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Marine Scotland Science

Scottish Shellfish Production Survey 2020



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// Introduction to the year 2020 survey

This report is based on the returns of an annual survey questionnaire sent to all active authorised shellfish farming businesses in Scotland. These are Official Statistics published by Marine Scotland Science in accordance with the [Code of Practice for Official Statistics](#). The cooperation of the shellfish farming industry is gratefully acknowledged. The report author acknowledges Amanda Walker, Sandy Murray, Keith Mutch, Edward Noble, Lorraine Nzvede, Ronald Smith, Stuart Wallace and Andrea Warwick for their contributions to the production of this report.

Production survey questionnaires were sent to 125 businesses registered as active during 2020 (*see Appendix 1, page 18*). During 2020, two business became authorised and three businesses rescinded their authorisation. One business's survey returns were not received for 2020 so their production estimates production provided in 2019 were used. The relevant sections will be updated in the 2021 report once the actual figures are obtained. Production figures for 2019 have been updated where 2018 figures had been substituted for the 2019 report. This was due to the COVID-19 pandemic impacting on the supply of some data during 2020.

The survey showed that, of the 125 businesses authorised at the end of 2020, 72 recorded sales during that year. These 125 authorised businesses farmed 313 active sites, of which 167 (53%) placed shellfish on the market. Shellfish production by business and site is presented.

LA Munro

June 2021

// Production

The survey reports that the shellfish species cultivated in Scottish waters in 2020 were:

Mussel:	<i>Mytilus</i> spp.
Pacific oyster:	<i>Crassostrea gigas</i> ¹
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 2020 production data for each species by region are given in Table 1.

Table 1
Scottish shellfish production by region, 2020.

Region	Mussel (tonnes)		Pacific oyster (000s)		Native oyster (000s)		Queen (000s)		Scallop (000s)	
	Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing
Highland	527	93	1,633	1,113	1	0	0.5	0	19	0
Orkney	0	0	2	25	0	10	0	0	0	0
Shetland	4,427	3,310	75	0	40	0	0	0	0	0
Strathclyde	425	724	1,143	525	34	0	0	0	0	0
Western Isles	282	0	85	0	0	0	0	0	0	0
All Scotland	5,661	4,127	2,938	1,663	75	10	0.5	0	19	0
Weight (Tonnes)	5,661	4,127	235		6		>1		2	

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 5](#)), 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 2011-2020.

For the table	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% change 19-20
Pacific oyster (000s)	3,136	2,706	1,891	3,392	2,693	3,534	5,034	4,031	4,393	2,938	-33
Native oyster (000s)	350	317	260	242	200	201	200	142	103	75	-27
Queen (000s)	27	9	33	18	33	155	273	18	18	0.5	-97
Scallop (000s)	78	58	40	48	30	35	47	31	26	19	-27
Mussel (tonnes)	6,996	6,277	6,757	7,683	7,270	7,732	8,232	6,874	6,699	5,661	-15

For on-growing	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	% change 19-20
Pacific oyster (000s)	1,400	3,190	6,216	6,792	5,864	4,584	3,849	4,240	2,405	1,663	-31
Native oyster (000s)	1	677	1,015	749	13	323	481	344	327	10	-97
Queen (000s)	0	0	1,490	500	900	17	300	0	0	0	0
Scallop (000s)	104	16	1,470	136	49	23	9	4	0	0	0
Mussel (tonnes)	282	309	1,281	1,263	1,841	2,619	4,437	2,137	3,493	4,127	18

Mussel production, for the table, decreased by 15% in 2020 ([see figure 1](#)) to 5,661 tonnes. The greatest regional contribution to mussel production was from Shetland, accounting for 4,427 tonnes or 78% of Scotland's total. Pacific oyster production decreased by 33% from 2019. Highland region produced 56% of Scotland's total farmed Pacific oysters in 2020. There was a very small amount of queen scallop production during 2020 as the main producer reported no production during 2020 due to the COVID-19 pandemic lockdown. The production of farmed scallops and native oysters both decreased by 27%. 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. During 2020, the biggest impact on shellfish production was the COVID-19 pandemic with a loss of much of the table trade to the hospitality sector during periods of lockdown and travel restrictions.

