Executive Summary

Biotoxin Monitoring Programme for Scotland

April 10 to March 11

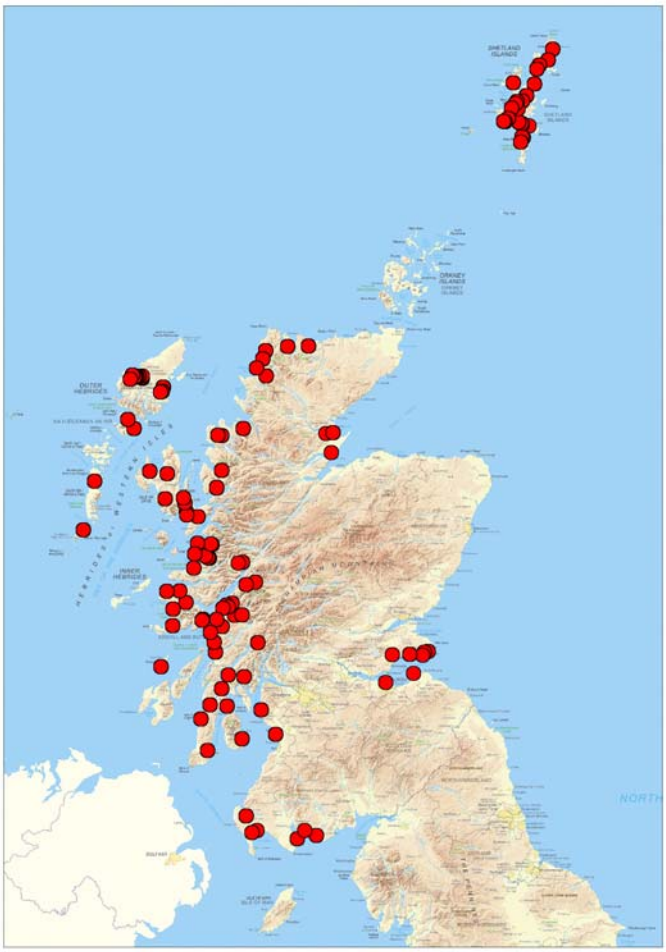
Contract Reference: PAU225 – S02007

This report provides a summary of the results of the Official Control (OC) Biotoxin Monitoring Programme for Scotland for the period 1st April 2010 to 31st March 2011. The laboratory testing for biotoxins in shellfish, co-ordination of the programme and its logistics were conducted by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) on behalf of the Food Standards Agency in Scotland (FSAS), the national competent authority for food safety. The programme aimed at delivering the testing required for the statutory monitoring of biotoxins in shellfish, as described in EC Regulations 854/2004, 882/2004 and 2074/2005.

For a full report on the results of the 2010-2011Scotttish OC monitoring programme for marine biotoxins and related activities, please see the algal toxin surveillance pages of the Cefas website: http://www.cefas.defra.gov.uk/our-science/animal-health-and-food-safety.aspx

During the period 1st April 2010 to 31st March 2011, 2796 bivalve shellfish samples were submitted to Cefas for toxin analyses. They comprised of: common mussels (2119), Pacific oysters (396), razors (92), common cockles (87), surf clams (22), queen scallops (17) and common otter shells (14) from 118 inshore sampling locations (Figure 1) as well as 49 king scallop samples from 16 commercial processors. In addition two common periwinkle samples were submitted to the laboratory for method validation purposes.

Figure 1: Scottish inshore sampling locations – biotoxin monitoring programme (1st April 2010 to 31st March 2011)



Fifteen inshore samples (0.5%) were rejected as unsuitable for analysis on arrival at the laboratory, ten of which had been delayed in the postal system due to severe weather

conditions in December 2010. A further 15 inshore samples (0.5%), mainly Pacific oysters were received in insufficient amounts to perform all of the required analyses.

Monitoring for lipophilic toxins

Lipophilic toxins analyses were performed using the biological assay (MBA) on 2493 samples from inshore locations and 48 samples from commercial processors. Results were as follows:

