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Marine Scotland Science

Scottish Shellfish Farm Production Survey 2021

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science

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// Introduction to the year 2021 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 Joanne Murphy, Sandy Murray, Keith Mutch, Edward Noble, Ronald Smith, Stuart Wallace and Andrea Warwick for their contributions to the production of this report.

Production survey questionnaires were sent to 120 businesses registered as active during 2021 (*see* Appendix 1, page 17). During 2021, three businesses became authorised and nine businesses rescinded their authorisation. Production figures for 2020 have been updated where 2019 figures had been substituted for the 2020 report. This was due to the COVID-19 pandemic impacting on the supply of some data. For the 2021 survey 100% returns were received from businesses.

The survey showed that, of the 120 businesses authorised at the end of 2021, 69 recorded sales during that year. These 120 authorised businesses farmed 309 active sites, of which 165 (53%) placed shellfish on the market. Shellfish production by business and site is presented.

LA Munro
June 2022

// Production

The survey reports that the shellfish species cultivated in Scottish waters in 2021 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 2021 production data for each species by region are given in Table 1.

Table 1
Scottish shellfish production by region, 2021.

Region	Mussel		Pacific oyster		Native oyster		Queen		Scallop	
	(tonnes)		(000s)		(000s)		(000s)		(000s)	
	Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing	Table	On-growing
Highland	854	241	2,097	2,200	1	3	0.5	0	27	0
Orkney	0	0	28	0	0	30	0	0	0	0
Shetland	6,850	2,302	0	0	0	0	0	0	0	0
Strathclyde	497	710	2,345	1,328	7	8	0	0	0	0
Western Isles	389	0	383	0	0	0	0	0	0	0
All Scotland	8,590	3,253	4,853	3,528	8	41	0.5	0	27	0
Weight (Tonnes)	8,590	3,253	388		<1		<1		3	

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 2012-2021.

For the table	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	% change 20-21
Pacific oyster (000s)	2,706	1,891	3,392	2,693	3,534	5,034	4,031	4,393	2,863	4,853	70
Native oyster (000s)	317	260	242	200	201	200	142	103	35	8	-77
Queen (000s)	9	33	18	33	155	273	18	18	0.5	0.5	0
Scallop (000s)	58	40	48	30	35	47	31	26	19	27	42
Mussel (tonnes)	6,277	6,757	7,683	7,270	7,732	8,232	6,874	6,699	5,661	8,590	52

For on-growing	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	% change 20-21
Pacific oyster (000s)	3,190	6,216	6,792	5,864	4,584	3,849	4,240	2,405	1,663	3,528	>100
Native oyster (000s)	677	1,015	749	13	323	481	344	327	10	41	>100
Queen (000s)	0	1,490	500	900	17	300	0	0	0	0	0
Scallop (000s)	16	1,470	136	49	23	9	4	0	0	0	0
Mussel (tonnes)	309	1,281	1,263	1,841	2,619	4,437	2,137	3,493	4,127	3,253	-21

Mussel production, for the table, increased by 52% in 2021 (*see* figure 1) to 8,590 tonnes. This is the highest level of mussel production recorded in Scotland. The greatest regional contribution to mussel production was from Shetland, accounting for 6,850 tonnes (80%) of Scotland's total. Pacific oyster production increased by 70% from 2020. The production of farmed scallops increased by 42% while production of native oysters decreased by 77%. There was a very small amount of queen scallop production during 2021 as the main producer reported no production during 2021 due to impacts from the COVID-19 pandemic. 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, pandemic restrictions and fluctuations in market prices.

