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Annual report on the results of the Biotoxin and Phytoplankton Official Control Monitoring Programmes for Scotland - 2014

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Quality statement: This report is a compilation of the information included on the reports provided daily/weekly to the FSA and showing the results of the phytoplankton and toxin analyses undertaken on samples submitted by local authorities. All results were quality checked and approved prior to release to the FSA and the results compiled in this report have been further checked against a copy of the original reports held on a central database. Information relating to the origin of the samples (place (including co-ordinates), date and time of collection) is as provided by contracted sampling staff and has not undergone verification checks by Cefas.

 The co-ordinates used to depict the location of the monitoring points are the default co-ordinates of the RMP or AHA sampling points defined by FSAS.

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1. Executive summary

This report describes the results of the Official Control Biotoxin and Phytoplankton Monitoring Programmes for Scotland for the period 1st January to 31st December 2014.

Results from previous periods are available via the following web links:

- Toxin monitoring on Cefas website
- Phytoplankton monitoring on FSA website

The laboratory analyses for biotoxins in shellfish, co-ordination of the programme and its logistics were conducted by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) Weymouth Laboratory, whilst the laboratory phytoplankton analyses, co-ordination of the programme and its logistics were performed by the Scottish Association for Marine Science (SAMS - SRSL) in Oban under the scope of the contracted Shellfish Partnership.

The programmes were delivered on behalf of the Food Standards Agency in Scotland (FSAS), the national competent authority for food safety and are aimed at delivering the testing required for the statutory monitoring of biotoxins in shellfish and for identification and enumeration of potentially harmful algal species in selected shellfish harvesting areas, as described in EC Regulations 854/2004, 882/2004 and 2074/2005.

Toxin monitoring

A total of 2967 bivalve shellfish samples from 102 inshore sampling locations (Figure 1) were submitted to Cefas for toxin analyses in the reporting period. They comprised of: common mussels (2142), Pacific oysters (459), razors (185), common cockles (142) and surf clams (39).
Forty four king scallop verification samples were also collected from 14 commercial establishments under the scope of the FSAS official control verification programme and were submitted for toxin analysis during the reporting period.

Seven inshore samples (0.3%) and one king scallop verification sample were rejected on arrival at the laboratory – 4 of these were submitted in error as testing was not required in these areas, 2 arrived at the laboratory in an unsuitable condition for analyses with a further 2 samples arriving at the laboratory outside of agreed testing periods. All samples received and assessed as suitable for testing provided sufficient material to perform all of the required analyses.

Phytoplankton monitoring

A total of 1271 seawater samples from 51 separate sites (Figure 2) were submitted to SAMS - SRSL for the identification and enumeration of potentially harmful algal species during the reporting period and 1270 were analysed. One sample was not analysed due to laboratory error.

Figure 1: Scottish inshore shellfish sampling locations – FSA in Scotland biotoxin monitoring programme in 2014

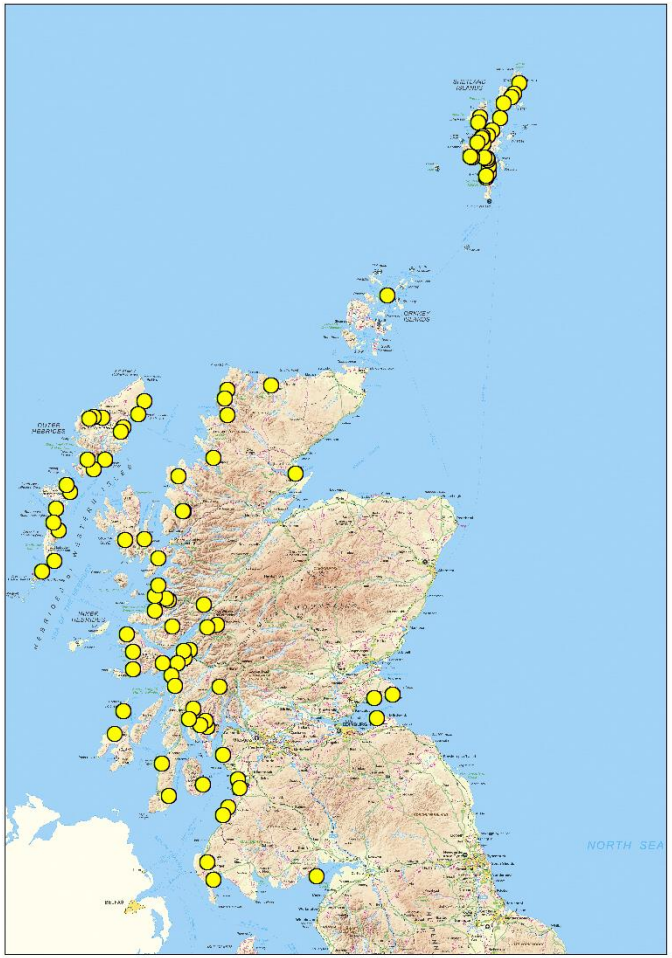
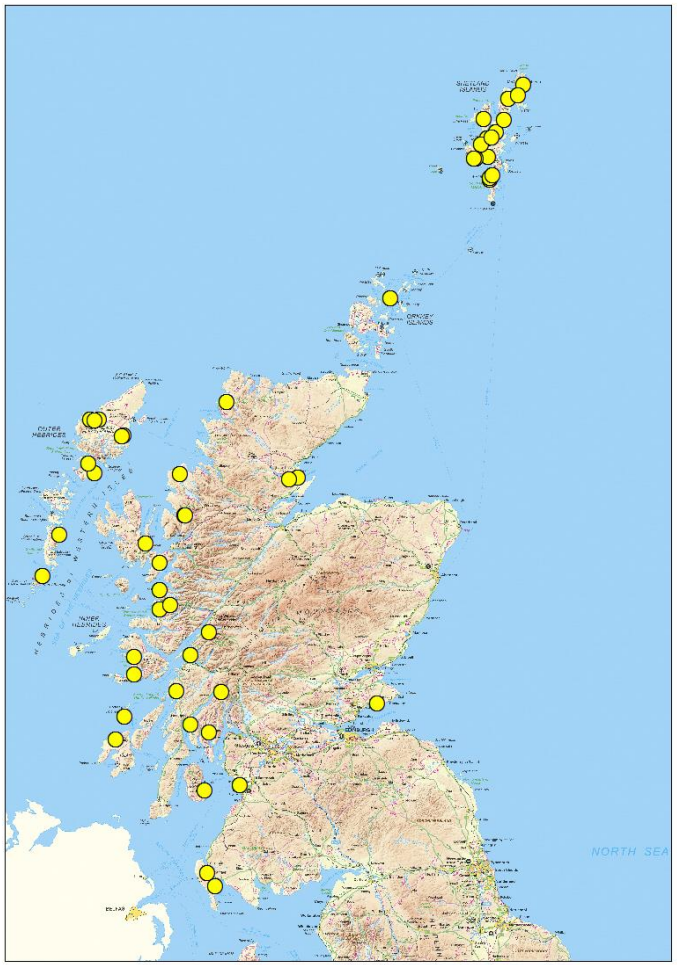


Figure 2: Scottish phytoplankton sampling locations – FSA in Scotland phytoplankton monitoring programme in 2014



Monitoring for lipophilic toxins

Monitoring for lipophilic toxins (LTs) was conducted using a liquid chromatography with tandem mass spectrometry (LC-MS/MS) method. The method is able to characterise and quantify the following LT groups; Okadaic Acid (OA)/Dinophysis Toxins (DTXs) and Pectenotoxins (PTXs) – reported as µg OA equivalent (eq.)/kg shellfish flesh, Azaspiracid toxins (AZAs) – reported as µg AZA1 eq./kg shellfish flesh and Yessotoxins (YTXs) reported as mg YTX eq./kg shellfish flesh.

During this reporting period, 201 inshore samples breached maximum permitted levels (MPL) for lipophilic toxins. In 98% of these cases (n=196), the LC-MS method provided an early warning, detecting low toxin levels either one or two weeks prior to closure. Of the 5 results, where no early warning was provided, these samples were from 2 areas which had not been monitored prior to regulatory limits being exceeded.

In total, lipophilic toxins analyses were performed on 2923 samples from inshore locations and 43 verification samples collected from commercial establishments. Results are summarised below.

OA/DTX/PTX group

- OA/DTX/PTX group toxins were detected in 1135 inshore samples, comprising of mussels (1083 samples), surf clams (32), razors (13), Pacific oysters (6) and cockles (1).
- OA/DTX/PTX group toxins were detected in all months throughout the reporting period, with the majority of recorded results occurring between March and November 2014 (1058 samples).
- The distribution of OA/DTX/PTX toxins was widespread, affecting sites within all council regions, with the exception of the Orkney Islands and South Ayrshire.
- Two hundred and one samples comprising of mussels (188 samples), surf clams (11) and razors (2) from 28 sites recorded results above the MPL. All above MPL results were recorded between April and December 2014 (Figure 3).
- The highest level recorded during this reporting period was 1049µg OA eq./kg, more than six times the regulatory limit, in a sample from Loch Fyne (Argyll & Bute) in mid April 2014. Levels of OA/DTX/PTX group toxins at this site rose from 69µg OA eq./kg to 1049µg OA eq./kg within one week.
- Elsewhere, OA/DTX/PTX group toxins were detected below the MPL in a further 934 samples from 73 sites (Figure 4), between January and December 2014.
- YTX group toxins were detected in 43 samples which contained OA/DTX/PTX group above the MPL between April and November 2014, none of which exceeded the YTX group MPL. A further 68 samples were found to contain YTX and OA/DTX/PTX group toxins below the relative MPLs between January and December 2014.
- No AZA toxins were detected in samples which contained OA/DTX/PTX group toxins.
- OA/DTX/PTX group toxins below the MPL were detected in two whole king scallop verification samples from the Clyde 05 scallop ground received in March and April 2014.

AZA group

- Unlike years 2011 to 2013, no distinct AZA events were recorded in 2014.
- AZA group toxins were detected in just two inshore samples, both below the MPL. The samples, both collected in early January 2014 comprised of cockles (1), from Traigh Mhor: Traigh Mhor and mussels (1) from Loch Glencoul: Kylescu (Figure 5).
- The highest level recorded during this reporting period was 157µg AZA1 eq./kg, marginally below the regulatory limit, in the cockle sample.
- No OA/DTX/PTX and YTX group toxins were detected in these two samples.
- No AZA toxins were detected in the scallop verification samples received during the reporting period.

Figure 3: Inshore locations recording OA/DTX/PTX group results above the maximum permitted limit (>160µg OA eq./kg) in 2014

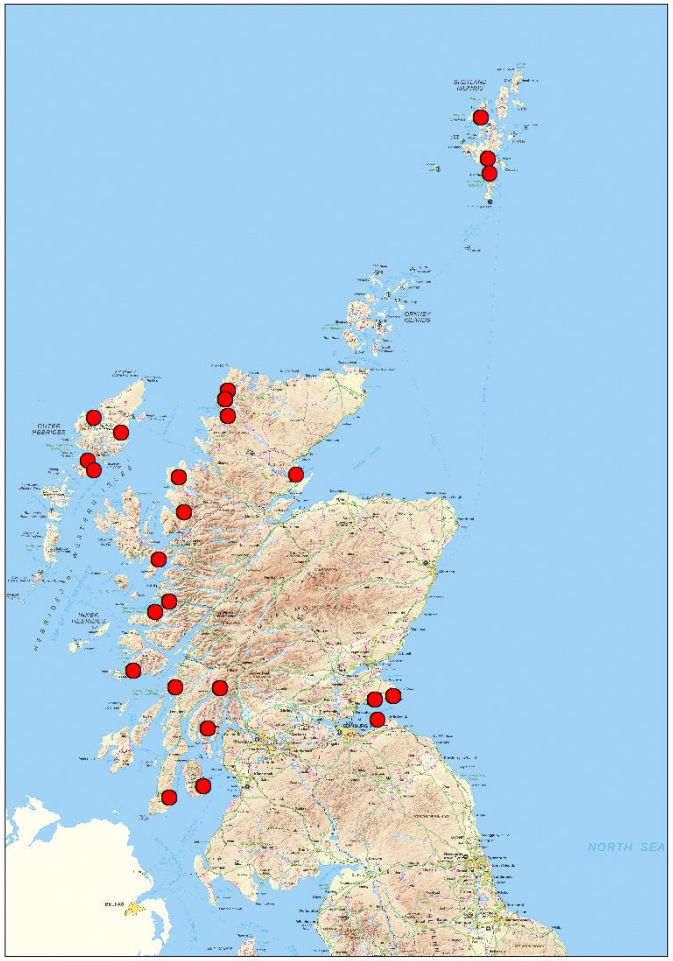


Figure 4: Inshore locations where toxins of OA/DTX/PTX group were detected below the maximum permitted limit (≤160µg OA eq./kg) in 2014

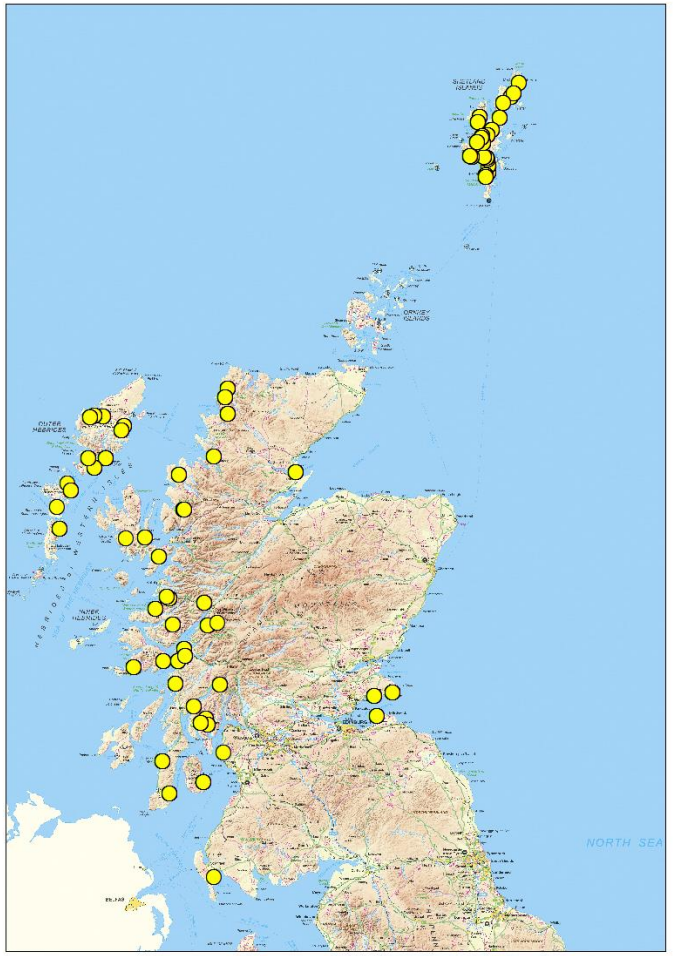
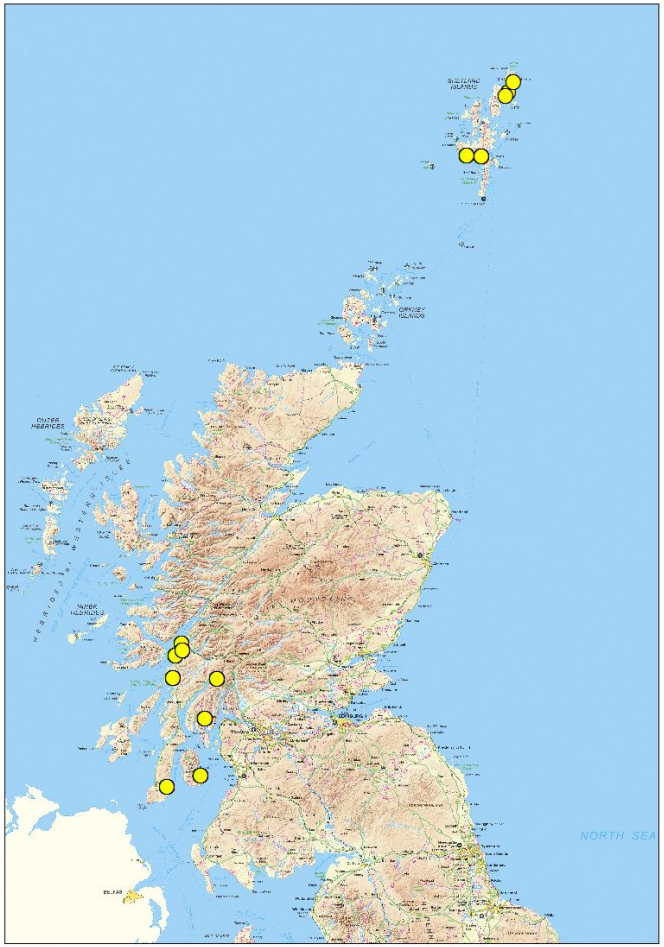


Figure 5: Inshore locations where toxins of AZA group were detected below the maximum permitted limit (≤160µg AZA1 eq./kg) in 2014

YTX group

- YTXs were detected in 130 mussel samples during the reporting period. In comparison with the previous reporting period (96 samples), this represents a significant increase in the occurrence of YTX toxins in 2014.
- Results from 2011 & 2012 indicated the distribution of the YTX group was fairly localised, predominantly within the Loch Fyne, Firth of Clyde and Firth of Lorn region. Although YTX group toxins were detected at two sites within this region in 2013, results indicated a geographic shift in the distribution of YTXs during 2013, with the majority of sites where YTXs were recorded located in the Shetland Isles.The occurrence of YTX toxins in 2014 was limited to sites within the Loch Fyne, Firth of Clyde, Firth of Lorn and Shetland Isles.
- YTXs were detected throughout the year, and were largely prevalent between April and August 2014, during which time they were detected in 84 samples.
- No samples exceeded the MPL (3.75mg YTX eq./kg) in 2014. The highest level recorded was 2.5mg/kg in a sample from Loch Striven: Troustan (Argyll & Bute) in mid June. The remaining samples recorded results between 0.2 and 2.3mg/kg (Figure 6).
- OA/DTX/PTX group toxins above the MPL were detected in 43 mussel samples, which also contained YTXs below the MPL (see above). OA/DTX/PTX group toxins below the MPL were also detected in 68 samples where YTX group toxins were present below the MPL.
- AZA group toxins were not found to co-occur in any samples where YTX group toxins were detected during the reporting period.
- No YTX toxins were detected in the scallop verification samples received during the reporting period.

Figure 6: Inshore locations where toxins of the YTX group were detected below the maximum permitted limit (≤3.75mg YTX eq./kg) in 2014



Phytoplankton associated with the production of lipophilic toxins

- *Dinophysis* was present in 600 samples (47.2%) analysed during 2014. It was recorded at all sites where regular monitoring took place over the summer months.
- *Dinophysis* was observed at or above the trigger level (set at 100 cells/L) in 245 samples (19.3%). The earliest blooms were recorded in Argyll & Bute and North Ayrshire during late March and early April, although the majority of *Dinophysis* blooms occurred in July and August, with 43.6% of the samples exceeding threshold counts in July.
- The largest recorded *Dinophysis* bloom was observed in Loch Torridon (Highland: Ross & Cromarty) on 22nd July, with an abundance of 3,520 cells/L. *Dinophysis* blooms were widespread around North Ayrshire, Argyll & Bute, and the Highland region from May to late September, with associated DSP toxicity reported in shellfish. Arran: Lamlash Bay (North Ayrshire) recorded *Dinophysis* counts at or above trigger level for a continuous period of twenty-one weeks from the second week of May until the end of September. Both Loch Striven and Loch Scridain (Argyll & Bute) also had extended bloom periods lasting about three months from late May into August. The blooms of *Dinophysis* that were observed around the Shetland Islands in July and August 2014 were neither as dense nor widespread as those that occurred in in 2013.
- The number of *Dinophysis* blooms at or exceeding trigger level over the reporting period was similar to the years 2010, 2011 and 2012, but not as high as in 2013.

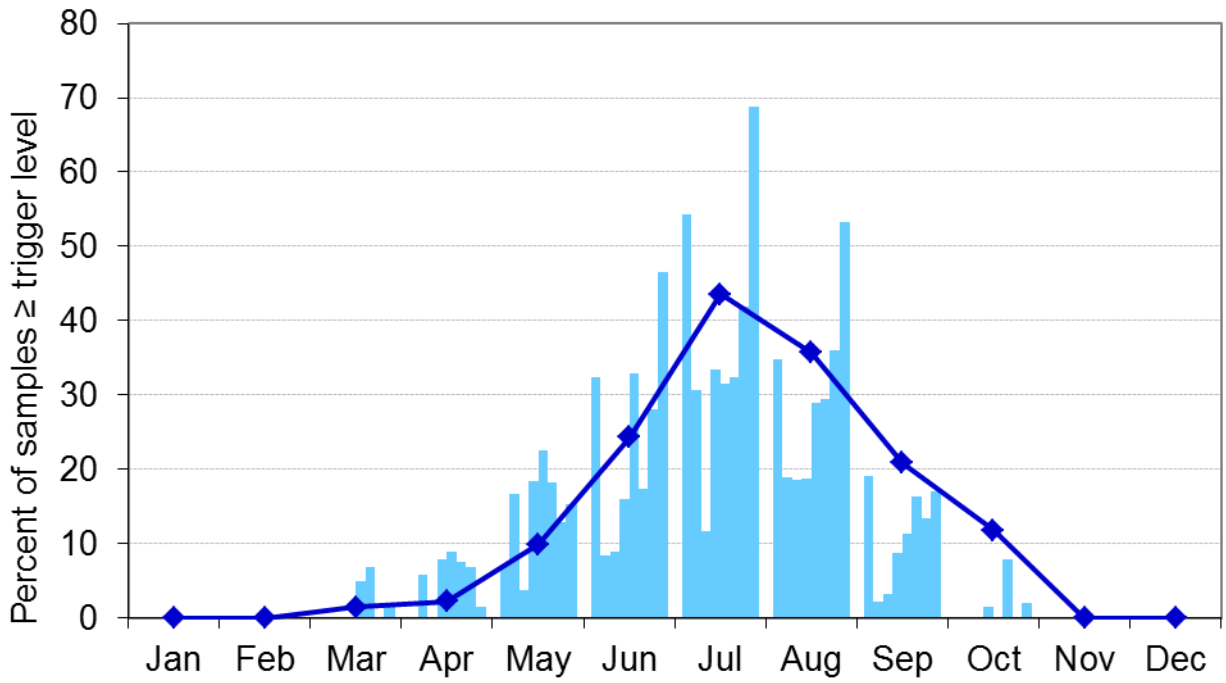


Figure 7: The percentage of samples in which *Dinophysis* cells equalled or exceeded the trigger level of 100 cells/L in 2014 is indicated by the line. For comparison, the bars show the percentage of samples in which *Dinophysis* cells equalled or exceeded the trigger level between 2006 and 2013.

- *Prorocentrum lima was* present in 189 samples (14.9%) analysed during 2014 and occurred at or above the trigger level (set at 100 cells/L) in 18 samples (1.4%). It was most frequently observed in samples from Colonsay: The Strand East, Loch Fyne: Otter Ferry, and Loch Melfort (Argyll & Bute), but the densest bloom in 2014 (920 cells/L) was recorded in South Voe (Shetland Islands) on 14th July.

- *Protoceratium reticulatum* was present in 57 samples (4.5%), and was most frequently observed in April. The densest blooms occurred in Argyll & Bute, with 640 cells/L recorded in Loch Melfort on 7th July, and 460 cells/L recorded in Loch Striven on 10th June with some associated toxicity at these sites. Other sites where there was a link between the presence of *Protoceratium reticulatum* and the detection of yessotoxins in shellfish were Arran: Lamlash Bay (North Ayrshire), Loch Fyne: Ardkinglas (Argyll & Bute) and Gruting Voe: Braewick Voe (Shetland Islands).

- *Lingulodinium polyedrum* was recorded in August and September 2014 on only twelve occasions (0.9 % of samples). It occurred most frequently in Loch Creran, where it appears to bloom annually, and also Loch Melfort (Argyll & Bute). It was also recorded in Loch Leven (Highland: Lochaber) and Seilebost (Lewis & Harris). The maximum bloom density of 2,580 cells/L was observed in Loch Creran on 20th August.

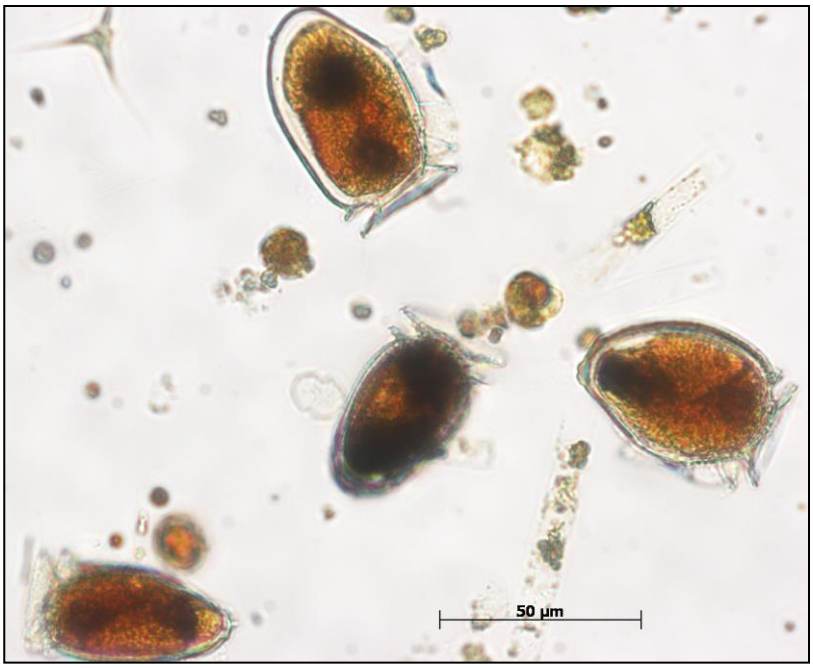


Figure 8: Species belonging to the genus *Dinophysis* were observed at a concentration of 3,140 cells/L on 14th July in Loch Torridon (Highland: Ross & Cromarty).

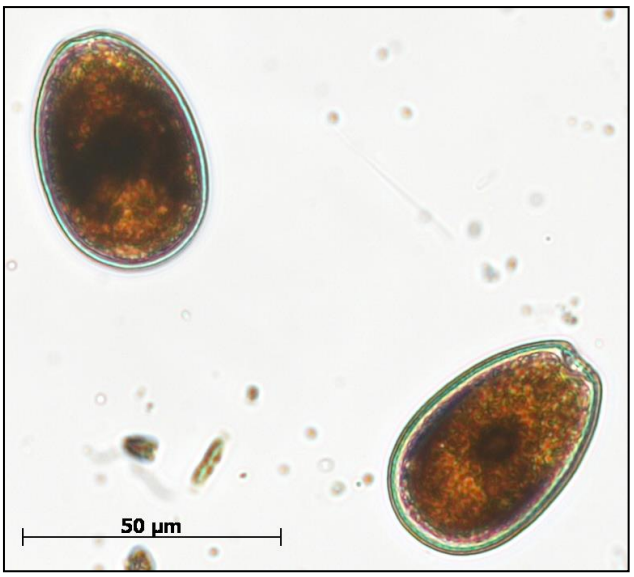


Figure 9: *Prorocentrum lima* recorded from South Voe (Shetland Islands) on 14th July at a concentration of 920 cells/L.

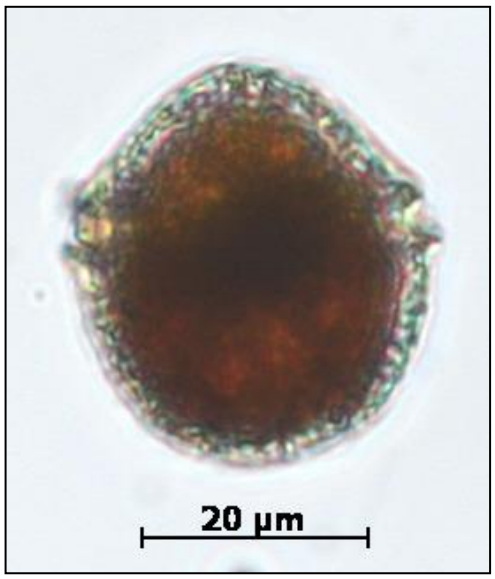


Figure 10: *Protoceratium reticulatum was* observed at a concentration of 640 cells/L in Loch Melfort on 7th July

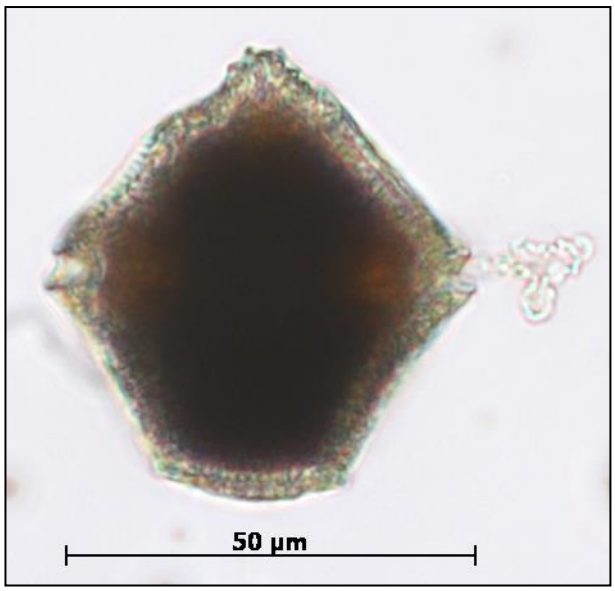
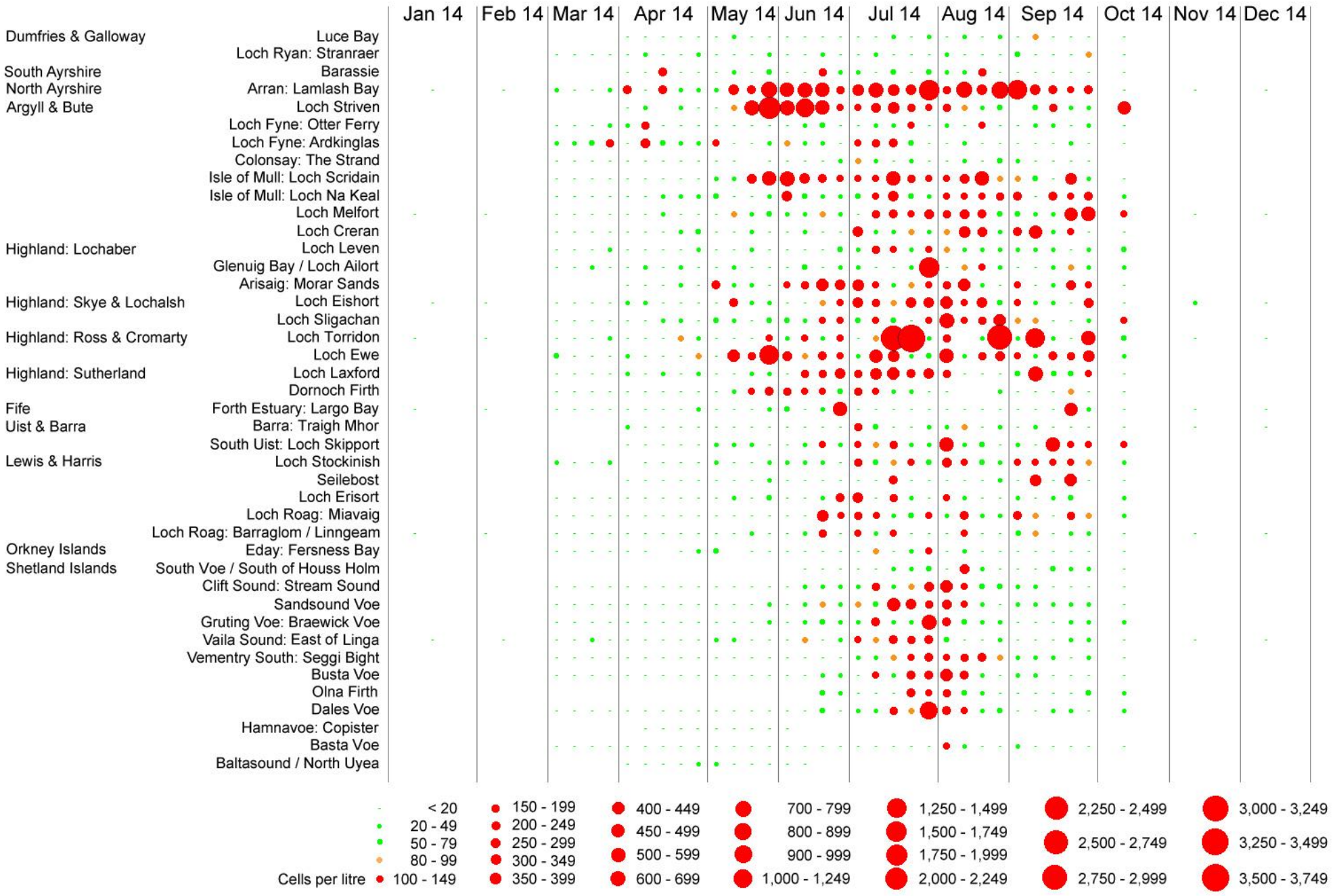


Figure 11: *Lingulodinium polyedrum* recorded in Loch Creran on 7th August at a density of 240 cells/L.