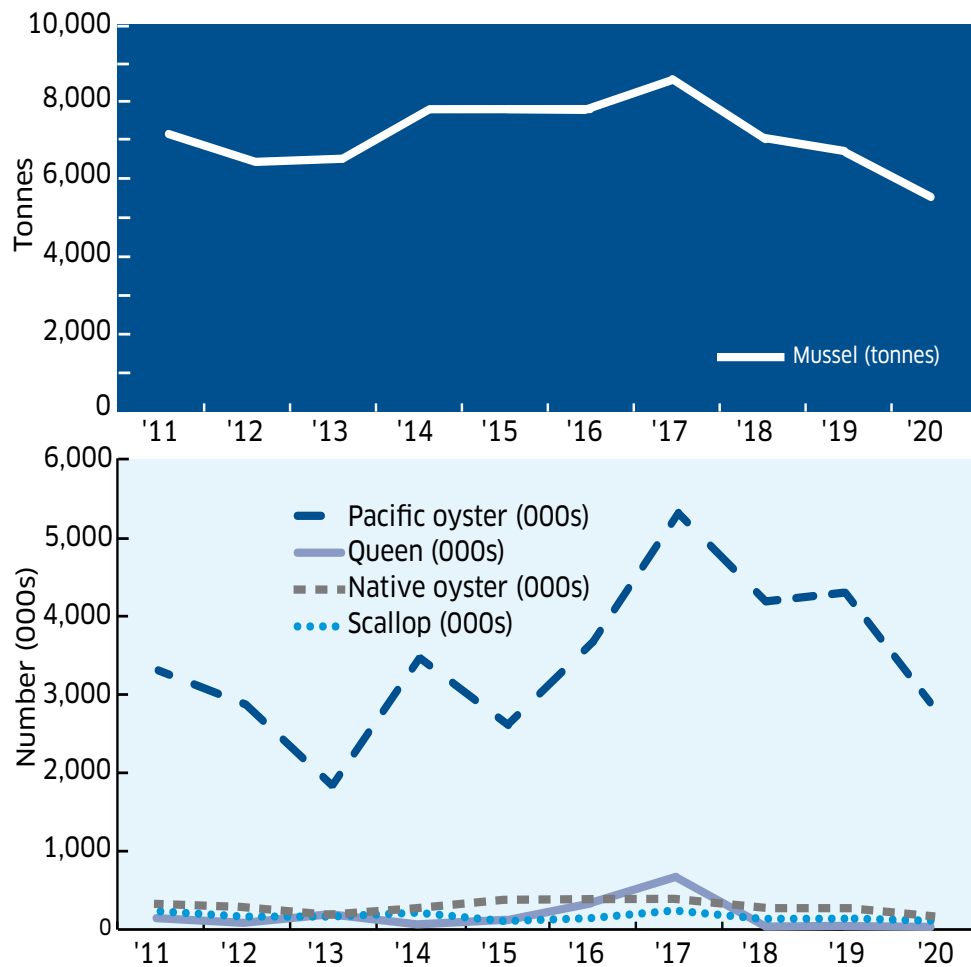


Figure 1
Table production by species 2011-2020.

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 £0.33 per shell; native oyster, £0.60 per shell; scallop, £2.32 per shell; queen scallop, £0.13 per shell and mussel £892 per tonne. The value of the table trade is estimated from the production figures shown in Table 1 ([see page 3](#)).

Mussel:	£5.0 million	Pacific oyster:	£.97 million
Native oyster:	£0.05 million	Scallop:	£0.04 million
Queen:	>£0.001 million		

In 2020, the total value at first sale for all species was calculated at approximately £6.1 million, a decrease of 23% from the £7.9 million estimated in 2019. This decline is largely due to impacts from the COVID-19 pandemic with many businesses reporting lost trade while the hospitality sector was in lockdown during much of 2020.

// Businesses and sites

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. In 2020, 167 sites produced shellfish for sale, an increase of 1% since 2019, and 60% of these sites were located in Shetland.

Table 3
Authorised and active businesses 2011-2020.

		Number of Businesses									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Active		153	153	142	144	144	138	132	130	129	125

Table 4
Active and producing farm sites by region 2020.

