

Aquaculture



Key message

Atlantic salmon dominates marine aquaculture, with a production value of £878 million in 2018, 97% of total marine aquaculture value. Mussels are the main shellfish species produced accounting for 6,874 tonnes, 95% of shellfish production in 2018. Between 2013 and 2017, the aquaculture GVA increased by 58% to £354 million, with employment increasing by 20%.



Salmon farm in Loch Ailort. Photo by Daniel Stuart © Crown.

What, why and where?

Aquaculture is diverse and provides a range of seafood products:

- Finfish - salmon, rainbow trout, brown trout, halibut, wrasse and lumpfish
- Shellfish - mussels, Pacific oysters, native oysters, queen scallops and king scallops
- Seaweed (see separate [Seaweed Harvesting & Cultivation assessment](#)).

Marine based Scottish aquaculture is dominated by Atlantic salmon production by weight and value (accounting for around 97% by value in 2018). In 2017 Scottish salmon was Scotland and the UK's number one food export. Mussels, which filter about 2 - 3 litres of sea water per hour, are the main shellfish species produced (95% of

shellfish production in 2018). The 2018 aquaculture production was similar to 2011 for both Atlantic salmon and mussels (Figures 1 and 2).

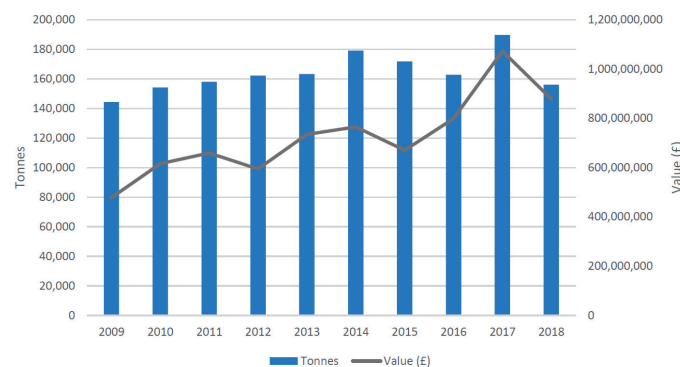


Figure 1: Atlantic salmon production and value (2009-2018), all Scotland. Source: Marine Scotland.

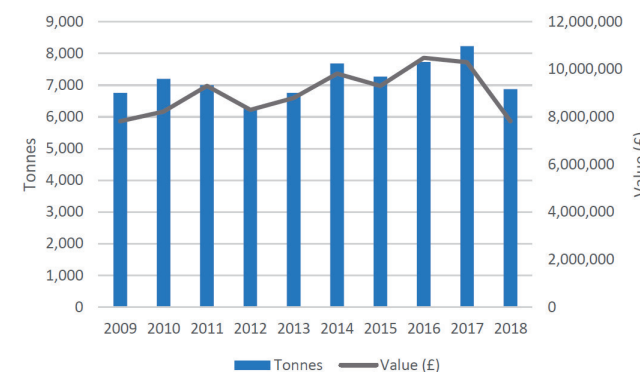


Figure 2: Mussel production and value (2009-2018), all Scotland. Source: Marine Scotland.

All farms must meet strict guidelines to ensure that the environmental effects are assessed and managed safely. Since 1 April 2007 all new fish and shellfish farm development has required planning permission under the [Town and Country Planning Marine Fish Farming \(Scotland\) Order 2007](#) from the relevant Planning Authority. Most finfish developments require to be screened on the need for an [Environmental Impact Assessment](#). Bivalve mollusc farming is categorised as one of the most environmentally benign methods of food production (SARF, 2014).

Areas of coastal waters are categorised on the basis of Marine Scotland predictive models to estimate environmental sensitivity of sea lochs and so aid the decision making in the location of sites. The [locational guidance](#) is updated regularly. The location of active aquaculture sites are shown in Figure 3 (finfish) and Figure 4 (shellfish). There is a continuing presumption against further marine finfish farm developments on the north and east coasts to safeguard migratory fish species.