Figure 12. Phytoplankton concentrations observed between Jan and Dec 14 for the genus *Dinophysis*.



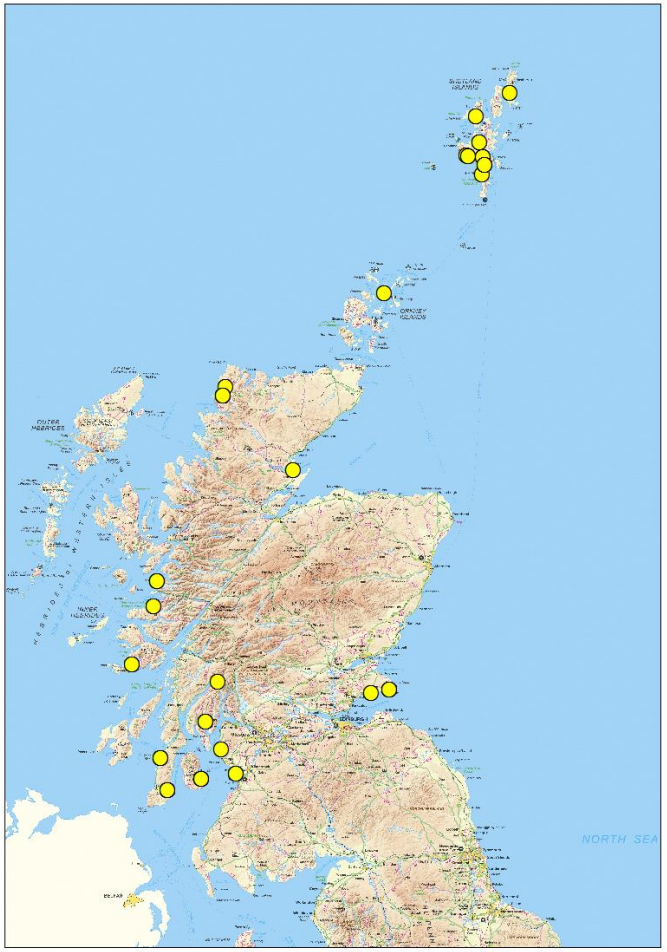
Monitoring for PSP toxins

A total of 1905 samples from inshore locations and 43 king scallop verification samples collected from commercial establishments were tested for paralytic shellfish poisoning (PSP) toxins. All samples were tested by a high performance liquid chromatography (HPLC) method. Results are summarised below.

- Twenty six mussel samples from 9 separate sites were found to contain PSP toxins above the MPL of 800µg STX eq./kg shellfish flesh between April and August 2014 (Figure 13). The highest level recorded was 14,730µg/kg, over eighteen times the regulatory limit in a sample from Loch Striven: Troustan collected in June 2014. This result represents the highest level of PSP toxins recorded in shellfish analysed via the OC programme from inshore Scottish waters since 2001, eclipsing the previous highest result of 4,776 µg/kg recorded at Loch Laxford: Weavers Bay in June 2013.
- PSP toxins above reporting levels, but below the MPL were detected in a further 48 samples (mussels (38), razors (6), surf clams (3) and Pacific oysters (1)) from 24 sites (Figure 14). All occurrences were recorded between April and August 2014.
- Results from 2008 to 2012 indicated that PSP toxicity episodes began typically in March/April and tended to conclude by July. The April onset in 2014 was consistent with previous years.
- Overall, the period January to December 2014 saw a similar number of samples found containing PSP toxins in comparison with 2013. However, it must be noted that, as a consequence of the revised risk assessment, testing frequencies were reduced in many areas and 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 this reporting period and alterations to the testing frequencies, the PSP statistics for 2014 may therefore not be a true reflection of the prevalence of PSP toxins in Scotland but more a result of targeted monitoring throughout the high risk period.
- A range of PSP toxins, most notably the toxins STX, GTX1&4, GTX2&3, NEO and C1&2, were identified throughout the reporting period in samples breaching the MPL (data not shown). Lower concentrations of GTX5 and dcGTX2&3 were also detected. Proportions of each toxin were found to vary widely but indications were provided for these to fall into three specific groups of profiles. These were found to be similar to those expected from shellfish contaminated with *Alexandrium* as evidenced by validation work and similar to toxin distributions seen in previous years (Turner et al., 2014).
- One shucked scallop verification sample originating from the Jura 15 scallop ground in June 2014 exceeded the MPL, recording a level of 1,222 µg/kg. One further shucked scallop sample from East 07 scallop ground collected in June 2014 recorded a result below the MPL at 296 µg/kg.
- In addition, trace levels of PSP toxins were detected in three whole king scallop and fifteen shucked product samples between January and October 2014.

Figure 13: Inshore locations recording PSP toxin results above the maximum permitted limit (>800µg STX eq./kg) in 2014

Figure 14: Inshore locations recording PSP toxin results below the maximum permitted limit (≤800µg STX eq./kg) in 2014



Phytoplankton associated with the production of PSP toxins

- *Alexandrium* was observed between February and October and was present in 536 samples (42.2%) analysed during 2014. It was recorded at or above the trigger level (set at 20 cells/L until 20th July 2014 and at 40 cells/L from 21st July) in 497 samples (39.1%). *Alexandrium* was most frequently observed during May, June and July, and was recorded at or above 40 cells/L in 48.6% of samples during July.
- The largest recorded *Alexandrium* bloom was observed in Loch Leven (Highland: Lochaber) on 18th July, with an abundance of 24,660 cells/L. The majority of cells were relatively small in size and although the presence of *Alexandrium minutum* was confirmed, no associated PSP toxicity in shellfish was reported at this time. However, an *Alexandrium* bloom of density 7,280 cells/L recorded in Loch Striven (Argyll & Bute) on 17th June was associated with an extensive PSP toxic event from late May until late July.
- *Alexandrium* was widespread throughout the Shetland Islands and was continuously present in Sandsound Voe for a period of 23 weeks between 5th March and 4th August. Continuous blooms were also recorded in Gruting Voe: Braewick Voe (19 weeks from 2nd April) and East of Linga (15 weeks from 30th April), with maximum densities of 1,260 cells/L and 1,200 cells/L observed at these sites, respectively on 30th July. PSP toxins were reported in shellfish from both of these sites and exceeded permitted levels at East of Linga. Toxin-producing *Alexandrium* was also variously recorded between March and July in Barassie (South Ayrshire), Arran: Lamlash Bay (North Ayrshire), Loch Fyne: Ardkinglas and Loch Scridain (Argyll & Bute), Arisaig: Morar Sands (Highland: Lochaber), Loch Laxford and Dornoch Firth (Highland: Sutherland), Forth Estuary: Largo Bay (Fife),

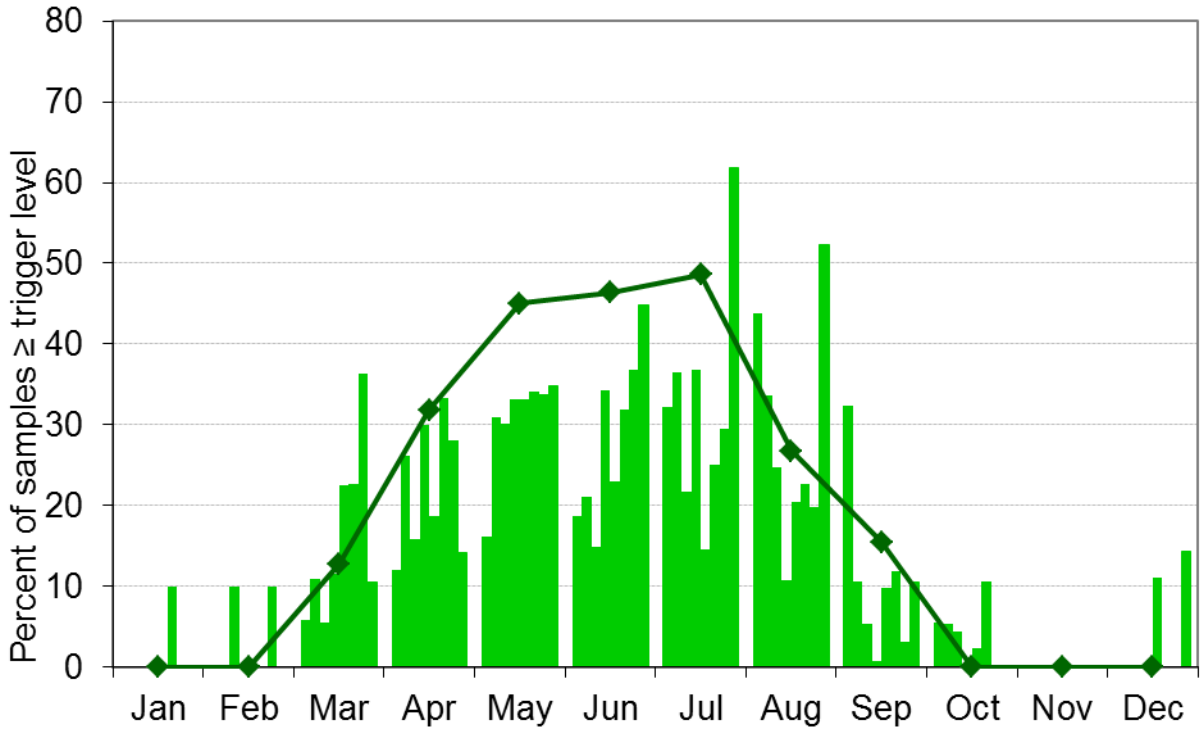


Figure 15: The percentage of samples in which *Alexandrium* cells equalled or exceeded the trigger level of 40 cells/L in 2014 is indicated by the line. For comparison, the bars show the percentage of samples in which *Alexandrium* cells equalled or exceeded the trigger level between 2006 and 2013. NOTE: Data collected prior to July 2014 (including 2006-2013) have been adjusted to the new trigger level of 40 cells/L for comparative purposes.

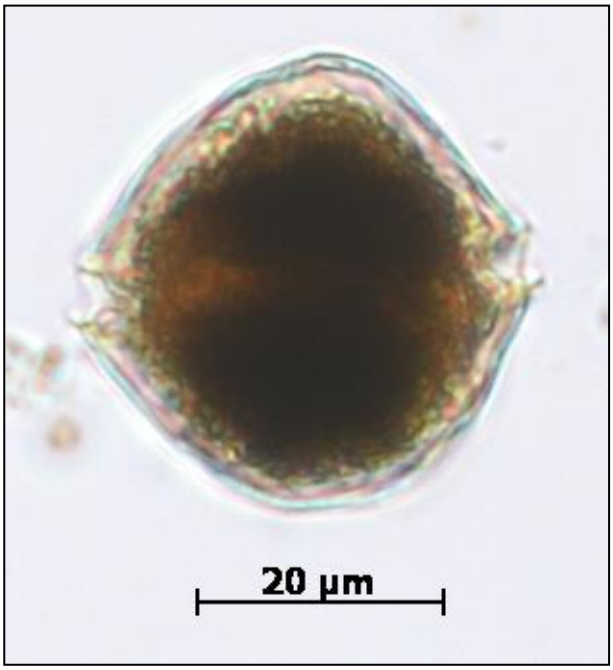
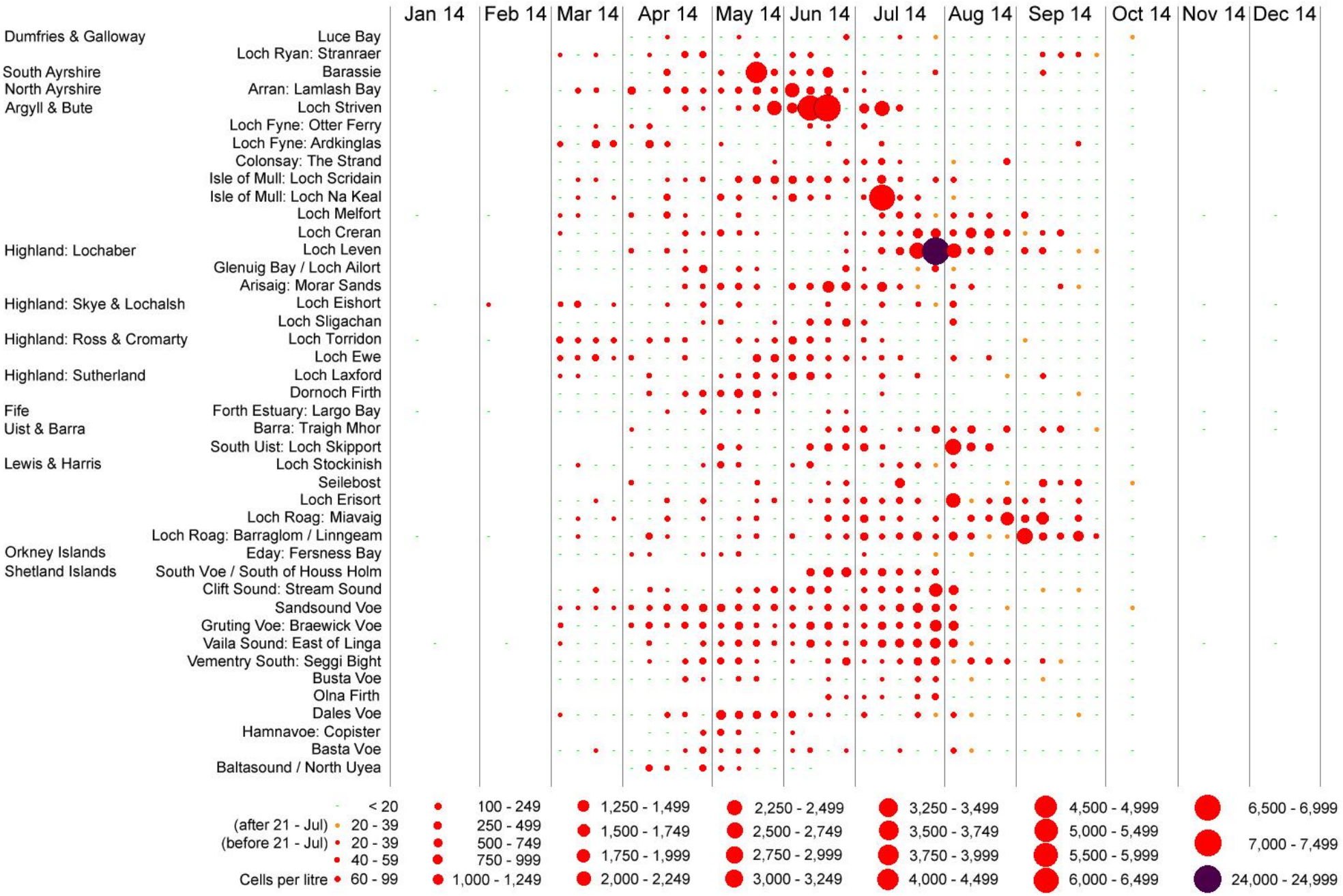


Figure 16: Species belonging to the genus *Alexandrium* were recorded at a density of 6,640 cells/L on 10th June. This bloom was associated with a PSP toxic event in shellfish from Loch Striven.

Figure 17. Phytoplankton concentrations observed between Jan and Dec 14 for the genus *Alexandrium*.

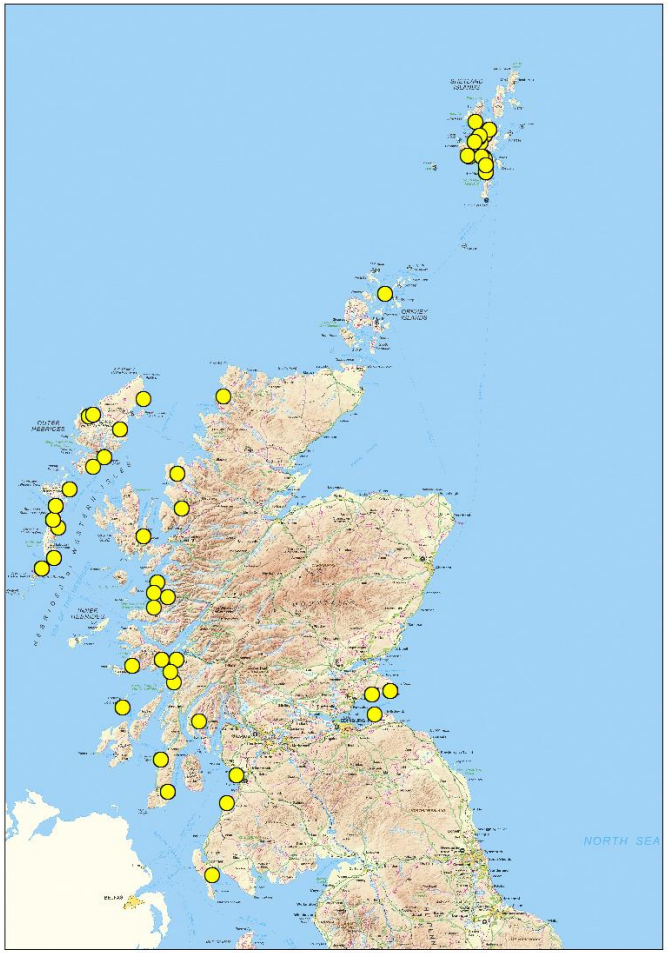


Monitoring for ASP toxins

Analyses for amnesic shellfish poisoning (ASP) toxins were conducted on 1335 samples from inshore locations and 43 king scallop verification samples collected from commercial establishments. All samples were analysed by an HPLC method. Results are summarised below.

- ASP toxins were detected in 121 inshore samples comprising of: common mussels (80), common cockles (19), razors (14), Pacific oysters (4) and surf clams (4). These samples originated from 49 sites, predominantly on the West Coast, Western Isles, Shetland Isles and Forth Estuary. All incidences were recorded between February and October 2014, with the peak period occurring between May & October.
- No samples exceeded the MPL of 20mg [domoic/epi domoic acid] (DA)/kg shellfish flesh. The highest level recorded was 14mg/kg in two mussel samples collected in mid July 2014 and originating from Campbeltown Loch: Kildalloig Bay Indicator (Argyll & Bute) and Olna Firth Inner: Parkgate (Shetland Islands) respectively. The remaining samples recorded levels below the MPL at ranges between 1 and 13mg/kg (Figure 18).
- The periods where ASP was detected during this reporting period are consistent with previous years, with significant increase in occurrence compared to 2013. However, it must be noted that, as a consequence of the revised risk assessment, testing frequencies were reduced in many areas and monitoring for ASP 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 this reporting period and alterations to the testing frequencies, the statistics may therefore not be a true reflection of the prevalence of ASP toxins in Scotland but more a result of targeted monitoring throughout the high risk period.
- ASP was detected in 23 king scallop verification samples from 11 establishments. Toxin levels ranged between 1.1 and 60mg/kg DA/shellfish flesh, two of which exceeded the MPL. These shellfish samples were originally harvested in the following offshore scallop grounds; Jura (12 samples), Clyde (5 samples), East Coast (2 samples), North Minch (2 samples), South Minch (1 sample) and Shetlands (1 sample) between January and December 2014. Eight of these samples comprised of whole king scallop material, the remaining fifteen of shucked product.
- The two samples which exceeded the MPL comprised of whole scallop samples originating from the Clyde 02 and Jura 09 offshore scallop grounds collected by Argyll & Bute Council in February and June respectively.

Figure 18: Inshore locations where ASP toxins were detected below the maximum permitted limit (≤20mg/kg) in 2014



Phytoplankton associated with the production of ASP toxins

- *Pseudo-nitzschia* was observed every month in 2014 and at all sites, and was present in 1225 (96.5%) of the samples analysed.
- *Pseudo-nitzschia* counts at or above the trigger level (set at 50,000 cells/L) were recorded in 116 samples (9.1%), with 12.7% of the samples analysed in June breaching this level. The earliest blooms were recorded around the Shetland Islands and Dornoch Firth during March.
- The largest *Pseudo-nitzschia* bloom was observed in Loch Sligachan (Highland: Skye & Lochalsh) on 23rd April, where a maximum density of >3.1 million cells/L was recorded. The rapid development of the bloom would suggest that the accumulation of cells from offshore is likely to have been a factor, as the increase in cell abundance was greater than would be possible by *in situ* growth alone. This bloom was widespread in the Highland region, from Arisaig: Morar Sands (Lochaber) to Loch Eishort (Skye & Lochalsh), Loch Torridon and Loch Ewe (Ross & Cromarty), with some associated ASP toxicity.
- Dense blooms exceeding 1 million cells/L were also recorded in Luce Bay (Dumfries & Galloway) in April, and around the Shetland Islands (Vementry South: Seggi Bight, Busta Voe and Olna Firth) on 30th June, and toxin-producing *Pseudo-nitzschia* was widespread around Shetland between June and August.

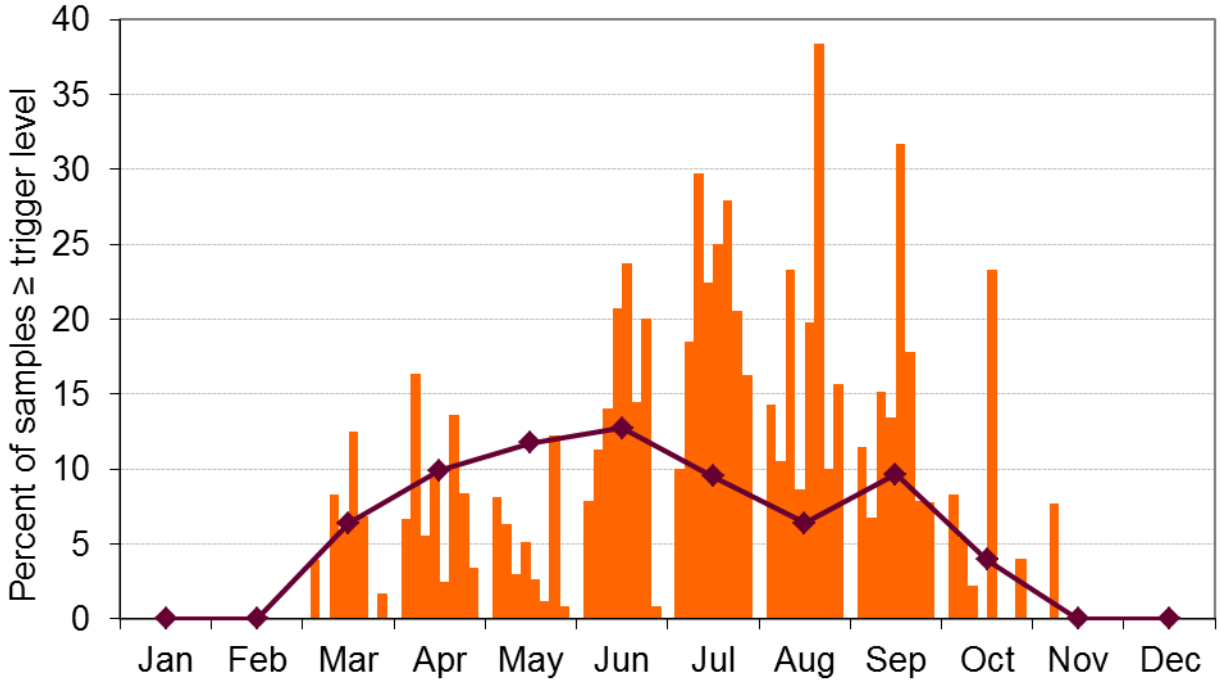


Figure 19: The percentage of samples in which *Pseudo-nitzschia* cells equalled or exceeded the trigger level of 50,000 cells/L in 2014 is indicated by the line. For comparison, the bars show the percentage of samples in which *Pseudo-nitzschia* cells equalled or exceeded the trigger level between 2006 and 2013.

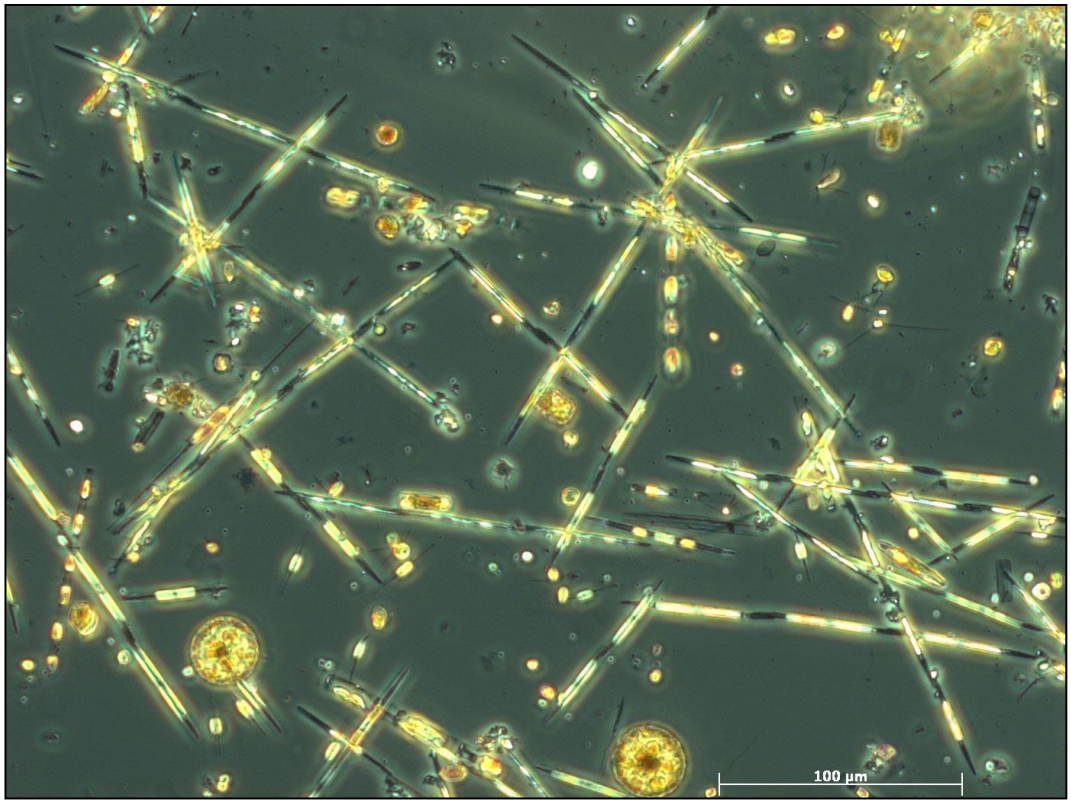
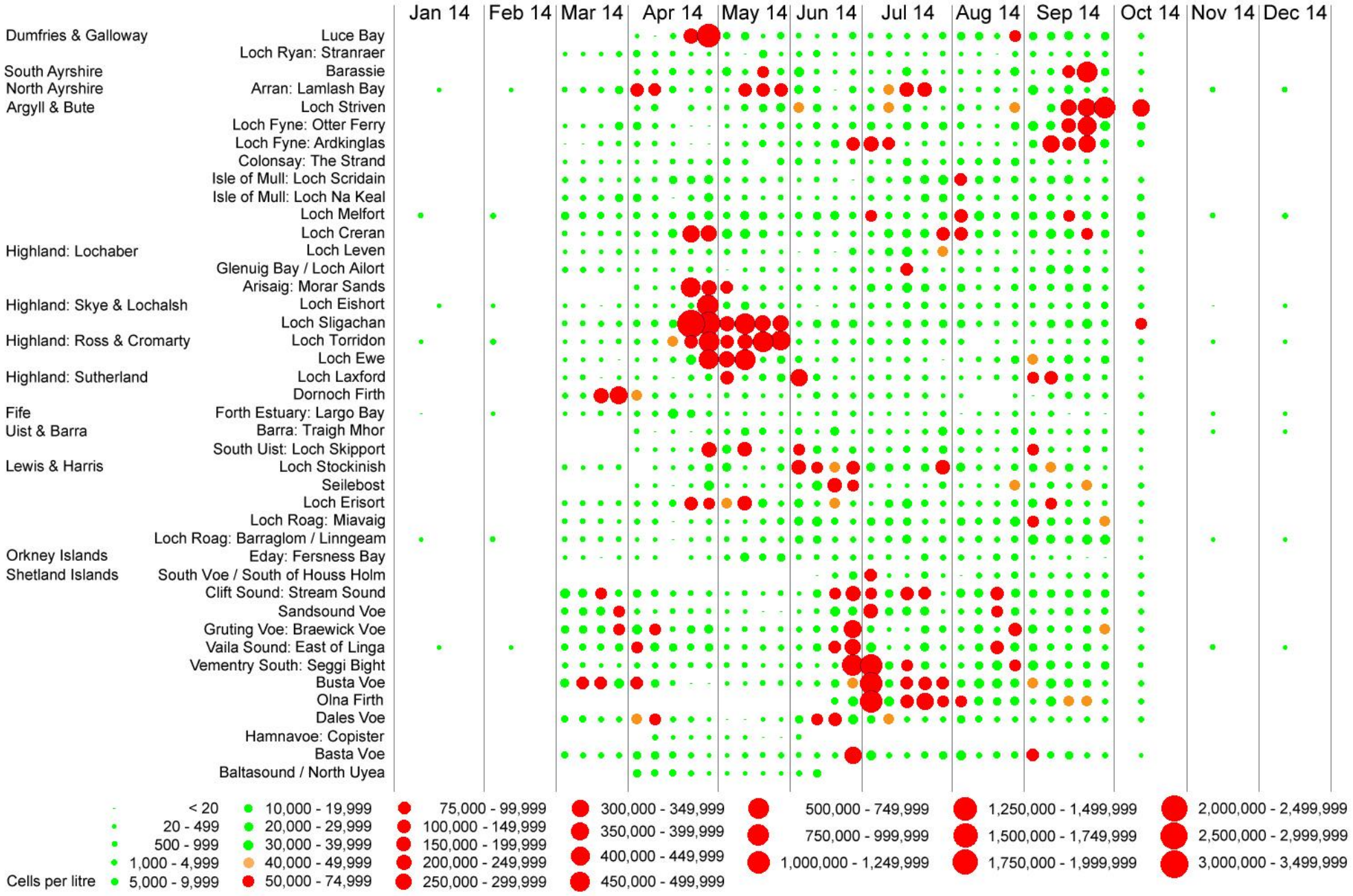


Figure 20: Species belonging to the genus *Pseudo-nitzschia* were observed at a concentration of greater than 3.1 million cells/L in Loch Sligachan (Highland: Skye & Lochalsh) on 23rd April.

Figure 21: Phytoplankton concentrations observed between Jan and Dec 14 for the genus *Pseudo-nitzschia*.



Other potentially harmful phytoplankton

Prorocentrum cordatum, formerly known as *Prorocentrum minimum* (Guiry, 2015), was present in 692 samples analysed in 2014 (54.5%). It was most abundant in May and June, being recorded in 82.1% and 86.2% of the samples analysed, respectively. The densest blooms in 2014 mainly occurred around the Shetland Islands and a maximum abundance of 513,891 cells/L was recorded in East of Linga on 28th May. A late bloom of *Prorocentrum cordatum* was observed in Loch Skipport (Uist & Barra), with an abundance of 168,270 cells/L on 16th September. This species was still present in Loch Skipport at a concentration of 9,560 cells/L on 14th October.

Figure 22: *Prorocentrum cordatum* observed in East of Linga (Shetland Islands) on 28th May at a density of 513,891 cells/L.

The potentially problematic dinoflagellate *Karenia mikimotoi* was not observed in densities likely to negatively impact aquaculture during 2014. This species is not an issue in terms of shellfish harvesting, as it does not produce biotoxins that are harmful to human health. However, it does produce ichthyotoxins that can kill finfish, and dense blooms may results in both fish and invertebrate mortality as a result of hypoxia. The densest *Karenia mikimotoi* blooms were most frequently detected in July and August, with a maximum abundance of 1,920 cells/L noted in Gruting Voe: Braewick Voe (Shetland Islands) on 30th July. This is the lowest abundance in any year since SAMS/SRSL began enumerating this species in 2006.

2. Abbreviations used in the text

AHA	Associated Harvesting Area
AOAC	AOAC International
ASP	Amnesic Shellfish Poisoning
AZA	Azaspiracid
AZP	Azaspiracid Poisoning
CI	Cyclic Imines
DA	Domoic Acid
DSP	Diarrhetic Shellfish Poisoning
DTX	Dinophysistoxin
dcSTX	decarbamoyl saxitoxin
EC	European Commission
EU	European Union
EHO	Environmental Health Officer
EPT	End product test
FSA	Food Standards Agency
FSAS	Food Standards Agency in Scotland
GTX	Gonyautoxin
HPLC	High Performance Liquid Chromatography
LA	Local Authority
LC-MS/MS	Liquid Chromatography with tandem Mass Spectrometry
LOD	Limit of detection
LOQ	Limit of quantitation
LT(s)	Lipophilic Toxins
MBA	Biological Assay
MPL	Maximum Permitted Level
ND	Not Detected
UKNRL	UK National Reference Laboratory for Marine Biotoxins
OA	Okadaic Acid
PSP	Paralytic Shellfish Poisoning
PTX	Pectenotoxin
PTX2	Pectenotoxin 2
PTX2sa	Pectenotoxin 2 seco-acid
RL	Reporting limit
RMP	Representative Monitoring Point
SAMS	The Scottish Association for Marine Science
SOP(s)	Standard Operating Procedure(s)
STX	Saxitoxin
YTX	Yessotoxin

3. Introduction

Phytoplankton are the organisms at the bottom of the marine food chain and are the primary food source for filter-feeding marine animals, such as bivalve molluscs.