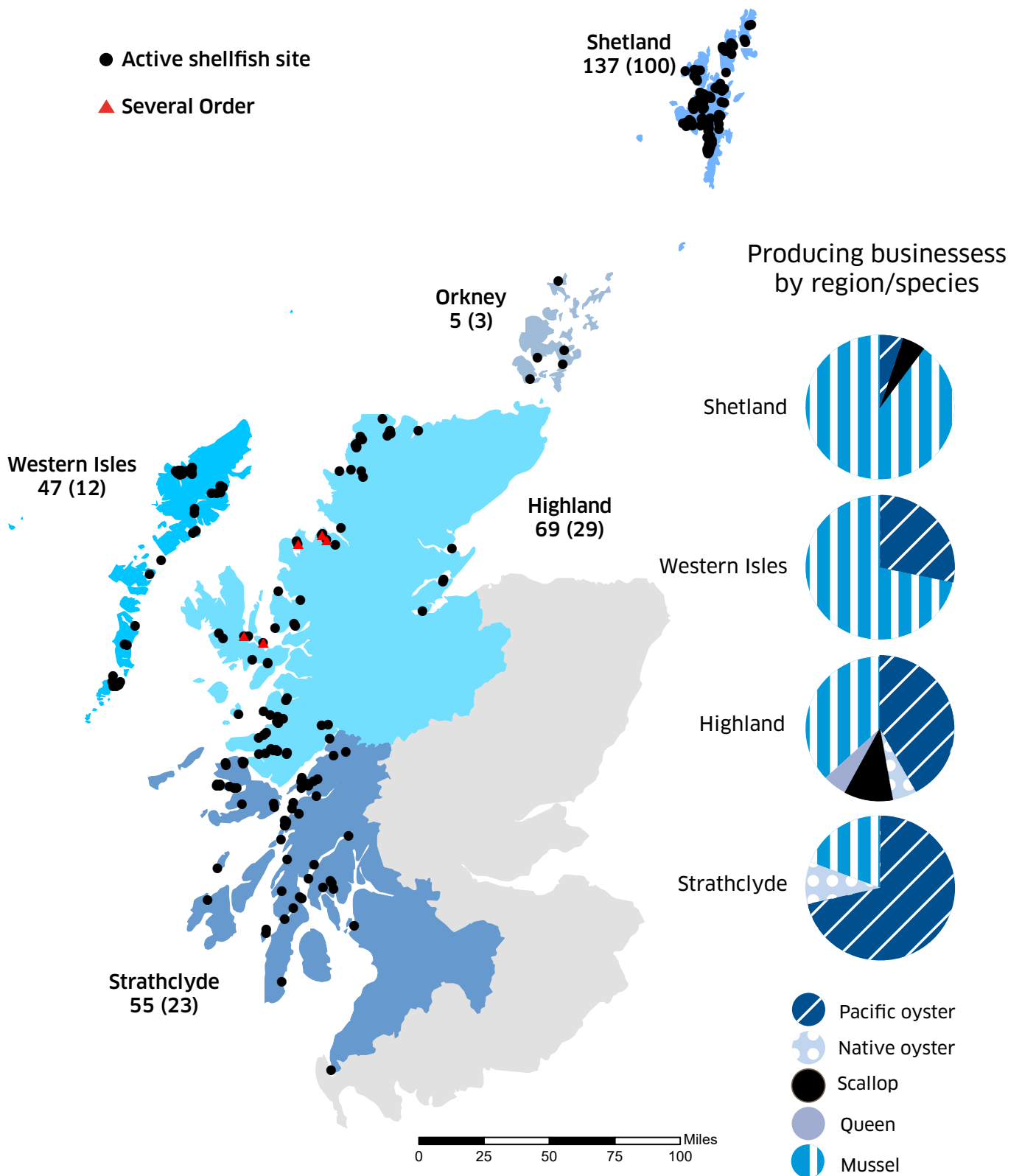
		Region					
		Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Sites							
Active		69	5	137	55	47	313
Producing		29	3	100	23	12	167

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 2019 (NUMBER PRODUCING GIVEN IN BRACKETS) AND NUMBER OF PRODUCING BUSINESSES BY REGION/SPECIES.



There were five Several Orders in place for scallop fisheries in 2020 (see Fig. 2). all of which are in the Highland region.

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. The highest proportion of Pacific oyster businesses are located in Strathclyde while the highest proportion of mussel businesses are in Shetland.

Table 5
Number of businesses by region and by species 2020.

a) Production for the table

	Highland	Orkney	Region Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	8	1	1	15	2	27
Native oyster	1	0	1	2	0	4
Scallop	2	0	0	0	0	2
Queen	1	0	0	0	0	1
Mussel	7	0	18	4	5	34
Total	19	1	20	21	7	68

b) Production for on-growing to other producers

	Highland	Orkney	Region Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	2	1	0	1	0	4
Native oyster	0	1	0	0	0	1
Scallop	0	0	0	0	0	0
Queen	0	0	0	0	0	0
Mussel	2	0	15	2	0	19
Total	4	2	15	3	0	24

c) No production, actively on-growing or fallow

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	9	0	0	14	2	25
Native oyster	2	0	0	3	0	5
Scallop	7	0	0	4	0	11
Queen	2	0	0	2	0	4
Mussel	11	2	1	6	5	25
Total	31	2	1	29	7	70

Business production levels by species are shown in Table 6. There were 10 businesses producing more than 200 tonnes of mussels, this remained the same as in 2019. These 10 businesses produced 79% of the total mussel production in Scotland. There were four businesses that produced more than 200,000 Pacific oysters. The production from these businesses accounted for 71% of the Scottish Pacific oyster total.

Table 6
Business production levels by species 2020.

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)	9	2	2	1	2	3	0	1	1	0	2	4	27
Native oyster (000s)	2	0	0	1	1	0	0	0	0	0	0	0	4
Scallop (000s)	1	1	0	0	0	0	0	0	0	0	0	0	2
Queen (000s)	1	0	0	0	0	0	0	0	0	0	0	0	1
Mussel (tonnes)	6	2	5	3	2	0	0	0	1	0	5	10	34

// 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 presented in two parts: is this a spat collection site; if yes, was spat settlement sufficient for production purposes?

Responses were received from 225 (100%) of the sites authorised for mussel production in 2020. One hundred and twenty three (55%) of these were spat collection sites, 48 (39%) of which reported that they had sufficient spat settlement for production purposes. Insufficient spat settlement on sites may require movement of mussels to that site which increases the risk of introduction or spread of diseases.

Table 7
Spat settlement responses 2013 - 2020.