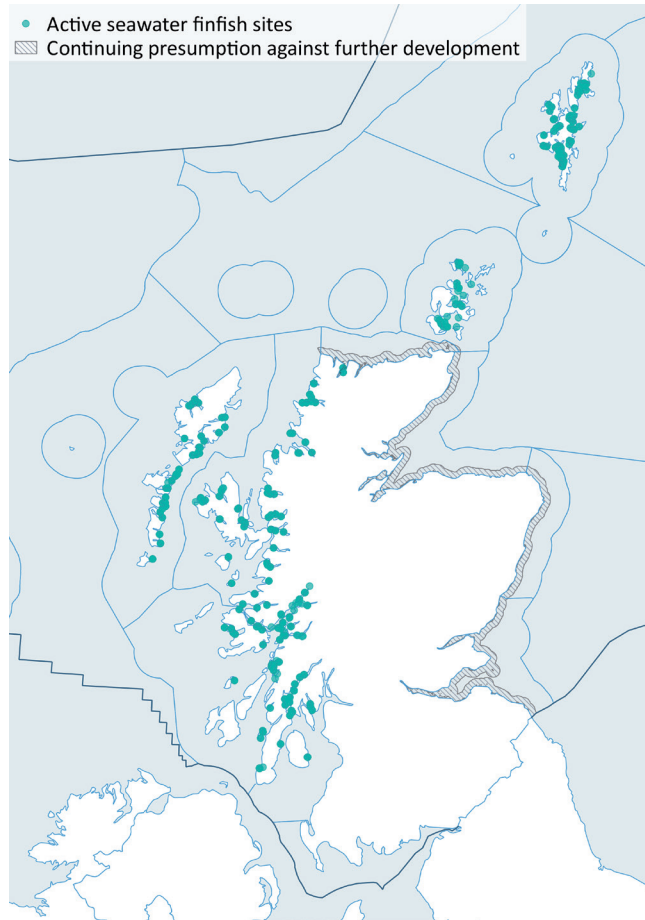


Figure 3:
Active aquaculture finfish sites November 2019 (showing Scottish Marine Regions). Source: Marine Scotland.
Note: Land based seawater tank facilities, used for research and development purposes, have been omitted.

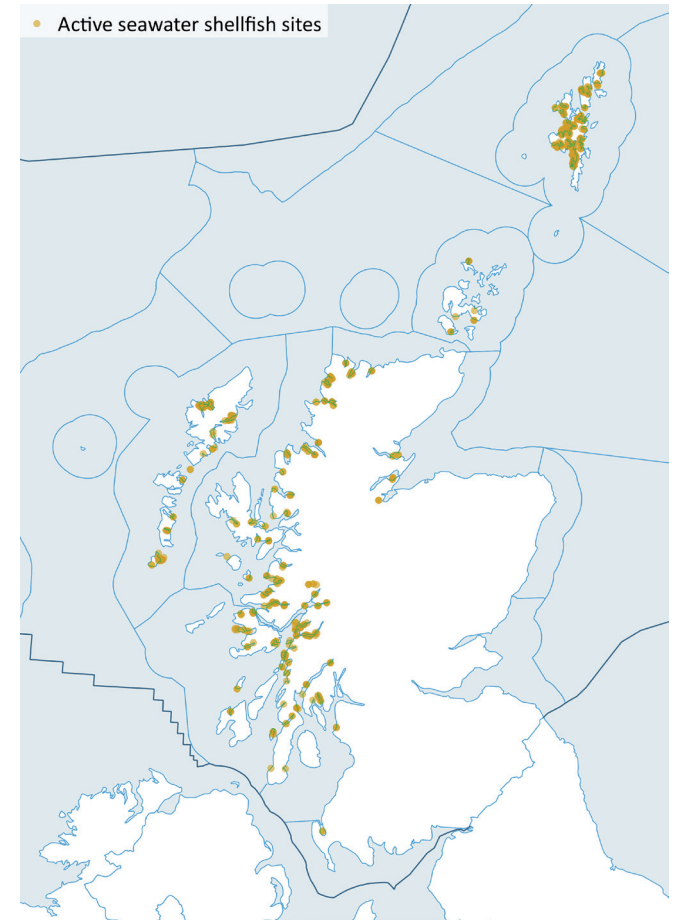


Figure 4:
Active aquaculture shellfish sites November 2019. (showing Scottish Marine Regions). Source: Marine Scotland.
Note: Land based seawater tank facilities, used for research and development purposes, have been omitted.

Contribution to the economy

While much of the Scottish aquaculture production is exported, aquaculture also makes an important contribution to food security.

Scotland's Marine Economic Statistics (Scottish Government, 2019c) reported that, in 2017, aquaculture generated £354 million in Gross Value Added (GVA), a 58% increase on the 2013 value of £224 million. The longer GVA term trend from 2008 to 2017 tripled from £110 million. GVA is the value of goods and services produced minus the cost of raw materials and other inputs used to produce them. Figure 5 shows that GVA from aquaculture can be volatile from year-to-year, with impacts such as disease challenges in 2015 resulting in lower turnover and higher costs. From 2008 to 2017 aquaculture employment increased by 23%