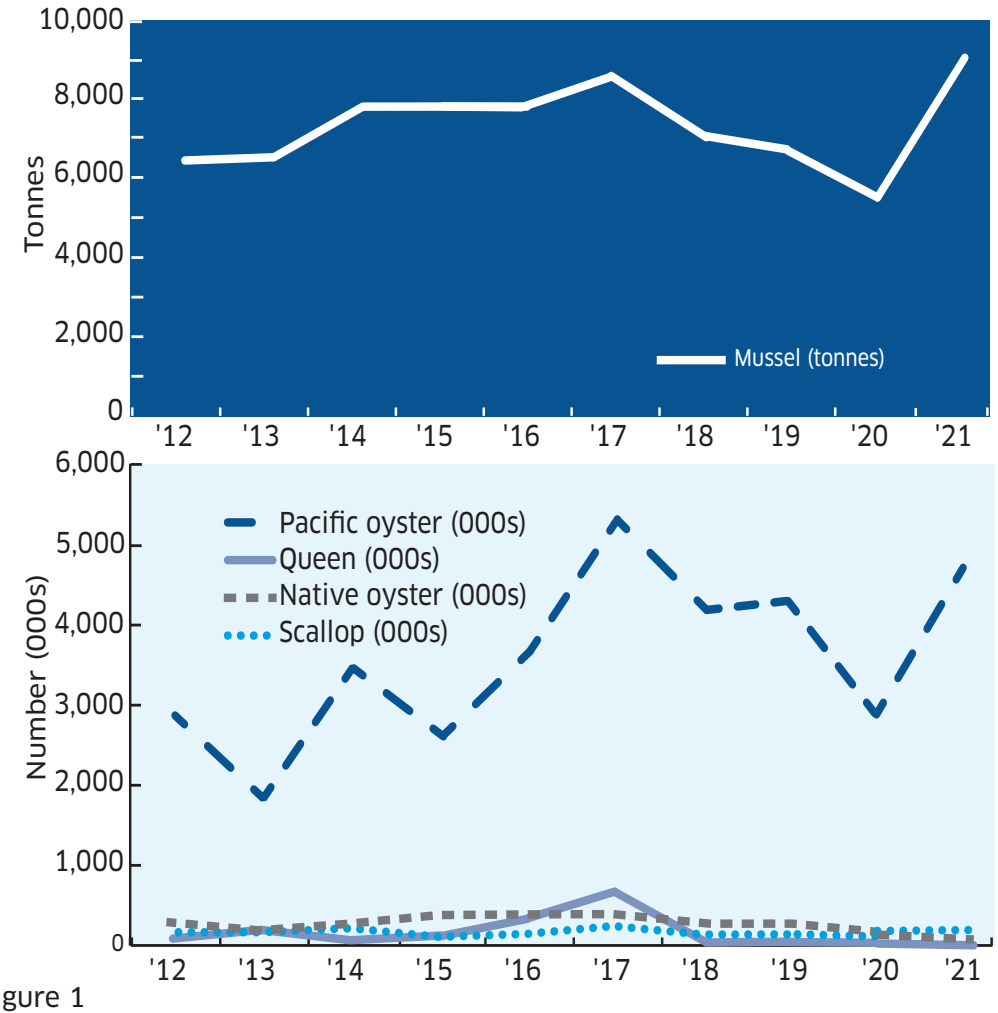


Figure 1
Table production by species 2012-2021.

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 £0.37 per shell; native oyster, £0.60 per shell; scallop, £2.31 per shell; queen scallop, £0.13 per shell and mussel £916 per tonne. The value of the table trade is estimated from the production figures shown in Table 1 (*see* page 2).

Mussel:	£7.9 million	Pacific oyster:	£1.8 million
Native oyster:	£0.005 million	Scallop:	£0.06 million
Queen:	>£0.0001 million		

In 2021, the total value at first sale for all species was calculated at approximately £9.8 million, an increase of 61% from the £6.1 million estimated in 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 2021, 165 sites produced shellfish for sale, a decrease of 1% from 2020, with 61% of these sites located in Shetland.

Table 3
Authorised and active businesses 2012-2021.

Number of Businesses										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Active	153	142	144	144	138	132	130	129	125	120

Table 4
Active and producing farm sites by region 2021.

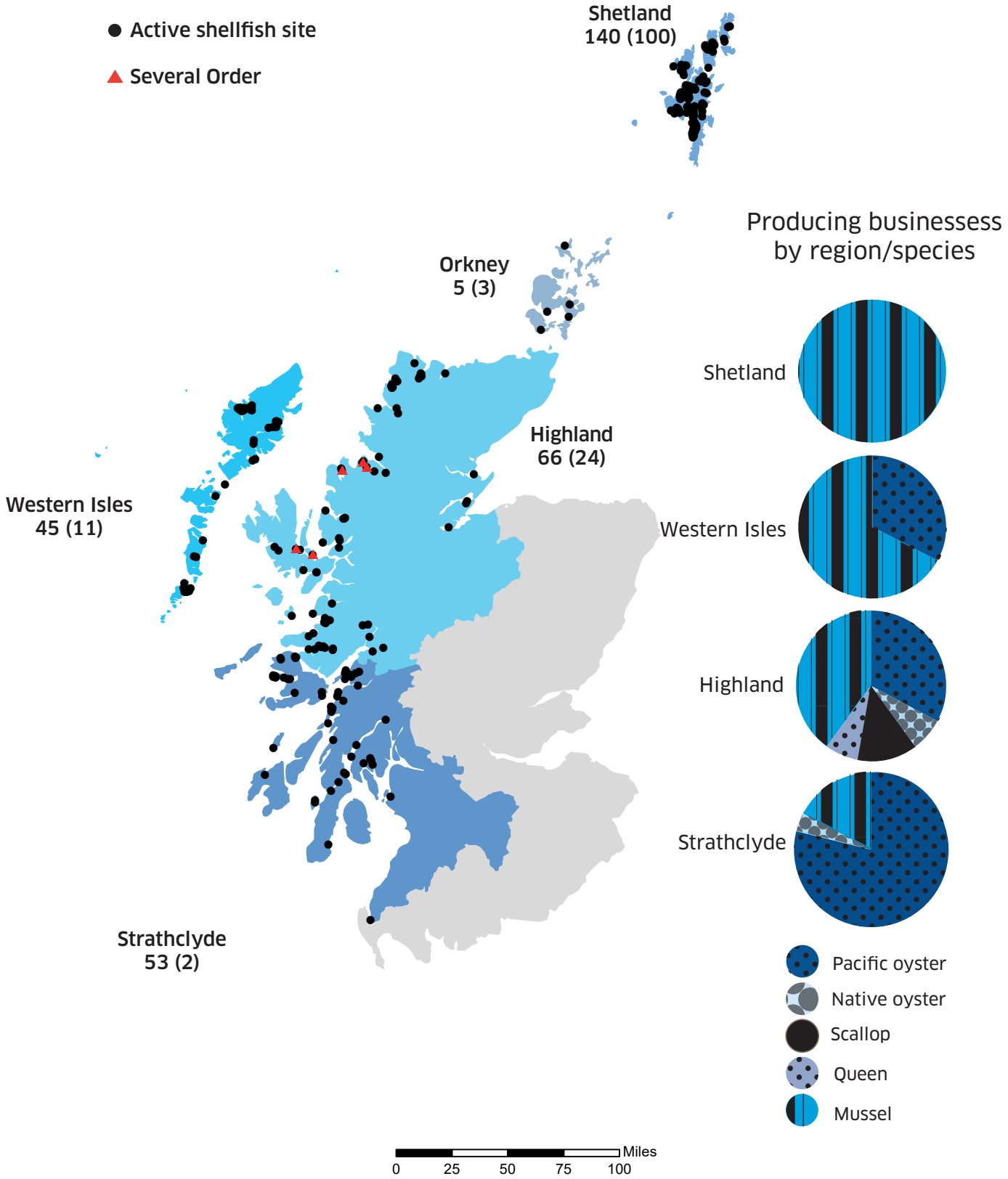
Region						
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Sites						
Active	66	5	140	53	45	309
Producing	24	3	100	27	11	165