Year	Number mussel production sites surveyed	Number of responder sites	Number of sites classed as spat collection sites	Number of sites with spat settlement sufficient for production purposes
2013	246	176	97	42
2014	259	218	105	60
2015	249	249	111	77
2016	248	248	108	68
2017	234	234	104	77
2018	232	232	136	55
2019	235	235	128	41
2020	227	227	123	48

// Employment

The industry employed 142 full-time and 158 part-time and casual workers during 2020. The number of full-time staff increased by six while the number of part-time and casual employees increased by 17 compared with 2019. The regional breakdown of employment is given in Table 7. The number of people employed by the shellfish farming industry in Scotland increased by 8% from the 2019 total of 277.

Table 8
Regional employment 2020.

Region	Businesses	Staff						Total
		Full-time Male	Full-time Female	Part-time Male	Part-time Female	Casual Male	Casual Female	
Highland	43	17	1	23	7	6	3	57
Orkney	5	4	1	0	0	3	0	8
Shetland	24	56	2	10	11	17	6	102
Strathclyde	41	35	9	26	14	17	7	108
Western Isles	12	16	1	4	1	3	0	25
Scotland	125	128	14	63	33	46	16	300

// Scottish Marine Regions

The Marine (Scotland) Act 2010 introduced 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 24*) 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 25-28*).

In order to maintain commercial confidentiality mussel production figures for Argyll & Clyde, and the West Highlands, Moray Firth & the North Coast were merged. Similarly, Pacific oyster production for the West Highlands & the North Coast were also required to be merged. 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 14 shellfish site inspections was undertaken during 2020. On these visits, facilities, stock health, bio-security measures plans, movement records and details required for authorisation were checked. Records were checked remotely for a further nine sites. The number of site inspections was reduced in 2020 due to COVID-19 travel restrictions in Scotland. Statutory samples were taken from four sites as part of an investigation following confirmation of the presence of *Bonamia ostreae* in the Lynn of Lorne and the Dornoch Firth.

Movement restrictions placed due to confirmation of the presence of *Bonamia ostreae*, remained in force in Loch Sunart and the Dornoch Firth, (both Highland), in West Loch Tarbert, (Argyll), and the Lynn of Lorne, Loch Etive and Loch Creran, (all Strathclyde) during 2020. Movement restrictions covering these areas prevent the relaying of native oyster from them ([see Appendix 3, page 29 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 (<https://www.gov.scot/policies/fish-health-inspectorate/movement-restrictions-on-fish-and-shellfish/>).

Most of the reported mortalities during 2020 were attributed to: predation from wild ducks, starfish, crabs and oystercatchers; fouling by sea squirts; adverse weather conditions including storms and temperature extremes; damage due to grading and handling and from natural causes. 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, page 18](#)).

In 2020, 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 are required to be accompanied by a health certificate.

The whole coastline of Great Britain is recognised as free from infection with *Marteilia refringens* although there are movement restrictions in place on the River Tamar in Cornwall and Devon. Guernsey, Jersey, Herm and the Isle of Man are all recognised as *Marteilia refringens* free areas. The whole coastline of Northern Ireland is recognised as free from *Marteilia refringens* apart from Belfast Lough and Dundrum Bay.

The whole coastline of Great Britain is recognised as free from infection with *Bonamia ostreae* except the following areas which are covered by movement restrictions:

- 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;
- Dornoch Firth, Highland;
- West Loch Tarbert, Argyll;
- Lynn of Lorne, Loch Creran and Loch Etive, Strathclyde;
- Menai Strait.

Guernsey, 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. Jersey is no longer recognised as free from *Bonamia ostreae*.

The whole coastline of Great Britain is recognised as free from OsHV-1 μ var except for the following areas:

- River Roach, River Crouch, Blackwater Estuary and River Colne in Essex;
- the north Kent coast;
- Poole Harbour in Dorset;
- the River Teign in Devon.

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

Movements of shellfish species susceptible to infection by *Marteilia refringens*, *Bonamia ostreae* and OsHV-1 μ var, 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, as well as those for direct human consumption without re-immersion in any other sea water areas.

// Summary

- In 2020, 5,661 tonnes of mussels were produced for the table market;
- Mussel and Pacific oyster remain the main species produced in terms of value and tonnage. Mussel production decreased by 15% and Pacific oyster production decreased by 33% during 2020;
- This decline is largely due to impacts from the COVID-19 pandemic, with many businesses reporting no table trade while the hospitality sector was in lockdown during much of 2020;
- During 2020, over 1.6 million Pacific oyster shells were produced for on-growing;
- There was a very small amount of queen scallop production during 2020 with the biggest producer reporting no production due to the COVID-19 pandemic. There was a decrease in scallop production, from 26,000 to 19,000 shells, since 2019;
- There was a decrease in the production of native oyster from 103,000 to 75,000 shells in 2020.
- Employment levels increased by 8% from the previous year, with 300 full, part-time and casual staff being employed during 2020.
- The Scottish shellfish farming industry is estimated to be worth approximately £6.1 million at first sale value, a decrease of 23% on the 2019 figure. This decline is largely due to impacts from the COVID-19 pandemic with many businesses reporting lost trade while the hospitality sector was in lockdown during much of 2020.
- Active surveillance for bonamiasis, marteiliasis and OsHV-1 μ var continued in 2020;