- One hundred and thirty two (132) samples (~5%) from 38 separate inshore sites recorded positive results (Figure 2). These figures represent a significant increase (c.20%) in terms of number of affected samples compared to the previous year.
- Positive results were recorded in common mussels (111 samples), Pacific oysters (20) and queen scallops (1).
- The worst affected areas were Argyll & Bute (53 positive samples), North Ayrshire (25) and the Shetland Islands (27). As with the 2009 – 2010 reporting period, a large portion of these positive results can be directly attributed to a large scale DSP event affecting sites in and around the Firth of Clyde and Loch Fyne between early May and mid October 2010. During this period, 55 samples from 4 separate sites (Arran: Lamlash Bay, Fairlie: Southannan Sands, Loch Fyne: Stonefield: North Bay and Loch Striven: Loch Striven) recorded positive results, with closures in force at the affected sites for up to 26 weeks.
- Elsewhere, positive results were also recorded in 27 samples from a further four local authority (LA) areas (Comhairle nan Eilean Siar: Lewis & Harris (7 samples), Highland Council: Lochaber (7), Highland Council: Ross & Cromarty (1) and Highland Council: Skye & Lochalsh (12)). These events, all recorded between May and December 2010, were generally short in duration (<4 weeks). Exceptions were at Arisaig: Sgeirean Buidhe (Lochaber) where harvesting restrictions were in place for six weeks, Loch Harport: Inner: Carbost (Skye & Lochalsh) – 5 weeks and Loch Eishort: Drumfearn (Skye & Lochalsh) - 6 weeks.
- In addition, whilst recording negative results, clinical signs potentially indicative of the presence of lipophilic toxins were observed in a further 295 assays from 71 separate sites (Figure 3) between April 2010 and March 2011. This represents a 20% increase on figures reported in 2009 – 2010.
- None of the 48 king scallop samples originating from commercial processors recorded positive results or clinical signs potentially indicative of the presence of lipophilic toxins.
- Twenty samples collected between 21/04/2010 and 13/12/2010 were analysed by liquid chromatography with tandem mass spectrometry (LC-MS/MS) in order to investigate their toxin content, profile and evaluate the concentrations. Three samples showed concentrations of azaspiracids above the 160 µg/kg maximum permited limit.

PSP monitoring

A total of 2435 samples from inshore locations and 48 King scallop samples from commercial processors were tested for paralytic shellfish poisoning (PSP) toxins. Results were as follows:

- No samples were found to contain PSP toxins above the maximum permitted level (MPL) of 80µg [STX eq.]/100g [shellfish flesh].
- PSP toxins above quantifiable levels, but below the MPL were detected in 10 mussel samples from 6 sites in the Argyll & Bute, Highland: Lochaber, Highland: Ross &

Cromarty and Shetland Island regions (Figure 4). All occurrences were recorded between May and July 2010 and in March 2011.

- The implementation of a high performance liquid chromatography (HPLC) method for the detection of PSP toxins in the majority of shellfish species received via the programme gave the opportunity to detect toxins in these matrices at levels well below the limit of detection of the biological assay (circa 33 µg/100g). Using this method, PSP toxins were detected at trace levels in a further 64 samples.
- Overall, the 2010/2011 reporting period saw a marked decrease in the number of samples found containing PSP toxins, as well as in the levels of toxins detected compared to the previous year. However, it must be noted that, the monitoring for PSP toxins was suspended at sites where harvesting restrictions were placed due to the presence of lipophilic toxins. Given the high prevalence of lipophilic toxins in 2010, the PSP statistics for 2010-2011 may therefore not be a true reflection of the prevalence of PSP toxins in Scotland but more a result of targeted monitoring thoughout the high risk period.
- Results from previous years (2005 to 2008) indicated that PSP toxicity episodes usually begin in late spring (April to May) in Scottish waters. However, as in 2009 and 2010, PSP toxins were detected in March 2011. These results would indicate a continued shift in PSP toxicity occurence towards early spring.
- PSP toxins were detected by biological assay in two king scallop samples (both shucked products) submitted from commercial processors. Both results were below the maximum permitted level.

ASP monitoring

Analyses for amnesic shellfish poisoning (ASP) toxins were conducted on 1891 samples from inshore locations and 48 king scallop samples from commercial processors. Results were as follows:

- ASP toxins were detected in 94 inshore samples comprising of: common mussels (70), queen scallops (12), Pacific oysters (8), common cockles (1), razors (1), surf clams (1) and common otter shells (1). These samples originated from 48 sites within 44 pods, predominantly on the West Coast, Western Isles and Shetlands (Figure 5). All occurrences were recorded between May and October 2010
- None of inshore samples exceeded the maximum permitted limit of 20 µg [domoic/epi domoic acid]/g. The highest level detected was 19 µg/g in a mussel sample from Loch Sligachan in July 2010.
- The periods of toxicity and levels of ASP detected during this monitoring period are consistent with previous years, albeit with a 20% rise in occurrence compared to the previous reporting period.
- ASP toxins were detected in 8 king scallop samples from commercial processors originating from 5 separate offshore scallop grounds (figure not shown).
- The maximum permitted limit of 20 µg [domoic/epi domoic acid]/g was exceeded in four whole king scallop samples, the highest level at 162 µg/g sample from the J09 (Jura) offshore scallop ground in July 2010. The MPL was not exceeded in any of the shucked product king scallop samples in which ASP toxins were detected.
- Of the remaining 4 samples in which ASP was detected below the action level, two samples comprised of whole scallop material, the remaining two of shucked product.