Marine waters contain a diverse array of phytoplankton, the vast majority of which are benign. However, under certain conditions, a relatively few species produce toxins, some of which can accumulate in the tissue and organs of filter-feeding shellfish and also sometimes in other shellfish such as grazing gastropods. The ingestion of shellfish contaminated with biotoxins above certain levels is known to pose risks to the human consumer.

All phytoplankton grow by harvesting light energy from the sun through the process of photosynthesis, primarily using the pigment chlorophyll. Some phytoplankton species may also exhibit mixotrophic growth, being able to both photosynthesize and ingest smaller phytoplankton. Phytoplankton are characteristic of relatively shallow depths where sunlight can still penetrate into the water column. Photosynthesis allows phytoplankton to take up dissolved carbon dioxide from the water, along with inorganic nutrients such as nitrate, phosphate, silicate and trace metals, such as iron, which are also required for growth. Phytoplankton require sufficient light, warmth and nutrients to grow.

In winter, the water is too cold and the day length too short for growth to occur in most species. However, at this time, mixing of the water column returns nutrients to the surface layers.

In spring, with increasing water temperatures and daylight, rapid phytoplankton growth begins. This growth phase is called the spring bloom and is, in Scottish waters, characterised by diatom species that are capable of rapid utilisation of available nutrients and fast growth. Diatoms often dominate the spring bloom and early spring blooms may be large if the population of zooplankton grazers has not yet begun to increase. The spring bloom is terminated by the exhaustion of nutrients (usually the elements nitrogen or silicon) in the water column, and a rapid decline in phytoplankton density may occur as cells die, or are grazed down. This will also serve to return some nutrients, particularly nitrogen, into the water.

During summer, the composition of the phytoplankton community is of a different character to that of spring and contains a greater proportion of dinoflagellate species. Autumnal phytoplankton blooms can also occur due to enhanced nutrient availability following water column mixing and the breakdown of any summer stratification.

To date, eight major classes of marine phytotoxins have been identified and are distinguished by their chemical structure and physico-chemical behaviour. Five of these groups are known to induce human illness - Okadaic acid and Dinophysistoxins (OA/DTXs), Azaspiracids (AZAs), and the Saxitoxin (STX), Domoic Acid (DA) and the Brevetoxin groups. These groups are responsible for Diarrhetic Shellfish Poisoning (DSP), Azaspiracid Poisoning (AZP), Paralytic Shellfish Poisoning (PSP), Amnesic Shellfish Poisoning (ASP) and Neurotoxin Shellfish Poisoning (NSP) respectively. Pectenotoxins (PTXs), Yessotoxins (YTXs) and Cyclic Imines (CIs) form the remaining three groups and currently, there is a lack of toxicological evidence regarding human illness from these compounds.

Of the five major shellfish biotoxin groups known to induce human illness, there are currently three which are subject to statutory testing across the European Union (including the UK) to protect human health:

1. PSP toxins: PSP is associated with algae of the genus *Alexandrium* in Scottish waters. The active component in PSP is STX and its derivatives, which act upon blocking the voltage dependent sodium channels in nerves, thereby blocking nerve conduction. The symptoms seen following consumption of PSP contaminated shellfish include numbness in the mouth and fingertips followed by impaired muscle co-ordination. Respiratory distress and paralysis can occur and this may be fatal. PSP outbreaks have occurred in Scottish waters such as those along the west coast, Shetlands, Orkney Isles and Offshore Scallop Grounds. PSP toxicity is usually an annual event at the above locations, although levels may not exceed the maximum permitted limit (MPL) of 800 µg STX equivalence (STX eq.) per kg of flesh (EC Regulation 853/2004).

2. Lipophilic toxins: Of the lipid-soluble toxins, it is the OA/DTXs, AZAs, YTXs, PTXs that contribute to this class and collectively, they are referred to as lipophilic toxins (LTs). OA/DTXs are responsible for human DSP, whilst AZAs are responsible for AZP if present in shellfish flesh at concentrations above those defined as the MPL by EC Regulation 853/2004. Predominant symptoms include diarrhoea, nausea, vomiting and abdominal pain. OA and DTX-1 have also been shown to be cancer promoters in mouse skin bioassays and this poses another possible health problem (van Egmond *et al*. 1993). In the UK, LT positive samples have been found mostly in Southern English waters and throughout Scotland, where approximately 5 - 10% of samples submitted through the official control programme are found to be positive per annum. DSP toxins (OA and DTX groups) are produced by algae of the genera *Dinophysis* and *Prorocentrum.* AZAs are produced by dinoflagellates of the genera *Azadinium* and *Amphidoma*, whilst PTX toxins are produced by algae of the genera *Dinophysis.* YTX toxins are produced by a number of algal species including, *Lingulodinium polyedrum*, *Gonyaulax spinifera* and *Protoceratium reticulatum.*

3. ASP toxins: ASP is caused by DA produced by marine diatoms of the genus *Pseudo-nitzschia.* Symptoms include vomiting, diarrhoea, abdominal cramps and loss of short term memory which may be permanent. In a small number of cases ASP has been fatal. ASP toxins can often be detected in Scottish shellfish during the period April to November, at concentrations which at times exceed the MPL of 20 mg per kg of flesh (EC Regulation 853/2004).

Because of the above health risks to consumers of shellfish, legal controls are placed on the production and marketing of fishery products worldwide. In the European Union controls are prescribed in Regulation (EC) 854/2004. Regulation (EC) 853/2004 Chapter V of Section VII, Annex III prescribes the statutory maximum levels of biotoxins permitted in live bivalve molluscs being placed on the market by food business operators. Regulation (EC) 882/2004 provides a regulatory framework for competent authorities including general requirements for the methods used for analysis of official control samples and the validation of these methods. The regulations are further supported by Regulation (EC) 2074/2005 which sets out the analytical methods to be used for shellfish toxins. The above package of EU Regulation is directly applicable across all member

states and is intended to ensure a uniform approach to feed and food law across Europe. The Regulations are enabled in Scotland by The Food Hygiene (Scotland) Regulations 2006 (as amended).

Whilst it is the responsibility of Food Business Operators to ensure that the products they sell do not contain toxins above regulatory limits, there are very specific requirements placed upon 'Competent Authorities' in all member states. The legal requirements essentially require EU Member States to have in place an 'Official Control' monitoring system which checks i) for the presence of regulated marine biotoxins in shellfish production and relaying areas, and in products placed on the market and ii) checks for the possible presence of toxin producing phytoplankton in production and relaying areas. The competent authority is required to take action to close the production or relaying area and prevent further harvesting or sale of products found to contain levels of biotoxins above the limits prescribed in the legislation.

Under EU legislation the competent authority has the statutory responsibility for ensuring delivery of an effective official control programme including such aspects as the monitoring scope and frequency, test methods used, etc. The competent authority is required to act within the legal framework set by the legislation including, for example, the use of methods prescribed by the legislation.

In Scotland, the national Competent Authority is the Food Standards Agency in Scotland (FSAS), which, through its office in Aberdeen, delegates certain official control functions through Local Authorities e.g. local enforcement and sampling activities in some parts of the country. In 2012, the delivery of the FSA official control shellfish monitoring programmes (co-ordination, logistics and analyses) was contracted out to a consortium of UK laboratories and organisations known as the Shellfish Partnership. Within the context of the marine Biotoxin programmes, activities relating to the shellfish toxin programme in Scotland are delivered by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) whilst those relating to the phytoplankton monitoring are delivered by the Scottish Association for Marine Science (SAMS).

Within Scotland, monitoring for algal biotoxins is divided into two aspects, the flesh and phytoplankton monitoring programmes. For the flesh monitoring programme, samples of shellfish from designated shellfish harvesting areas and wild pectinidae from commercial processors are tested. In the phytoplankton monitoring programme, water samples are collected from fixed sites within selected harvesting areas and the composition of marine algae identified and enumerated. The presence of toxin-producing phytoplankton in the water column does not necessarily mean that toxin will be present. While the reasons for toxin production remain unclear, some phytoplankton may produce toxins as a deterrent for grazers, with some species only becoming toxic as a stress response to nutrient unavailability or other, as yet poorly understood environmental factors. Even when toxic phytoplankton are present in the water column, to some extent the amount ingested by filter-feeding shellfish will depend on the availability of other harmless phytoplankton species. Different genera of bivalves also vary in their rates of biotoxin accumulation and retention. Furthermore, the toxicity of harmful species may vary with the condition of the water column or the physiological state of the cell and the current analysis cannot be used to determine actual toxin production.

The shellfish monitoring programme encompassed two elements:

- Wild pectinidae control in the form of onshore verification checks by authorised officers of the Local Authorities, as required under Regulations (EC) 854/2004 and 882/2004.
- The inshore biotoxin monitoring programme whereby shellfish production areas are sampled through representative monitoring points (RMPs) and associated harvesting areas (AHAs). Under the current inshore monitoring programme, classified shellfish production areas are grouped into 'pods', where sites within a pod are thought to be similar hydrographically and environmentally. The pods are sampled through RMPs, which were chosen as the sites most likely to be representative or indicative of any toxicity in the area. Other sites within the pods are designated as AHAs.

During this reporting period, the pods were monitored in accordance with the FSAS risk assessment, at the following pod specific frequencies prior to and during periods of expected or active harvesting:

- PSP: either weekly, fortnightly or monthly, as determined by risk assessment
- LTs: weekly March to December, monthly January and February
- ASP: either weekly, fortnightly or monthly, as determined by risk assessment

The phytoplankton monitoring programme focuses on a number of selected sampling locations amongst the active shellfish RMPs. During the reporting period, monitoring frequency was set by the FSAS as follows:

- weekly for all sites between March and September;
- fortnightly in October;
- monthly sampling from November to February in a limited number of selected areas, to reflect the low abundance of phytoplankton in the water column during the winter months.

Monitoring at the selected water sampling locations focuses on those algal species which are considered as potentially harmful. In the reporting period, water samples collected from designated shellfish harvesting areas were monitored for seven potentially toxic genera or species of phytoplankton (Table 1).

Table 1: The seven genera or species of phytoplankton monitored in Scottish coastal waters in 2014

Toxin group	Genus/species
ASP toxins	*Pseudo-nitzschia* (genus)
PSP toxins	*Alexandrium* (genus)
OA/DTX/PTX	*Dinophysis* (genus)
OA/DTX	*Prorocentrum lima*
Unknown	*Prorocentrum cordatum*
YTX	*Protoceratium reticulatum*
YTX	*Lingulodinium polyedrum*

In addition, the monitoring programme will report unusually large occurrences of any of the other harmful species detailed on the IOC-UNESCO taxonomic reference list of harmful micro algae at http://www.marinespecies.org/hab/index.php

Species belonging to the diatom genus *Pseudo-nitzschia* are associated with the production of ASP toxins. Nine species have been observed in Scottish coastal waters, although it is not possible to routinely discriminate between species of *Pseudo-nitzschia* using light microscopy. Hence, determination of *Pseudo-nitzschia* is only carried out to genus level. In Scotland, a trigger level of 50,000 cells/L for *Pseudo-nitzschia* spp was defined by the UKNRL network. Cell counts above this level are regarded as having the potential to cause an ASP toxic event in shellfish.

In Scottish waters, species belonging to the dinoflagellate genus *Alexandrium* are associated with the production of PSP toxins. Dense blooms are not required before there is a cause for concern, and the presence of *Alexandrium* (40 cells/L) is taken as an indication of the potential for a PSP event. Four species have been reported from around Scotland, one of which is thought to be non-toxic (*Alexandrium tamutum)* and both toxic and non-toxic strains of another species (*Alexandrium tamarense)* have been found at some locations. However, it is difficult to determine *Alexandrium* to species level in a Lugol's-fixed sample using light microscopy and *Alexandrium* is thus reported to genus level within the monitoring programme.

Dinoflagellate phytoplankton are also associated with the production of toxins belonging to different LT groups. Okadaic acid and dinophysistoxins are produced by several species of *Dinophysis* and also by the benthic dinoflagellate *Prorocentrum lima*. In addition to these toxins, *Dinophysis acuta* is also associated with pectenotoxins, although this species is not particularly abundant in Scottish coastal waters. *Prorocentrum lima* is epiphytic in nature and it is unlikely that abundance in the water column is a true reflection of the actual abundance of this species. *Dinophysis* is reported to genus level within the monitoring programme, and cell counts above a threshold level of 100 cells/L for both *Dinophysis* spp. and *Prorocentrum lima* may be regarded as having the potential to cause a DSP toxic event in shellfish.

Prorocentrum cordatum is a small dinoflagellate that can form highly dense blooms, often exceeding several million cells/L, resulting in a visible discolouration of the water. One strain isolated from the French Mediterranean coast was found to be a neurotoxin producer, although the toxicity of *Prorocentrum cordatum* around UK waters is currently unknown.

Protoceratium reticulatum and *Lingulodinium polyedrum* are not frequently observed in Scottish coastal waters, but both species are associated with the production of yessotoxins. No threshold level has been applied to these species within the monitoring programme.

The azaspiracid producers, *Azadinium* and *Amphidoma*, are difficult to accurately identify using light microscopy and are not currently monitored as part of the programme.

4. Biotoxin Methodology

4.1. Shellfish collection

Inshore Monitoring Programme (classified shellfish production areas):

For the monitoring period of 1st January to 31st December 2014, 2967 samples from 102 inshore sampling locations were submitted for toxin analyses. These sampling locations covered 84 pods within 14 Local Authority regions.

The inshore samples received by Cefas during the reporting period comprised of mussels (*Mytilus* spp.) (2142 samples - 72% of all samples), Pacific oysters (*Crassostrea gigas*) (459 - 15%), razors (*Ensis* spp.) (185 – 6%), common cockles (*Cerastoderma edule*) (142 – 5%) and surf clams (*Spisula solida*) (39 - 2%).

Samples were collected by officers operating on behalf of several contractors appointed by the FSAS. A list is provided in Table 2. The majority of samples were collected by appointed sampling officers. However, in specific incidences and dependent on location or accessibility, the FSAS also allowed the collection of samples by the industry. These samples qualified as “unverified” were collected under the direction of the responsible sampling contractor. During this reporting period, 15% of the samples received were of unverified origin (Table 2). Numbers however varied significantly between Local Authority regions. A further breakdown of unverified samples received (by species and fishery type) is provided in Table 3.

Table 2: Number of verified and unverified inshore biotoxin samples collected during the reporting period by Local Authority region and by sampling contractor.

Local Authority	Sampling contractor	No. samples received	No. verified samples received	No. unverified samples received
Argyll & Bute Council	Argyll & Bute Council	704	696	8
Comhairle nan Eilean Siar: Lewis & Harris	Hall Mark Meat Hygiene	341	295	46
Comhairle nan Eilean Siar: Uist & Barra	Hall Mark Meat Hygiene	261	234	27
Dumfries & Galloway Council	FSA Operations	64	43	21
Fife Council	Hall Mark Meat Hygiene	96	38	58
East Lothian Council	Hall Mark Meat Hygiene	12	2	10
Highland Council: Lochaber	Highland Council	249	128	121
Highland Council: Ross & Cromarty	Highland Council	100	100	0
Highland Council: Skye & Lochalsh	Highland Council	131	130	1
Highland Council: Sutherland	Highland Council	189	98	91
North Ayrshire Council	FSA Operations	87	84	3
Orkney Islands Council	Hall Mark Meat Hygiene	16	0	16
Shetland Islands Council	Hall Mark Meat Hygiene	680	664	16
South Ayrshire Council	FSA Operations	37	3	34
Totals		**2967**	**2515 (85%)**	**452 (15%)**

Table 3: Number of unverified inshore biotoxin samples collected during the reporting period by species and fishery type.

Species	Fishery type	No. unverified samples received	Proportion of unverified samples received per species
Common cockles	Wild harvest	4	2.8%
Common mussels	Aquaculture	214	10.5%
Common mussels	Wild harvest	11	
Pacific oysters	Aquaculture	16	3.5%
Razors	Wild harvest	169	91.4%
Surf clams	Wild harvest	38	97.4%

Shellfish were collected and packaged in accordance with the Shellfish Partnership protocols and sent to the Cefas Weymouth laboratory for analysis. All samples were posted using Royal Mail next day delivery service. The majority of samples (~99%) arrived at the laboratory within one or two working days of sample collection (86 and 13%, respectively) (Table 4). When delays occurred, these were generally attributed to the time at which the samples were collected, thus missing the routine post office collection deadline or to other events outside of the laboratory or sampling officers' control, such as inclement weather or transport network problems.

Table 4: Number of inshore samples received from each Local Authority region in 2014 and time taken between collection and receipt at Cefas

Local Authority	No. samples received	No. received 1 working day post collection	No. received 2 working days post collection	No. received 3 working days post collection	No. received 4 working days post collection
Argyll & Bute Council	704	636	65	3	0
Comhairle nan Eilean Siar: Lewis & Harris	341	318	23	0	0
Comhairle nan Eilean Siar: Uist & Barra	261	168	86	6	1
Dumfries & Galloway Council	64	48	14	2	0
Fife Council	96	73	22	1	0
East Lothian Council	12	7	5	0	0
Highland Council: Lochaber	249	168	77	4	0
Highland Council: Ross & Cromarty	100	96	4	0	0
Highland Council: Skye & Lochalsh	131	110	19	2	0
Highland Council: Sutherland	189	187	2	0	0
North Ayrshire Council	87	81	6	0	0
Orkney Islands Council	16	2	14	0	0
Shetland Islands Council	680	632	40	8	0
South Ayrshire Council	37	19	15	3	0
Totals	**2967**	**2545 (86%)**	**392 (13%)**	**29 (0.98%)**	**1 (0.03%)**

Careful programme management and liaison with sampling officers minimised the occurrence and impact of delays on the programme, with only 1.1% of samples (n=30) being received three or four working days post collection throughout this reporting period. Only one of these 20 late samples (a razor sample collected from Forth Estuary: Largo Bay, and received three working days post-collection) was assessed as unsuitable for analyses, based on poor organoleptic properties upon arrival at the laboratory (see section 4.2).

Wild pectinidae – Onshore Surveillance Programme:

Forty four king scallop samples (consisting of shucked product (n=34) or whole shellfish (n=10)) were collected from 14 separate premises by authorised officers from five LA regions (Argyll & Bute, Comhairle na Eilean Siar – Uist & Barra, Moray, Shetland Isles and South Ayrshire) during the reporting period and submitted to Cefas for toxin analyses. These premises represented approximately 20% of the circa 70 approved shellfish processing, auction and dispatch centres in Scotland.

The scallop samples were originally harvested from the following offshore scallop grounds: Clyde (C01, C02, C03 & C05), East Coast (E04 & E07), Hebrides (H10), Jura (J02, J05, J08, J09, J12 & J15), North Minch (NM19 & NM20), Shetlands (S09, S10, S13 & S14) and South Minch (SM07, SM09 & SM15) (Figure 24, page 144). Two samples were received from un-specified offshore scallop grounds.

Thirty nine samples arrived within one working day of collection and five two working days post collection.

4.2. Shellfish analysis

Assessment of suitability of the samples for analysis

On arrival at the laboratory, all samples were assigned a unique laboratory number and assessed for their suitability for analysis.

Shellfish which failed to respond to a percussion test, and/or did not exhibit the organoleptic characteristics of freshness or were accompanied by incorrect or missing paperwork were excluded from the test and reported as unsuitable for analysis. A summary of the number of samples assessed as unsuitable during the reporting period is given in Table 5. Overall, only seven inshore samples were rejected in 2014. All 44 king scallop samples collected by local food authorities from commercial establishments were received in a suitable condition for analyses, although one sample was rejected due to arrival at the laboratory outside of agreed testing periods. Therefore 99.7% of all samples received were assessed as suitable for analysis and tested in 2014.

Table 5: Summary of inshore samples found unsuitable for toxin analyses, by Local Authority region.

Local Authority	No. samples received	No. rejected due to unsatisfactory organoleptic quality/freshness	No. rejected due to other reasons (eg: arrived late or unscheduled sample)
Argyll & Bute Council	704	0	0
Comhairle nan Eilean Siar: Lewis & Harris	341	0	0
Comhairle nan Eilean Siar: Uist & Barra	261	0	0
Dumfries & Galloway Council	64	1	0
Fife Council	96	1	0
East Lothian Council	12	0	0
Highland Council: Lochaber	249	0	1
Highland Council: Ross & Cromarty	100	0	0
Highland Council: Skye & Lochalsh	131	0	0
Highland Council: Sutherland	189	0	0
North Ayrshire Council	87	0	1
Orkney Islands Council	16	0	0
Shetland Islands Council	680	0	1
South Ayrshire Council	37	0	2
Totals	**2967**	**2 (0.1 %)**	**5 (0.2%)**

Insufficient samples

Samples which were assessed as suitable for analysis were then prepared for ASP, LTs and/or PSP tests (where required). The tests to be conducted on each batch of samples were defined by the current risk assessment and co-ordinated by Cefas. All inshore and king scallop verification samples assessed as suitable for analyses yielded sufficient material for the required tests.

Methodology

The methods used for routine toxin analysis were those specified by FSA and involved the application of a range of analytical methods. These included liquid chromatography (LC) with Ultra-violet (UV) or fluorescence (FLD) detection or LC with tandem mass spectrometry (MS/MS) for either qualitative screening of samples (screen) or full toxin quantitation. The methods used for toxin testing were as follows:

ASP testing

- Shellfish species received in the reporting period were tested by LC-UV analysis following extraction with 50% methanol and filtration of the crude extracts. The quantitative method was applied to all shellfish species and is based on the method of Quilliam et al., 1995.

PSP testing

- Shellfish species received in the reporting period have all been validated at Cefas for the use of a refined LC-FLD method based on OMA AOAC 2005.06. Samples were all extracted with acetic acid and forwarded for qualitative screening by LC-FLD. Any samples returning a positive LC screen result were then forwarded for quantitation by LC-FLD.
- A semiquantitative LC-FLD method was assessed for the determination of Paralytic Shellfish Toxin levels in bivalve molluscs from Great Britain. The qualitative screening step employed at Cefas since 2007 for determining positive samples prior to quantitation, was modified to enable the estimation of total sample toxicity from the periodate-oxidised sample extracts. To validate the method, the approach was applied to data obtained over 5 years, enabling a comparison between quantitative and semiquantitative PST data in over 15,000 shellfish samples. The assessment showed the semiquantitative approach to over-estimate the quantitative sample toxicity, on average by a factor of 2. Following validation, the method was implemented into the official control monitoring programmes in May 2014, using a threshold of 400 µg STX eq/kg. Samples containing PST with a total sample toxicity above this threshold were forwarded to full quantitation, whilst those under this limit were reported as <400 µg STX eq/kg. Since implementation, this approach has significantly increased the number of sample results reported within 1 day of sample receipt and increased the ability of the laboratory to deal with large numbers of positive samples during periods of high PST toxicity.

Lipophilic toxins testing

- All shellfish species were analysed by LC-MS/MS for the quantitation of all EU regulated lipophilic toxins. The method used was validated at Cefas based on the conditions stipulated by the EU Reference Laboratory (EU RL) for Marine Biotoxins.

Table 6 summarises the methods of analysis used throughout this reporting period together with a summary of the current UKAS accreditation status of each method to ISO 17025:2005 standard.

Table 6: List of analytical methods used in 2014

Toxin group	Methods employed	Species tested	Dates	Accreditation status (as of 31st December 2014) to ISO 17025:2005 standard
ASP	LC-UV	All species	1st January to 31st December 2014	Accredited
PSP	LC-FLD (screen, semi – quantitative screen & full quantitation)	All species	1st January to 31st December 2014	Accredited
Lipophilic toxins	LC-MS/MS	All species	1st January to 31st December 2014	Accredited

Test outcome

Samples were considered as positive if they were found to breach the maximum permitted limits (MPL) for marine toxins specified in EC regulation 853/2004 (Table 7). Where these levels were exceeded, recommendations were that temporary harvesting restrictions be put in place on the affected area until two consecutive negative or below action level (action level equals MPL) results were achieved for the toxin which was the cause of the closure, and negative or below action level results for the toxin groups which had not exceeded the MPL.

Table 7: Maximum Permitted Limits of toxins in shellfish flesh

Toxin group	Maximum Permitted Limits
ASP	20 mg Domoic/epi-domoic acid/kg [shellfish flesh]
LTs	Diarrhetic shellfish poisoning (DSP) toxins and pectenotoxins (PTXs) together, 160µg okadaic acid eq./kg [shellfish flesh] or Yessotoxins, 3.75mg yessotoxin eq./kg [shellfish flesh] or Azaspiracids, 160µg azaspiracid eq./kg [shellfish flesh]
PSP	800µg saxitoxin eq./kg [shellfish flesh]

In accordance with the FSAS risk assessment, requests were made for weekly shellfish monitoring to be instigated (if not already ongoing) when set trigger levels, indicative of heightened toxicity risk risks were breached. The trigger levels used in the 2014 reporting period are summarised in Table 8:

Table 8: Flesh and phytoplankton trigger levels

Toxin group	Levels of toxin or cell concentrations triggering additional monitoring if breached
ASP	≥10mg domoic/epi-domoic acid/kg shellfish flesh and/or *Pseudo-nitzschia* spp. ≥ 50,000 cells/L
LTs	OA/DTX/PTX group: ≥80 µg OAeq./kg shellfish flesh AZA group: ≥80 µg AZA1eq./kg shellfish flesh YTX group: ≥1.8mg/kg shellfish flesh and/or *Prorocentrum lima*/*Dinophysis* spp. ≥ 100 cells/L
PSP	≥400µg STX eq./kg shellfish flesh and/or *Alexandrium* spp. (20 cells/L) before 21st July 14 *Alexandrium* spp. (40 cells/L) from 21st July14

4.3. Reporting of results

Upon completion of the required analyses, the results were collated and quality control checked prior to submission to FSAS.

Results were reported on a daily basis. During this reporting period, Cefas were able to report all results from 93% of all samples received within one working day of receipt and 100% within two working days. Of the 205 samples results which were reported after one working day of receipt, 199 samples (97%) required additional PSP LC-FLD quantitative analyses, thus incurring a delay in the reporting timeframe.

For reference, the turnaround times agreed with the FSAS and required from Cefas during the reporting period were as follows:

Table 9: Sample turnaround times (from sample receipt) specified by FSAS and achieved by the laboratory

Toxin and analysis method	FSA specified targets	Laboratory statistics in the reporting period (all results combined)
ASP by HPLC	80% within 1 working day 100% within 3 working days	93% within 1 working day 100% within 2 working days
Lipophilic toxins by LC-MS	70% within 1 working day 100% within 3 working days	
PSP by HPLC (screen)	80% within 1 working day 100% within 3 working days	
PSP by HPLC (quantitation)	80% within 2 working days 100% within 4 working days	

Required turnaround times were therefore all met and for all analyses, delivery by the laboratory exceeded the targets agreed with FSAS.

In addition to daily reports, all results from samples received between Monday and Friday the previous week were collated and reported in a weekly results sheet to FSAS, released by the following Tuesday.

A summary of results turnaround times, for inshore samples from day of receipt to completion of all required analyses for the period 1st January to 31st December 2014 is given in Table 10.

Table 10: Turnaround times, by Local Authority region, for samples received from inshore areas in 2014

Local Authority	No. samples received	No. completed results reported within one working day of receipt of sample	No. completed results reported two working days after receipt of sample	No. completed results reported more than two working days after receipt of sample
Argyll & Bute Council	704	654	50	0
Comhairle nan Eilean Siar: Lewis & Harris	341	334	7	0
Comhairle nan Eilean Siar: Uist & Barra	261	252	9	0
Dumfries & Galloway Council	64	61	3	0
Fife Council	96	90	6	0
East Lothian Council	12	12	0	0
Highland Council: Lochaber	249	235	14	0
Highland Council: Ross & Cromarty	100	94	6	0
Highland Council: Skye & Lochalsh	131	123	8	0
Highland Council: Sutherland	189	170	19	0
North Ayrshire Council	87	76	11	0
Orkney Islands Council	16	14	2	0
Shetland Islands Council	680	615	65	0
South Ayrshire Council	37	32	5	0
Totals	**2967**	**2762 (93%)**	**205 (7%)**	**0 (0%)**

5. Phytoplankton Methodology

5.1. Water collection

For the monitoring period 1st January to 31st December 2014, a total of 1271 seawater samples were collected from 51 sampling locations within 13 Local Authority regions (Table 11). As for shellfish samples, seawater samples were collected by officers operating on behalf of several contractors appointed by the FSAS. A list is provided in Table 11.

Table 11: Number of water samples collected during the reporting period by Local Authority region and by sampling contractor.

Local Authority	Sampling contractor	No. samples received 01st Jan to 31st Dec 14	No. samples rejected
Argyll & Bute Council	Argyll & Bute Council	254	1
Comhairle nan Eilean Siar: Lewis & Harris	Hall Mark Meat Hygiene	159	
Comhairle nan Eilean Siar: Uist & Barra	Hall Mark Meat Hygiene	58	
Dumfries & Galloway Council	FSA Operations	60	
Fife Council	Hall Mark Meat Hygiene	36	
Highland Council: Lochaber	Highland Council	92	
Highland Council: Ross & Cromarty	Highland Council	67	
Highland Council: Skye & Lochalsh	Highland Council	68	
Highland Council: Sutherland	Highland Council	62	
North Ayrshire Council	FSA Operations	36	
Orkney Islands Council	Hall Mark Meat Hygiene	31	
Shetland Islands Council	Hall Mark Meat Hygiene	320	
South Ayrshire Council	FSA Operations	28	
TOTAL		**1271**	**1**

Samples were collected and packaged in accordance with SRSL's guidance and protocols and sent to the SRSL Oban laboratory for analysis. One sample was not analysed due to a laboratory error.

The sampling protocol used by appointed officers followed that described by the UKNRL SOP for the collection of water samples for toxic phytoplankton analysis. The aim of this method is to collect samples of phytoplankton that are representative of the community in the water body. The water sample is taken as close to the shellfish bed as possible and at the location from where shellfish samples for tissue analysis are collected. The sampling method used depends on the depth of water at the site, and water samples are collected with either a PVC sample tube (the preferred method, taking a depth integrated sample) or a bucket, as appropriate. A well-mixed 500 mL sub-sample of this water is then preserved using acidified Lugol's iodine and returned (usually by post) to SRSL for analysis.

The majority of samples (98.5%) arrived at the laboratory within one or two working days of sample collection, 85.5% and 13.0%, respectively (Table 12). Of the samples taking more than one working day to arrive, over 89% were from remote areas, with the majority of these samples being collected on islands (82.9%). Delays from non-remote areas were

generally attributed to the time at which the samples were collected, thus missing the routine post office collection deadline, and no postal collection due to bank holidays.

Table 12: Number of phytoplankton samples received from each Local Authority region and time taken between collection and receipt at SRSL in 2014.

Local Authority	No. samples received	No. received 1 working day post collection	No. received 2 working days post collection	No. received 3 working days post collection	No. received ≥4 working days post collection
Argyll & Bute Council	254	226	25	3	0
Comhairle nan Eilean Siar: Lewis & Harris	159	142	14	3	0
Comhairle nan Eilean Siar: Uist & Barra	58	30	22	5	1
Dumfries & Galloway Council	60	54	6	0	0
Fife Council	36	27	9	0	0
Highland Council: Lochaber	92	73	18	1	0
Highland Council: Ross & Cromarty	67	62	4	1	0
Highland Council: Skye & Lochalsh	68	54	14	0	0
Highland Council: Sutherland	62	58	4	0	0
North Ayrshire Council	36	33	3	0	0
Orkney Islands Council	31	19	11	1	0
Shetland Islands Council	320	286	30	4	0
South Ayrshire Council	28	23	5	0	0
Totals	**1271**	**1087** (85.5%)	**165** (13.0%)	**18** (1.4%)	**1** (0.1%)

5.2. Phytoplankton analysis

Assessment of suitability of the samples for analysis

On arrival at the laboratory, all samples were assigned a unique laboratory number and assessed for their suitability for analysis. One sample was not analysed due to lab error.

Methodology

The UKNRL protocol for the identification and enumeration of potential toxin-producing phytoplankton was used to analyse all water samples. In the laboratory, a sub-sample of 50 mL is routinely settled (Figure 23), but if the amount of sediment present in the sub-sample is excessive, 25 mL or 10 mL sub-samples may be used. The phytoplankton cells within the sub-sample are allowed to sink onto the base of a settling chamber for a minimum period of 20 hours (for a 50 mL sub-sample) before analysis. The cells are then identified and enumerated using an inverted light microscope. Final cell densities are calculated to express phytoplankton concentration as the number of cells per litre of sample. The method is accredited to ISO 17025 standard.