- For shellfish health purposes, 14 out of 313 sites were inspected during 2020 as part of a risk based surveillance programme implemented under Council Directive 2006/88/EC. Details of this can be found at <https://www.gov.scot/policies/fish-health-inspectorate/surveillance-programme/>;
- Movement restrictions remain in place for the presence of *Bonamia ostreae* at Loch Sunart and the Dornoch Firth, Highland, West Loch Tarbert, Argyll, and Lynn of Lorne, Loch Creran and Loch Etive, Strathclyde;
- The UK maintained disease free status with regard to bonamiasis, marteiliasis and OsHV-1 μ var, with the exception of specific compartments under movement restrictions. 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	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 https://www.gov.scot/policies/fish-health-inspectorate/
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 2020

ANNUAL RETURNS OF SHELLFISH FARM PRODUCTION – 2020

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 2020. While 2020 has been a difficult year for aquaculture production, the collection of your data will help to inform the Scottish Government on the impacts of the pandemic on annual production levels across your industry.

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.

The data you supply to Marine Scotland Science (MSS) 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 2020 report will be available in May 2021. MSS is 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).

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 e-mail MS.Productionsurvey@gov.scot

Please send returns to me by post, or electronically, before **31st January 2021**. I would also like to remind you that the Scottish Shellfish Farm Production Survey 2019 is available on the Marine Scotland website, <https://www.gov.scot/publications/scottish-shellfish-farm-production-survey-2019/>.

Kind regards,

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SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2020

FORM (b) – SITE PRODUCTION, SIZE and MOVEMENTS

Site No./Site Name:

SPECIES	PRODUCTION OF SHELLFISH FOR 2020 (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>A. opercularis</i>						
Lobster						
Other (specify)						

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

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2020			
	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 2020 (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 2020			
	Crustaceans			
	Ponds (hectares or m ²)	Enclosures and pens (hectares or m ²)	Tanks and raceways (m ³)	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	Off-site	Species	On-site	Off-site

2020 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

GUIDANCE ON COMPLETING THE SURVEY FORMS

FORM (a) - BUSINESS PRODUCTION

Production of shellfish for 2020: Please provide your total business production for 2020 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 2021 (estimate): Please provide estimates of production for 2021 “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 2020: Please provide your total site production for 2020 “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 2020 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 3498 or by e-mail at MS.fishhealth@gov.scot

Size of production facilities in 2020 (molluscs): Please provide the size of the production facilities for the respective species cultured. If you cultured shellfish species in 2020 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 2020 (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 2020 (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 ongrowing, **not for table production**.

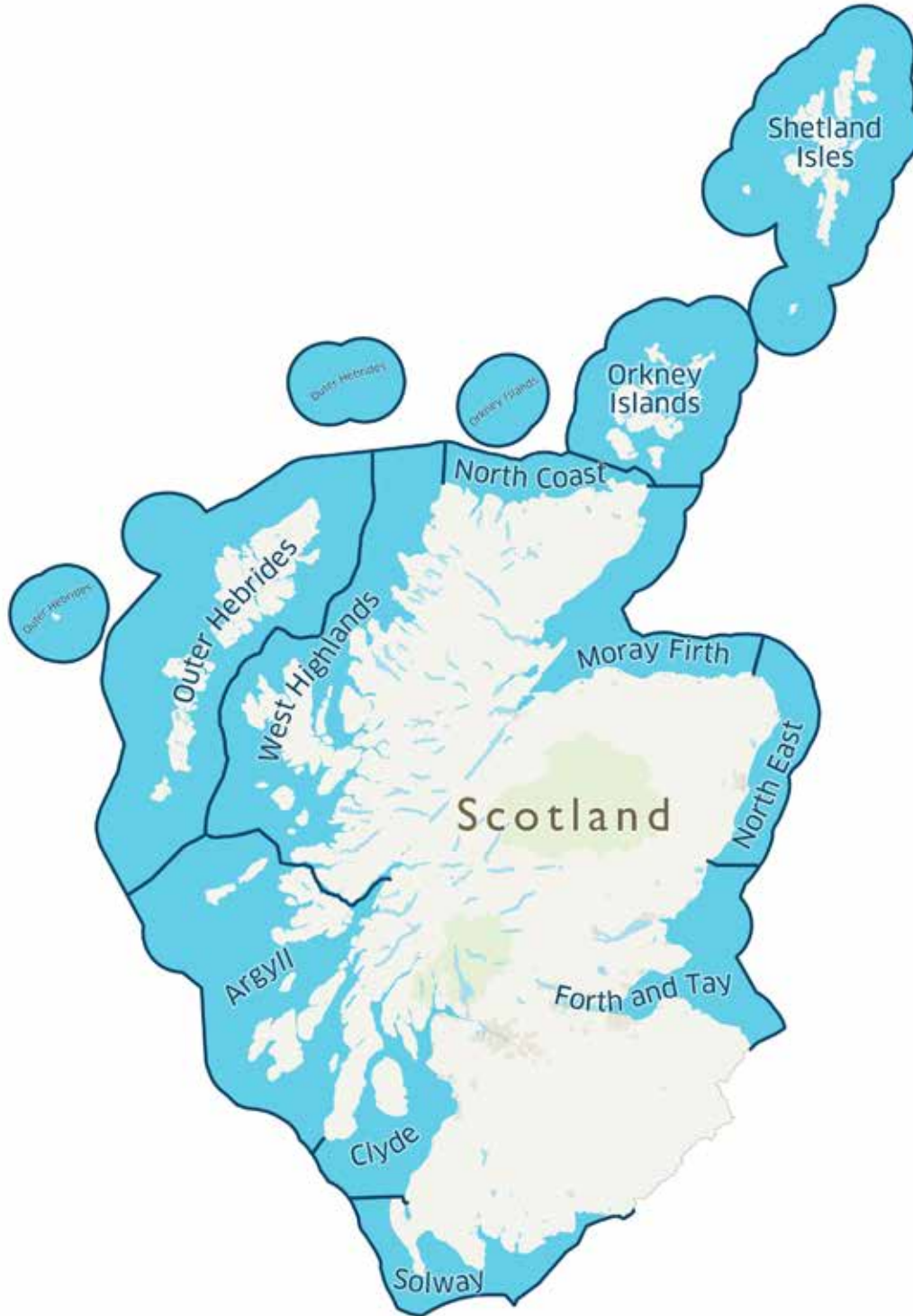
2020 spat settlement: Please indicate if this was a spat collection site and if so, was spat settlement sufficient for production purposes.

