	176

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

PRODUCING = PLACING ON THE MARKET FOR THE TABLE AND/OR 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 2017 (NUMBER PRODUCING GIVEN IN BRACKETS) AND NUMBER OF PRODUCING BUSINESSES BY REGION/SPECIES.



There were six Several Orders in place for scallop fisheries in 2017 (*see* Fig. 2). Four 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 2017.

A) PRODUCTION FOR THE TABLE

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	8	0	0	19	2	30
Native oyster	0	0	0	1	0	1
Scallop	3	0	0	1	0	4
Queen	1	0	0	1	0	2
Mussel	6	0	20	6	5	36
Total	**18**	**0**	**20**	**28**	**7**	**73**

B) PRODUCTION FOR ON-GROWING TO OTHER PRODUCERS

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	1	0	0	4	0	5
Native oyster	0	0	0	2	0	2
Scallop	1	0	0	1	0	2
Queen	0	0	0	1	0	1
Mussel	0	0	12	2	0	14
Total	**2**	**0**	**12**	**10**	**0**	**24**

C) NO PRODUCTION, ACTIVELY ON-GROWING OR FALLOW

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	9	0	0	11	3	23
Native oyster	5	0	0	2	0	7
Scallop	7	0	0	3	0	10
Queen	2	0	0	1	0	3
Mussel	17	2	2	8	6	35
Total	**40**	**2**	**2**	**25**	**9**	**78**

Business production levels by species are shown in Table 6. There were 18 businesses producing more than 100 tonnes of mussels, an increase of three businesses since 2016. Out of these 18 businesses, 11 produced more than 200 tonnes. These 11 businesses produced 79% of the total mussel production in Scotland. There were five businesses that produced more than 200,000 Pacific oysters. The production from these businesses accounted for 77% of the Scottish Pacific oyster total.

TABLE 6
BUSINESS PRODUCTION LEVELS BY SPECIES 2017.

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	1	1	2	1	0	1	0	5	5	**29**
Native oyster (000s)	0	0	0	0	0	0	0	0	0	0	1	0	**1**
Scallop (000s)	2	1	1	0	0	0	0	0	0	0	0	0	**4**
Queen (000s)	1	0	0	0	0	0	0	0	0	0	0	1	**2**
Mussel (tonnes)	3	1	4	5	2	0	2	2	0	0	7	11	**37**
Total	**17**	**3**	**6**	**6**	**3**	**2**	**3**	**2**	**1**	**0**	**13**	**17**	**73**

// 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 234 (100%) of the sites authorised for mussel production in 2017. One hundred and four (44%) of these were spat collection sites, 77 (74%) 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 146 full-time and 182 part-time and casual workers during 2017. The number of full-time staff decreased by 11 and the number of part-time and casual employees increased by 24 compared with 2016. The regional breakdown of employment is given in Table 7. The number of people employed by the shellfish farming industry in Scotland increased by 4% from the 2016 total of 315.

TABLE 7
REGIONAL EMPLOYMENT 2017.

Region	Businesses	Staff						
		Full-time Male	Full-time Female	Part-time Male	Part-time Female	Casual Male	Casual Female	Total
Highland	48	23	2	26	7	33	0	**91**
Orkney	2	0	0	0	0	1	0	**1**
Shetland	23	59	2	12	10	16	1	**100**
Strathclyde	45	38	3	33	8	20	3	**105**
Western Isles	14	18	1	8	1	2	1	**31**
Scotland	**132**	**138**	**8**	**79**	**26**	**72**	**5**	**328**

// 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 22) 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 (*see* page 22).

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 81 shellfish site inspections was undertaken during 2017. 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 2017. These movement restrictions covering both sea lochs prevent the relaying of native oyster from them (*see* Appendix 3, p.26 for maps of areas under movement restrictions). Approved zone status for bonamiasis, marteiliasis and Ostreid Herpes Virus-1 Microvariant (OsHV-1 µvar) 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 2017 were attributed to: predation from wild ducks, starfish, sea urchins, 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 three shellfish diagnostic cases during 2017, at sites holding Pacific oysters and mussels. 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.20-21).

In 2017 there was a continued demand for imported mussel and Pacific oyster spat in Scotland. 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. In addition consignments imported from outside Great Britain require to be accompanied by a health certificate.

