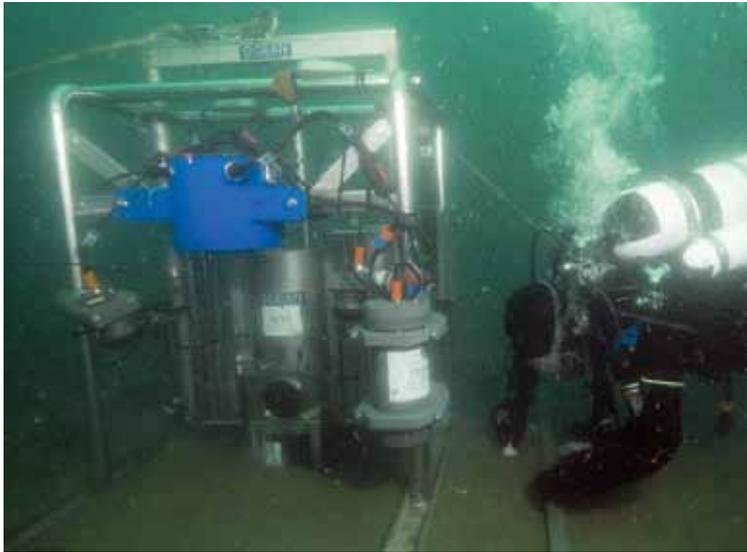


MARINE SCIENCE

Highlands and Islands
of Scotland



Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean



Benthic sampling

The Highlands and Islands of Scotland are rich in marine resources. They underpin a vibrant and growing economic cluster based on marine science. This includes innovative enterprises, world-class research, excellent locations and facilities, a skilled talent pool, strong government support for business, and close links between policymakers, industry and academia.

SECTOR STRENGTHS

Within the region, the breadth of marine science expertise is significant. The aquaculture industry is supported by world-leading commercial and academic research activity, the largely underutilised marine environment is supporting a growing bio-economy whilst the wind, wave and tidal resource has put the region at the centre of the growth in marine renewables and emerging marine technologies.

Image right: Argyll Seaweed Farm, *Saccharina latissima*



Aquaculture

Scotland is the largest aquaculture producer in the European Union and farmed fish are Scotland's largest fresh food export. Some 6,200 jobs are supported by fish and shellfish aquaculture. Species being farmed include salmon, halibut, rainbow trout, pacific and native oysters, scallops, queen scallops and mussels. Salmon farming, farm gate value alone, is worth £600 million (US\$ 1bn) to the Scottish economy and total production is around 150,000 tonnes per annum. Industry examples include Marine Harvest, Meridian Ltd, Scottish Seafarms Ltd, Scottish Salmon Company Ltd, Loch Duart Ltd, Kames Ltd, Hjaltland Ltd, Dawnfresh and Wester Ross Salmon Ltd.

Aquaculture research

Aquaculture research activity underpinning the industry includes marine genetic work being undertaken by Landcatch Natural Selection (LNS). LNS is the aquaculture breeding division of Hendrix Genetics. Based in Argyll in the west Highlands, they produce high-performance salmon eggs and smolts based on their genetic breakthroughs utilising "SNP" chips in developing sea lice resistant salmon stocks. "This work demonstrates how genomic analysis can be applied to real world farming problems resulting in improved animal welfare and performance of a key farmed species," Alastair Hamilton head of Molecular Biology at LNS. Fish Vet Group based in Inverness but operating globally provides expert veterinarian diagnostics and biological support to fish farms world wide.



Mohn Aqua, based on the Enterprise Park in Forres, Moray

Marine biotechnology

Highlands and Islands companies involved in marine biotechnology include Lallemand Animal Nutrition, a company pioneering products based on compounds from marine microbes. GlycoMar Ltd is a biotechnology company developing products and services for the human healthcare and personal care markets, exploiting marine micro-organisms such as microalgae and invertebrates to identify glycomolecules for commercial development.

Marine bio-fuels

Commercial interest in marine bio-fuels is growing. Significant research activity undertaken by the Scottish Association for Marine Science in this field has developed and optimised methodologies and practicalities for the use of both macro and micro algae. Commercial operators in the sector include Xanthella Ltd who have developed an innovative photo-bioreactor (PBR), to produce products from micro algae.

Marine renewable energy

The European Marine Energy Centre (EMEC) in Orkney is leading the world in the deployment and testing of offshore marine renewable energy devices. The Islay Tidal Array in Argyll will be the world's first tidal array. The underpinning expertise to support this growing industry from feasibility to deployment can be found in this region. SRSL Ltd, based in Oban, provides environmental surveying, sampling, monitoring and analysis to cover the lifespan of a marine renewable development.



Glycomar, Oban

Research Expertise

The internationally recognised Scottish Association for Marine Science (SAMS), one of the oldest oceanographic institutions in the world, is committed to increasing knowledge and stewardship of the marine environment through research, education and knowledge transfer. Key research themes include dynamic oceans, arctic seas, marine renewables and people and the sea. The UK national culture collection of algae and protozoa (CCAP) is held and maintained at SAMS.