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	2011		2012		2013		2014		2015	
	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll & Clyde	710	990,450	323	447,032	770	1,048,740	755	1,010,190	491	657,449
Outer Hebrides	1,001	1,396,395	629	870,536	528	719,136	411	549,918	718	961,402
Shetland Isles	4,567	6,370,965	4,340	6,006,560	4,337	5,906,994	5,919	7,919,622	5,565	7,451,535
West Highlands, Moray Firth & North Coast	718	1,001,610	985	1,363,240	1,122	1,528,164	598	800,124	496	664,144
All Scotland	6,996	9,759,420	6,277	8,687,368	6,757	9,203,034	7,683	10,279,854	7,270	9,734,530

Scottish Marine Region	2016		2017		2018		2019		2020	
	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll & Clyde	615	872,070	631	823,455	442	526,422	363	341,583	425	379,100
Outer Hebrides	727	1,030,886	396	516,780	555	661,005	544	511,904	282	251,544
Shetland Isles	5,686	8,062,748	6,647	8,674,335	5,160	6,145,560	5,324	5,009,884	4,427	3,948,884
West Highlands, Moray Firth & North Coast	704	998,272	558	728,190	717	853,947	468	440,388	527	470,084
All Scotland	7,732	10,963,976	8,232	10,742,760	6,874	8,186,934	6,699	6,303,759	5,661	5,049,612

Footnote – Figures for Argyll & Clyde and the West Highlands, Moray Firth & the North Coast have been merged due to commercial confidentiality. Average prices (real) have been adjusted for inflation based on 2020 price estimates.

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

Scottish Marine Region	2011		2012		2013		2014		2015	
	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	2,155	1,012,850	1,837	753,170	1,172	433,640	1,549	573,130	1,884	810,120
Clyde	480	225,600	485	198,850	331	122,470	404	149,480	249	107,070
Orkney Islands	0	0	0	0	0	0	0	0	0	0
Outer Hebrides	15	7,050	46	18,860	19	7,030	26	9,620	4	1,720
Shetland Isles	25	11,750	15	6,150	0	0	0	0	0	0
West Highlands & North Coast	461	216,670	323	132,430	369	136,530	1,413	522,810	556	239,080
All Scotland	3,136	1,473,920	2,706	1,109,460	1,891	699,670	3,392	1,255,040	2,693	1,157,990

Scottish Marine Region	2016		2017		2018		2019		2020	
	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	1,774	762,820	2,857	1,228,510	1,672	652,080	2,274	795,900	1,002	330,660
Clyde	369	158,670	229	98,470	304	118,560	165	57,750	140	46,200
Orkney Islands	0	0	0	0	0	0	0	0	2	660
Outer Hebrides	70	30,100	149	64,070	268	104,520	411	143,850	85	28,050
Shetland Isles	0	0	0	0	0	0	0	0	75	24,750
West Highlands & North Coast	1,321	568,030	1,799	773,570	1,787	696,930	1,760	616,000	1,634	539,220
All Scotland	3,534	1,519,620	5,034	2,164,620	4,031	1,572,090	4,610	1,613,500	2,938	969,540

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 2020 price estimates.