Figure 23: Phytoplankton cells in a 50 mL sub sample of Lugol's-fixed seawater are allowed to settle onto the base plate of the chamber prior to analysis.

Test outcome

"Trigger" levels for toxic phytoplankton concentrations in the water column have been determined historically by comparing phytoplankton count data with the presence of biotoxins in shellfish tissue. The trigger levels set by the FSAS remained at the same cell concentrations as used in previous years, with one exception (Table 8). The trigger level for *Alexandrium* spp. changed from 20 to 40 cells/L for all samples collected from 21st July 2014, following a review by FSAS.

5.3. Reporting of results

Upon completion of analyses, results were collated and quality control checked prior to submission to the FSAS. During 2014, SRSL was able to report all results within three working days of sample receipt. This turnaround time is in full compliance with the targets specified by the FSAS.

In addition to the daily reports, all results from samples received the previous week were collated and reported in a weekly results sheet to FSAS, released by the following Tuesday.

6. Results of the inshore biotoxin & phytoplankton monitoring programmes

The following section gives an overview of all shellfish biotoxin and phytoplankton sampling locations and results by Local Authority region and pod for the period 1st January to 31st December 2014.

Site locations and corresponding maps are correct as of 31st December 2014, in accordance with the FSAS Biotoxin RMP information list.

Key to shellfish results summary

	No sample received/No result
	Test not required
	ASP: <Limit of Quantitation (LOQ) LTs: <Reporting Limit (RL) PSP: Not detected (ND), <400 ug/kg (by semi quantitative analyses) or <RL (by full quantitative analyses)
	ASP: >LOQ but ≤20mg/kg LTs: >RL but ≤MPL PSP: Quantifiable levels ≤800ug/kg
	ASP: >20mg/kg LTs: >MPL PSP: >800ug/kg
▲	Toxin levels increasing from previous week(s)
▼	Toxin levels decreasing from previous week(s)

Key to phytoplankton results summary

	No sample received/No result
	Test not required
	Pseudo-nitzschia spp.: <40,000 cells/L *Dinophysis* spp.: <80 cells/L *Prorocentrum lima*: <80 cells/L *Alexandrium* spp.: Not detected
	Pseudo-nitzschia spp.: 40,000 to <50,000 cells/L *Dinophysis* spp.: 80 cells/L *Prorocentrum lima*: 80 cells/L *Alexandrium* spp.: 20 cells/L from 21st July 14
	Pseudo-nitzschia spp.: ≥50,000 cells/L *Dinophysis* spp.: ≥100 cells/L *Prorocentrum lima*: ≥100 cells/L *Alexandrium* spp.: ≥20 cells/L before 21st July 14 *Alexandrium* spp.: ≥40 cells/L from 21st July 14

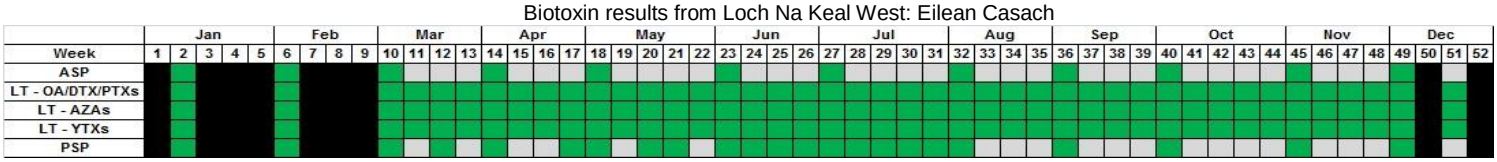
6.1. ARGYLL & BUTE COUNCIL

Pod 1

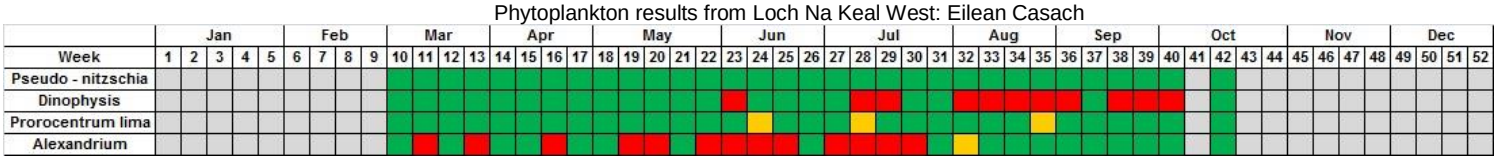
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
1	Argyll and Bute Council	Loch Na Keal West	Eilean Casach	AB 286 082 13	Pacific oysters	Yes	NM45723919
1	Argyll and Bute Council	Ulva: Loch Tuath Soriby Bay	Loch Tuath Soriby Bay	AB 285 081 13	Pacific oysters		NM42944022
1	Argyll and Bute Council	Loch Na Keal	Eilean Liath	AB 284 080 13	Pacific oysters		NM47423929

Biotoxin results from Loch Na Keal West: Eilean Casach



Phytoplankton results from Loch Na Keal West: Eilean Casach



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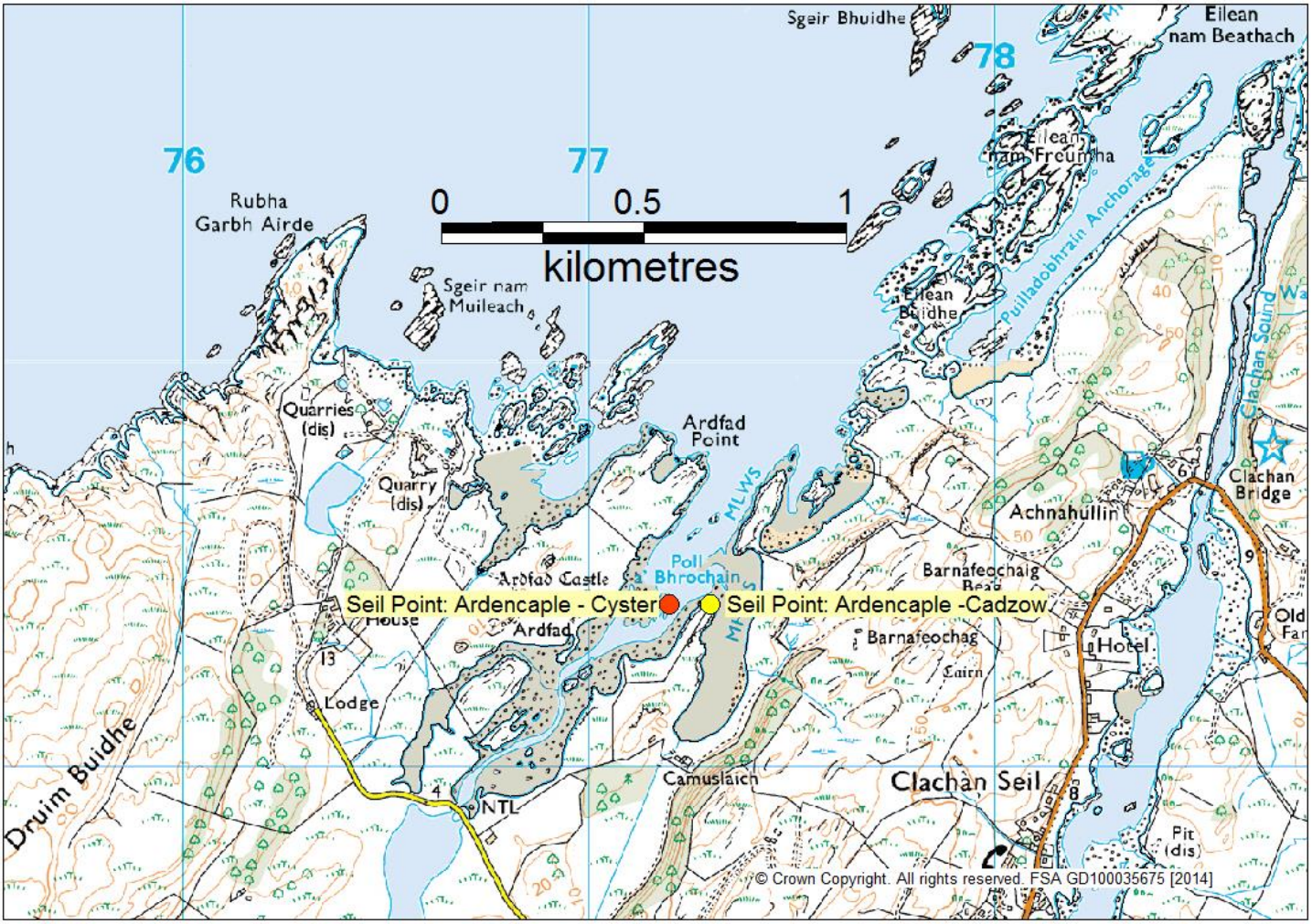
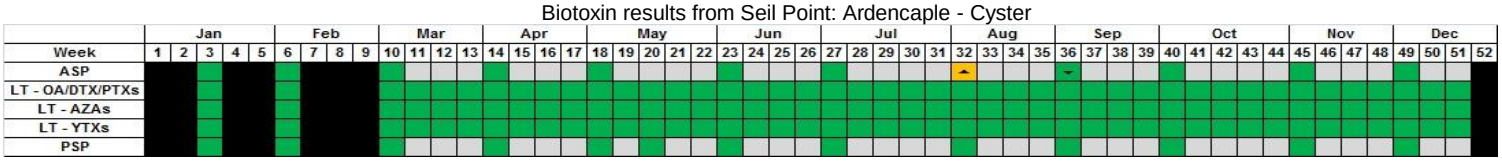


RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
4	Argyll and Bute Council	Seil Point	Ardencaple - Cadzow	AB 245 069 13	Pacific oysters		NM773194
4	Argyll and Bute Council	Seil Point	Ardencaple - Cyster	AB 245 070 13	Pacific oysters	Yes	NM77091938

Biotoxin results from Seil Point: Ardencaple - Cyster



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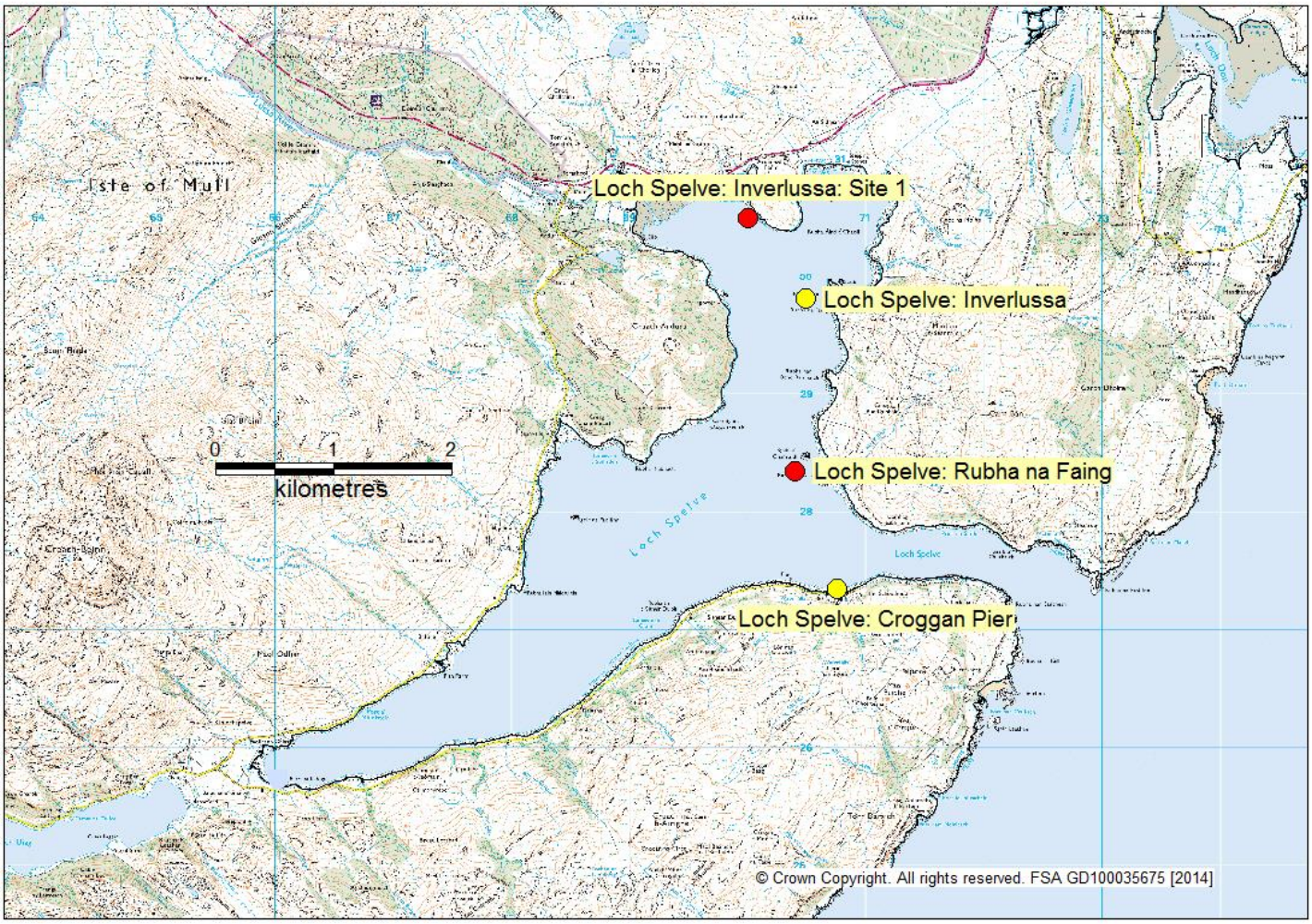
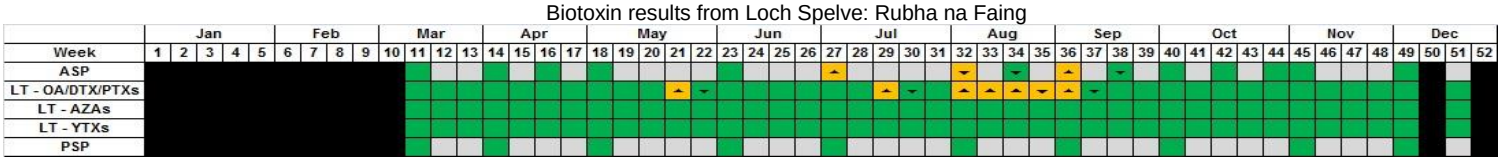


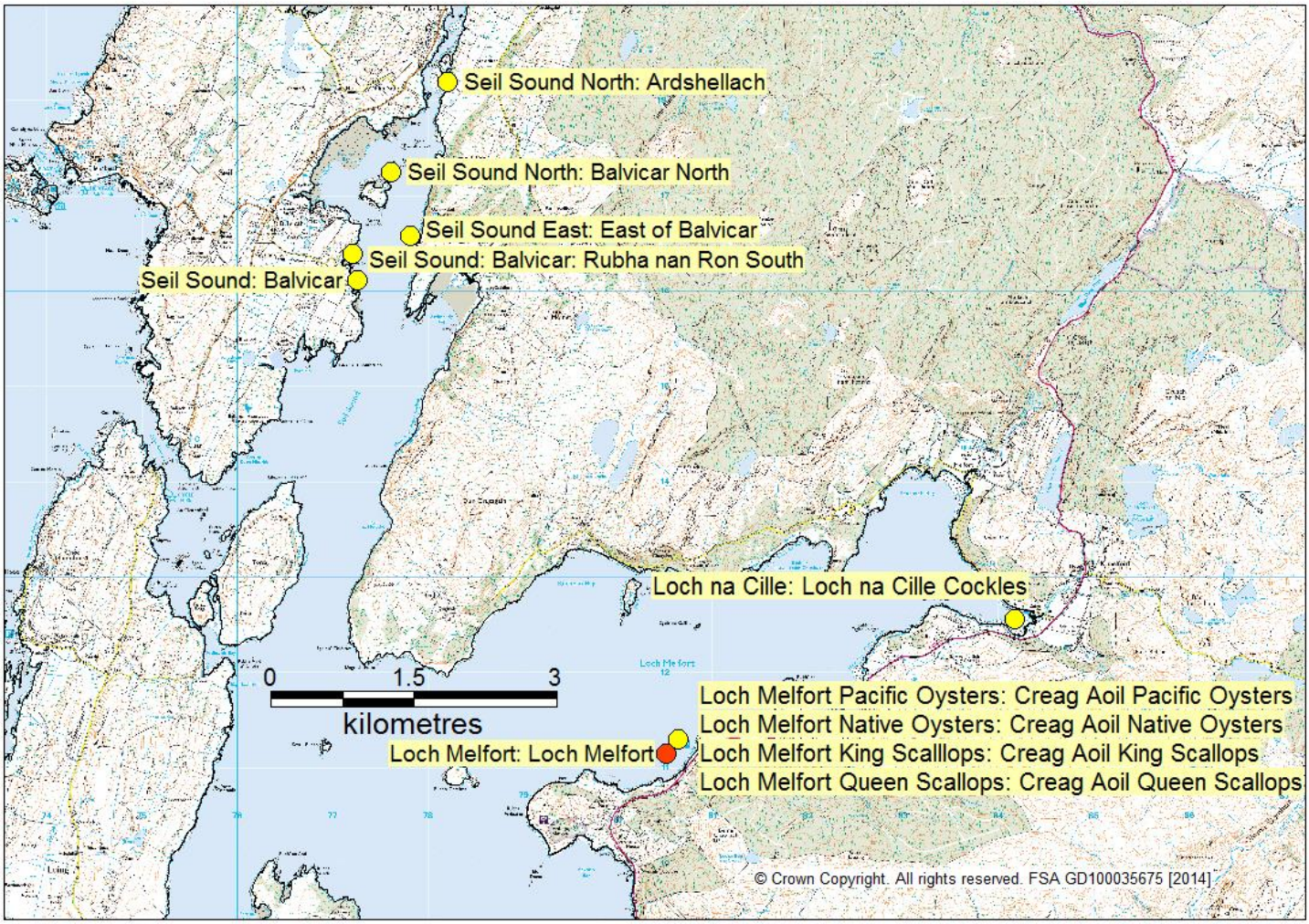
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
5	Argyll and Bute Council	Loch Spelve: Inverlussa	Inverlussa	AB 200 056 08	Common mussels		NM705298
5	Argyll and Bute Council	Loch Spelve: Inverlussa	Site 1	AB 200 057 08	Common mussels	Alternate RMP	NM69893046
5	Argyll and Bute Council	Loch Spelve: Rubha na Faing	Rubha na Faing	AB 202 059 08	Common mussels	Yes	NM70402833
5	Argyll and Bute Council	Loch Spelve: Croggan Pier	Croggan Pier	AB 199 055 13	Pacific oysters		NM70752733

Biotoxin results from Loch Spelve: Rubha na Faing



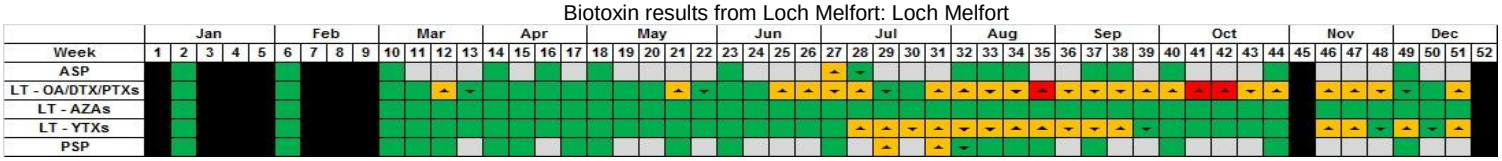
Pod 6



RMP position: AHA position:

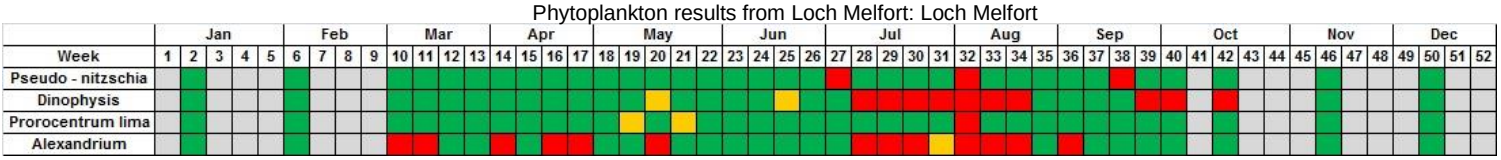
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
6	Argyll and Bute Council	Loch Melfort	Loch Melfort	AB 178 051 08	Common mussels	Yes	NM80491114
6	Argyll and Bute Council	Seil Sound East	East of Balvicar	AB 247 703 08	Common mussels		NM77801659
6	Argyll and Bute Council	Seil Sound North	Ardshellach	AB 247 071 13	Pacific oysters		NM782182
6	Argyll and Bute Council	Seil Sound: Balvicar	Balvicar	AB 247 072 13	Pacific oysters		NM77251612
6	Argyll and Bute Council	Seil Sound North	Balvicar North	AB 247 735 13	Pacific oysters		NM77601726
6	Argyll and Bute Council	Seil Sound: Balvicar	Rubha nan Ron South	AB 247 728 13	Pacific oysters		NM772164
6	Argyll and Bute Council	Loch na Cille	Loch na Cille Cockles	AB 617 1204 04	Common cockles		NM84231259
6	Argyll and Bute Council	Loch Melfort Pacific Oysters	Creag Aoil Pacific Oysters	AB 671 1448 13	Pacific oysters		NM80611113
6	Argyll and Bute Council	Loch Melfort Native Oysters	Creag Aoil Native Oysters	AB 672 1449 12	Native oysters		NM80611113
6	Argyll and Bute Council	Loch Melfort King Scallops	Creag Aoil King Scallops	AB 673 1450 07	King scallops		NM80611113
6	Argyll and Bute Council	Loch Melfort Queen Scallops	Creag Aoil Queen Scallops	AB 674 1451 15	Queen scallops		NM80611113

Biotoxin results from Loch Melfort: Loch Melfort

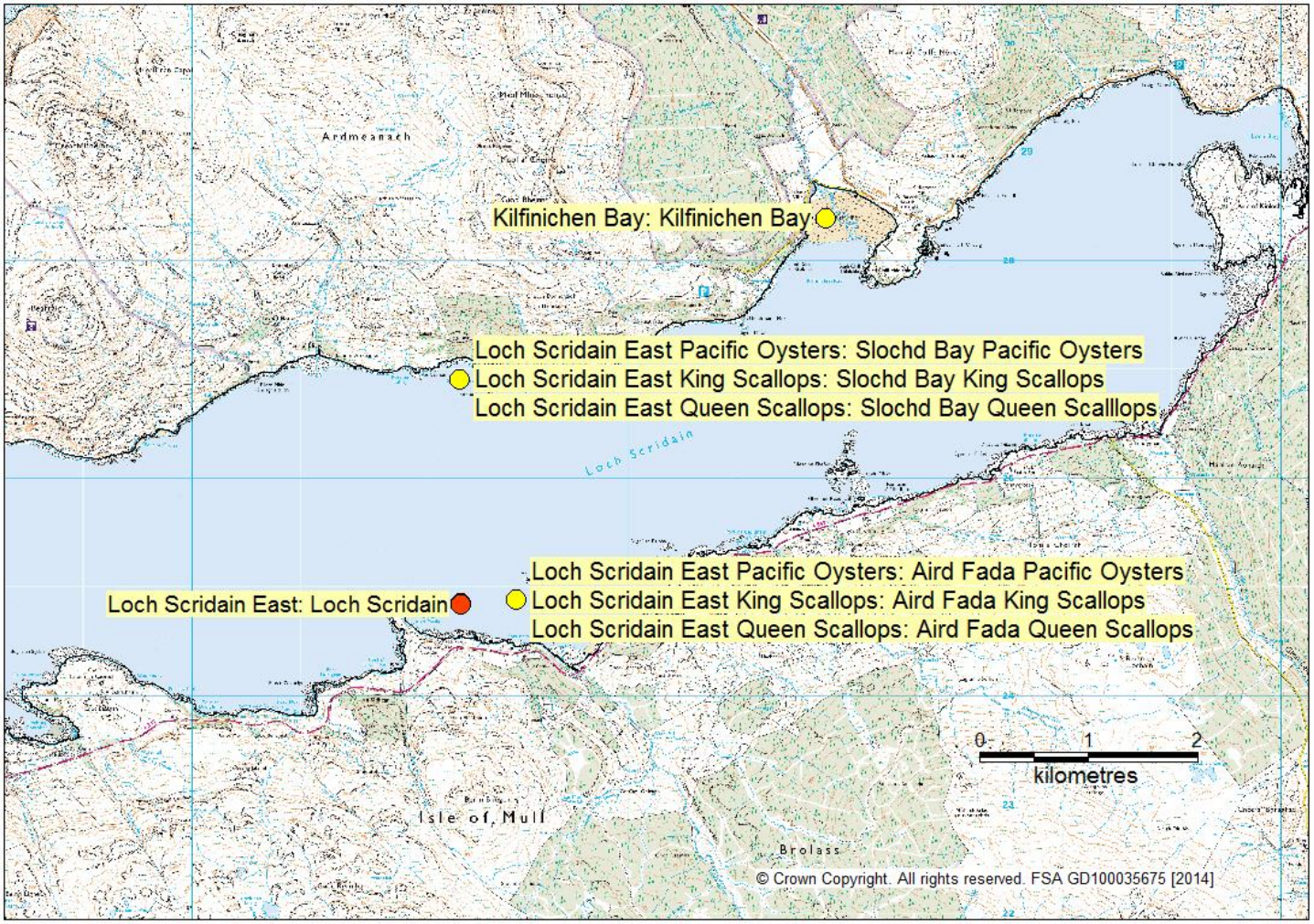


Biotoxin results from Seil Sound: Balvicar: Rubha nan Ron South (mussels)

Phytoplankton results from Loch Melfort: Loch Melfort



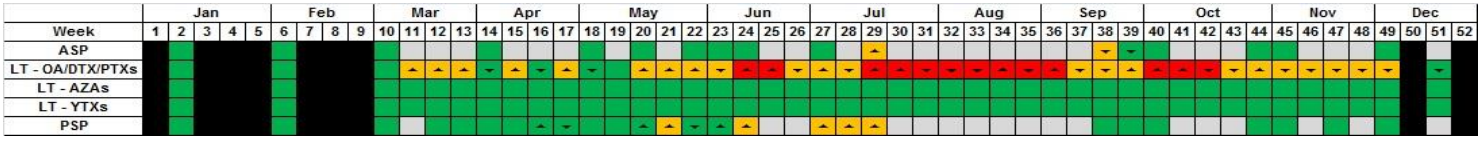
Pod 7



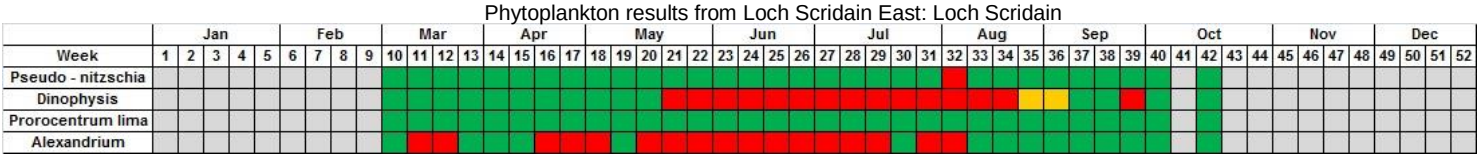
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
7	Argyll and Bute Council	Loch Scridain East	Loch Scridain	AB 314 054 08	Common mussels	Yes	NM45462484
7	Argyll and Bute Council	Kilfinichen Bay	Kilfinichen Bay	AB 695 1507 04	Common cockles		NM48792838
7	Argyll and Bute Council	Loch Scridain East Pacific Oysters	Aird Fada Pacific Oysters	AB 663 1439 13	Pacific oysters		NM4595724892
7	Argyll and Bute Council	Loch Scridain East Pacific Oysters	Slochd Bay Pacific Oysters	AB 663 1443 13	Pacific oysters		Not given
7	Argyll and Bute Council	Loch Scridain East King Scallops	Aird Fada King Scallops	AB 665 1441 07	King scallops		NM4595724892
7	Argyll and Bute Council	Loch Scridain East King Scallops	Slochd Bay King Scallops	AB 665 1445 07	King scallops		Not given
7	Argyll and Bute Council	Loch Scridain East Queen Scallops	Aird Fada Queen Scallops	AB 666 1442 15	Queen scallops		NM4595724892
7	Argyll and Bute Council	Loch Scridain East Queen Scallops	Slochd Bay Queen Scallops	AB 666 1446 15	Queen scallops		Not given

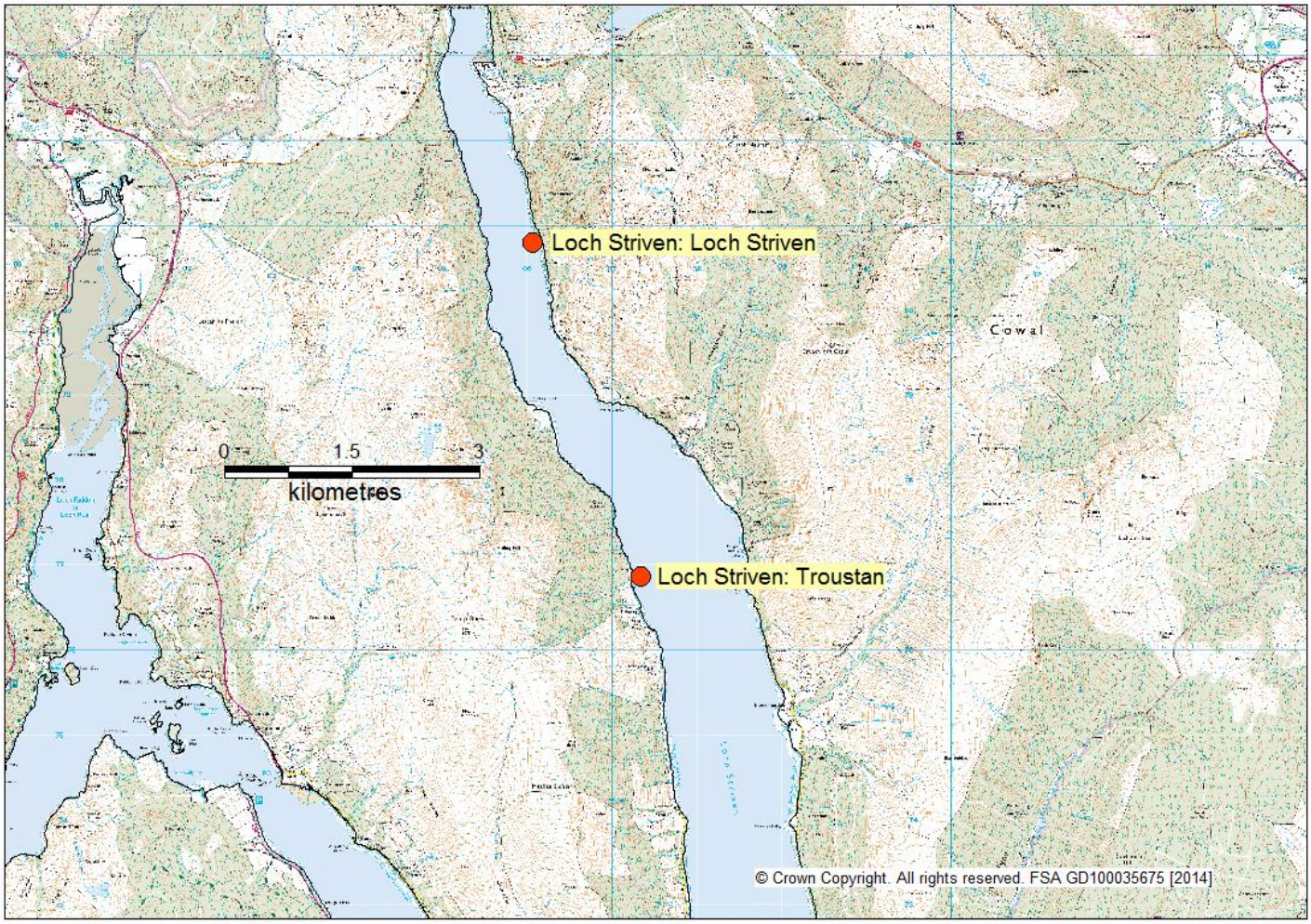
Biotoxin results from Loch Scridain East: Loch Scridain