Figure 2: Inshore locations recording positive results for lipophilic toxins by MBA (1st April 2010 to 31st March 2011)

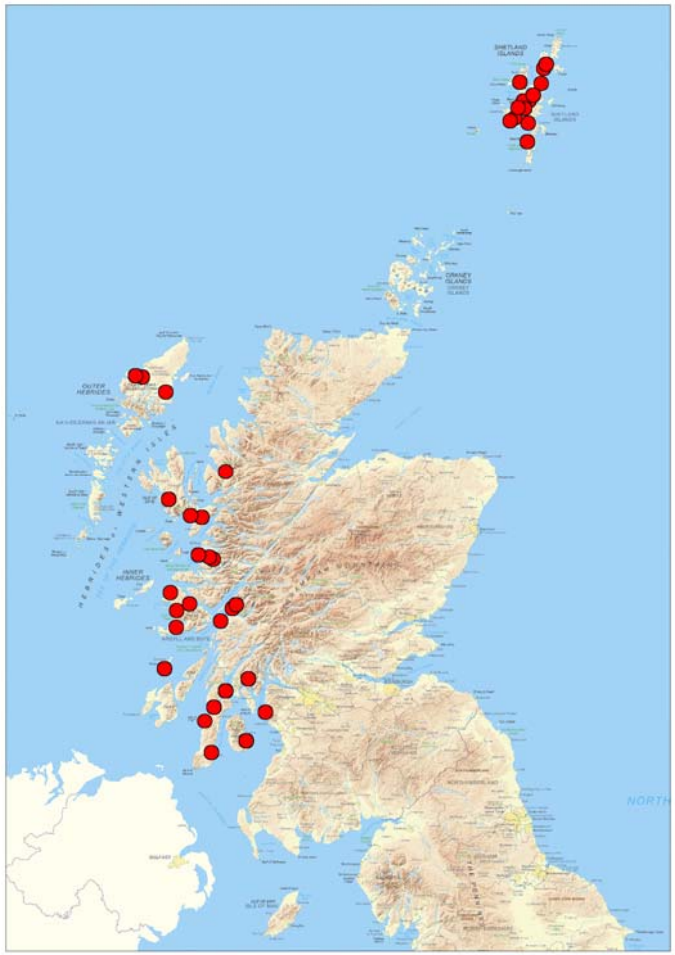


Figure 3: Inshore locations where negative MBA results were recorded with clinical signs potentially indicative of the presence of lipophilic toxins (1st April 2010 to 31st March 2011)