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 2021 (number producing given in brackets) and number of producing businesses by region/species.



There were five Several Orders in place for scallop fisheries in 2021 (*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 2021.

a) Production for the table

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	5	2	0	19	2	28
Native oyster	1	0	0	1	0	2
Scallop	2	0	0	0	0	2
Queen	1	0	0	0	0	1
Mussel	6	0	21	4	4	35
Total	**15**	**2**	**21**	**24**	**6**	**68**

b) Production for on-growing to other producers

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	1	0	0	3	0	4
Native oyster	1	1	0	1	0	3
Scallop	0	0	0	0	0	0
Queen	0	0	0	0	0	0
Mussel	2	0	14	1	0	17
Total	**4**	**1**	**14**	**5**	**0**	**24**

c) No production, actively on-growing or fallow

	Region					
	Highland	Orkney	Shetland	Strathclyde	Western Isles	All Scotland
Pacific oyster	12	0	1	10	2	25
Native oyster	4	0	1	2	0	7
Scallop	6	0	0	3	0	9
Queen	2	0	0	2	0	4
Mussel	13	1	2	6	5	27
Total	**37**	**1**	**4**	**23**	**7**	**72**

Business production levels by species are shown in Table 6. There were 11 businesses producing more than 200 tonnes of mussels, this was an increase of one from 2020. These 11 businesses produced 84% of the total mussel production in Scotland. There were seven businesses that produced more than 200,000 Pacific oysters. The production from these businesses accounted for 82% of the Scottish Pacific oyster total.

Table 6
Business production levels by species 2021.

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	1	4	2	0	1	1	0	0	0	3	7	**28**
Native oyster (000s)	2	0	0	0	0	0	0	0	0	0	0	0	**2**
Scallop (000s)	0	2	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)	8	3	2	2	1	0	0	0	1	0	7	11	**35**

// 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. 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. As a result of talks between the Association of Scottish Shellfish Growers and Marine Scotland 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 219 (100%) of the sites authorised for mussel production in 2021. One hundred and twelve (51%) of these were spat collection sites, 58 (52%) 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 - 2021.

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
2021	219	219	112	58

// Employment

The industry employed 141 full-time and 162 part-time and casual workers during 2021. The number of full-time staff remained the same while the number of part-time and casual employees increased by three compared with 2020. The regional breakdown of employment is given in Table 8. The number of people employed by the shellfish farming industry in Scotland increased by 1% from the 2020 total of 300.

Table 8
Regional employment 2021.

Region	Businesses	Staff						
		Full-time Male	Full-time Female	Part-time Male	Part-time Female	Casual Male	Casual Female	Total
Highland	41	16	2	22	6	10	5	61
Orkney	4	5	3	0	1	2	3	14
Shetland	24	54	1	14	12	16	4	101
Strathclyde	40	37	7	34	8	15	3	104
Western Isles	11	15	1	7	0	0	0	23
Scotland	120	127	14	77	27	43	15	303

// 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 23) 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 24-27).

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

A risk based surveillance programme targeting 37 shellfish site inspections was undertaken during 2021. 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 15 sites. The number of site inspections was reduced in 2021 due to COVID-19 travel restrictions in Scotland.

Most of the reported mortalities during 2021 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 17-22).

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 stock in Scotland's waters (https://www.gov.scot/policies/fish-health-inspectorate/movement-restrictions-on-fish-and-shellfish/).

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.

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

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

(*see* Appendix 3, page 28 for maps of areas under movement restrictions for *Bonamia ostreae* in Scotland)

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

- Essex, Kent and Suffolk (Felixstowe to Ramsgate)
- Butley Creek, Suffolk;
- Poole Harbour in Dorset;
- the River Teign in Devon.

Movements and imports 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 and are required to be accompanied by a health certificate. 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.

In 2021, 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.