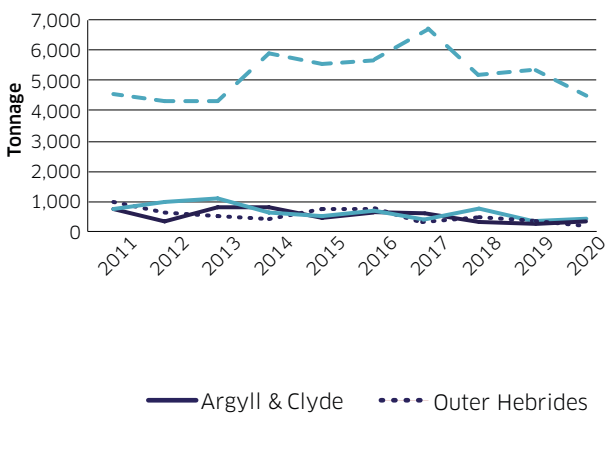
Other Scottish Shellfish Production (Number of Shells and Value)

Species	2011		2012		2013		2014		2015	
	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	350	164,500	317	221,900	260	176,800	242	162,140	200	132,000
Queen Scallop	27	3,240	10	1,300	33	5,610	18	3,060	33	3,960
Scallop	78	105,300	58	74,820	40	58,400	48	69,120	30	62,400
All Scotland	455	273,040	385	298,020	333	240,810	308	234,320	263	198,360

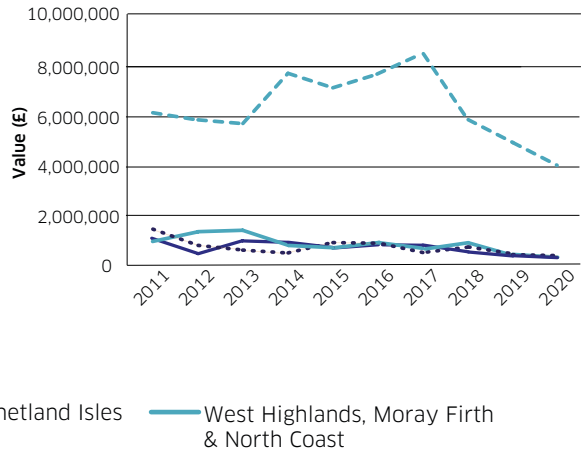
Species	2016		2017		2018		2019		2020	
	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)
Native Oyster	201	130,650	200	128,000	142	89,460	103	62,830	75	45,000
Queen Scallop	155	20,150	273	35,490	18	2,520	100	2,340	0.5	65
Scallop	35	77,350	47	92,120	31	59,210	26	48,880	19	44,080
All Scotland	391	228,150	520	255,610	191	151,190	229	114,050	95	89,145

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 2020 price estimates.

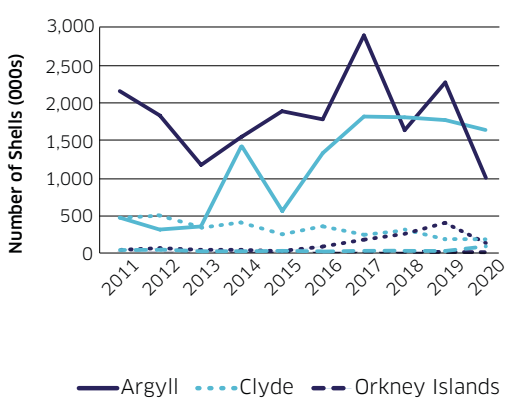
Mussel Production by Scottish Marine Region



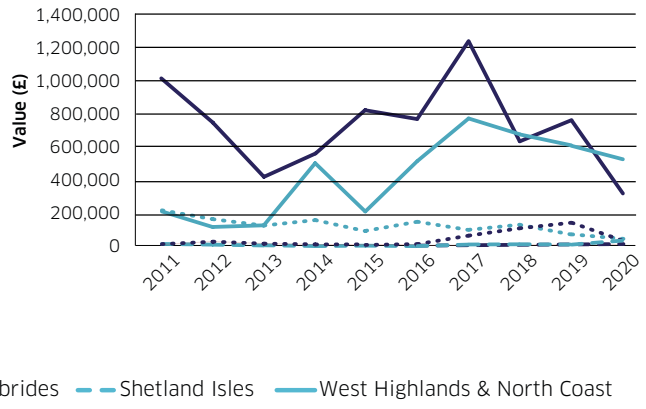
Mussel Production Value (£) by Scottish Marine Region



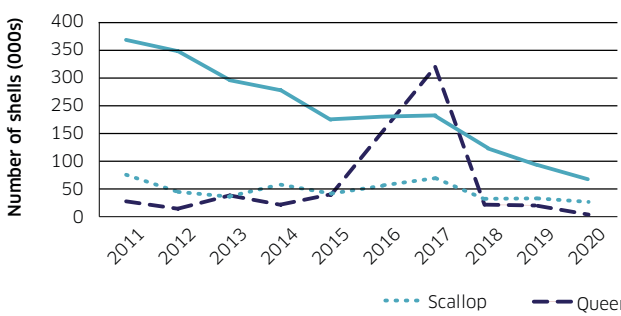
Pacific Oyster Production by Scottish Marine Region