Phytoplankton results from Loch Scridain East: Loch Scridain



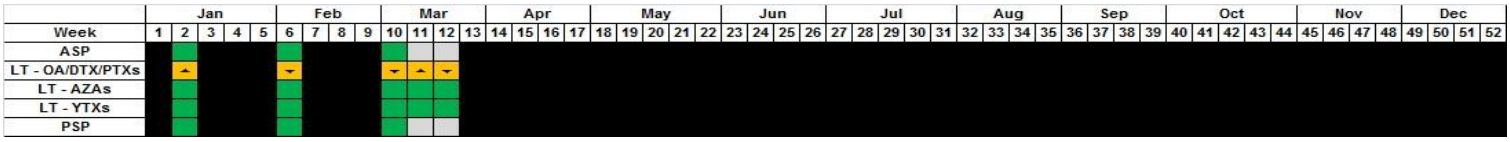
Pod 8



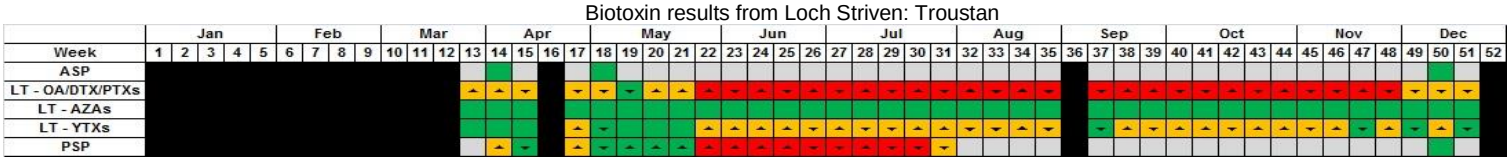
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
8	Argyll and Bute Council	Loch Striven	Troustan	AB 205 063 08	Common mussels	Alternate RMP	NS07337686
8	Argyll and Bute Council	Loch Striven	Loch Striven	AB 205 062 08	Common mussels	Yes	NS06078086

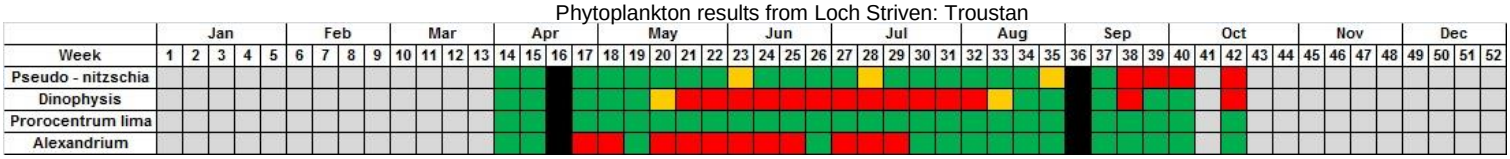
Biotoxin results from Loch Striven: Loch Striven



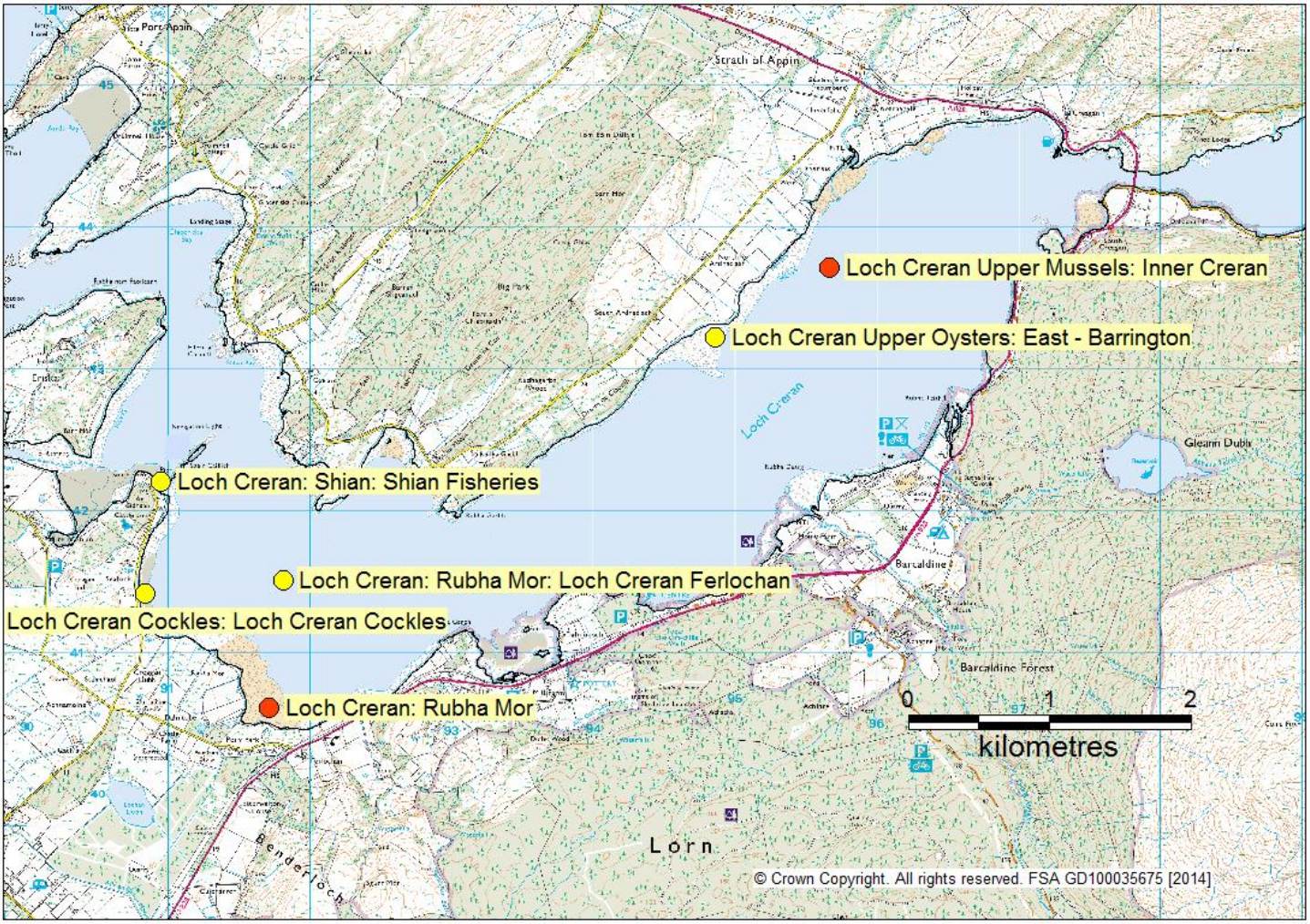
Biotoxin results from Loch Striven: Troustan



Phytoplankton results from Loch Striven: Troustan



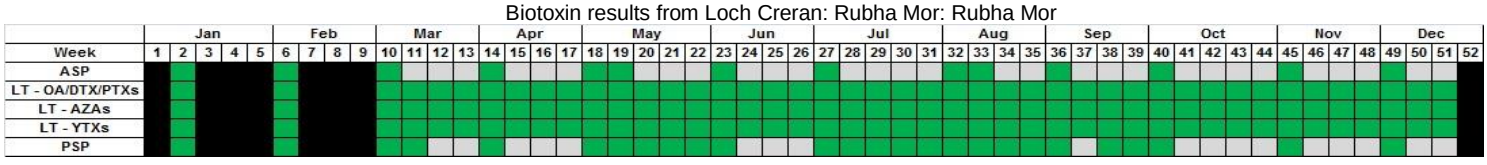
Pod 9



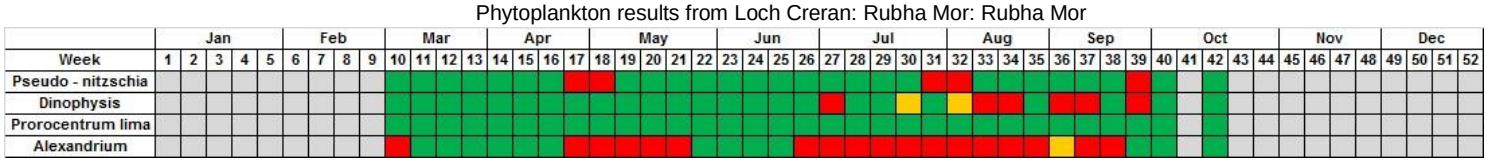
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
9	Argyll and Bute Council	Loch Creran Upper Mussels	Inner Creran	AB 313 709 08	Common mussels	Yes	NM95664371
9	Argyll and Bute Council	Loch Creran: Shian	Shian Fisheries	AB 131 023 13	Pacific oysters		NM90944220
9	Argyll and Bute Council	Loch Creran Upper Oysters	East - Barrington	AB 129 021 13	Pacific oysters		NM94854322
9	Argyll and Bute Council	Loch Creran: Rubha Mor	Rubha Mor	AB 130 022 13	Pacific oysters	Alternate RMP	NM917406
9	Argyll and Bute Council	Loch Creran: Rubha Mor	Loch Creran Ferlochan	AB 130 742 13	Pacific oysters		NM918415
9	Argyll and Bute Council	Loch Creran Cockles	Loch Creran Cockles	AB 729 1685 04	Common cockles		NM90834140

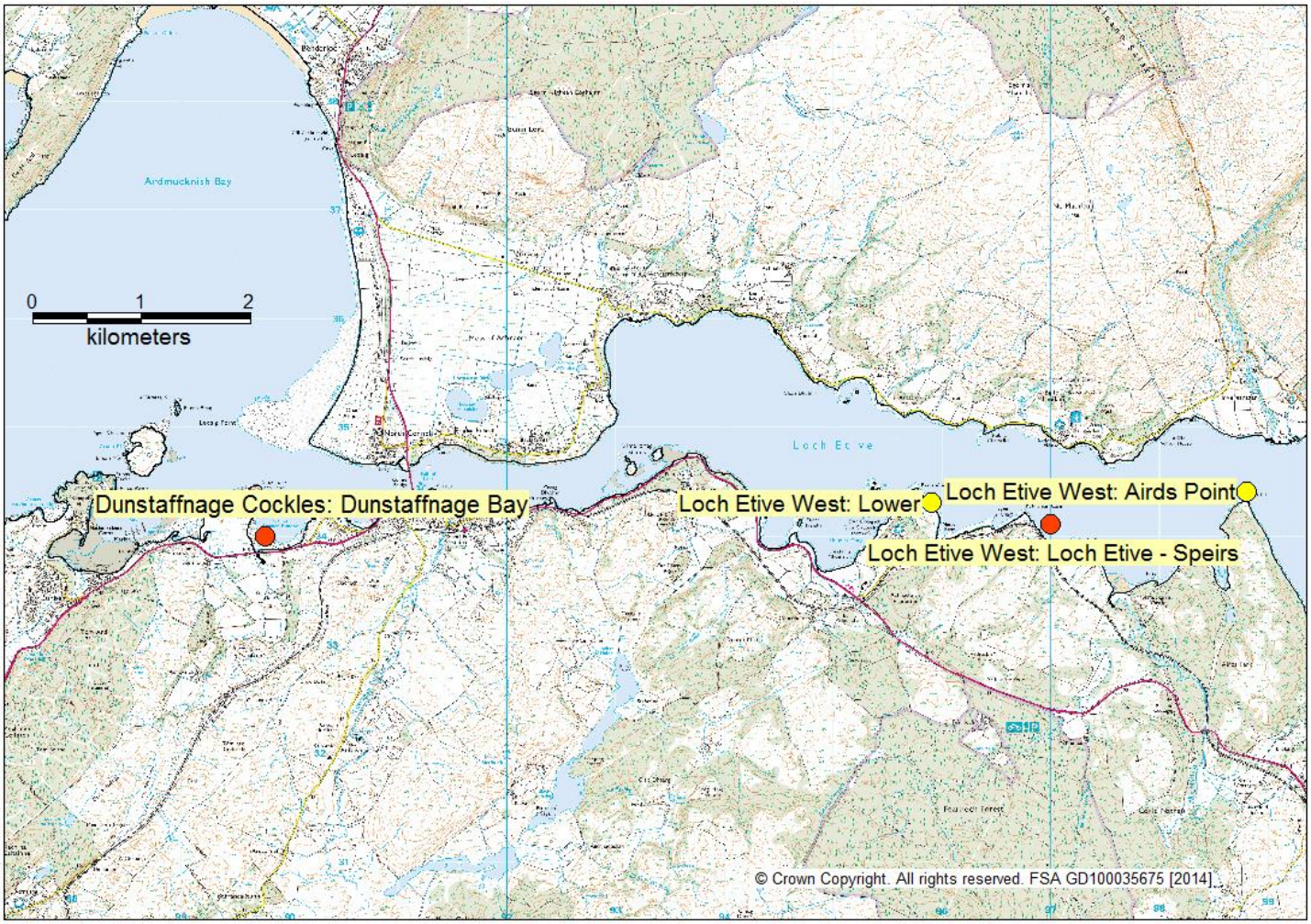
Biotoxin results from Loch Creran: Rubha Mor: Rubha Mor



Phytoplankton results from Loch Creran: Rubha Mor: Rubha Mor



Pod 10

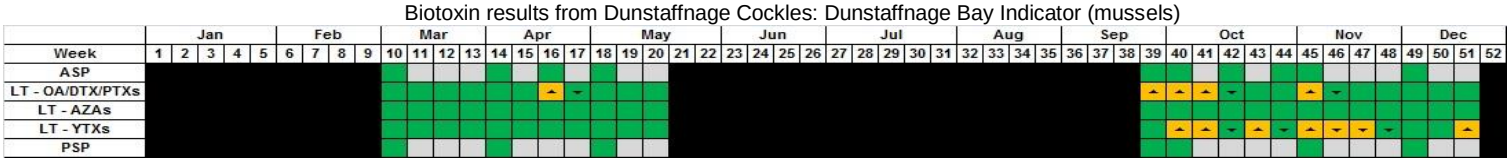


RMP position: AHA position:

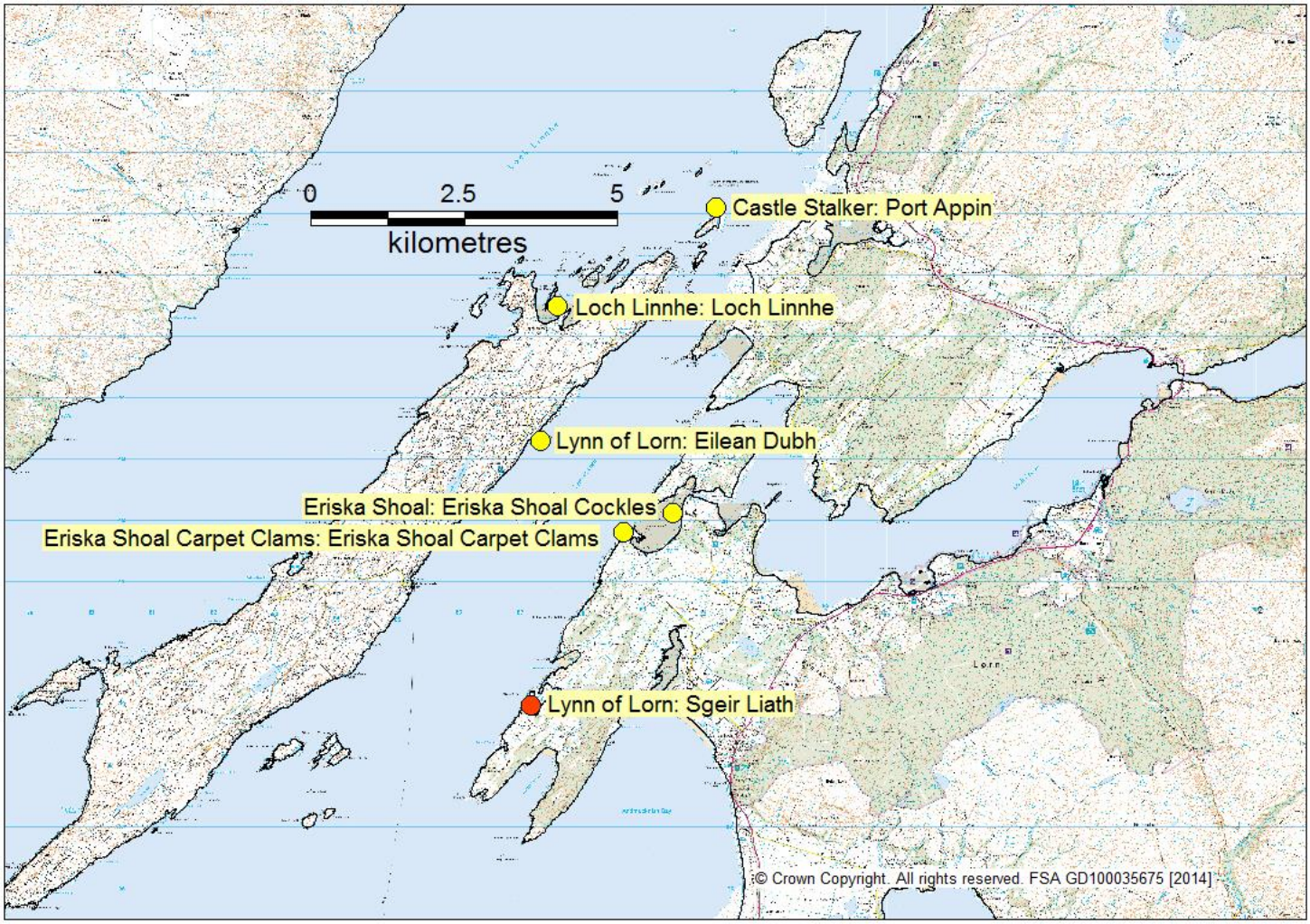
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
10	Argyll and Bute Council	Loch Etive West	Loch Etive - Speirs	AB 316 030 08	Common mussels	Yes	NM96993411
10	Argyll and Bute Council	Loch Etive West	Lower	AB 316 031 08	Common mussels		NM959343
10	Argyll and Bute Council	Loch Etive West	Airds Point	AB 316 025 08	Common mussels		NM988344
10	Argyll and Bute Council	Dunstaffnage Cockles	Dunstaffnage Bay	AB 696 1511 04	Common cockles	Alternate RMP	NM88973420

Biotoxin results from Dunstaffnage Cockles: Dunstaffnage Bay

Biotoxin results from Dunstaffnage Cockles: Dunstaffnage Bay Indicator (mussels)



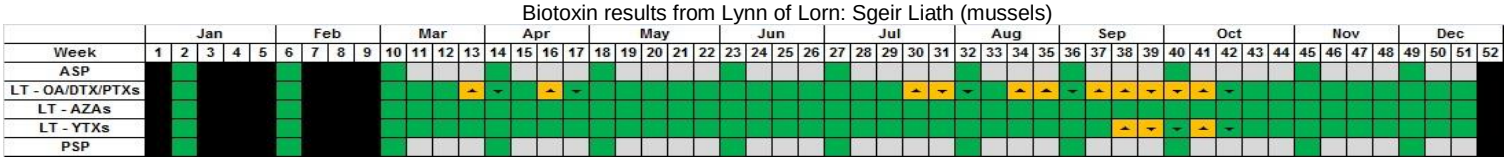
Pod 11



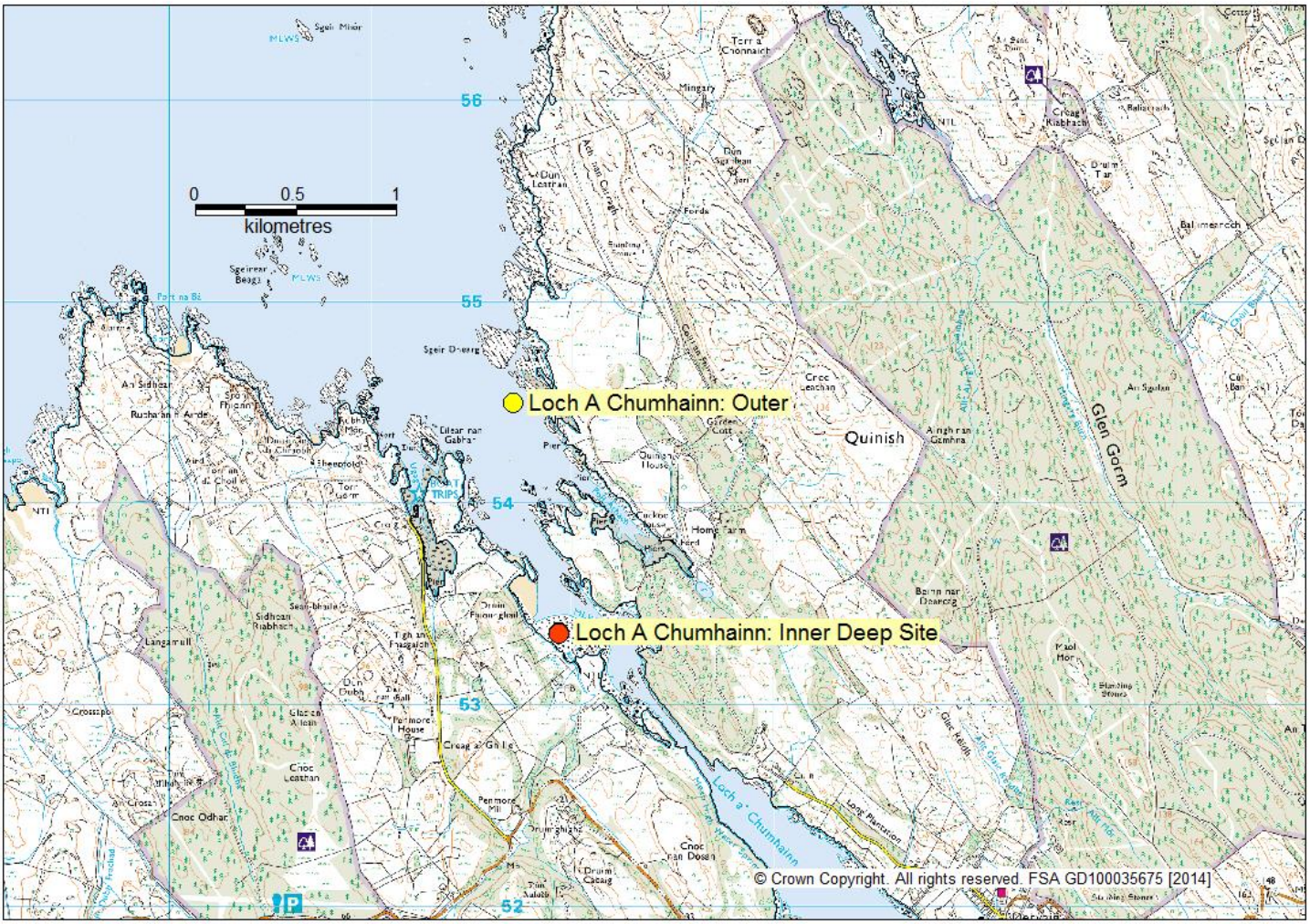
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
11	Argyll and Bute Council	Lynn of Lorn: Sgeir Liath	Sgeir Liath	AB 318 068 13	Pacific oysters	Yes	NM87163899
11	Argyll and Bute Council	Loch Linnhe	Loch Linnhe	AB 172 047 13	Pacific oysters		NM87614548
11	Argyll and Bute Council	Lynn of Lorn: Eilean Dubh	Eilean Dubh	AB 319 066 08	Common mussels		NM873433
11	Argyll and Bute Council	Eriska Shoal	Eriska Shoal Cockles	AB 490 907 04	Common cockles		NM89474213
11	Argyll and Bute Council	Eriska Shoal Carpet Clams	Eriska Shoal Carpet Clams	AB 547 1006 02	Carpet clams		NM88774188
11	Argyll and Bute Council	Castle Stalker	Port Appin	AB 492 909 04	Common cockles		NM90194710

Biotoxin results from Lynn of Lorn: Sgeir Liath (mussels)



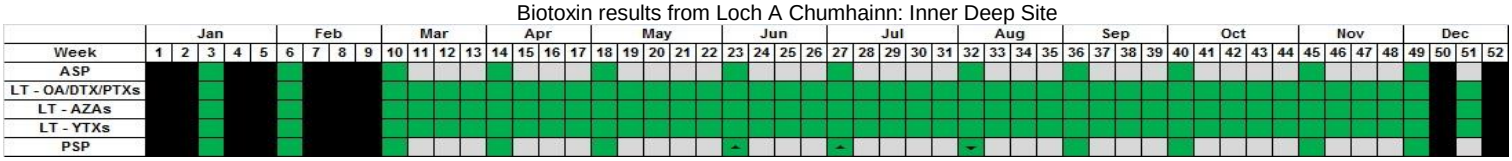
Pod 12



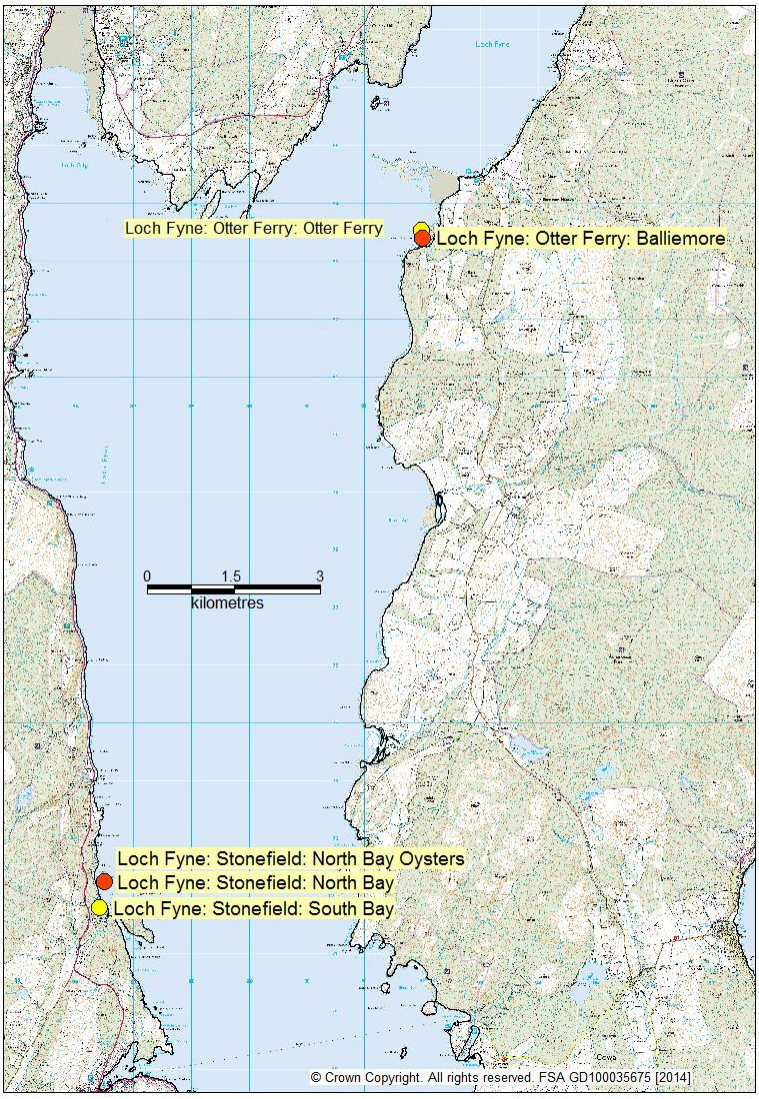
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
12	Argyll and Bute Council	Loch A Chumhainn: Inner Deep Site	Inner Deep Site	AB 112 017 13	Pacific oysters	Yes	NM40935336
12	Argyll and Bute Council	Loch A Chumhainn: Outer	Outer	AB 113 018 13	Pacific oysters		NM40705450

Biotoxin results from Loch A Chumhainn: Inner Deep Site



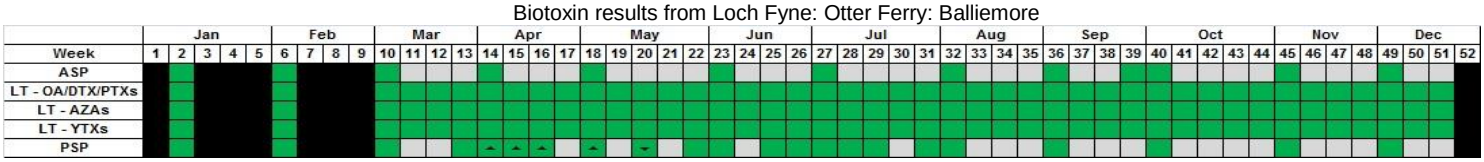
Pod 14



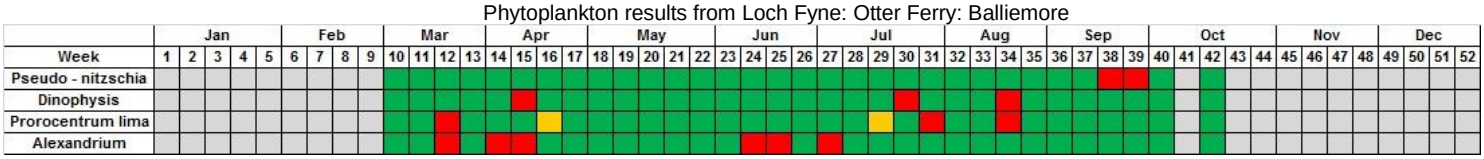
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
14	Argyll and Bute Council	Loch Fyne: Stonefield	North Bay	AB 154 043 15	Queen scallops	Yes	NR86487225
14	Argyll and Bute Council	Loch Fyne: Stonefield	South Bay	AB 154 044 15	Queen scallops		NR864718
14	Argyll and Bute Council	Loch Fyne: Otter Ferry	Balliemore	AB 151 039 13	Pacific oysters	Alternate RMP	NR92178350
14	Argyll and Bute Council	Loch Fyne: Otter Point	Otter Point	AB 714 1659 04	Common cockles		NR91998340
14	Argyll and Bute Council	Loch Fyne: Stonefield	North Bay Oysters	AB 435 840 13	Pacific oysters		NR86487225

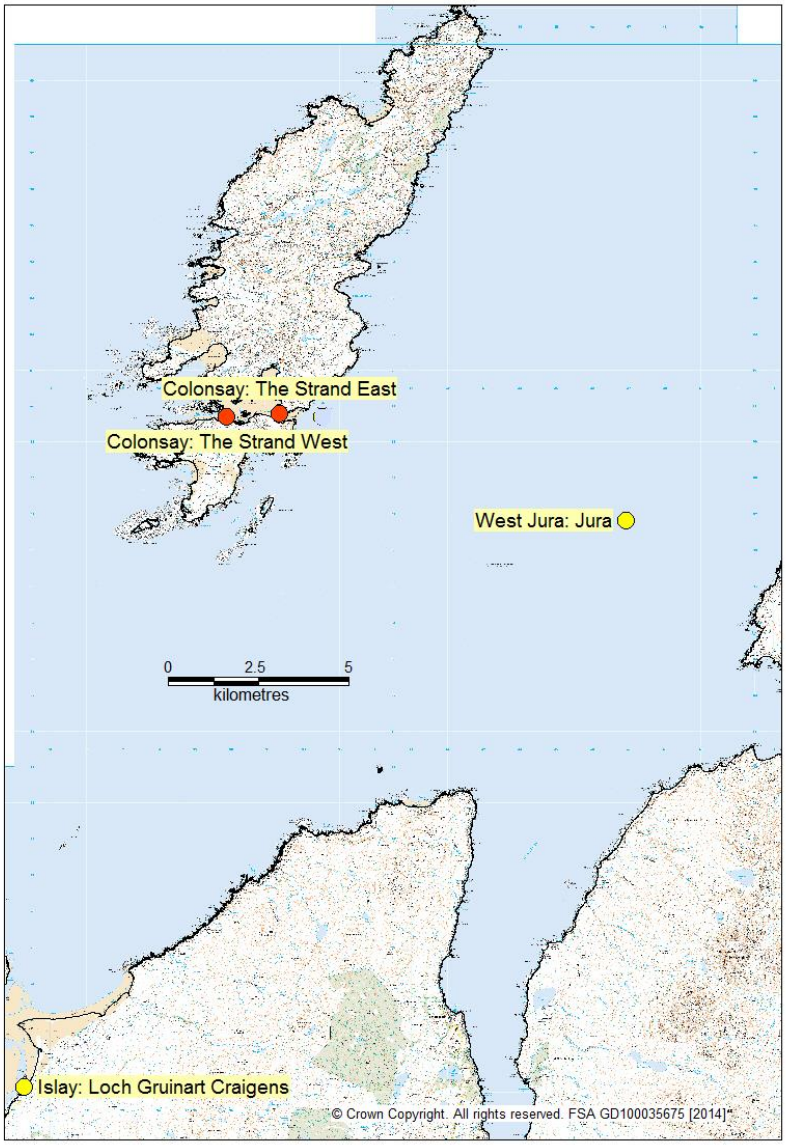
Biotoxin results from Loch Fyne: Otter Ferry: Balliemore