// Summary

- In 2021, 8,590 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. Mussel production increased by 52% and Pacific oyster production increased by 70% during 2021;
- During 2021, over 3.5 million Pacific oyster shells were produced for on-growing;
- There was a very small amount of queen scallop production during 2021 with the biggest producer reporting no production due to the COVID-19 pandemic. There was an increase in scallop production, from 19,000 to 27,000 shells, since 2020;
- There was a decrease in the production of native oyster from 35,000 to 8,000 shells in 2021.
- The number of mussel producing sites with sufficient spat settlement for production purposes increased from 48 to 58.
- Employment levels increased by 1% from the previous year, with 303 full, part-time and casual staff being employed during 2021.
- The Scottish shellfish farming industry is estimated to be worth approximately £9.8 million at first sale value, an increase of 61% on the 2020 figure.
- Active surveillance for bonamiasis, marteiliasis and OsHV-1 µvar continued in 2021;
- For shellfish health purposes, 37 out of 309 sites were inspected during 2021 as part of a risk based surveillance programme. Further details 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 in Highland region, West Loch Tarbert and Lynn of Lorne, Loch Creran and Loch Etive in Strathclyde region;

- Great Britain maintained disease free status with regard to bonamiasis, marteiliasis and OsHV-1 µvar, 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 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 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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MS.productionsurvey@gov.scot

December 2021

ANNUAL RETURNS OF SHELLFISH FARM PRODUCTION – 2021

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 2021.

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 2021 report will be available in May 2022. 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 2022**. I would also like to remind you that the Scottish Shellfish Farm Production Survey 2020 is available on the Marine Scotland website, https://www.gov.scot/publications/scottish-shellfish-farm-production-survey-2020/.

Kind regards,

Lorna Munro
Marine Scotland Science

Marine Laboratory, 375 Victoria Road,
Aberdeen, AB11 9DB
www.gov.scot/marinescotland

marinescotland science

gov.scot

SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2021

FORM (a) – BUSINESS PRODUCTION

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

Please indicate production of shellfish for business in 2021 and an estimate of production in 2022 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 2021				PRODUCTION OF SHELLFISH FOR 2022 (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*
Mussel *M. edulis*								
Pacific oyster *C. gigas*								
Native Oyster *O. edulis*								
Scallop *P. maximus*								
Queen *A. opercularis*								
Lobster								
Other (Specify)								

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

Please state the number of persons employed by your business in 2021:

Full time male: Full time female:

Part time male: Part time female:

Casual male: Casual female

Other/Prefer not to say/Unknown:

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 2022.

Marine Laboratory, 375 Victoria Road,
Aberdeen, AB11 9DB
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SCOTTISH SHELLFISH FARM PRODUCTION SURVEY 2021

FORM (b) – SITE PRODUCTION, SIZE and MOVEMENTS

Site No./Site Name: .....

SPECIES	PRODUCTION OF SHELLFISH FOR 2021 (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 *A. opercularis*						
Lobster						
Other (specify)						

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

SPECIES	SIZE OF PRODUCTION FACILITIES IN 2021			
	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 2021 (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 2021			
	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 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

2021 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 2021: Please provide your total business production for 2021 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 2022 (estimate): Please provide estimates of production for 2022 "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 2021: Please provide your total site production for 2021 "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 2021 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

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Size of production facilities in 2021 (molluscs): Please provide the size of the production facilities for the respective species cultured. If you cultured shellfish species in 2021 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 2021 (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 2021 (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**.