The whole of the UK is recognised as free from infection with *Marteilia refringens* although there are movement restrictions in place on the River Tamar in Cornwall and Devon.

The whole coastline of Great Britain is recognised as free from infection with *Bonamia ostreae* except 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, Highland;
- West Loch Tarbert, Argyll.

In addition, the Menai Strait is currently subject to movement restrictions for *Bonamia ostreae*.

Guernsey, Jersey, Herm and the Isle of Man are all recognised as *Bonamia ostreae* free areas. The whole coastline of Northern Ireland is recognised as free from *Bonamia ostreae* apart from Lough Foyle and Strangford Lough.

The whole coastline of Great Britain is recognised as free from OsHV-1 µvar except for the following areas;

- The coast of Colne Point, Essex to the southern extent of Pegwell Bay Kent (the River Roach, River Crouch, Blackwater Estuary and River Colne in Essex area has merged with the north Kent coast area);
- Poole Harbour in Dorset;
- The River Teign in Devon.

Guernsey is also recognised as free from OsHV-1 µvar. In the territory of Northern Ireland, Belfast Lough is the only area approved as free from OsHV-1 µvar.

Movements of shellfish species susceptible to infection by *Marteilia refringens*, *Bonamia ostreae* and OsHV-1 µvar, into the Great Britain health zone, must originate from another zone or country recognised as free of that disease. Movements are allowed from disease free areas to non-approved areas.

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

// SUMMARY

- In 2017, 8,232 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 tonnage increasing by 6% and 42% respectively during 2017;
- During 2017, over 3.8 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 (155,000 to 273,000 shells) and scallop production (35,000 to 47,000 shells) since 2016;
- There was a small decrease in the production of native oysters from 201,000 to 200,000 shells in 2017. The sector continues to target a strong niche market;
- Employment levels increased by 4% from the previous year, with 328 full, part-time and casual staff being employed during 2017.
- The Scottish shellfish farming industry is estimated to be worth approximately £12.4 million at first sale value, an increase of 6%.
- Active surveillance for bonamiasis, marteiliasis and OsHV-1 µvar continued in 2017;
- For shellfish health purposes, 81 out of 332 sites were inspected during 2017 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 µvar. 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). ***See*** 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

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December 2017

ANNUAL RETURNS OF SHELLFISH FARM PRODUCTION – 2017

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 2017.

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 0131 244 4348.

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 2017 report will be available in May 2018.

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 0131 244 4348 or e-mail MS.Productionsurvey@gov.scot

Please send returns to me by post, or electronically, before **31st January 2018**.
I would also like to remind you that the Scottish Shellfish Farm Production Survey 2016 is available on the Marine Scotland website, http://www.gov.scot/topics/marine/fish-shellfish/fhi/surveys

Yours faithfully,

Lorna Munro
Marine Scotland Science

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SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2017

FORM (a) – BUSINESS PRODUCTION

Please use BLOCK LETTERS and write in INK unless completing electronically:

Please indicate production of shellfish for business in 2017 and an estimate of production in 2018 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 2017				PRODUCTION OF SHELLFISH FOR 2018 (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 *M. edulis*								
Pacific oysters *C. gigas*								
Native Oysters *O. edulis*								
Scallops *P. maximus*								
Queens *C. opercularis*								
Lobsters								
Other (Specify)								

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

Please state the number of persons employed by your business in 2017

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:

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 2018.

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SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2017

FORM (b) – SITE PRODUCTION, SIZE and MOVEMENTS

Site name / Site No: .....

SPECIES	PRODUCTION OF SHELLFISH FOR 2017 (EXCLUDES HATCHERIES AND NURSERIES)				HIGHEST MORTALITY	
	A) for the table		B) for depositing in other waters			
	No.	Weight*	No.	Weight*	% of facilities type / period	Reason
Mussel *M. edulis*						
Pacific oyster *C. gigas*						
Native oyster *O. edulis*						
Scallop *P. maximus*						
Queen *C. opercularis*						
Lobster						
Other (specify)						

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

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2017			
	Molluscs			
	On bottom (lease area in hectares or m²)	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 m²)	
Mussel				
Pacific oyster				
Native oyster				
Scallop				
Queen				
Other (specify)				

SPECIES	INPUT TO CAPTURE BASED AQUACULTURE		SHELLFISH PRODUCTION FOR 2017 (HATCHERIES AND NURSERIES)			
			Transferred to a controlled environment for on growing		Released to the wild	
	No.	Weight*	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, kilogrammes.