Phytoplankton results from Loch Fyne: Otter Ferry: Balliemore



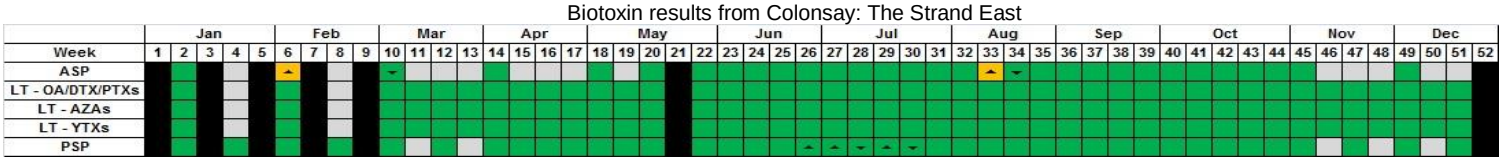
Pod 15



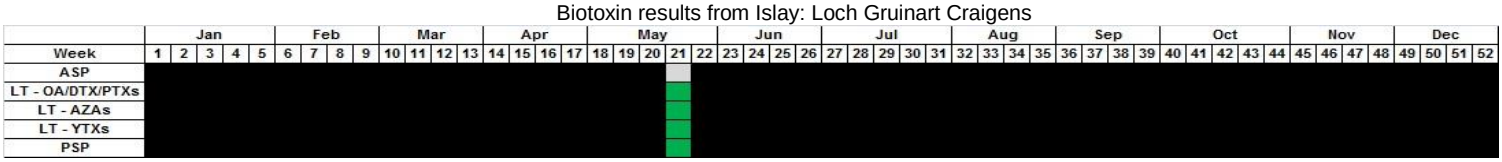
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
15	Argyll and Bute Council	Colonsay	The Strand East	AB 041 1199 13	Pacific oysters	Yes	NR37318979
15	Argyll and Bute Council	Colonsay	The Strand West	AB 041 009 13	Pacific oysters	Alternate RMP	NR35858971
15	Argyll and Bute Council	Islay	Loch Gruinart Craigens	AB 094 011 13	Pacific oysters		NR30247116
15	Argyll and Bute Council	West Jura	Jura	AB 482 805 16	Razors		NR46908684

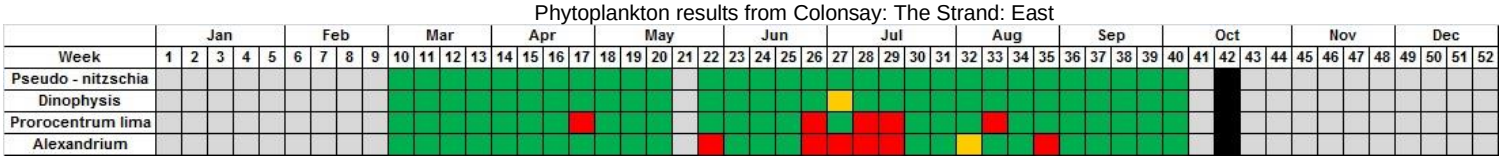
Biotoxin results from Colonsay: The Strand East



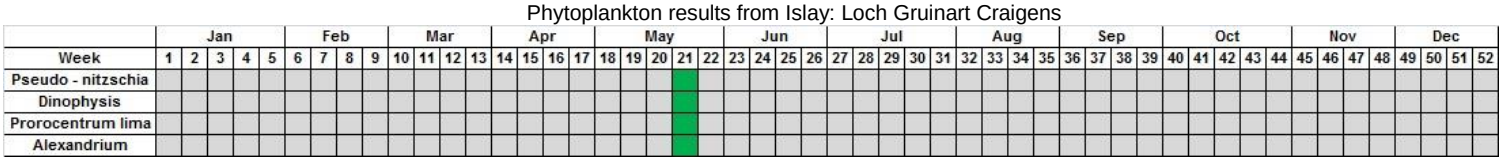
Biotoxin results from Islay: Loch Gruinart Craigens



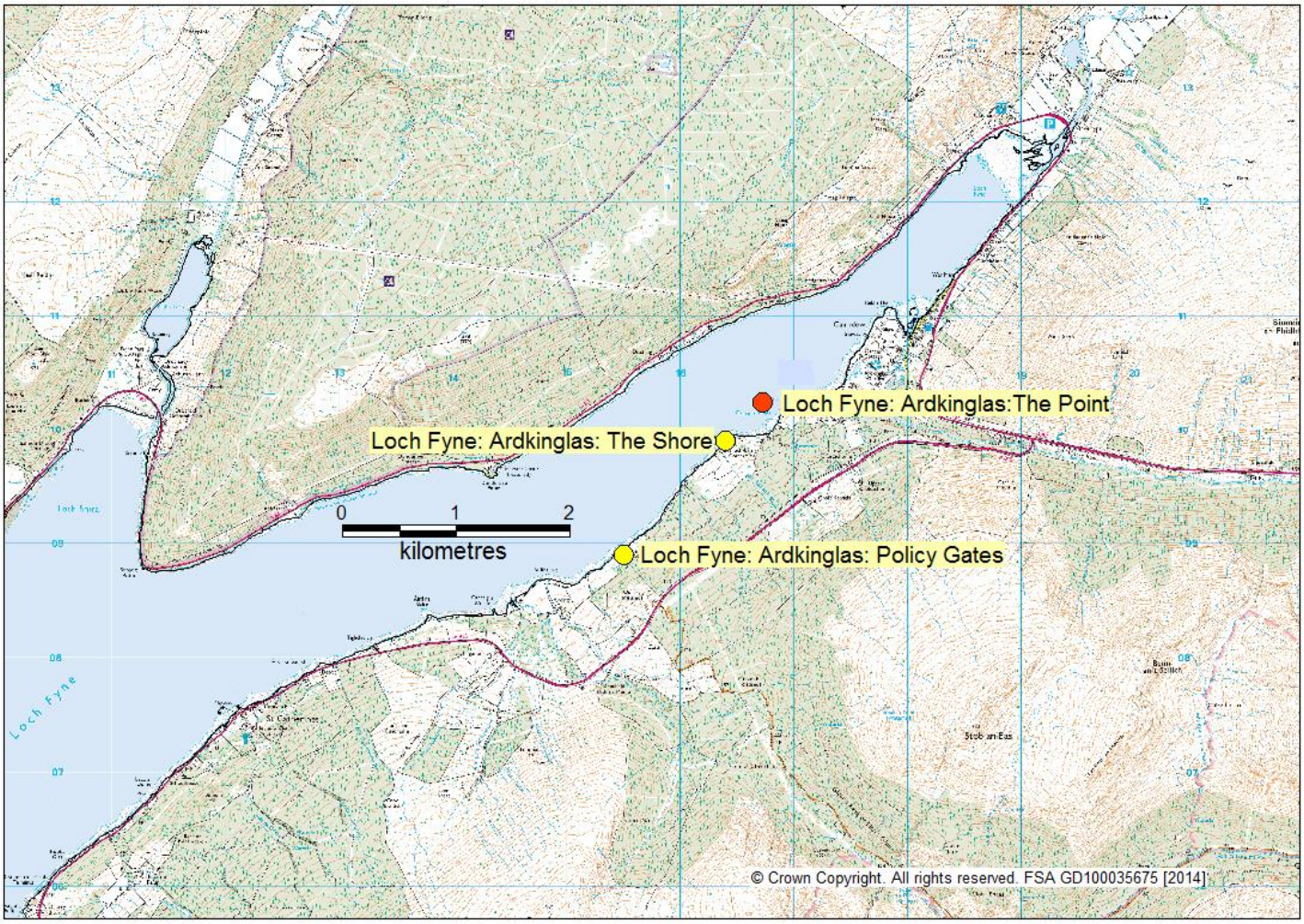
Phytoplankton results from Colonsay: The Strand: East



Phytoplankton results from Islay: Loch Gruinart Craigens



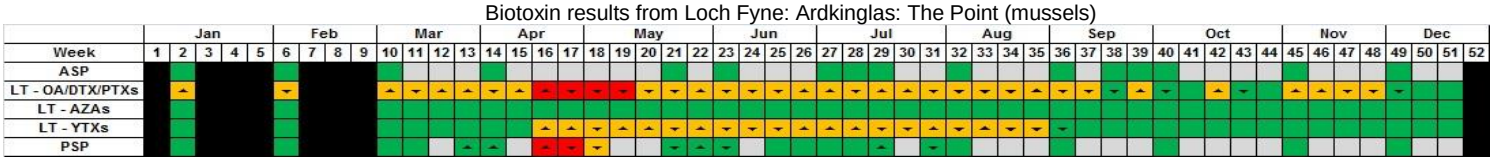
Pod 16



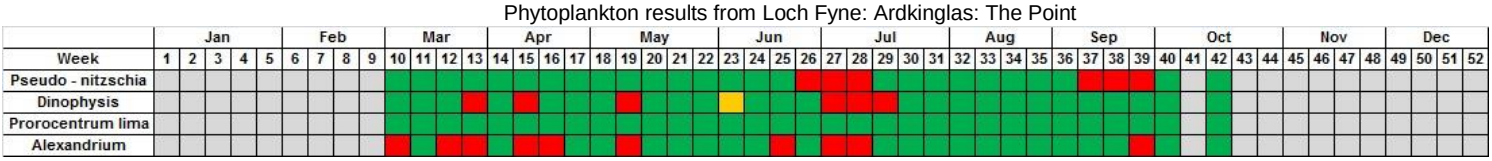
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	The Point	AB 147 035 08	Common mussels	Yes	NN16731024
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	Policy Gates	AB 147 034 08	Common mussels		NN155089
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	The Shore	AB 147 036 13	Pacific oysters		NN164099
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	The Point	AB 147 035 13	Pacific oysters	Alternate RMP	NN17411015
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	Policy Gates	AB 147 034 13	Pacific oysters		NN155089
16	Argyll and Bute Council	Loch Fyne: Ardkinglas	The Shore	AB 147 036 08	Common mussels		NN164099

Biotoxin results from Loch Fyne: Ardkinglas: The Point (mussels)



Phytoplankton results from Loch Fyne: Ardkinglas: The Point



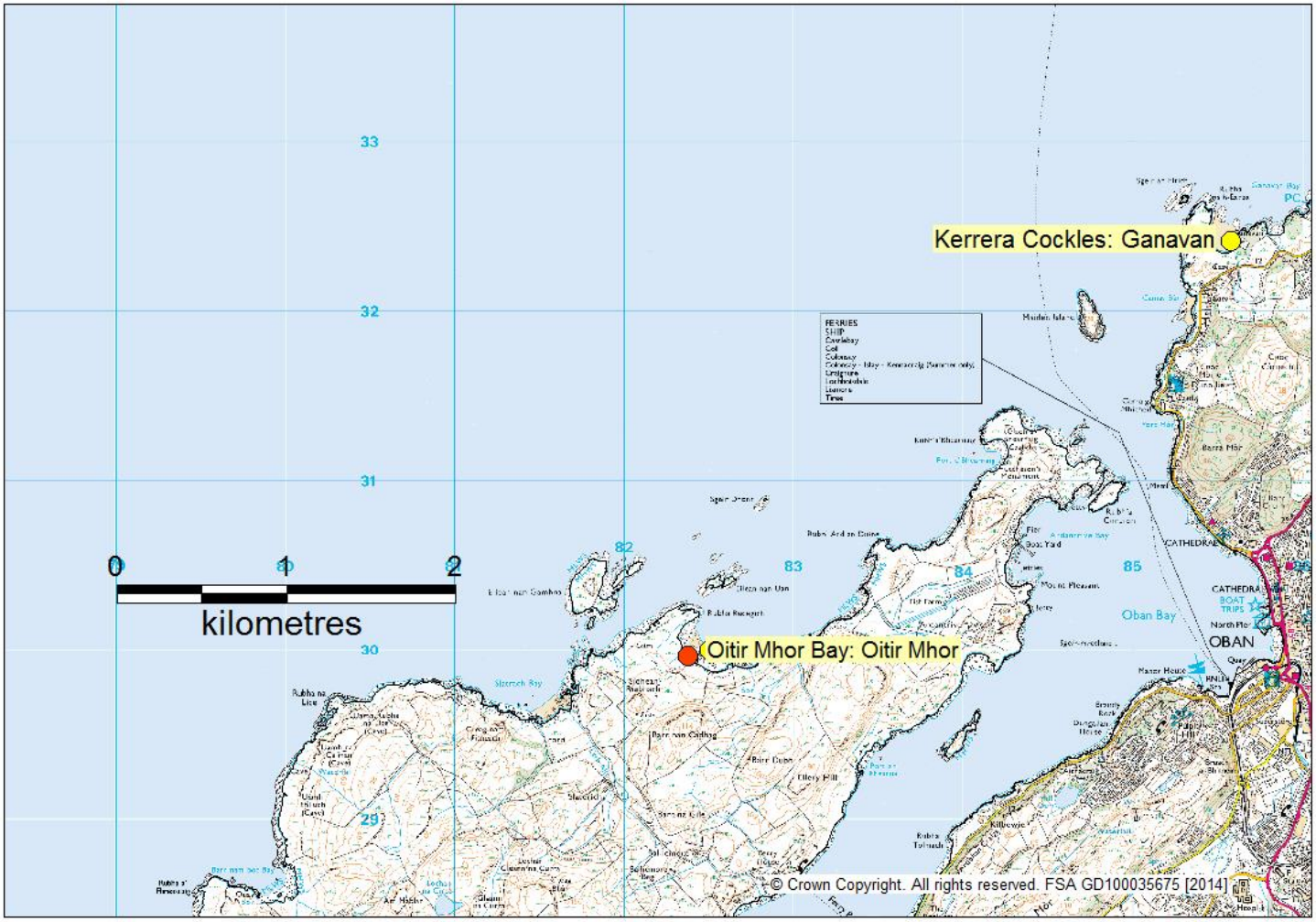
Pod 18

RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
18	Argyll and Bute Council	Machrie Bay	Machrie Bay Razors	AB 510 929 16	Razors		NR88853380
18	Argyll and Bute Council	Campbeltown Loch	Kildalloig Bay	AB 029 008 04	Common cockles	Yes	NR752198
18	Argyll and Bute Council	Carradale Bay	Carradale Bay Razors	AB 511 930 16	Razors		NR80503690
18	Argyll and Bute Council	Saddell Bay	Saddell Bay Razors	AB 512 931 16	Razors		NR7915031420
18	Argyll and Bute Council	Arran: Pirnmill	Pirnmill	NA 008 330 16	Razors		NR87004400

Biotoxin results from Campbeltown Loch: Kildalloig Bay (mussels)

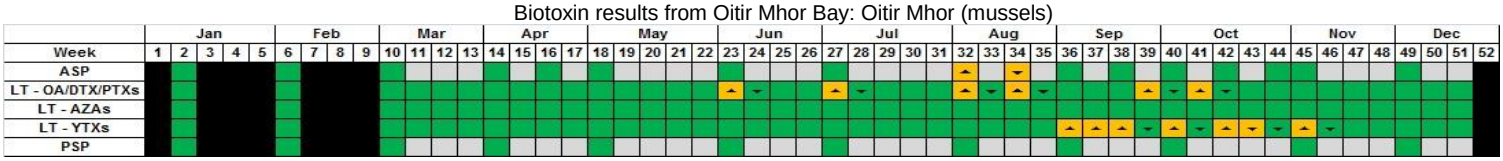
Pod 84



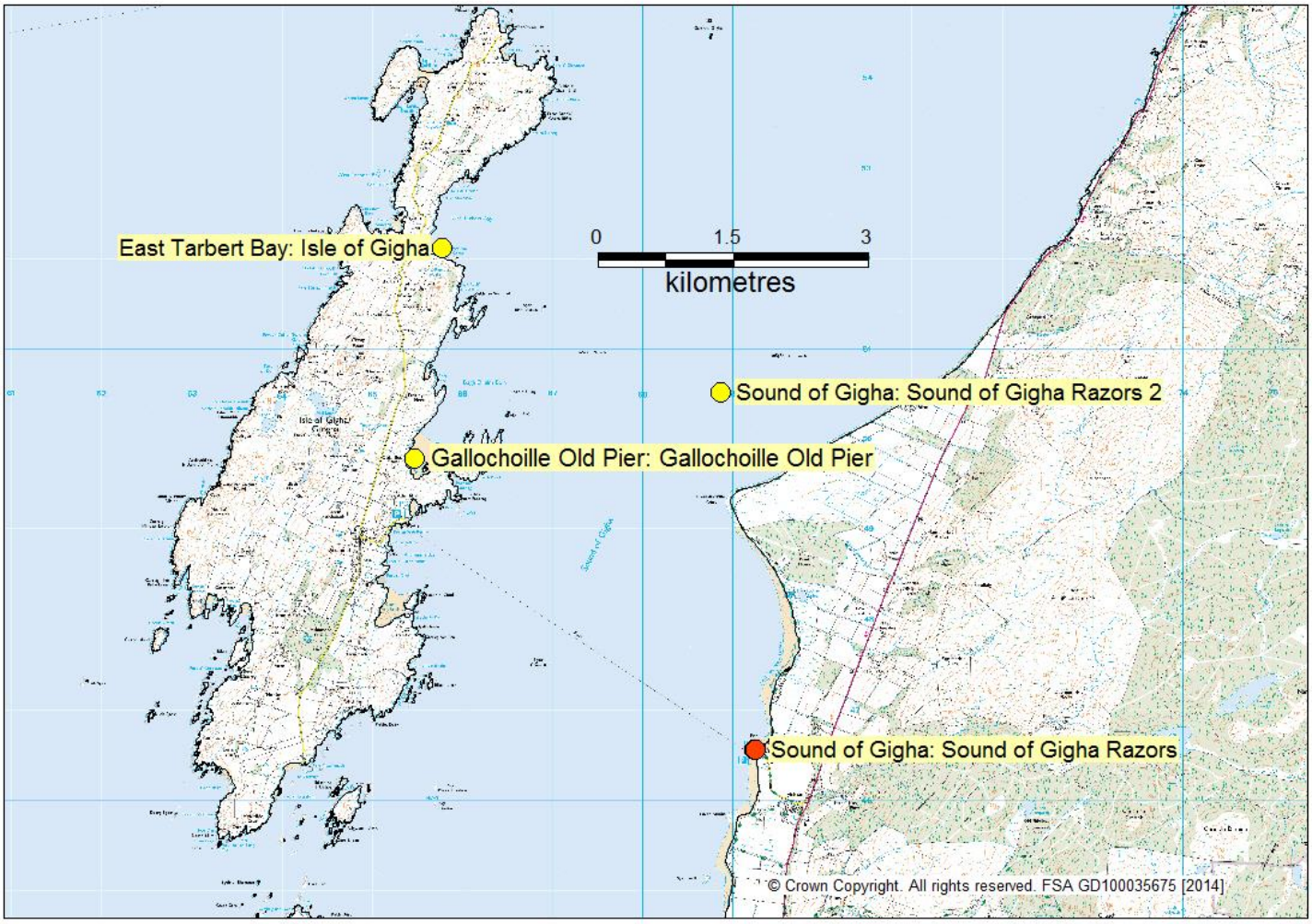
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
84	Argyll and Bute Council	Oitir Mhor Bay	Oitir Mhor	AB 308 701 13	Pacific oysters	Yes	NM82393001
84	Argyll and Bute Council	Kerrera Cockles	Ganavan	AB 697 1512 04	Common cockles		NM85523239

Biotoxin results from Oitir Mhor Bay: Oitir Mhor (mussels)



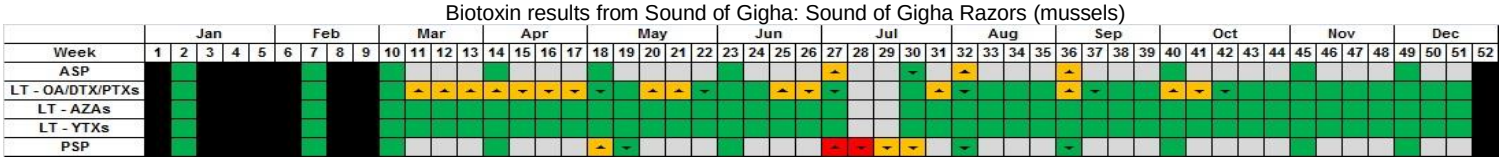
Pod 123



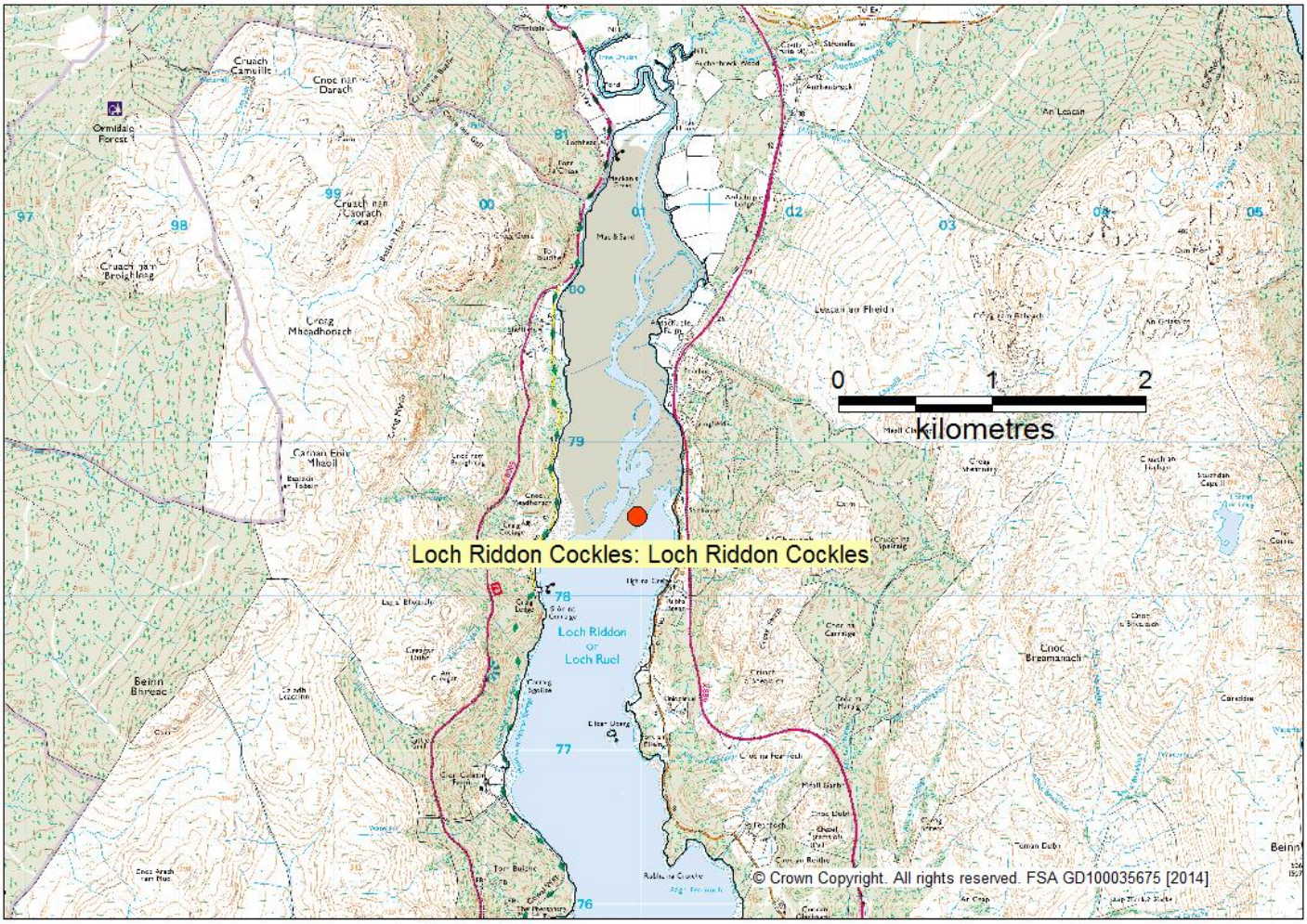
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
123	Argyll and Bute Council	Sound of Gigha	Sound of Gigha Razors	AB 515 935 16	Razors	Yes	NR69234656
123	Argyll and Bute Council	East Tarbert Bay	Isle of Gigha	AB 541 972 13	Pacific oysters		NR65765212
123	Argyll and Bute Council	Sound of Gigha	Sound of Gigha Razors 2	AB 515 1250 16	Razors		NR68855052
123	Argyll and Bute Council	Gallochoille Old Pier	Gallochoille Old Pier	AB 699 1519 13	Pacific oysters		NR64504806

Biotoxin results from Sound of Gigha: Sound of Gigha Razors (mussels)



Pod 139

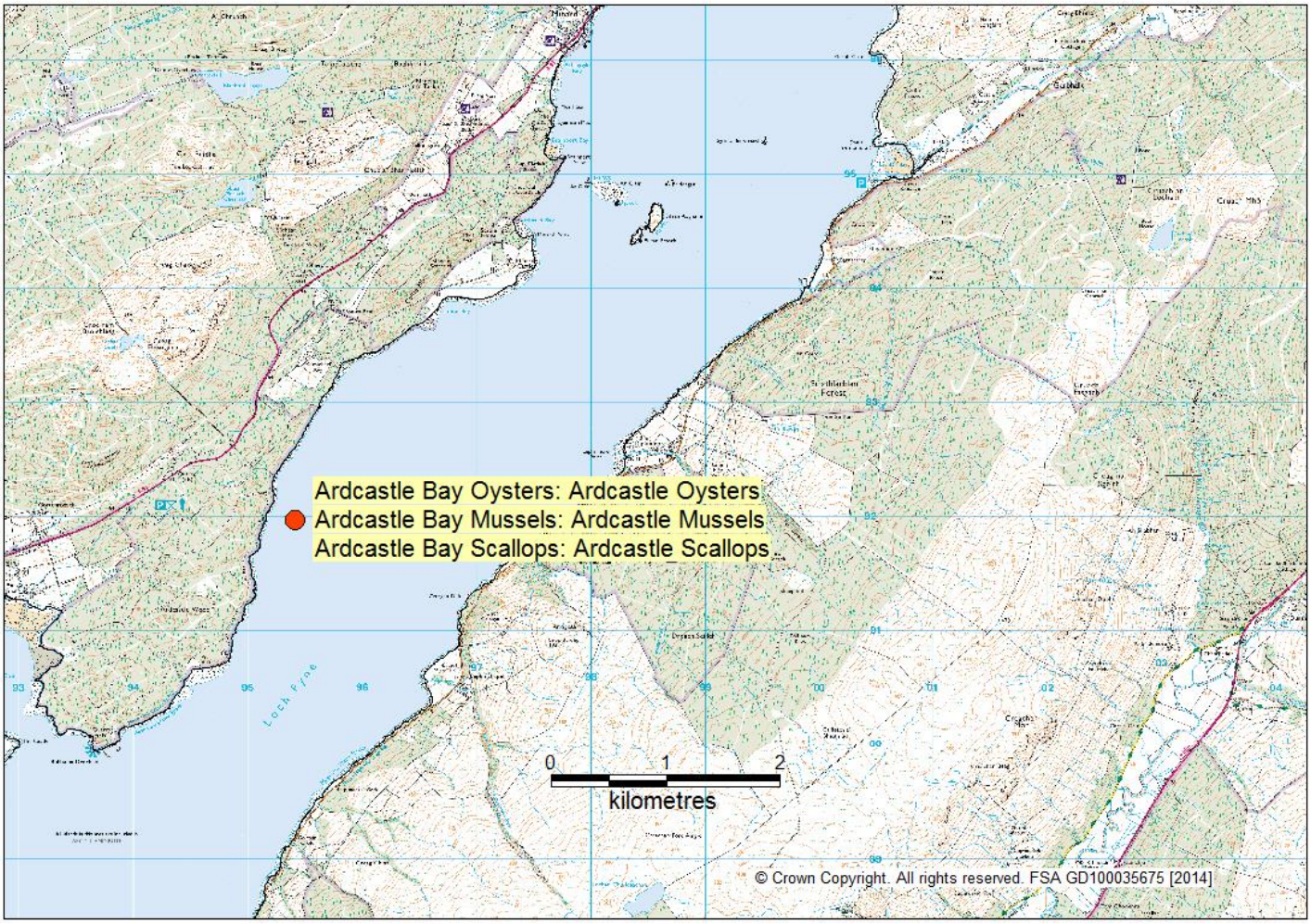


RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
123	Argyll and Bute Council	Loch Riddon Cockles	Loch Riddon Cockles	AB 656 1409 04	Common cockles	Yes	NS01157880

Biotoxin results from Loch Riddon Cockles: Loch Riddon Cockles (mussels)

Pod 145



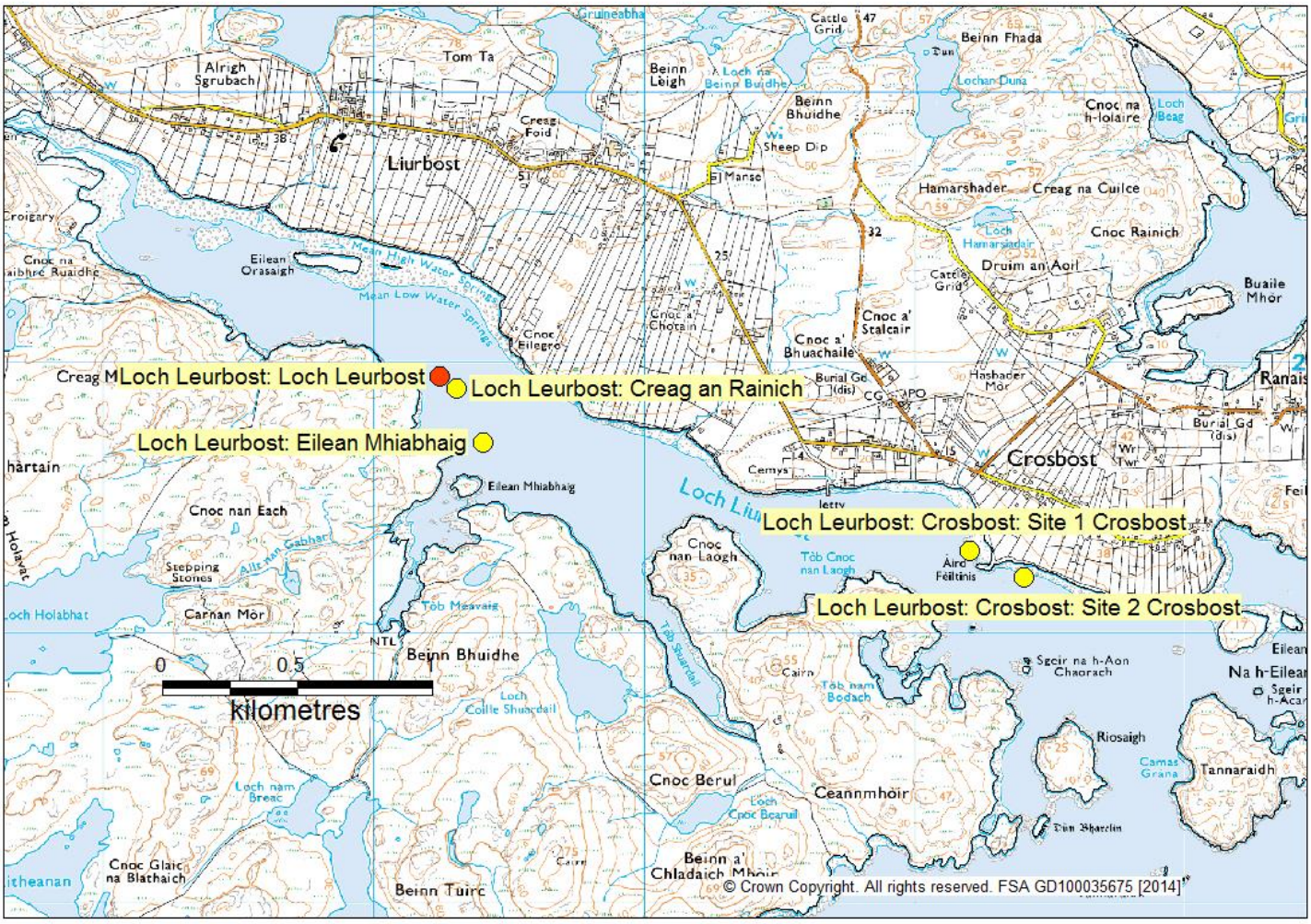
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
145	Argyll and Bute Council	Ardcastle Bay Mussels	Ardcastle Mussels	AB 635 1281 08	Common mussels	Yes	NR95349200
145	Argyll and Bute Council	Ardcastle Bay Oysters	Ardcastle Oysters	AB 634 1280 13	Pacific oysters		NR95349200
145	Argyll and Bute Council	Ardcastle Bay Scallops	Ardcastle Scallops	AB 636 1282 15	King scallops		NR95349200