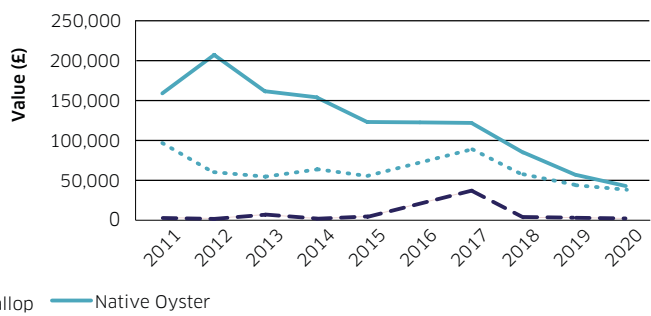
Pacific Oyster Production Value (£) by Scottish Marine Region



Other Scottish Shellfish Production

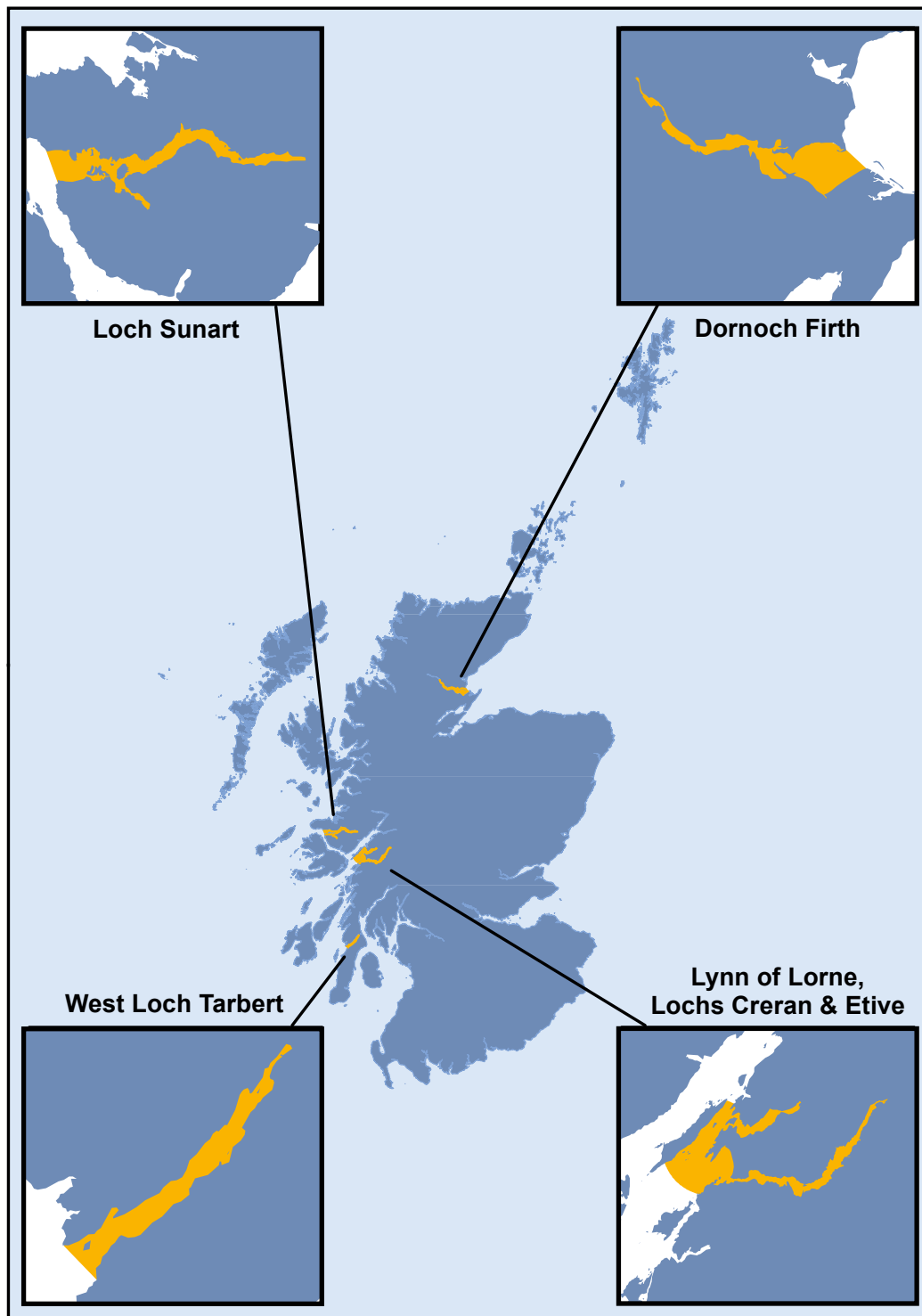


Other Scottish Shellfish Production Value (£)



// 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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