2021 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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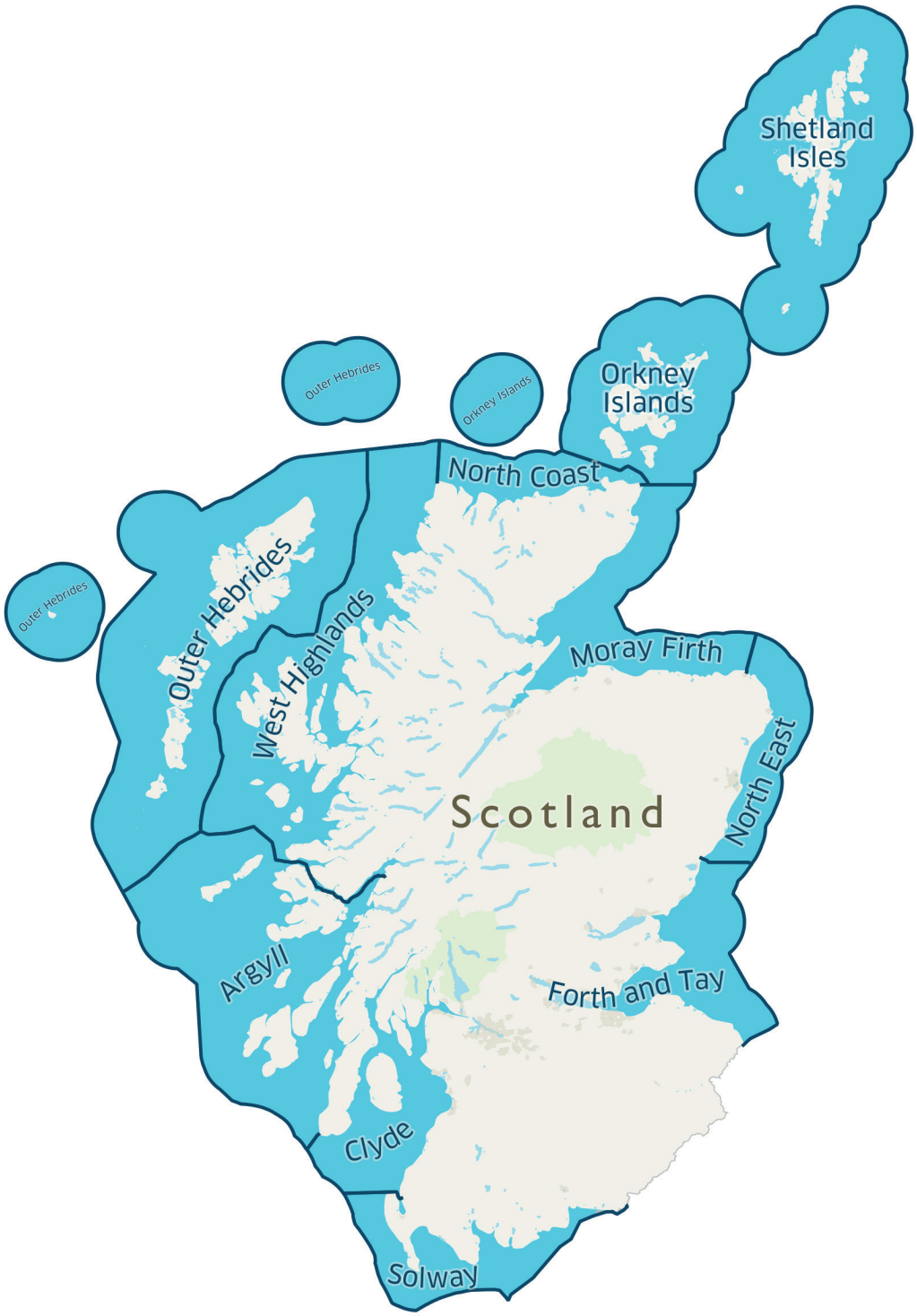
// Appendix 2

Scottish marine regions



Mussel Production by Scottish Marine Region (Tonnage and Value)

	2012		2013		2014	
Scottish Marine Region	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll & Clyde	323	469,642	770	1,101,870	755	1,056,245
Outer Hebrides	629	914,566	528	755,568	411	574,989
Shetland Isles	4,340	6,310,360	4,337	6,206,247	5,919	8,280,681
West Highlands, Moray Firth & North Coast	985	1,432,190	1,122	1,605,582	598	836,602
All Scotland	**6,277**	**9,126,758**	**6,757**	**9,669,267**	**7,683**	**10,748,517**

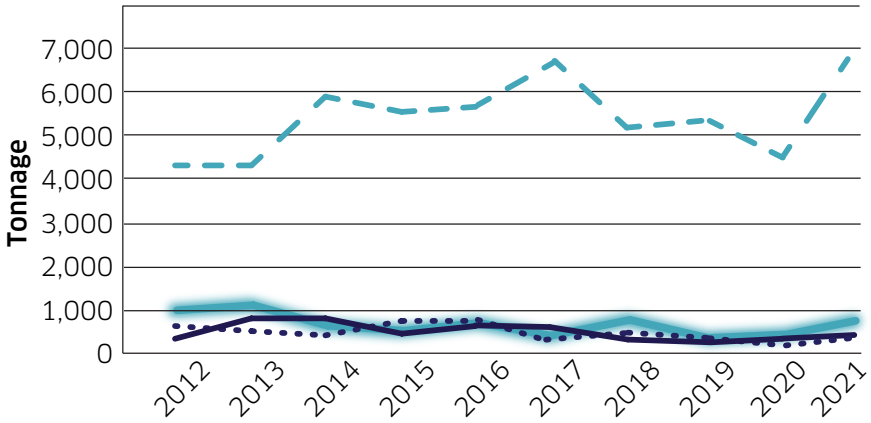
	2015		2016		2017	
Scottish Marine Region	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll & Clyde	491	688,873	615	915,735	631	866,994
Outer Hebrides	718	1,007,354	727	1,082,503	396	544,104
Shetland Isles	5,565	7,807,695	5,686	8,466,454	6,647	9,132,978
West Highlands, Moray Firth & North Coast	496	695,888	704	1,048,256	558	766,692
All Scotland	**7,270**	**10,199,810**	**7,732**	**11,512,948**	**8,232**	**11,310,768**

	2018		2019		2020	
Scottish Marine Region	Tonnage	Value £	Tonnage	Value £	Tonnage	Value £
Argyll & Clyde	442	554,268	363	360,822	425	400,350
Outer Hebrides	555	695,970	544	540,736	282	265,644
Shetland Isles	5,160	6,470,640	5,324	5,292,056	4,427	4,170,234
West Highlands, Moray Firth & North Coast	717	899,118	468	465,192	527	496,434
All Scotland	**6,874**	**8,619,996**	**6,699**	**6,658,806**	**5,661**	**5,332,662**