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2017			
	Crustaceans			
	Ponds (hectares or m²)	Enclosures and pens (hectares or m²)	Tanks and raceways (m³)	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 ongrowing, 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	Off-site	Species	On-site	Off-site

2017 SPAT SETTLEMENT

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

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GUIDANCE ON COMPLETING THE SURVEY FORMS

FORM (a) - BUSINESS PRODUCTION

Production of shellfish for 2017: Please provide your total business production for 2017 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 tranferred 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 2018 (estimate): Please provide estimates of production for 2018 "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 2017: Please provide your total site production for 2017 "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 2017 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 0131 244 4348 or by e-mail at MS.fishhealth@gov.scot

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Size of production facilities in 2017 (molluscs): Please provide the size of the production facilities for the respective species cultured. If you cultured shellfish species in 2017 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 (m^2) (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 subititled 'Total rope length (m)'.
- Where molluscs are cultured in trestles please record the total extent of the **lease area** in hectares or metres squared (m^2) (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 2017 (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 2017 (crustaceans): Please record the size of the facilities. For ponds, enclosures and pens, the **bottom area** should be recorded in hectares or m^2. For tanks and raceways the **volume** should be recorded in m^3. 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 ongrowing, **not for table production**.

2017 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

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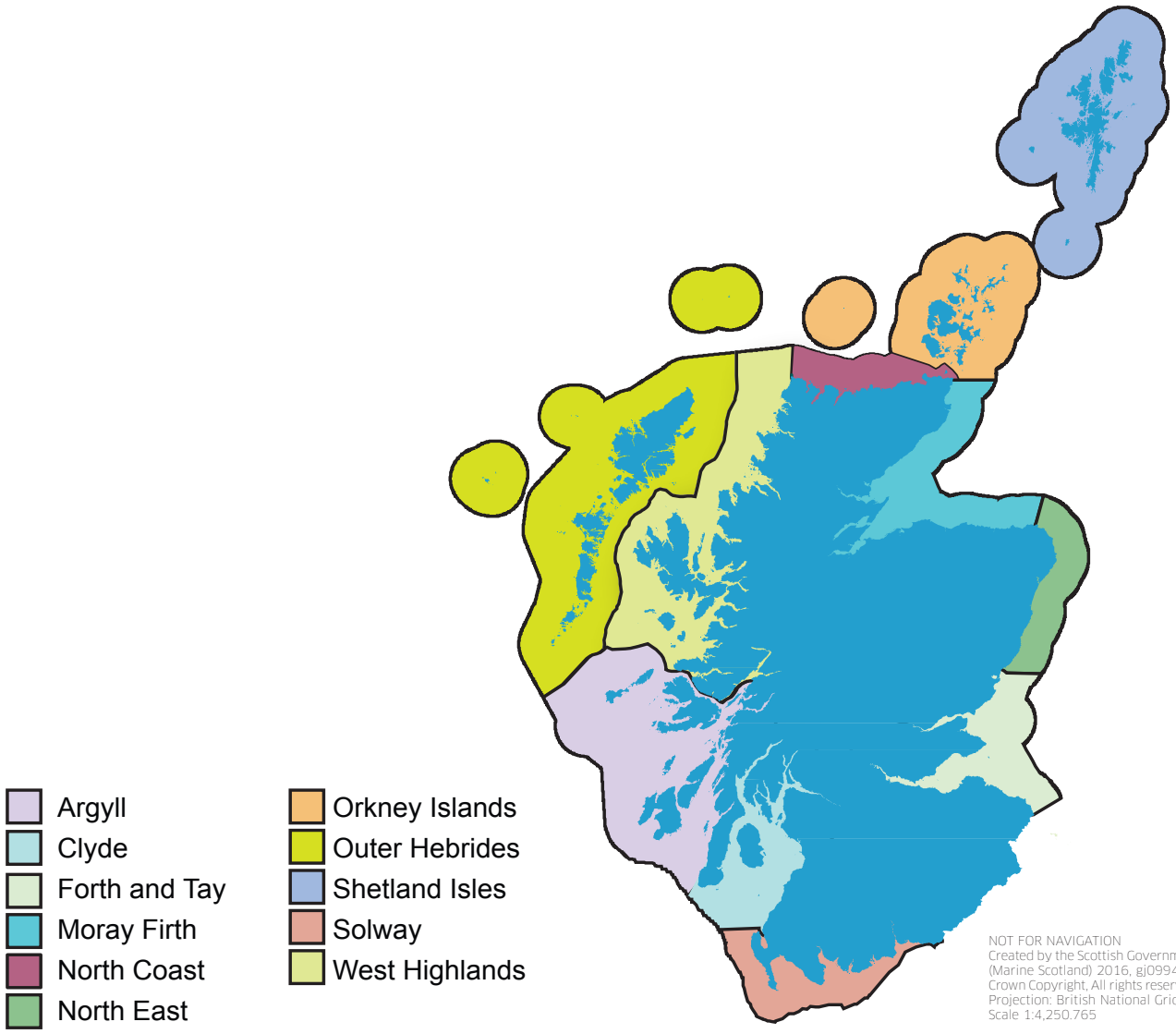
// APPENDIX 2