Biotoxin results from Ardcastle Bay Mussels: Ardcastle Mussels

6.2. COMHAIRLE NAN EILEAN SIAR: LEWIS & HARRIS

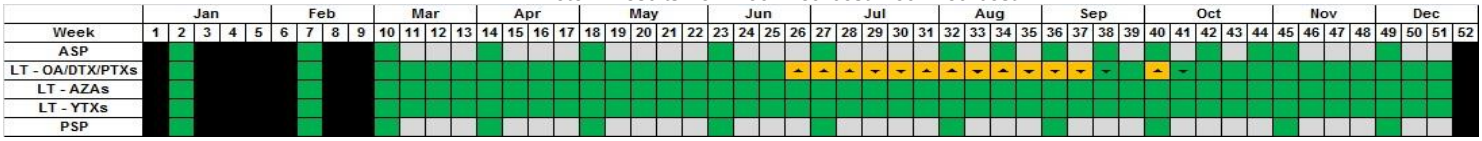
Pod 21



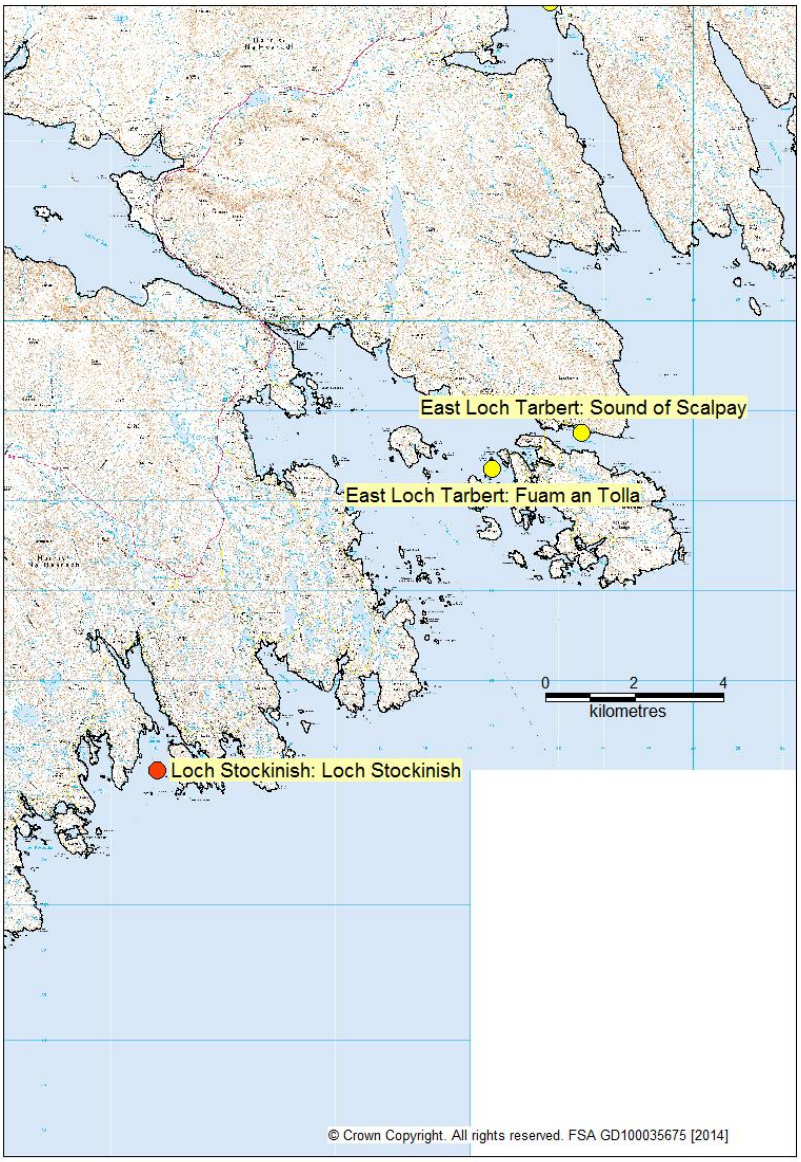
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
21	Comhairle nan Eilean Siar - Lewis & Harris	Loch Leurbost	Loch Leurbost	LH 168 114 08	Common mussels	Yes	NB37252492
21	Comhairle nan Eilean Siar - Lewis & Harris	Loch Leurbost	Creag an Rainich	LH 168 113 08	Common mussels		NB373249
21	Comhairle nan Eilean Siar - Lewis & Harris	Loch Leurbost	Eilean Mhiabhaig	LH 168 732 08	Common mussels		NB374247
21	Comhairle nan Eilean Siar - Lewis & Harris	Loch Leurbost: Crosbost	Site 1 Crosbost	LH 339 795 13	Pacific oysters		NB392243
21	Comhairle nan Eilean Siar - Lewis & Harris	Loch Leurbost: Crosbost	Site 2 Crosbost	LH 339 721 13	Pacific oysters		NB394242

Biotoxin results from Loch Leurbost: Loch Leurbost



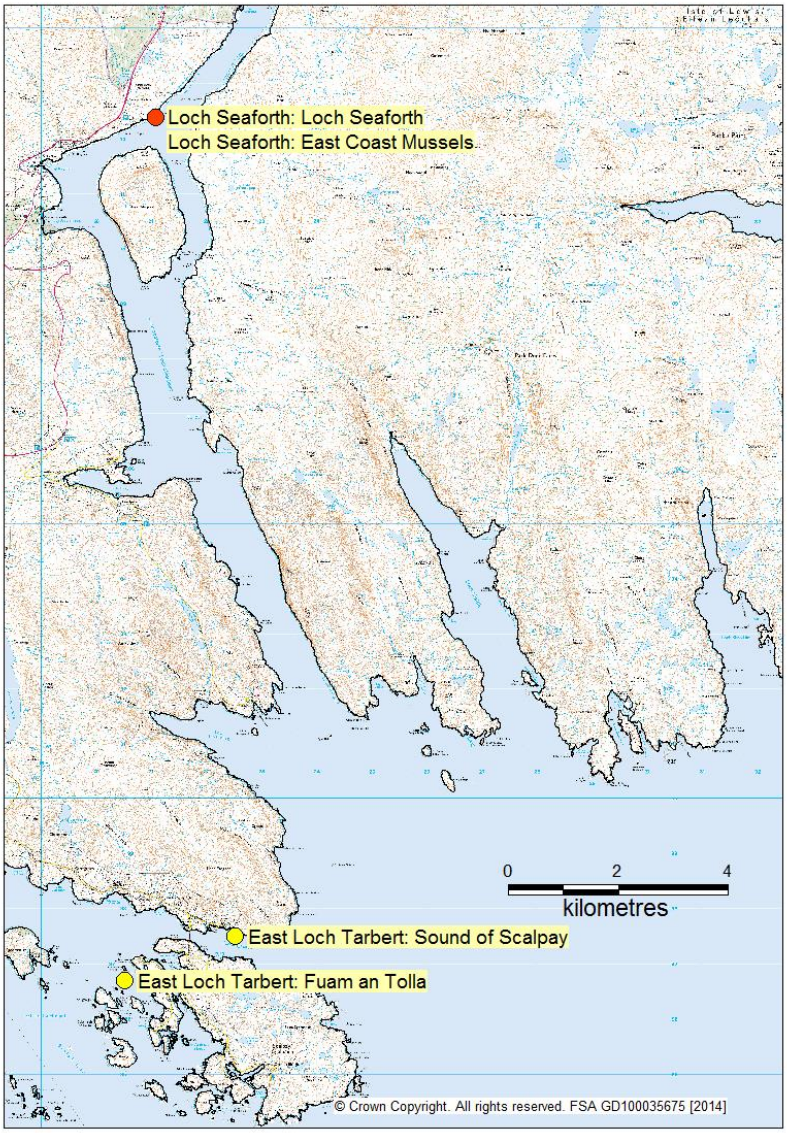
Pod 22 South



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
22	Comhairle nan Eilean Siar - Lewis & Harris	Loch Stockinish	Loch Stockinish	LH 203 127 08	Common mussels	Yes	NG13319076
22	Comhairle nan Eilean Siar - Lewis & Harris	East Loch Tarbert	Fuam an Tolla	LH 057 104 08	Common mussels		NG205967
22	Comhairle nan Eilean Siar - Lewis & Harris	East Loch Tarbert	Sound of Scalpay	LH 057 106 08	Common mussels		NG225975
22	Comhairle nan Eilean Siar - Lewis & Harris	Loch Seaforth	Loch Seaforth	LH 193 126 08	Common mussels		NB21051239
22	Comhairle nan Eilean Siar – Lewis & Harris	Loch Seaforth	East Coast Mussels	LH 484 811 08	Common mussels	Alternate RMP	NB21051239

Pod 22 North



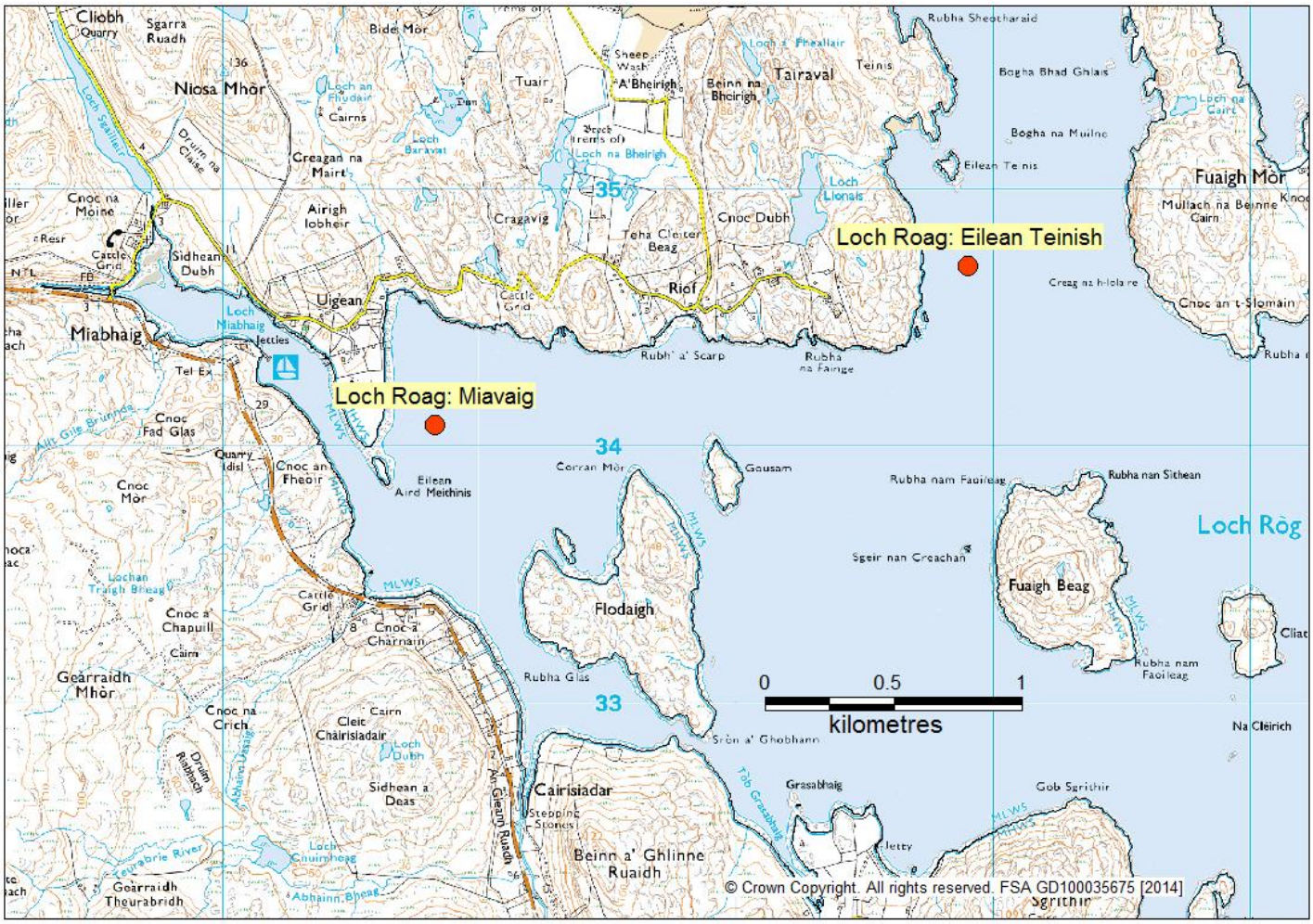
Biotoxin results from Loch Stockinish: Loch Stockinish

	Jan					Feb				Mar				Apr				May					Jun				Jul					Aug				Sep				Oct					Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																				
LT - OA/DTX/PTXs																																																				
LT - AZAs																																																			
LT - YTXs																																																			
PSP																																																			

Phytoplankton results from Loch Stockinish: Loch Stockinish

	Jan					Feb				Mar				Apr				May					Jun				Jul					Aug				Sep				Oct					Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Pseudo - nitzschia																																																				
Dinophysis																																																				
Prorocentrum lima																																																			
Alexandrium																																																			

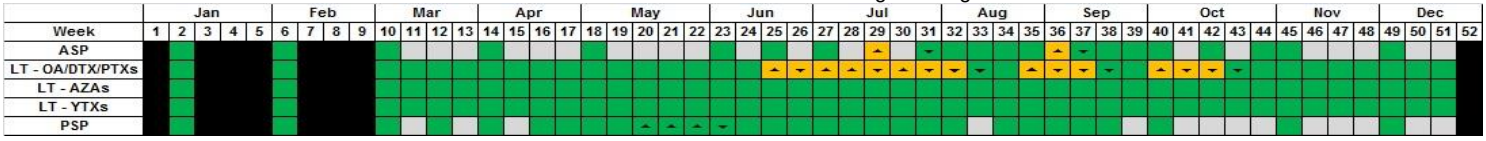
Pod 23



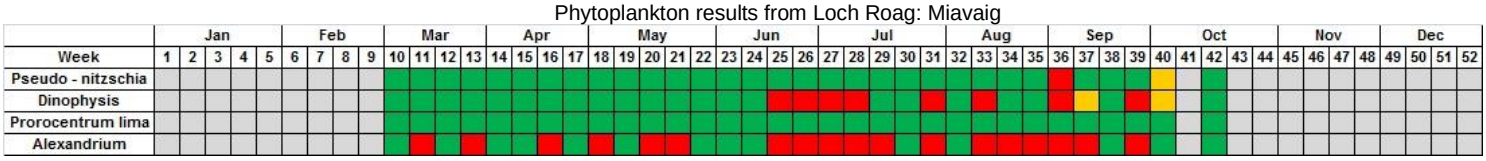
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
23	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Miavaig	Miavaig	LH 188 123 08	Common mussels	Yes	NB09893423
23	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Eilean Teinish	Eilean Teinish	LH 338 720 08	Common mussels	Alternate RMP	NB119347

Biotoxin results from Loch Roag: Miavaig



Phytoplankton results from Loch Roag: Miavaig

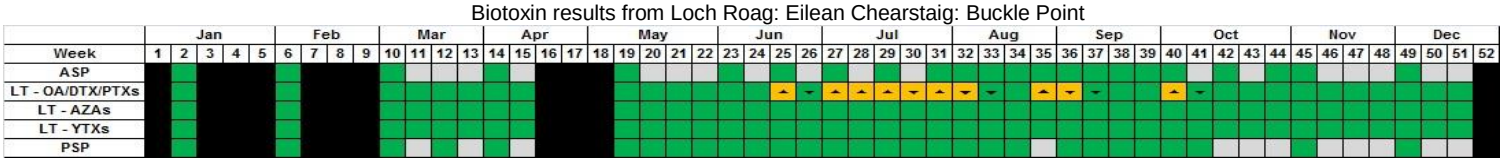


Pod 24

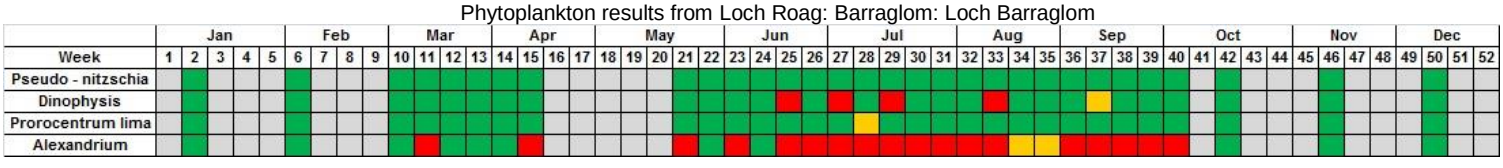
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
24	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Barraglom	Loch Barraglom	LH 185 120 08	Common mussels	Alternate RMP	NB16693413
24	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Eilean Chearstaigh	Eilean Scarastaigh	LH 344 697 08	Common mussels		NB196328
24	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Eilean Chearstaigh	Buckle Point	LH 344 791 08	Common mussels	Yes	NB201324
24	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Ceabhagh	Keava	LH 381 772 08	Common mussels		NB20053450

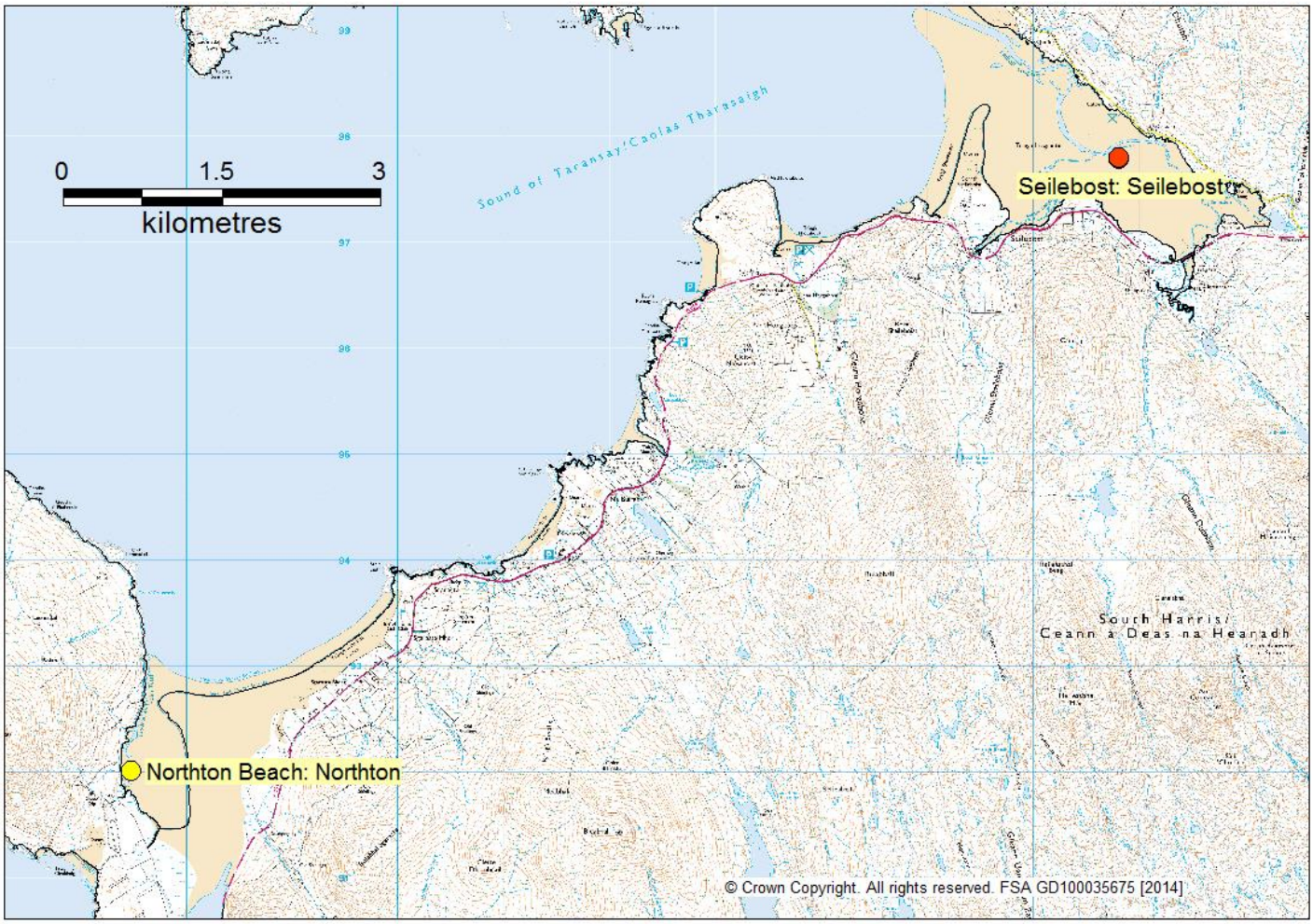
Biotoxin results from Loch Roag: Eilean Chearstaig: Buckle Point



Phytoplankton results from Loch Roag: Barraglom: Loch Barraglom



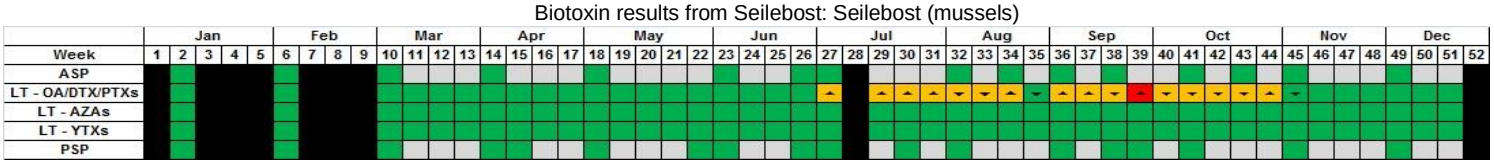
Pod 76



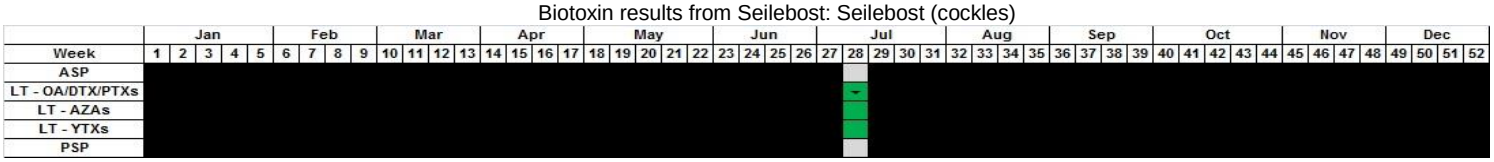
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
76	Comhairle nan Eilean Siar - Lewis & Harris	Seilebost	Seilebost	LH 249 129 04	Common cockles	Yes	NG078978
76	Comhairle nan Eilean Siar - Lewis & Harris	Northton Beach	Northton	LH 531 964 04	Common cockles		NF98479200

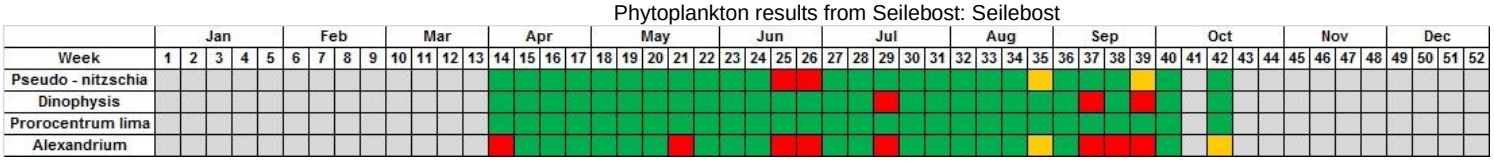
Biotoxin results from Seilebost: Seilebost (mussels)



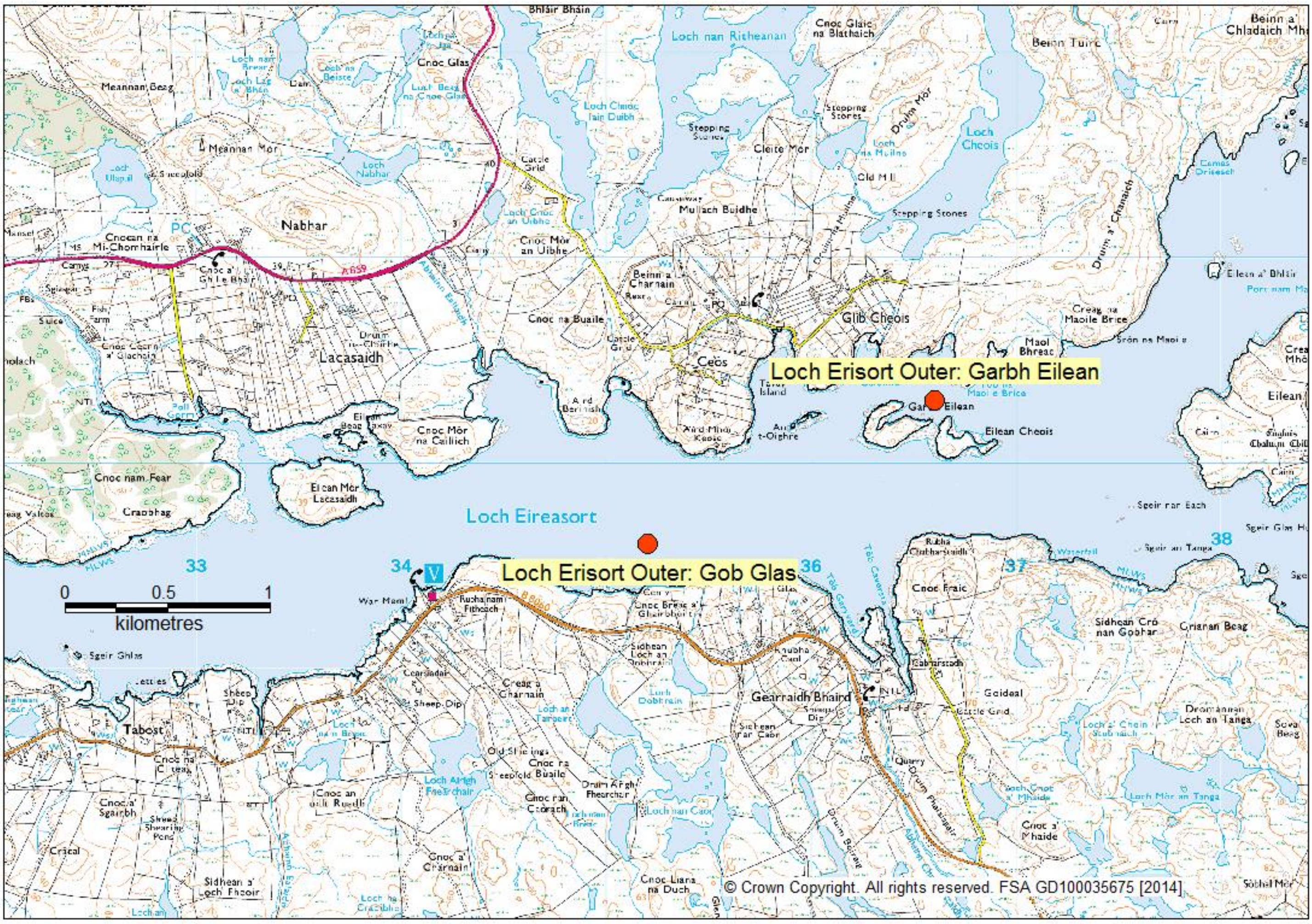
Biotoxin results from Seilebost: Seilebost (cockles)



Phytoplankton results from Seilebost: Seilebost



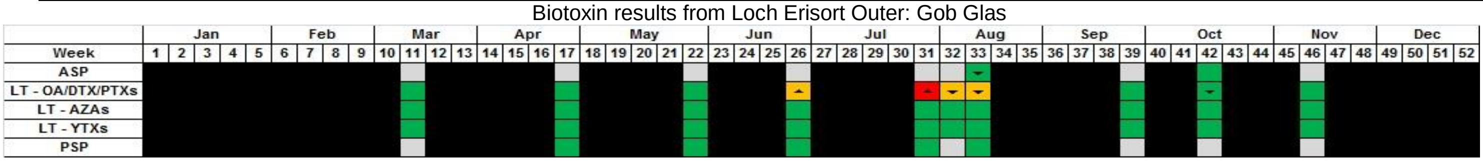
Pod 124



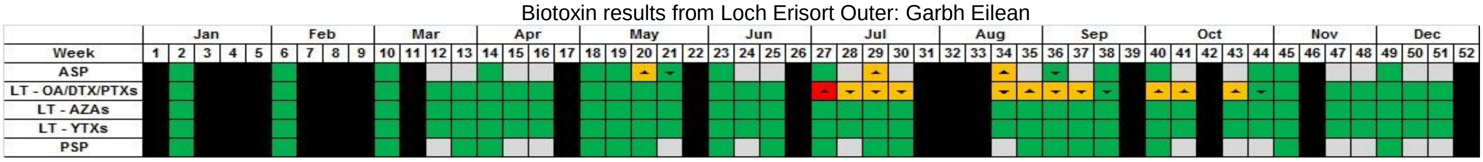
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
124	Comhairle nan Eilean Siar - Lewis & Harris	Loch Erisort Outer	Gob Glas	LH 357 711 08	Common mussels	Yes	NB352206
124	Comhairle nan Eilean Siar - Lewis & Harris	Loch Erisort Outer	Garbh Eilean	LH 357 747 08	Common mussels	Alternate RMP	NB366213

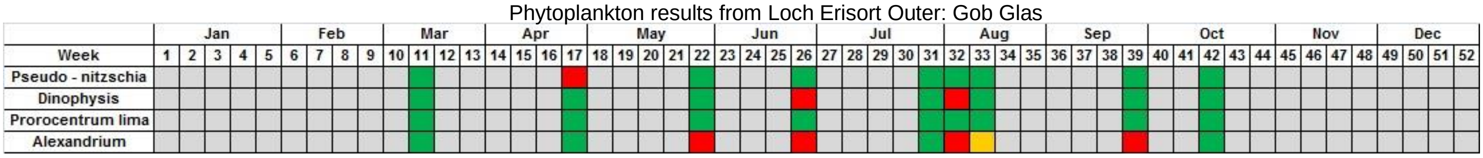
Biotoxin results from Loch Erisort Outer: Gob Glas



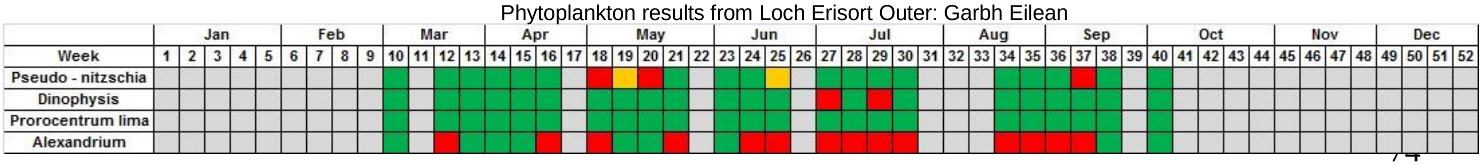
Biotoxin results from Loch Erisort Outer: Garbh Eilean



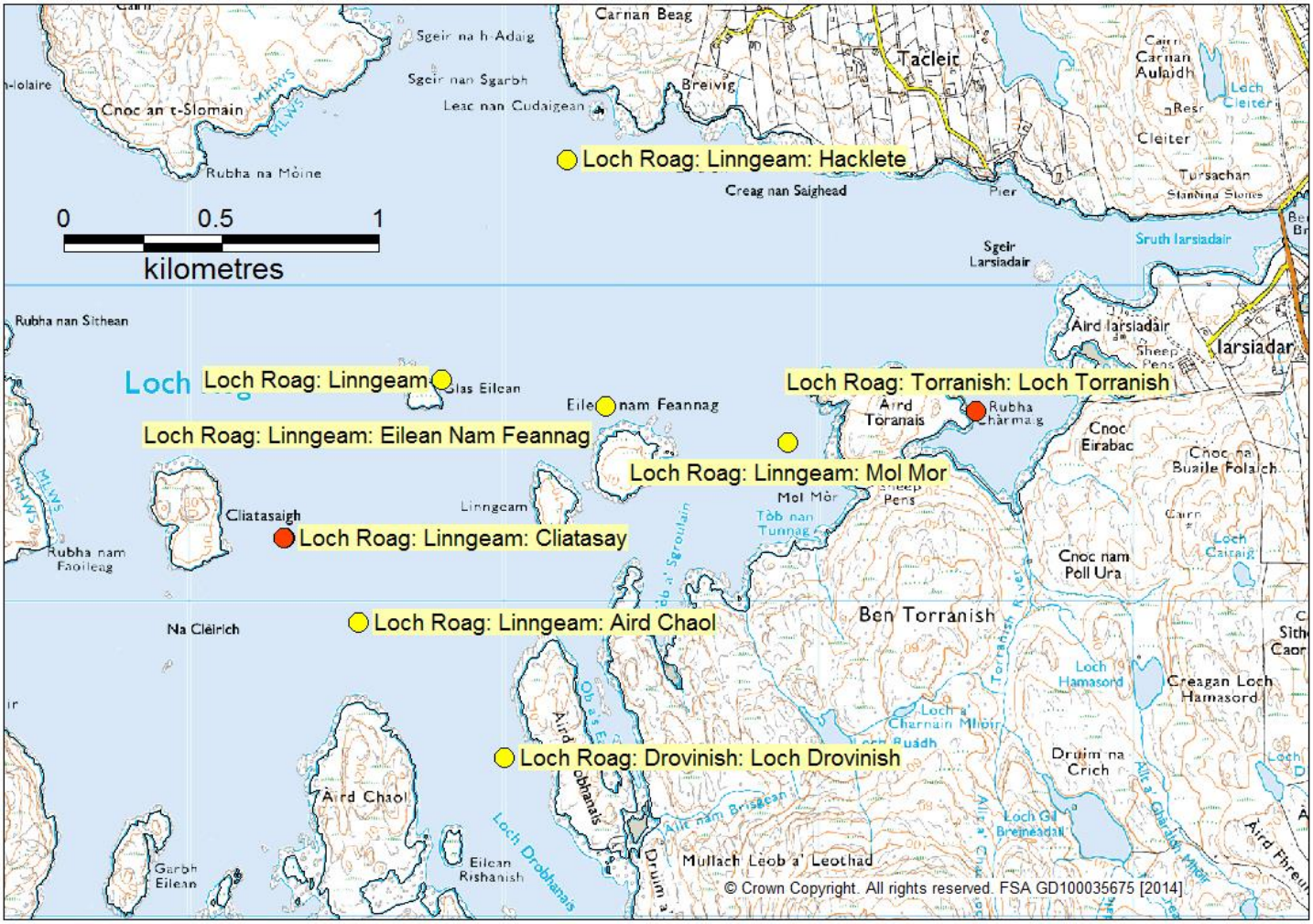
Phytoplankton results from Loch Erisort Outer: Gob Glas