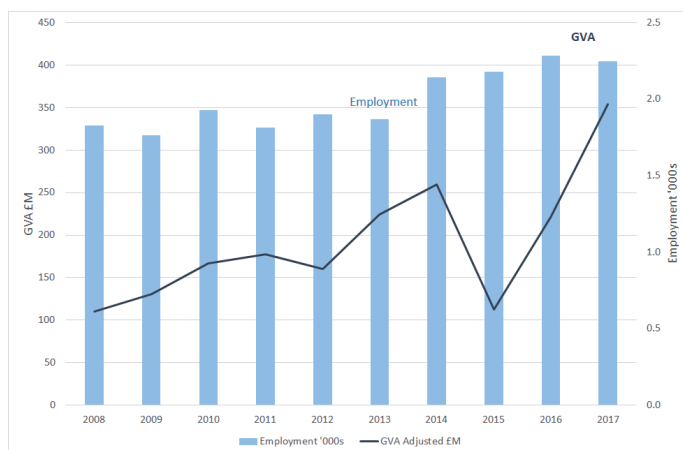


Figure 5: Aquaculture - employment and GVA (2017 prices), 2008 to 2017. Source: Scotland's Marine Economic Statistics.
Note: The economic statistics lag behind the production statistics. The most recent GVA is reported for 2017 while the production volume and farm gate value are reported for 2018.

Scotland's Marine Economic Statistics and figure 5 relate to the direct contributions of relevant activities to Scotland's economy and do not include activities of related supply chains. Scotland's aquaculture broader supply chain includes upstream businesses supplying farms with inputs such as feed and equipment, and downstream processing and handling businesses, including the retail and food service sectors. Impacts across the supply chain have been estimated to be around £620M in GVA and 12,000 jobs across the Scottish economy.

Examples of socio-economic effects

- Significant food exports and food security.
- Employment in remote and rural coastal communities.
- Knowledge transfer from university to industry.
- Investment in community projects.
- Potentially restricting sea bed use by other users.
- Infrastructure may have a visual impact on coastal locations.
- Disease and escapes may have financial consequences.

Pressures on the environment

An OSPAR agreed list of marine pressures is used to help assessments of human activities in the marine environment. The [marine pressure list](#) has been adapted for use in Scotland via work on the [Feature Activity Sensitivity Tool \(FeAST\)](#). Aquaculture

(finfish and shellfish) activities can be associated with 25 marine pressures - please read the pressure descriptions and benchmarks for further detail.

Forward look

The Scottish Government supports the [Aquaculture Industry Leadership Group](#) as it seeks to deliver the industry's [growth strategy](#) by 2030.

As with any sector that aspires to grow sustainably, there remain challenges, many of which for aquaculture are directly associated with the environment in which it works. There are other barriers to overcome such as ensuring a future workforce that is skilled and having appropriate infrastructures primarily in Rural Scotland such as housing, childcare and education.







The industry hopes to double production and value to the economy by 2030, including significantly increasing the number of jobs across the supply chain by 2030 (Scotland Food and Drink, 2016).

Global marine ecosystems will be affected by climate change (warming of the seas) and ocean acidification and the aquaculture industry will need to adapt. Scotland's 10-year Farmed Fish Health Framework Scottish Government (2018) provides a strategic, evidence based approach to the short and long term improvement of fish health. A subgroup has been established under the Framework to consider climate change and ocean acidification and its potential impacts.




Economic trend assessment

The regional trends are based on the farm gate value of the aquaculture production. Figures for SMRs have been merged due to commercial confidentiality and the combinations of SMR vary according to fish species. Average prices (real) have been adjusted for inflation based on 2018 price estimates to enable comparisons to be made.



















Change in farm gate value of aquaculture production between 2014 and 2018, by SMR or group of SMRs.

Atlantic salmon production by Scottish Marine Region (by value)	
	Change over last 5 years 2014 to 2018
Scottish Marine Region	Trend
Argyll & Clyde	
Orkney Islands	
Outer Hebrides	
Shetland Isles	
North Coast & West Highlands	
All Scotland	

Mussel production by Scottish Marine Region (by value)	
	Change over last 5 years 2014 to 2018
Scottish Marine Region	Trend
Argyll & Clyde	
Outer Hebrides	
Shetland Isles	
West Highlands, Moray Firth & North Coast	
All Scotland	

Pacific oyster production by Scottish Marine Region (by value)	
	Change over last 5 years 2014 to 2018
Scottish Marine Region	Trend
Argyll	
Clyde	
Outer Hebrides	
West Highlands & North Coast	
All Scotland	