SCOTTISH MARINE REGIONS

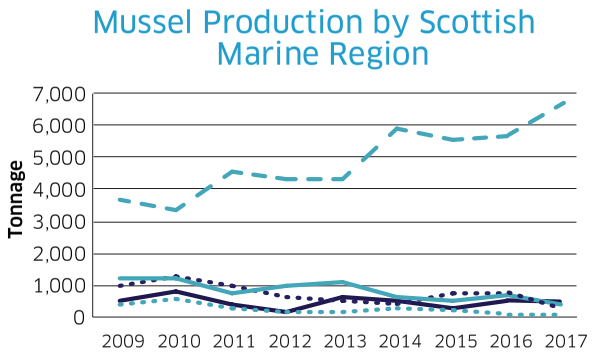


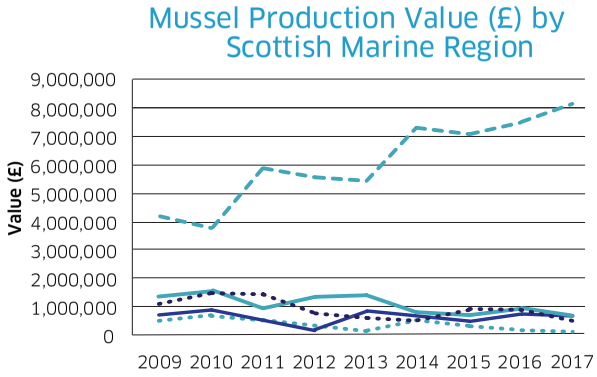
Mussel Production by Scottish Marine Region (Tonnage and Value)

	2009		2010		2011		2012		2013		2014		2015		2016		2017	
Scottish Marine Region	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll	511	580,496	781	873,939	412	537,248	144	186,480	637	811,538	483	605,199	301	376,852	532	707,028	565	692,690
Clyde	395	448,720	566	633,354	298	388,592	179	231,805	133	168,805	272	340,190	190	237,329	83	110,307	66	81,161
Outer Hebrides	955	1,084,880	1,264	1,414,416	1,001	1,305,304	629	814,555	528	673,199	411	515,108	718	898,548	727	966,183	396	485,496
Shetland Isles	3,698	4,200,928	3,349	3,747,531	4,567	5,955,368	4,340	5,620,300	4,337	5,525,004	5,919	7,416,758	5,565	6,967,787	5,686	7,556,694	6,647	8,149,222
West Highlands, Moray Firth & North Coast	1,197	1,359,792	1,239	1,386,441	718	936,272	985	1,275,575	1,122	1,429,428	598	749,294	496	620,992	704	935,616	558	684,108
All Scotland	**6,756**	**7,674,816**	**7,199**	**8,055,681**	**6,996**	**9,122,784**	**6,277**	**8,128,715**	**6,757**	**8,607,974**	**7,683**	**9,626,549**	**7,270**	**9,101,508**	**7,732**	**10,275,828**	**8,232**	**10,092,677**

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 2017 price estimates.