Environmental Research Institute, based in Thurso and part of The University of the Highlands and Islands (UHI), through research excellence and innovative scientific leadership, work to address contemporary environmental issues and advance understanding of the earth's natural resources. ERI has specific research interests in marine biotechnology including characterising novel bioactive compounds from the marine environment to identify novel antimicrobials, antivirals and antioxidants, and in renewable energy including interaction modelling, environmental impacts and sustainability.

The Shetland based North Atlantic Fisheries College (NAFC) Marine Centre UHI also offers R&D and knowledge exchange provision, expert consultancy and modern facilities to clients in aquaculture and fisheries.

The Institute of Aquaculture at the University of Stirling is the leading international research centre in its field and the largest, with more than 110 staff and 120 postgraduate students. It focuses on sustainable aquaculture. The University's Marine Environment Research Laboratory in Argyll provides commercial research solutions to the aquaculture industry worldwide, with specific expertise in control of sea lice.

The Marine Alliance for Science and Technology for Scotland (MASTS), a consortium representing most of Scotland's marine research capacity and some 700 researchers, with the aim of improving co-ordination and collaboration to enhance the Scottish marine research environment. MASTS' partner institutions are Edinburgh

Napier University, Heriot-Watt University, Scottish Association for Marine Science, government agency Marine Scotland, and the Universities of Aberdeen, Edinburgh, Glasgow, St Andrews, Stirling, and Strathclyde.

The involvement of Marine Scotland, the Scottish Government directorate responsible for the integrated management of Scotland's seas, underlines the importance that policymakers place on marine science. "We find there is good communication with government and development agencies such as Highlands and Islands Enterprise, Scottish Development International and Scottish Enterprise in Scotland," Dr Mark James, Operations Director with MASTS says. "They are very flexible, supportive and quick." The Government's Marine Laboratory, Aberdeen, is a world leading centre for research into the biology and catch technology of sustainable marine fisheries.



Nudibranchia: Flabellina pellucida

A UNIQUE ENVIRONMENT TO DO BUSINESS

There is a wide range of infrastructure and facilities throughout the Highlands and Islands to support sector growth in marine science, many of them available through Highlands and Islands Enterprise (HIE) and its partners in locations including Oban, Inverness, Forres, Shetland, Orkney and the Western Isles.

European Marine Science Park

The multi-million pound European Marine Science Park in Oban, developed by Highlands and Islands Enterprise, alongside the Scottish Association for Marine Science builds on the existing growing cluster of marine science related activity. Malin House, the £7.5 million first phase is open. It provides over 20,000 sq ft (1,860 sq m) of flexible laboratory and office space, ideally suited to those working in marine science.

SAMS and the European Marine Science Park are emerging as one of the most important 'clusters within a cluster' in European marine science and business development. "The critical thing for companies locating there is the availability of skilled staff from SAMS," Professor Marcel Jaspars, director of the Marine Biodiscovery Centre at the University of Aberdeen, says. "There are very few locations worldwide where you could find something similar in marine science and business with local government backing."

The European Centre for Marine Biotechnology operated by SAMS at Oban, provides dedicated incubator space for organisations working within Marine Biotech. Tenants can also benefit from SAMS' services including the European Marine Test Facility for trialling marine systems and technologies; the National Facility for Scientific Diving, a scientific dive centre providing divers, equipment, training and dive surveys; a research seawater aquarium; and research vessels for charter and marine sampling; and analytical equipment for hire.

Enterprise area status

Highlands and Islands Enterprise has developed both the Inverness Campus and the Enterprise Park Forres, 28 miles West of Inverness, which benefit from Enterprise Area status for life sciences companies. This offers added incentives including rates relief, simplified planning protocols and additional support for training and skills. The Centre for Health Science adjacent to the Inverness Campus provides business development, research, training, education and patient care under a single roof.



Malin House phase 1 of the European Marine Science Park, Argyll.

Skills

The Highlands and Islands are served by a first-rate education system producing large numbers of high achievers at primary, secondary, further and higher education. University-level education is provided by the University of the Highlands and Islands, a network of 14 colleges and research institutions and an associated network of 50 outreach learning centres, distributed throughout the region, providing local access to more than 7,500 students.

MASTS' Graduate School is a pan-Scotland initiative providing marine science education and training including technical and core skills. Its partner institutions including SAMS are a source of graduate, postdoctoral and experienced academic expertise and employees.

In aquaculture, there are more than 60 academic and non-academic trainers in fish health and related disciplines in Scotland. Over the past two years, more than 800 students have been through short courses in aquaculture, some going on to leadership roles in an industry that is well represented in Highlands and Islands. Among providers offering vocational qualifications to people already working in marine and freshwater aquaculture are the Shetland based NAFC Marine Centre UHI and Inverness College UHI.

Business Support

Highlands and Islands Enterprise (HIE) is the Scottish Government's economic and community development agency for the north and west of Scotland. HIE generates sustainable economic growth by providing

intensive support to business and communities and working with investors to assess new business opportunities.

HIE can provide assistance to find property to meet a company's needs and help with recruiting and training new staff. Growth organisations located in the Highlands and Islands area can also benefit from on-going assistance via the HIE account management programme. All aspects of continuing growth can be supported, such as business mentoring and advice, skills development programmes, new product development initiatives and international trade and marketing activities.

FOR FURTHER INFORMATION CONTACT

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