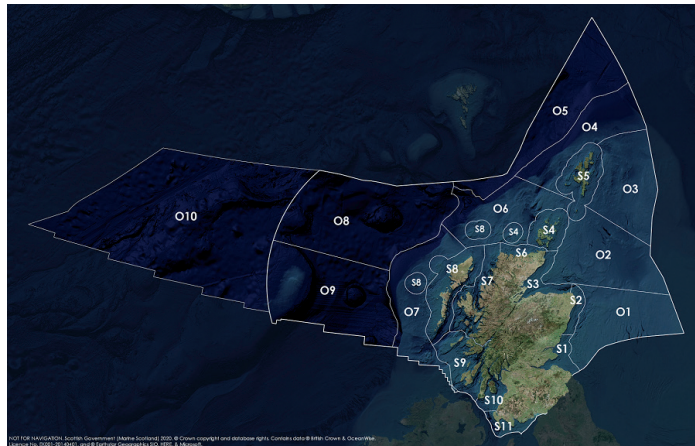
Status and trend assessment legend

Status assessment (for Clean and safe, Healthy and biologically diverse assessments)		Trend assessment (for Clean and safe, Healthy and biologically diverse and Productive assessments)	
	Many concerns		No / little change
	Some concerns		Increasing
	Few or no concerns		Decreasing
	Few or no concerns, but some local concerns		No trend discernible
	Few or no concerns, but many local concerns		All trends
	Some concerns, but many local concerns	Confidence assessment	
	Lack of evidence / robust assessment criteria	Symbol	Confidence rating
	Lack of regional evidence / robust assessment criteria, but no or few concerns for some local areas		Low
	Lack of regional evidence / robust assessment criteria, but some concerns for some local areas		Medium
	Lack of regional evidence / robust assessment criteria, but many concerns for some local areas		High

Overall confidence

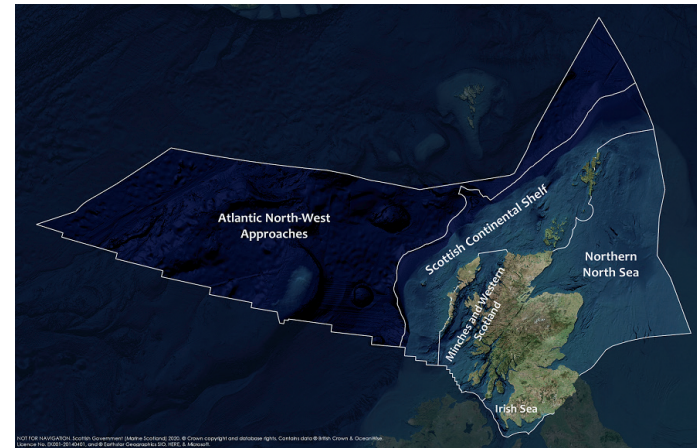


Assessment regions

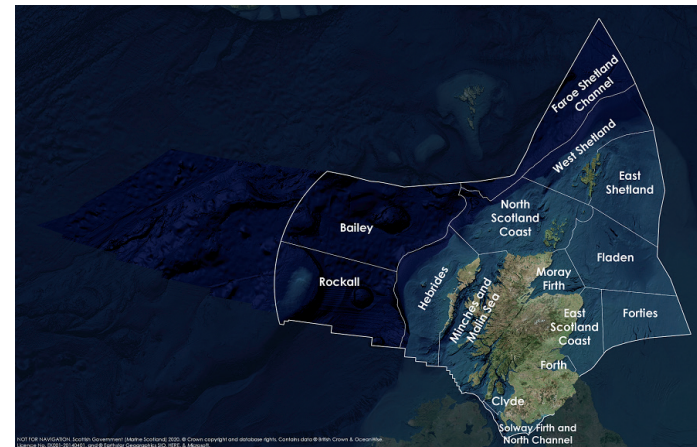


The Scottish Marine Regions (SMRs; S1 - S11) and the Scottish Offshore Marine Regions (OMRs, O1 - O10)

Key: S1, Forth and Tay; S2, North East; S3, Moray Firth; S4 Orkney Islands; S5, Shetland Isles; S6, North Coast; S7, West Highlands; S8, Outer Hebrides; S9, Argyll; S10, Clyde; S11, Solway; O1, Long Forties; O2, Fladen and Moray Firth Offshore; O3, East Shetland Shelf; O4, North and West Shetland Shelf; O5, Faroe-Shetland Channel; O6, North Scotland Shelf; O7, Hebrides Shelf; O8, Bailey; O9, Rockall; O10, Hatton.



Biogeographic, Charting Progress 2 (CP2) Regions. These have been used as the assessment areas for hazardous substances.



Scottish Sea Areas as used in Scotland's Marine Atlas 2011. These are sub divisions of the biogeographic, or Charting Progress 2 (CP2), Regions.