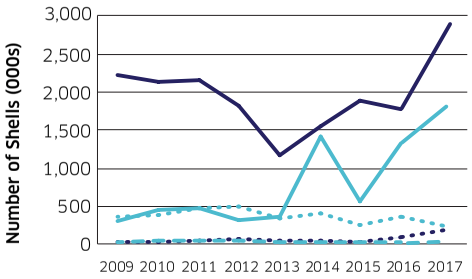
Pacific Oyster Production by Scottish Marine Region (Number of Shells and Value)

	2009		2010		2011		2012		2013		2014		2015		2016		2017	
Scottish Marine Region	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 £	No. of Shells (000s)	Value £
Argyll	2,237	1,051,390	2,145	750,750	2,155	948,200	1,837	698,060	1,172	410,200	1,549	526,660	1,884	753,600	1,774	709,600	2,857	1,142,800
Clyde	356	167,320	384	134,400	480	211,200	485	184,300	331	115,850	404	137,360	249	99,600	369	147,600	229	91,600
Outer Hebrides	5	2,350	3	1,050	15	6,600	46	17,480	19	6,650	26	8,840	4	1,600	70	28,000	149	59,600
Shetland Isles	0	0	30	10,500	25	11,000	15	5,700	0	0	0	0	0	0	0	0	0	0
West Highlands & North Coast	302	141,940	446	156,100	461	202,840	323	122,740	369	129,150	1,413	480,420	556	222,400	1,321	528,400	1,799	719,600
All Scotland	**2,900**	**1,363,000**	**3,008**	**1,052,800**	**3,136**	**1,379,840**	**2,706**	**1,028,280**	**1,891**	**661,850**	**3,392**	**1,153,280**	**2,693**	**1,077,200**	**3,534**	**1,413,600**	**5,034**	**2,013,600**

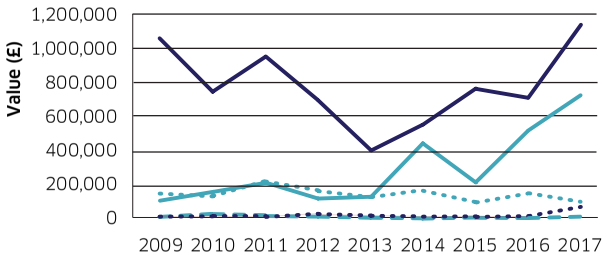
Footnote – Figures for West Highlands & the North Coast have been merged due to commercial confidentiality.

Average prices (real) have been adjusted for inflation based on 2017 price estimates.

Pacific Oyster Production by Scottish Marine Region



Pacific Oyster Production Value (£) by Scottish Marine Region

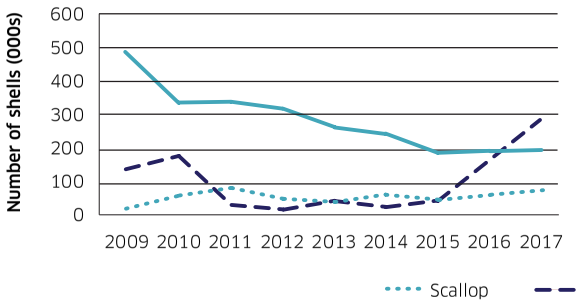


Other Scottish Shellfish Production (Number of Shells and Value)

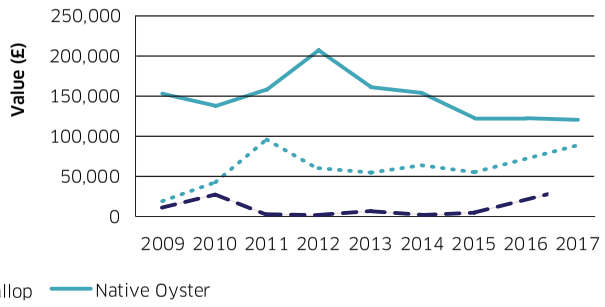
	2009		2010		2011		2012		2013		2014		2015		2016		2017	
Species	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £	No. of shells (000)	Value £
Native Oyster	490	151,900	350	136,500	350	154,000	317	206,050	260	166,400	242	152,460	200	124,000	201	122,610	200	120,000
Queen Scallop	138	13,800	184	31,280	27	2,970	10	1,200	33	5,280	18	2,880	33	3,630	155	18,600	273	32,760
Scallop	35	19,950	64	49,920	78	98,280	58	69,600	40	54,800	48	64,800	30	58,200	35	72,450	47	86,480
All Scotland	**663**	**185,650**	**598**	**217,700**	**455**	**255,250**	**385**	**276,850**	**333**	**226,480**	**308**	**220,140**	**263**	**185,830**	**391**	**213,660**	**520**	**239,240**

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 2017 price estimates.

