

Marine science



Overview of marine science in the Highlands and Islands

Marine science focuses on marine biotechnology, which is the use of marine organisms to provide solutions in fields such as healthcare, nutraceuticals, food additives, pharmaceuticals, cosmetics and research tools. There may also be wider processing, environmental and industrial applications. For this analysis, the sector does not include aquaculture, fisheries, renewable energy or marine engineering.

Employment and business units

The number of companies specialising in marine biotechnology in the UK is still relatively low. Over 60% of these companies are Scottish, many of them located in the Highlands and Islands. Also, around 50 Higher Education Institutions (HEIs) are active in the sector.¹

Around 290 personnel are located at the following employers / business units in the Highlands and Islands:

- Scottish Association of Marine Science (SAMS), Dunstaffnage (near Oban) – hosts the National Facility for Scientific Diving and the Culture Collection of Algae and Protozoa – a UHI partner
- Integrin Advanced Biosystems Ltd, located at the European Centre for Marine Biotechnology (ECMB) at SAMS – established 1999, specialising in marine biodiscovery and seafood safety
- Aquapharm Bio-Discovery Ltd, ECMB – established 2000, specialising in the commercialisation of compounds from the marine microbial biosphere
- Glycomar – ECMB, a marine natural products and drug discovery company specialising in marine invertebrate glycobiology
- Two companies are located in Innse Gall (the Outer Hebrides). Equateq at Breascleite and Hebridean Biotech Ltd at Lews Castle College
- University Marine Biological Station Millport, Isle of Cumbrae – a university (London & Glasgow) research facility
- North Atlantic Fisheries College, Shetland
- Institute of Aquaculture, University of Stirling, Machrihanish

Indications of salary are as follows:²

- Director, management: variable, mostly above £40,000
- Post graduate scientific: £28,000–£30,000
- Graduate scientific: £26,000
- Laboratory technician: £15,000

¹ 21 companies in the UK and 49 HEIs in 2005. Source: A study into the prospects for marine biotechnology development in the UK, commissioned by Foresight Marine Panel, 2005 (Foresight report 2005)

² Indicative salary levels from a small sample of organisations in the Highlands and Islands in 2007

- Depending on the employer, share options and performance-related bonuses might be paid on top of these levels. Taking wages at all levels in aggregate, the remuneration in the sector is around one third higher than the average in the local economy, eg around Oban. This reflects the relatively high concentration of science graduates in the workforce.

Output

Commercial output alone is relatively small within the marine science sector in the Highlands and Islands. Total income to the sector is larger if grant funding is also taken into account. Combined grant and commercial income from operations at SAMS (a charity) exceeds £9m annually. Total financial turnover, including grant funding, to the sector in the Highlands and Islands could be in the region of £15m annually.³

Product markets

The activity within the sector concentrates on (i) developing culture collections from the marine environment, and making this library of biological compounds available to others through licensing arrangements to other companies, (ii) developing end-products and taking these to market and (iii) seafood safety testing. A larger company may take a potential product through clinical trials and onwards to the market. The ultimate product markets for which the marine science industry is involved include:

- Pharmaceuticals – eg products for allergies, antibacterials, anti-cancer agents
- Food industry – eg food colouring, food safety (eg shellfish toxicity testing)
- Nutraceuticals – eg fish oil products and anti-oxidants
- ‘Cosmeceuticals’ – eg cosmetics with health benefits

³ Based on staffing levels alone – not from financial information from individual companies active in the sector

SWOT analysis

The following analysis illustrates the main issues facing the development of the marine science sector in the Highlands and Islands.

Strengths

- Excellent marine environment
- Sector leaders located in the Highlands and Islands
- Strong academic and research collaboration
- Through SAMS, the Highlands and Islands has a particular strength (at an international level) in cell cultures and bio-surfactants
- The ECMB at SAMS is the first UK business incubator for marine start-ups (opened 2004)
- A recognised cluster with important links with other sectors such as aquaculture

Weaknesses

- Lack of co-ordinated framework (until recently, development centred on pockets of excellence)
- Lack of critical mass in some areas compared with some international competitors
- Difficulty bridging the gap between academia and commercial applications
- Recruitment and retention of staff can be difficult in a relatively remote location (in UK terms)
- Geographical remoteness from industry networks
- Hand-to-mouth grant funding is time-consuming

Opportunities

- Global market valued at over \$3 billion⁴ and growing rapidly
- Sales and licensing to larger companies to take potential products through trials
- ECMB aims to develop a network of trans-national marine science development projects
- Funding programmes available to move scientific research into value-added commercial output⁵

Threats

- Well-funded French and German investment and commercialisation, eg in marine algae and marine bioactives
- Investment community may not always regard marine biotechnology seriously
- Switching funding priority from fundamental research work towards commercialisation could diminish leading-edge status

Priorities for action

- ARC project (Addressing Research Capacity at UHI) to increase the research capacity at SAMS (thereby boosting UHI's progress towards university status)
- Establish and develop a marine science park at Dunstaffnage
- Ad hoc support to local companies (new and existing) in all aspects including intellectual property, marketing, finance etc
- Support networking initiatives throughout the academic, research and commercial sectors
- Support training, recruitment and staff retention

⁴ Based on data from Foresight Marine Panel report

⁵ Including DTI business support, Proof of Concept projects and ITI support