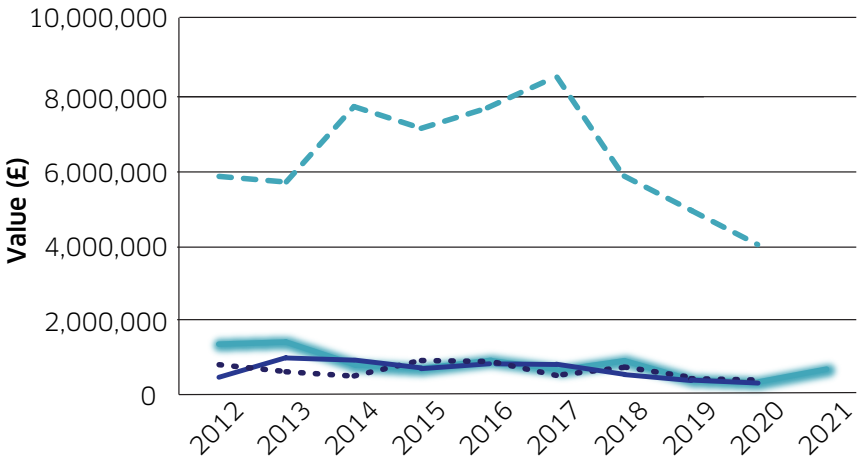
	2021	
Scottish Marine Region	Tonnage	Value £
Argyll & Clyde	497	455,252
Outer Hebrides	389	356,324
Shetland Isles	6,850	6,274,600
West Highlands, Moray Firth & North Coast	854	782,264
All Scotland	**8,590**	**7,868,440**

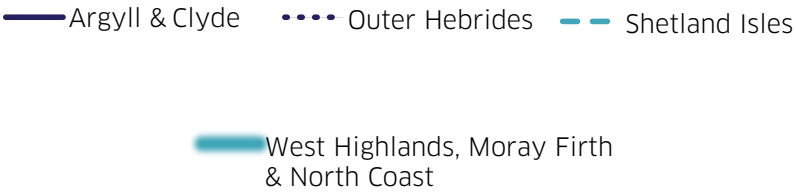
Footnote – Figures for Argyll & Clyde and the West Highlands, Moray Firth & the North Coast have been merged due to commercial confidentiality. Average prices (real) have been adjusted for inflation based on 2021 price estimates.

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)

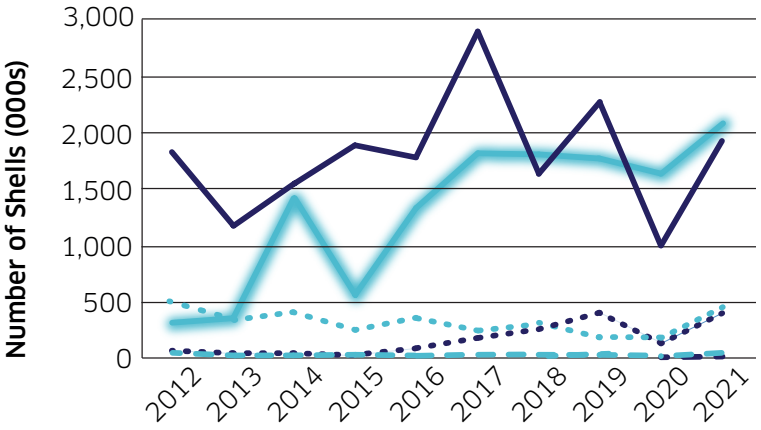
	2012		2013		2014		2015	
Scottish Marine Region	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £
Argyll	1,837	789,910	1,172	457,080	1,549	588,620	1,884	847,800
Clyde	485	208,550	331	129,090	404	153,520	249	112,050
Orkney Islands	0	0	0	0	0	0	0	0
Outer Hebrides	46	19,780	19	7,410	26	9,880	4	1,800
Shetland Isles	15	6,450	0	0	0	0	0	0
West Highlands & North Coast	**323**	**138,890**	**369**	**143,910**	**1,413**	**536,940**	**556**	**250,200**
All Scotland	**2,706**	**1,163,580**	**1,891**	**737,490**	**3,392**	**1,288,960**	**2,693**	**1,211,850**

	2016		2017		2018		2019	
Scottish Marine Region	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £
Argyll	1,774	798,300	2,857	1,285,650	1,672	685,520	2,274	841,380
Clyde	369	166,050	229	103,050	304	124,640	162	59,940
Orkney Islands	0	0	0	0	0	0	0	0
Outer Hebrides	70	31,500	149	67,050	268	109,880	411	152,070
Shetland Isles	0	0	0	0	0	0	0	0
West Highlands & North Coast	**1,321**	**594,450**	**1,799**	**809,550**	**1,787**	**732,670**	**1,546**	**572,020**
All Scotland	**3,534**	**1,590,300**	**5,034**	**2,265,300**	**4,031**	**1,652,710**	**4,393**	**1,625,410**