Other Scottish Shellfish Production

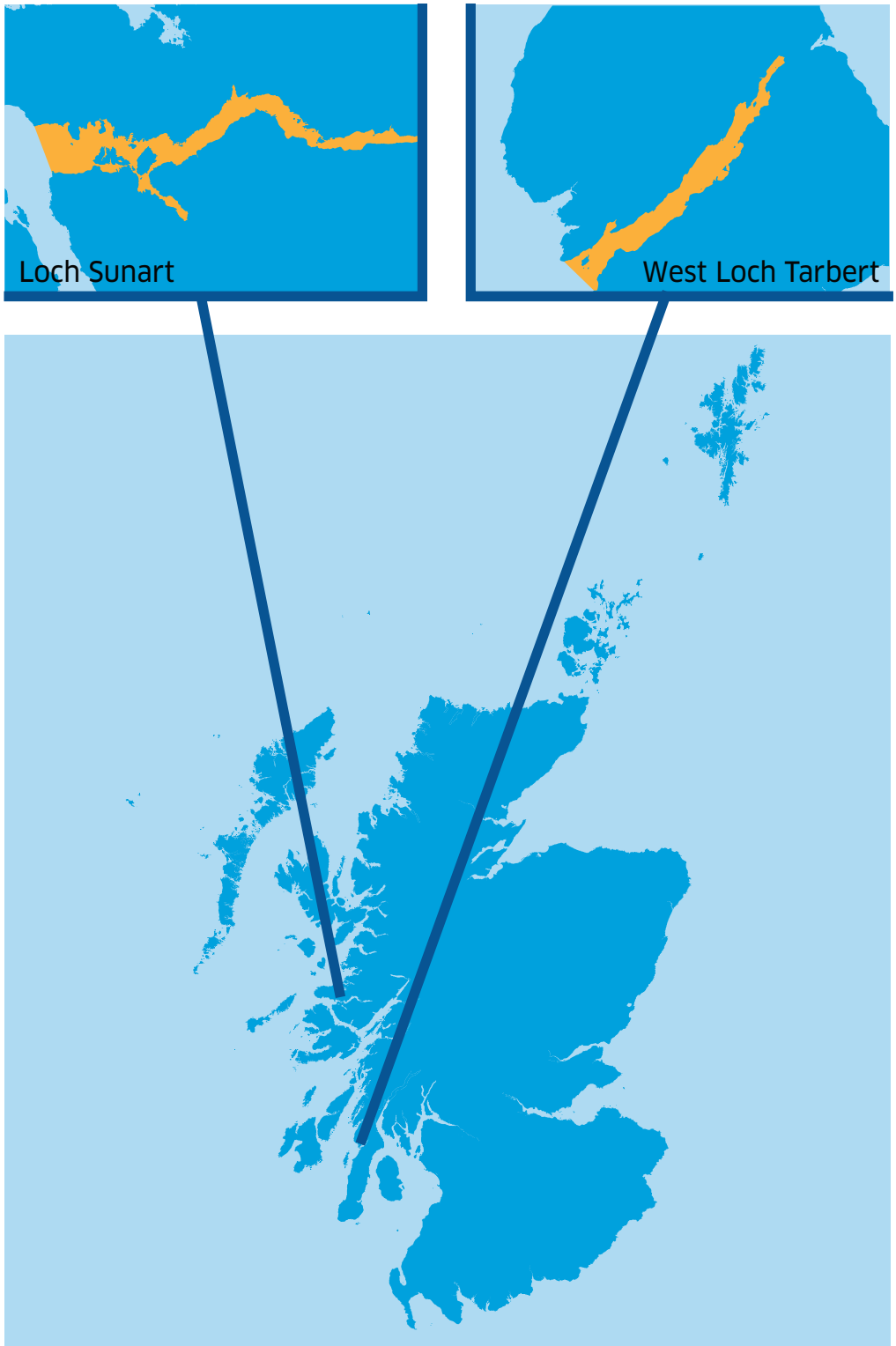


Other Scottish Shellfish Production Value (£)



// 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* AND OTHER LISTED DISEASES 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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