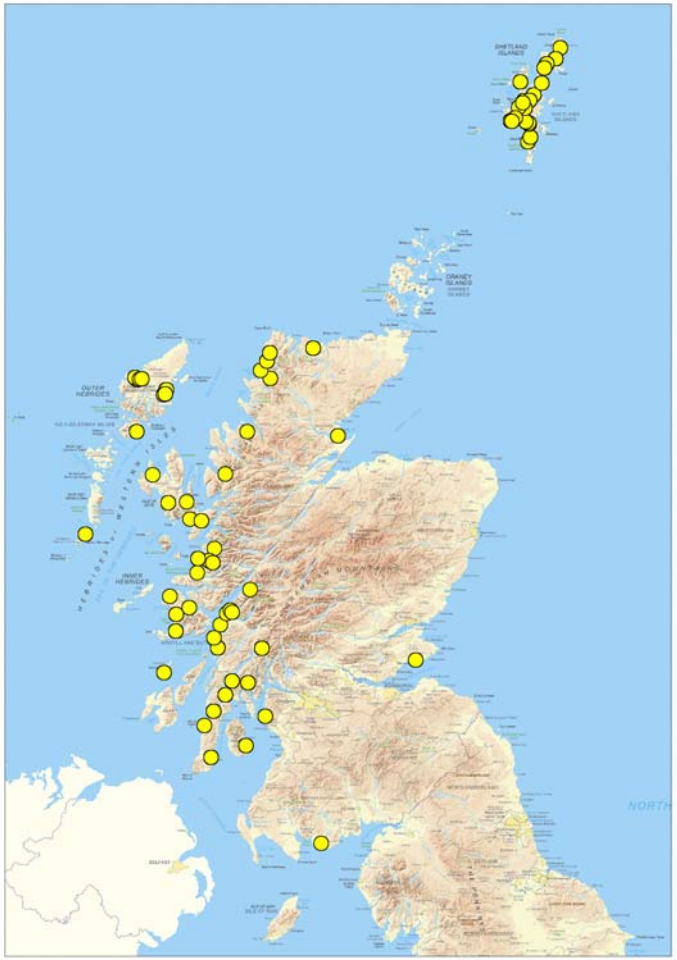
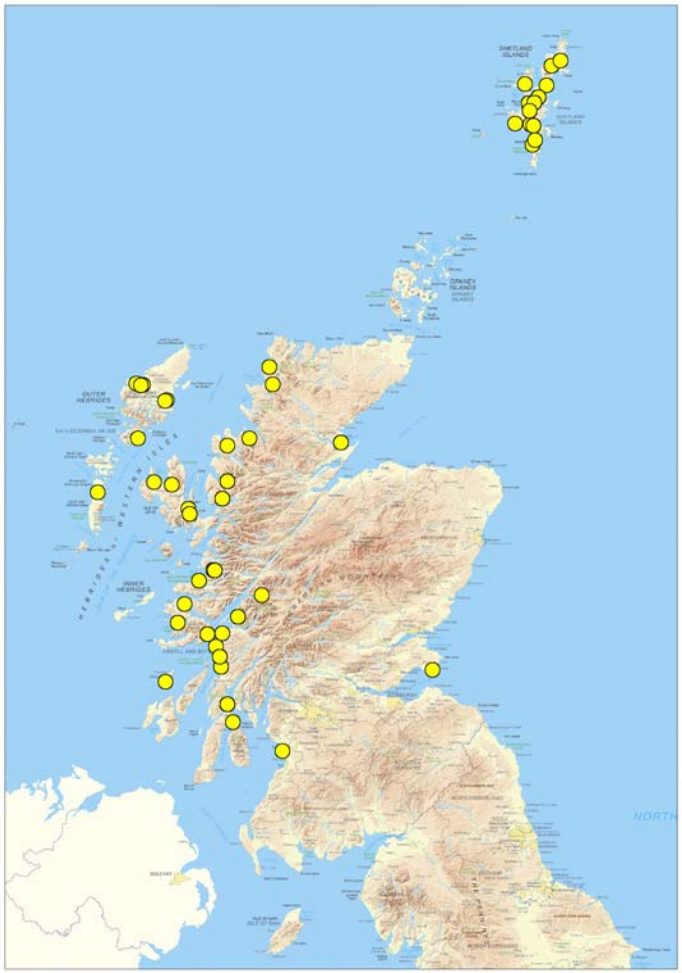


Figure 4: Inshore locations where PSP toxins were detected below the maximum permitted limit (≤79µg STXeq./100g) (1st April 2010 to 31st March 2011)

Figure 5: Inshore locations where ASP toxins were detected below the maximum permitted limit (1-19µg/g domoic/epi domoic acid) (1st April 2010 to 31st March 2011)



About us

Cefas is a multi-disciplinary scientific research and consultancy centre providing a comprehensive range of services in fisheries management, environmental monitoring and assessment, and aquaculture to a large number of clients worldwide.

We have more than 500 staff based in 2 laboratories, our own ocean-going research vessel, and over 100 years of fisheries experience.

We have a long and successful track record in delivering high-quality services to clients in a confidential and impartial manner.
(www.cefas.co.uk)

Cefas Technology Limited (CTL) is a wholly owned subsidiary of Cefas specialising in the application of Cefas technology to specific customer needs in a cost-effective and focussed manner.

CTL systems and services are developed by teams that are experienced in fisheries, environmental management and aquaculture, and in working closely with clients to ensure that their needs are fully met.
(www.cefastechnology.co.uk)

.

Customer focus

With our unique facilities and our breadth of expertise in environmental and fisheries management, we can rapidly put together a multi-disciplinary team of experienced specialists, fully supported by our comprehensive in-house resources.

Our existing customers are drawn from a broad spectrum with wide ranging interests. Clients include:

- international and UK government departments
- the European Commission
- the World Bank
- Food and Agriculture Organisation of the United Nations (FAO)
- oil, water, chemical, pharmaceutical, agro-chemical, aggregate and marine industries
- non-governmental and environmental organisations
- regulators and enforcement agencies
- local authorities and other public bodies

We also work successfully in partnership with other organisations, operate in international consortia and have several joint ventures commercialising our intellectual property

Head office
Centre for Environment,
Fisheries & Aquaculture Science
Pakefield Road, Lowestoft,
Suffolk NR33 0HT UK

Tel +44 (0) 1502 56 2244
Fax +44 (0) 1502 51 3865
Web www.cefas.defra.gov.uk

Centre for Environment,
Fisheries & Aquaculture Science
Weymouth Laboratory,
Barrack Road, The Nothe, Weymouth,
Dorset DT4 8UB

Tel +44 (0) 1305 206600
Fax +44 (0) 1305 206601

printed on paper made from a minimum 75% de-inked post-consumer waste