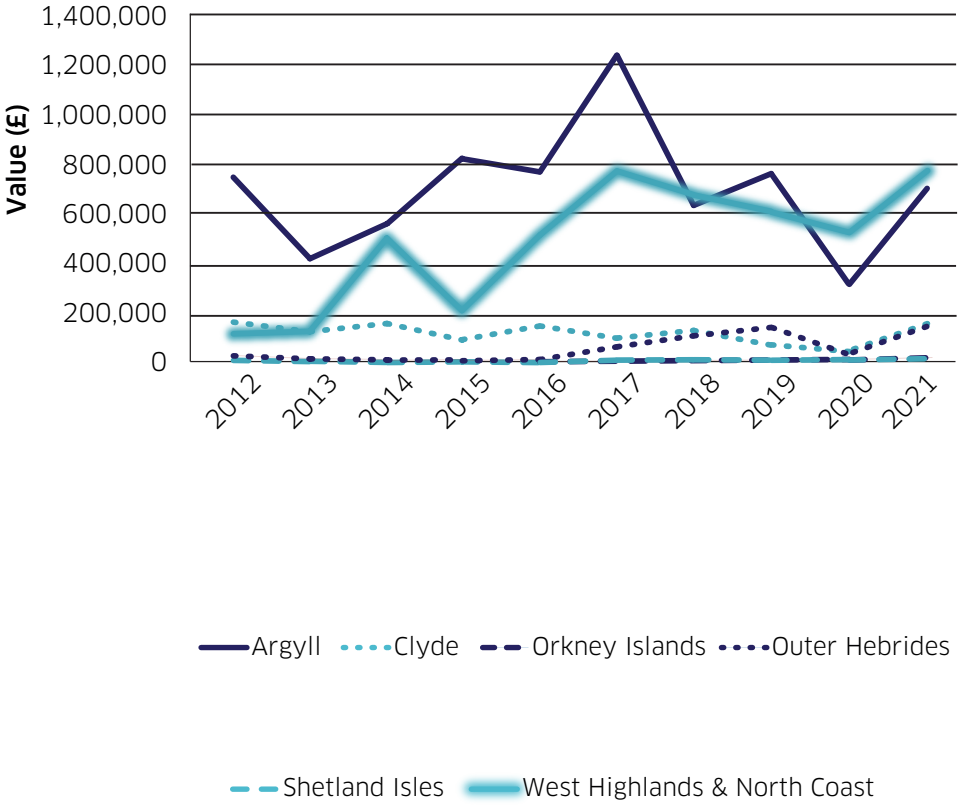
	2020		2021	
Scottish Marine Region	No. of Shells (000s)	Value £	No. of Shells (000s)	Value £
Argyll	1,002	350,700	1,929	713,730
Clyde	140	49,000	416	153,920
Orkney Islands	2	700	28	10,360
Outer Hebrides	85	29,750	383	141,710
Shetland Isles	0	0	0	0
West Highlands & North Coast	**1,634**	**571,900**	**2,097**	**775,890**
All Scotland	**2,863**	**1,002,050**	**4,853**	**1,795,610**

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 2021 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)

	2012		2013		2014	
Species	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)
Native Oyster	317	231,410	260	187,200	242	169,400
Queen Scallop	10	1,300	33	5,940	18	3,060
Scallop	58	78,300	40	61,600	48	72,000
All Scotland	**385**	**311,010**	**333**	**254,740**	**308**	**244,460**

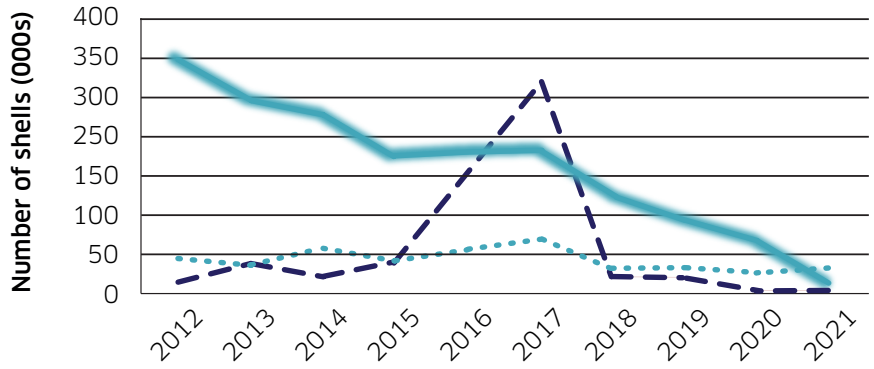
	2015		2016		2017	
Species	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)
Native Oyster	200	138,000	201	138,690	200	134,000
Queen Scallop	33	4,290	155	21,700	273	35,490
Scallop	30	65,400	35	81,550	47	96,820
All Scotland	**263**	**207,690**	**391**	**241,940**	**520**	**266,310**

	2018		2019		2020	
Species	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)	No. of Shells (000s)	Value (£)
Native Oyster	142	93,720	103	66,950	35	22,050
Queen Scallop	18	2,520	18	2,520	0.5	70
Scallop	31	62,620	26	51,740	19	46,550
All Scotland	**191**	**158,860**	**147**	**121,210**	**95**	**68,670**

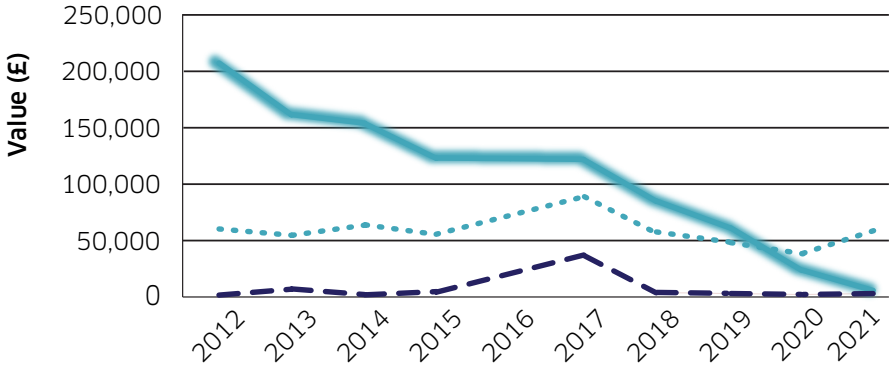
	2021	
Species	No. of Shells (000s)	Value (£)
Native Oyster	8	4,800
Queen Scallop	0.5	75
Scallop	27	62,370
All Scotland	**36**	**67,245**

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 2021 price estimates.

Other Scottish Shellfish Production



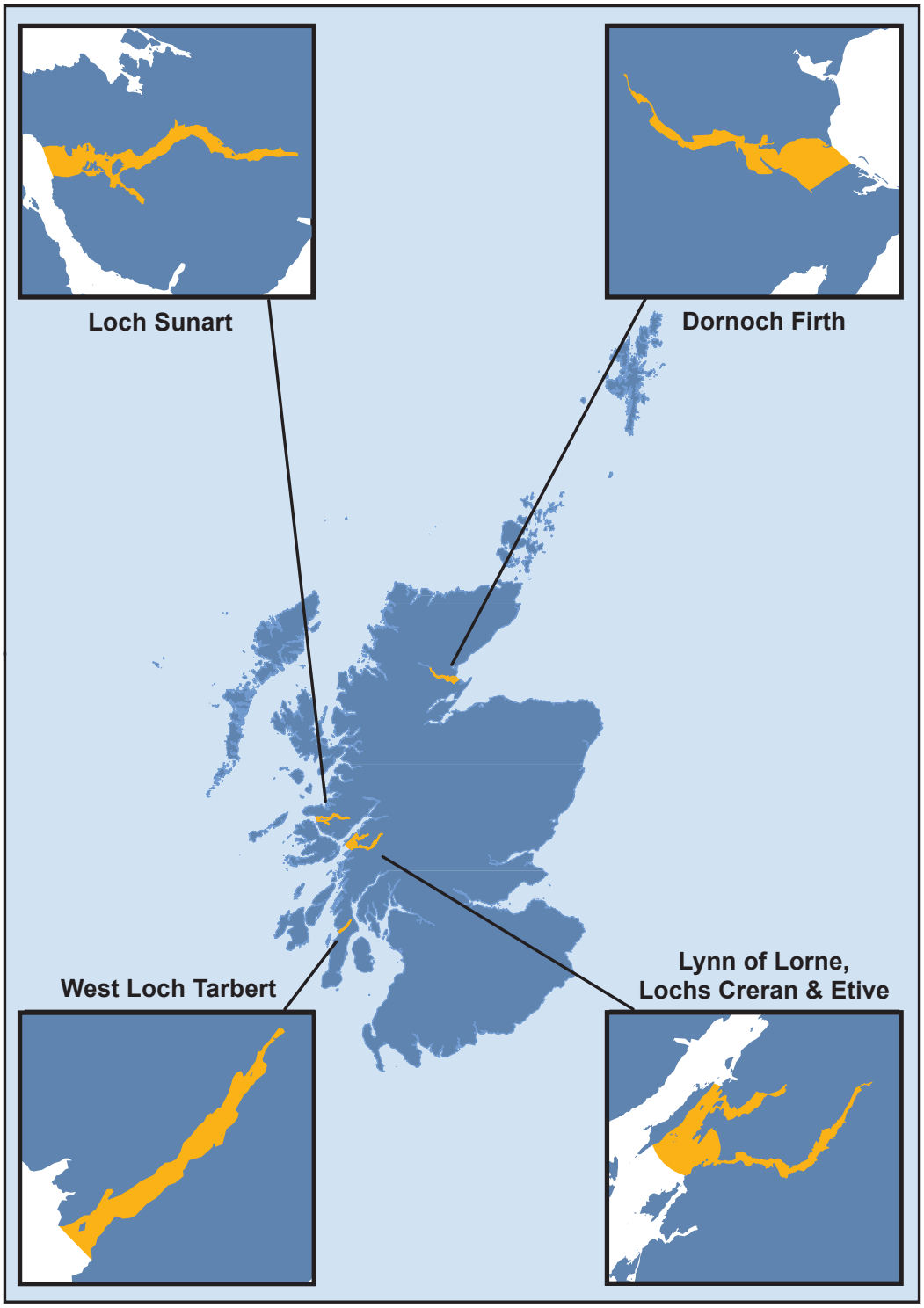
Other Scottish Shellfish Production Value (£)



Scallop Queen Scallop Native Oyster

// 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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