Phytoplankton results from Loch Erisort Outer: Garbh Eilean



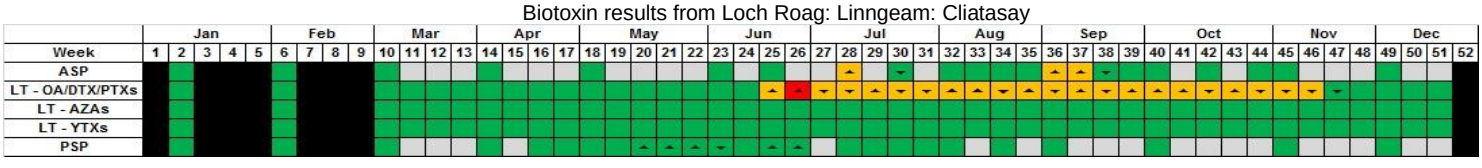
Pod 125



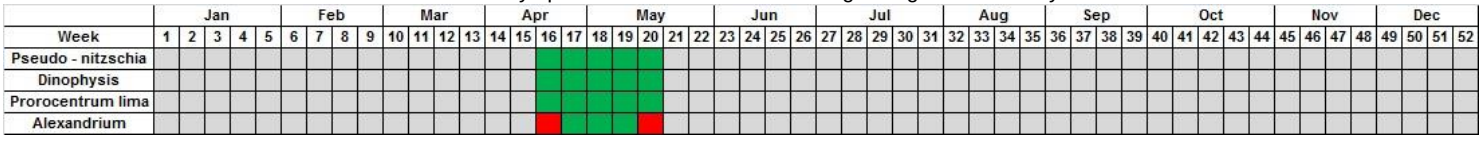
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Linngeam	Cliatasay	LH 187 699 08	Common mussels	Yes	NB13283323
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Linngeam	Mol Mor	LH 187 710 08	Common mussels		NB149335
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Linngeam	Linngeam	LH 187 122 08	Common mussels		NB138337
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Linngeam	Hacklete	LH 187 698 08	Common mussels		NB142344
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Torranish	Loch Torranish	LH 189 124 08	Common mussels	Alternate RMP	NB155336
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Drovinish	Loch Drovinish	LH 186 121 08	Common mussels		NB140325
125	Comhairle nan Eilean Siar - Lewis & Harris	Loch Roag: Linngeam	Eilean Nam Feannag	LH 187 939 08	Common mussels		NB143336
125	Comhairle nan Eilean Siar – Lewis & Harris	Loch Roag: Linngeam	Aird Chaol	LH 187 941 08	Common mussels		NB135329

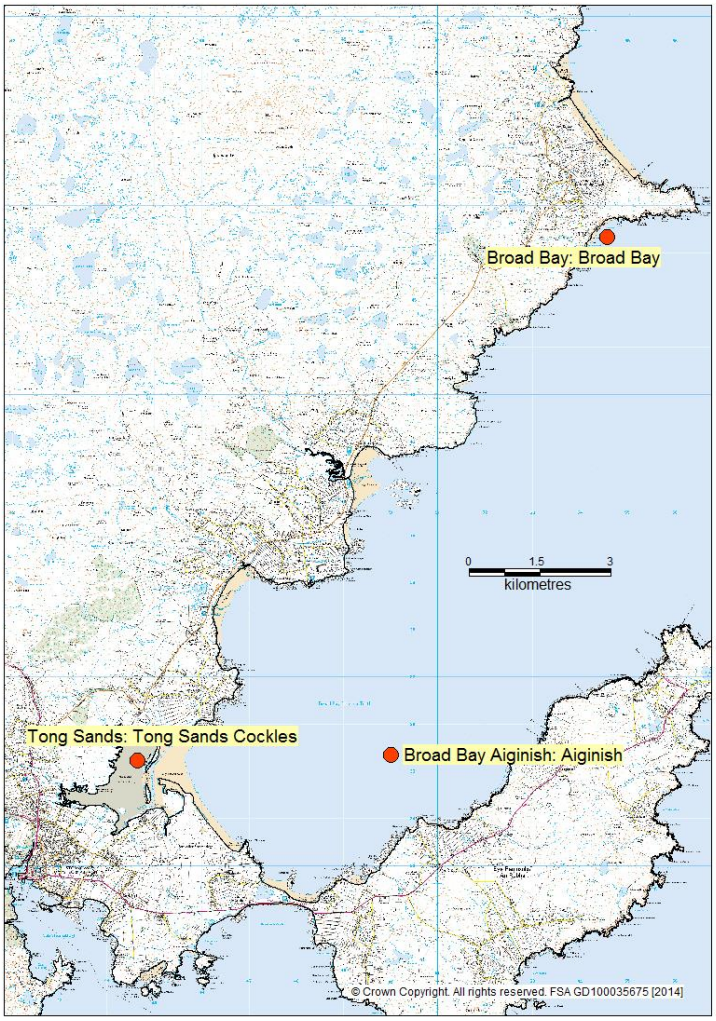
Biotoxin results from Loch Roag: Linngeam: Cliatasay



Phytoplankton results from Loch Roag: Linngeam: Cliatasay



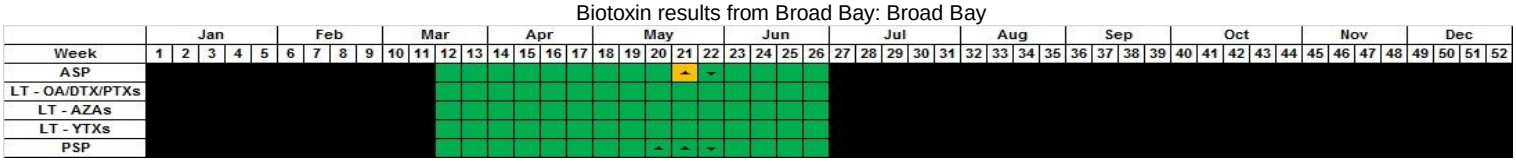
Pod 138



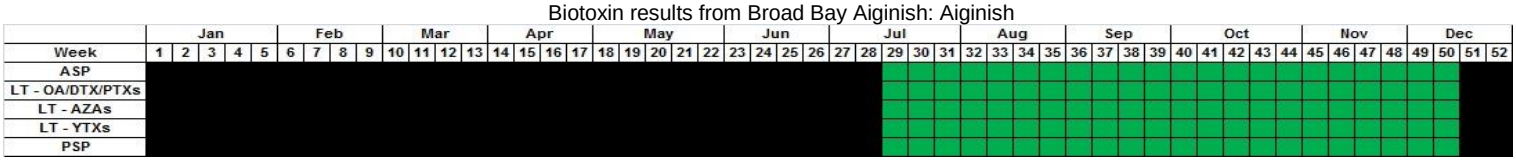
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
138	Comhairle nan Eilean Siar - Lewis & Harris	Tong Sands	Tong Sands Cockles	LH 605 1100 04	Common cockles	Yes	NB44613523
138	Comhairle nan Eilean Siar - Lewis & Harris	Broad Bay	Broad Bay	LH 024 099 16	Razors	Alternate RMP	NB54634617
138	Comhairle nan Eilean Siar - Lewis & Harris	Broad Bay Aiginish	Aiginish	LH 743 1740 16	Razors	Alternate RMP	NB50203550

Biotoxin results from Broad Bay: Broad Bay



Biotoxin results from Broad Bay Aiginish: Aiginish



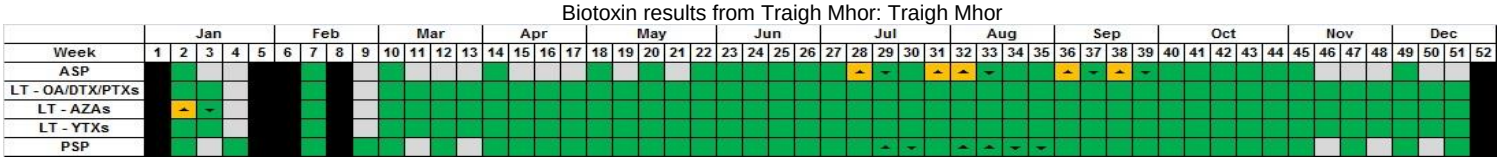
6.3. COMHAIRLE NAN EILEAN SIAR: UIST & BARRA

Pod 77

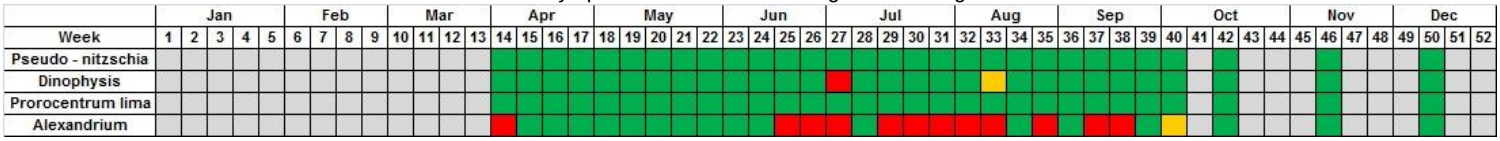
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
77	Comhairle nan Eilean Siar - Uist & Barra	Traigh Mhor	Traigh Mhor	UB 282 165 04	Common cockles	Yes	NF705055
77	Comhairle nan Eilean Siar - Uist & Barra	Cidhe Eolaigearraidh	Sound of Barra: Pacific oysters	UB 427 830 13	Pacific oysters		NF71200710
77	Comhairle nan Eilean Siar - Uist & Barra	Traigh Cille Bharra	Traigh Cille Bharra Cockles	UB 392 790 04	Common cockles		NF71380818
77	Comhairle nan Eilean Siar - Uist & Barra	Oitir Mhor Razors	Rubha nan Eun	UB 683 1484 16	Razors		NF73840660
77	Comhairle nan Eilean Siar - Uist & Barra	Traigh Cille Razors	Traigh Cille Razors	UB 711 1574 16	Razors		NF71330735

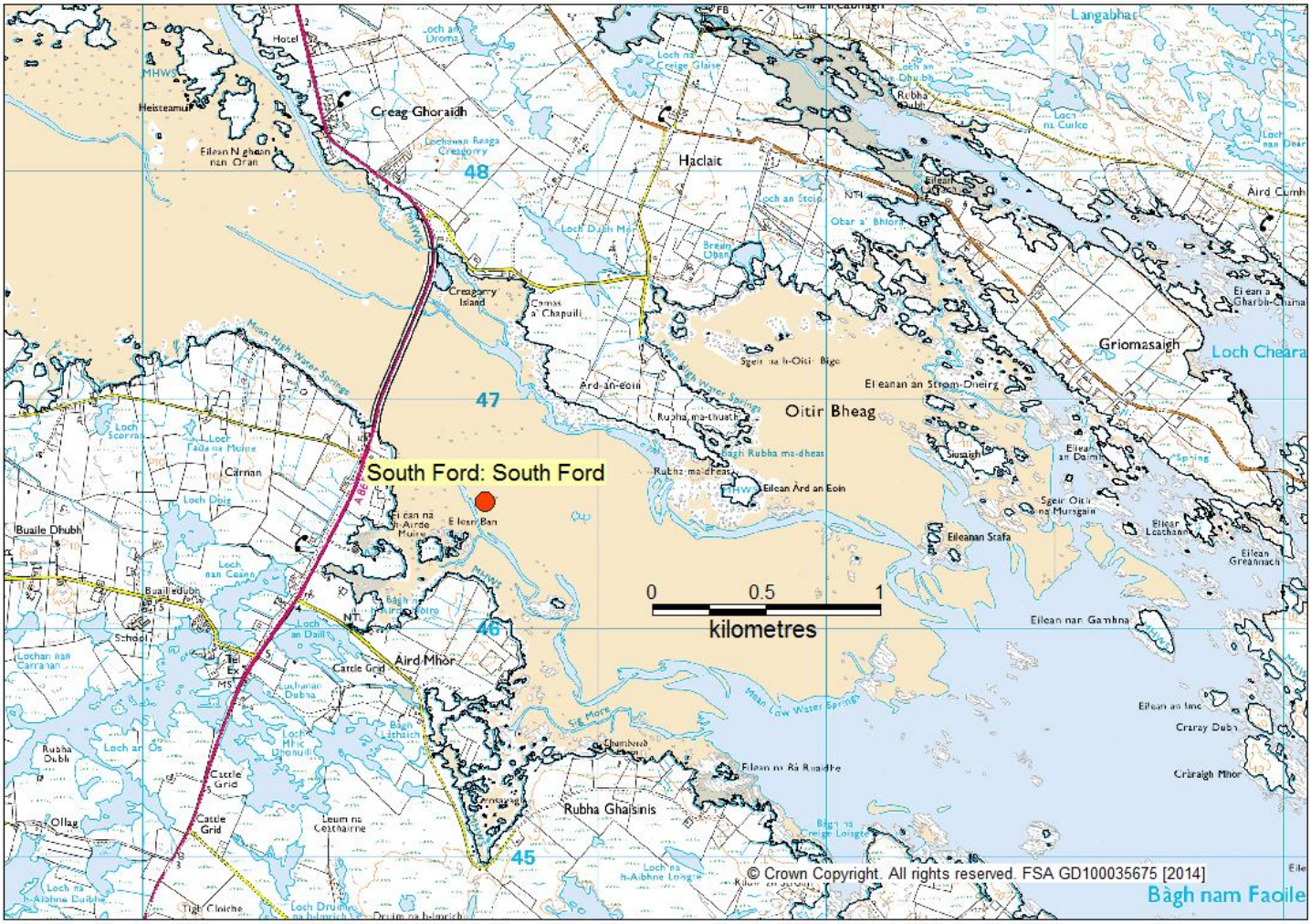
Biotoxin results from Traigh Mhor: Traigh Mhor



Phytoplankton results from Traigh Mhor: Traigh Mhor



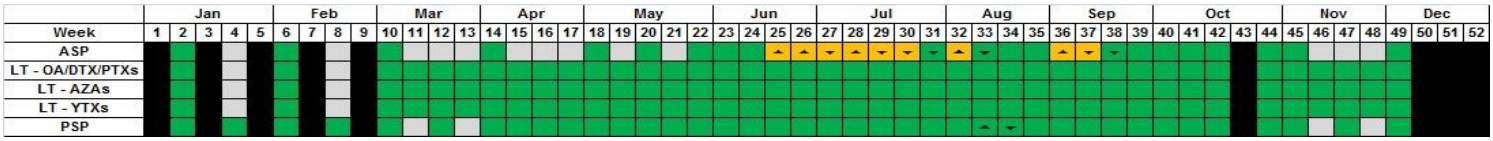
Pod 86



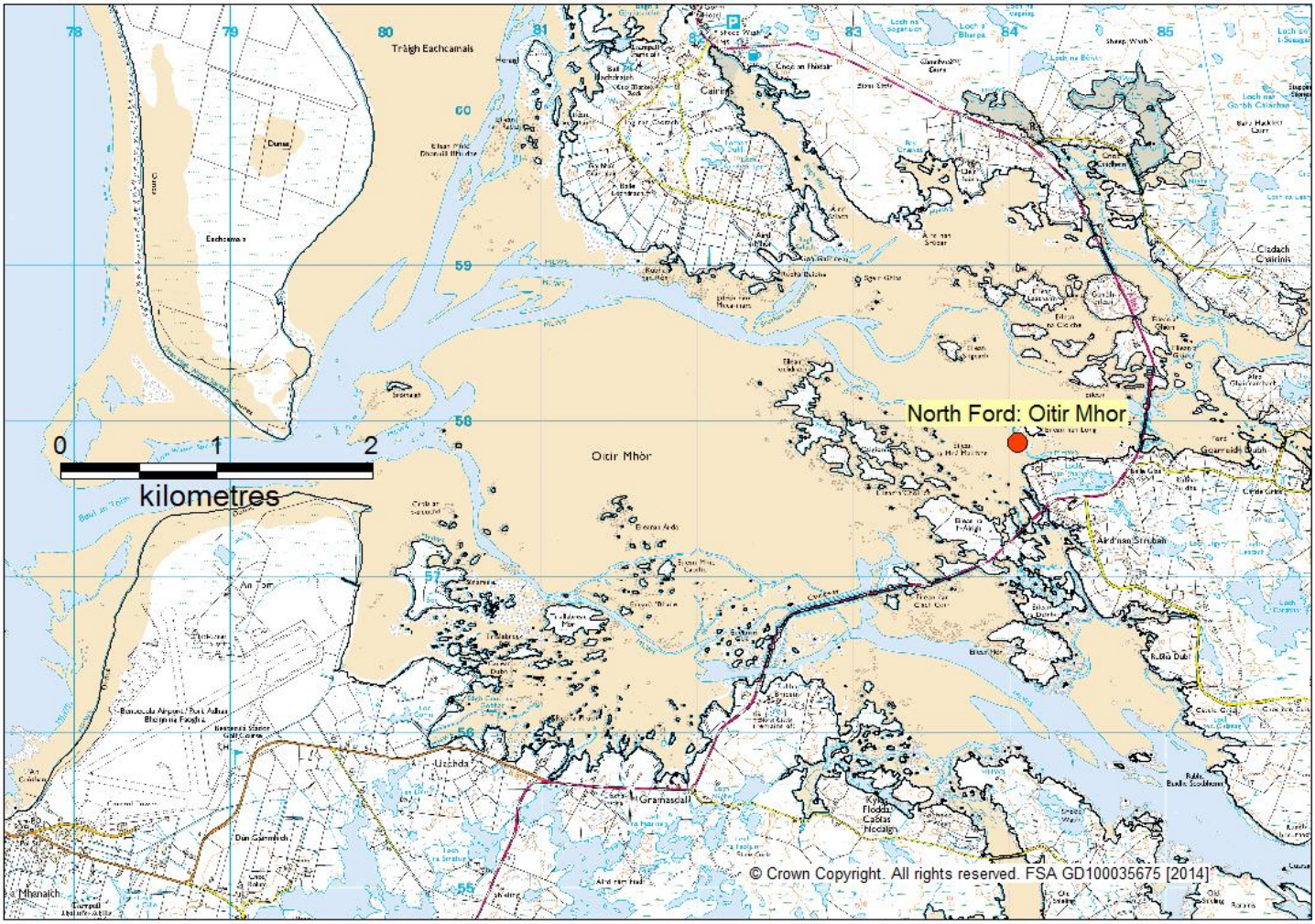
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
86	Comhairle nan Eilean Siar - Uist & Barra	South Ford	South Ford	UB 259 162 04	Common cockles	Yes	NF8050146551

Biotoxin results from South Ford: South Ford



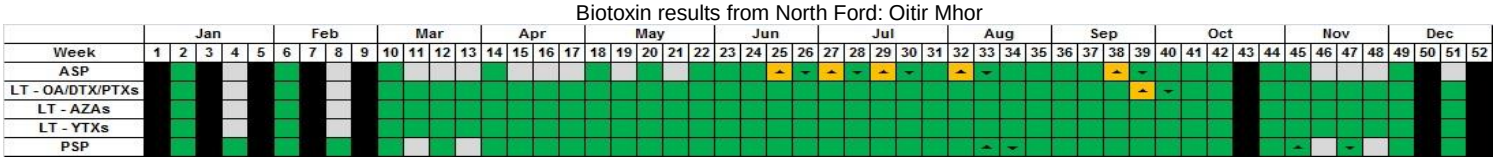
Pod 133



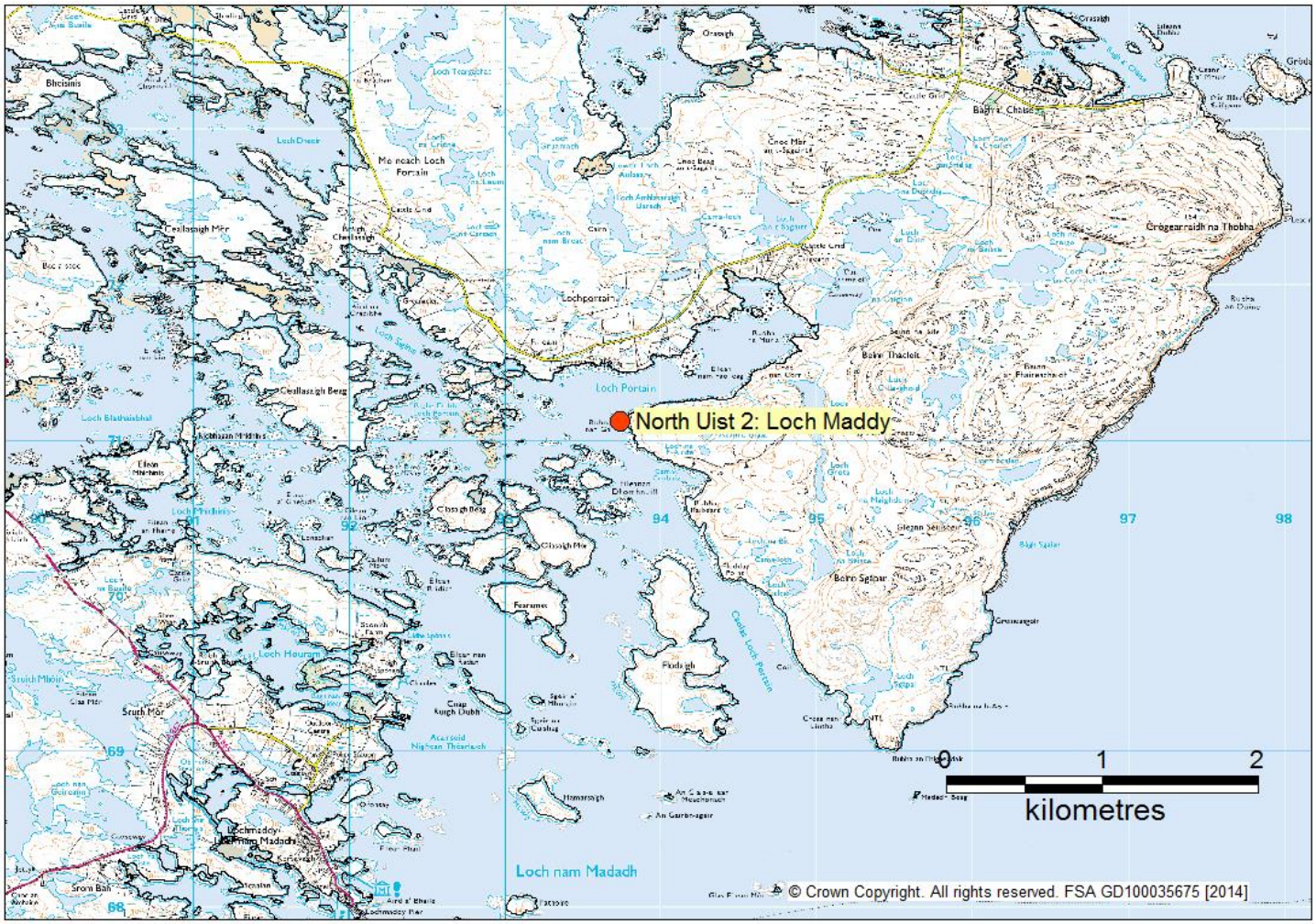
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
133	Comhairle nan Eilean Siar - Uist & Barra	North Ford	Oitir Mhor	UB 493 852 04	Common cockles	Yes	NF84055786

Biotoxin results from North Ford: Oitir Mhor



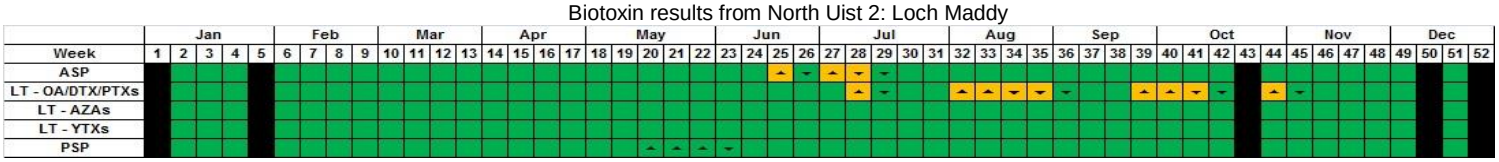
Pod 135



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
135	Comhairle nan Eilean Siar - Uist & Barra	North Uist 2	Loch Maddy	UB 540 969 08	Common mussels	Yes	NF93737112

Biotoxin results from North Uist 2: Loch Maddy

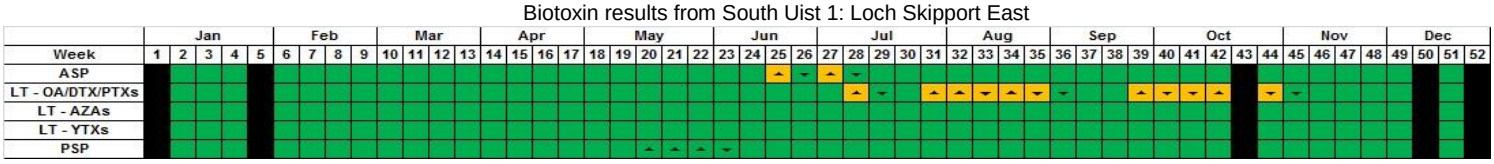


Pod 136

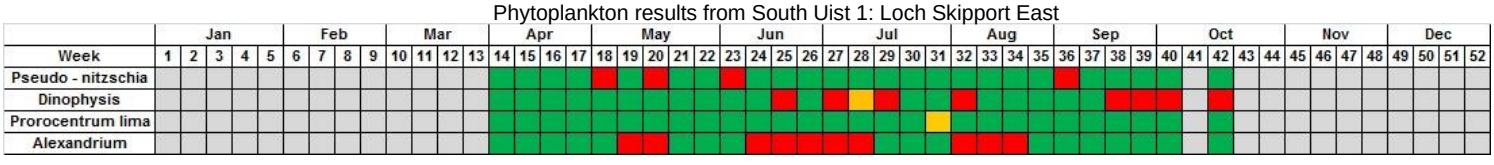
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
136	Comhairle nan Eilean Siar - Uist & Barra	South Uist 1	Loch Skipport East	UB 537 966 08	Common mussels	Yes	NF84353914

Biotoxin results from South Uist 1: Loch Skipport East



Phytoplankton results from South Uist 1: Loch Skipport East



Pod 141

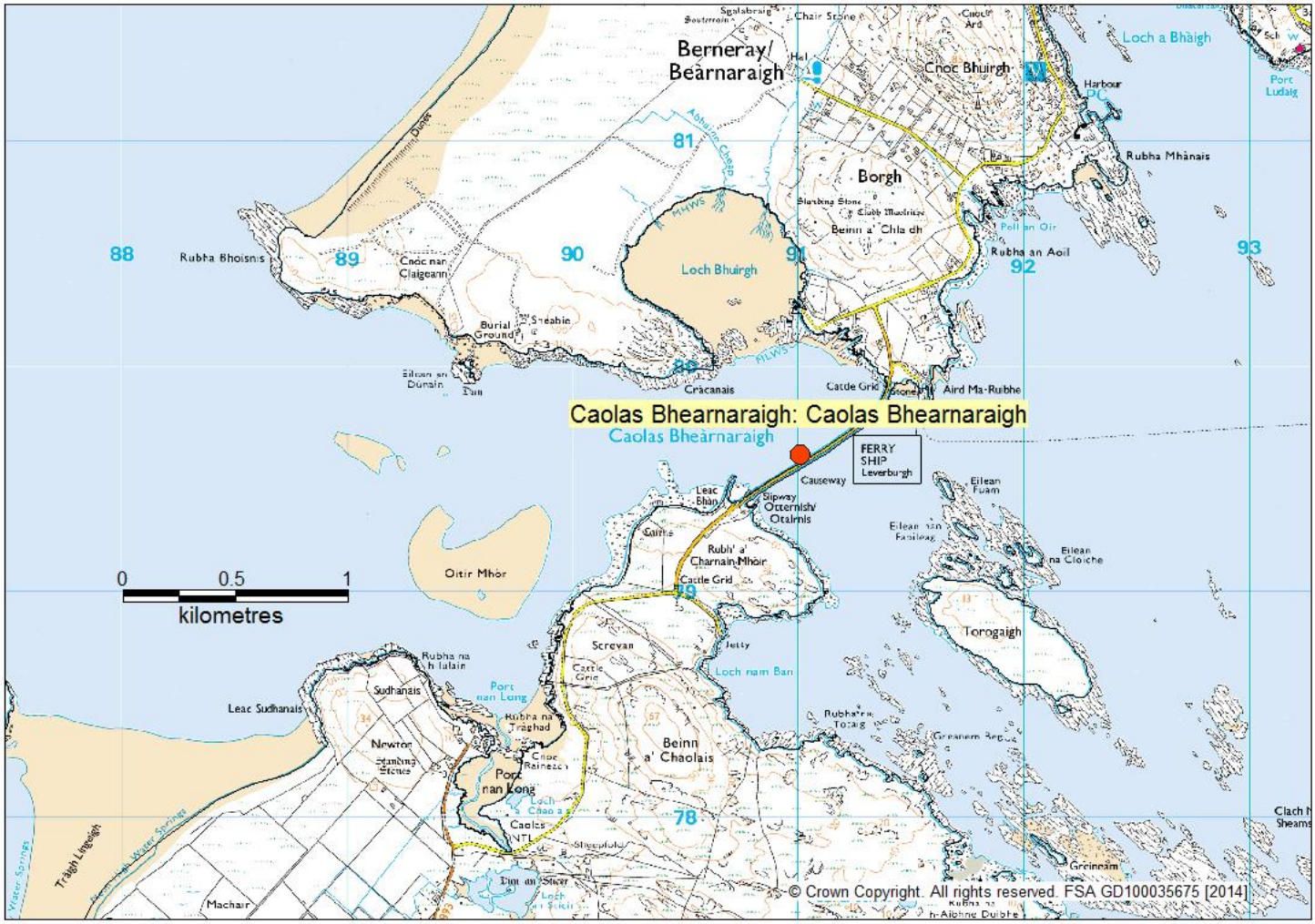
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
141	Comhairle nan Eilean Siar - Uist & Barra	Caolas Eiriosgaigh	Calbaigh	UB 684 1485 16	Razors	Yes	NF80711386

Biotoxin results from Caolas Eiriosgaigh: Calbaigh

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																									▲	▲	▼	▼																							
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																			
LT - YTXs																																																			
PSP																										▲	▼																									

Pod 147



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
147	Comhairle nan Eilean Siar - Uist & Barra	Caolas Bhearnaraigh	Caolas Bhearnaraigh	UB 735 1706 16	Razors	Yes	NF910769

Biotoxin results from Caolas Bhearnaraigh: Caolas Bhearnaraigh

	Jan					Feb				Mar				Apr				May					Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

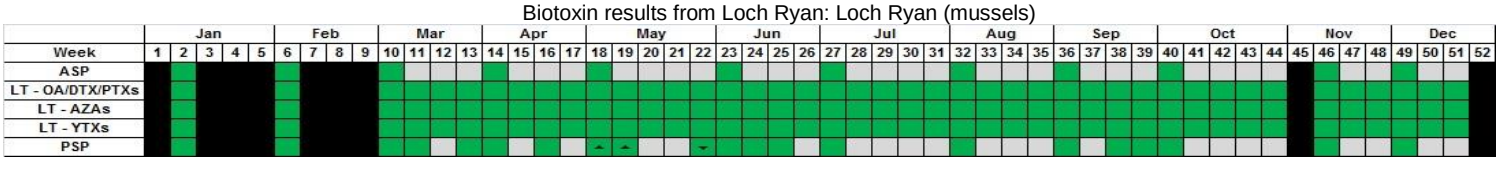
6.4. DUMFRIES & GALLOWAY COUNCIL

Pod 26

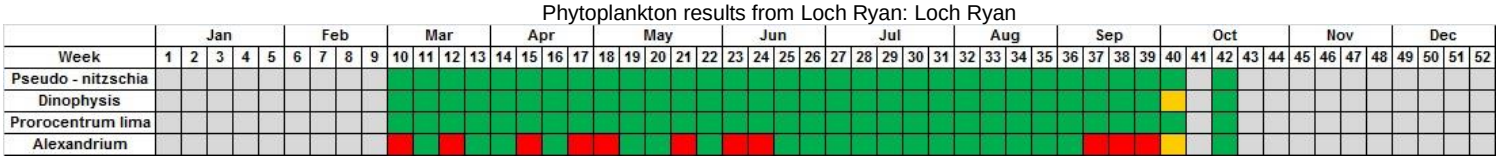
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
26	Dumfries and Galloway Council	Loch Ryan	Loch Ryan	DG 191 175 12	Native oysters	Yes	NX035665
26	Dumfries and Galloway Council	Loch Ryan	Leffnoll Point	DG 191 174 12	Native oysters		NX072652
26	Dumfries and Galloway Council	Loch Ryan Cockles	Loch Ryan Cockles	DG 746 1809 04	Common cockles		NX07106140

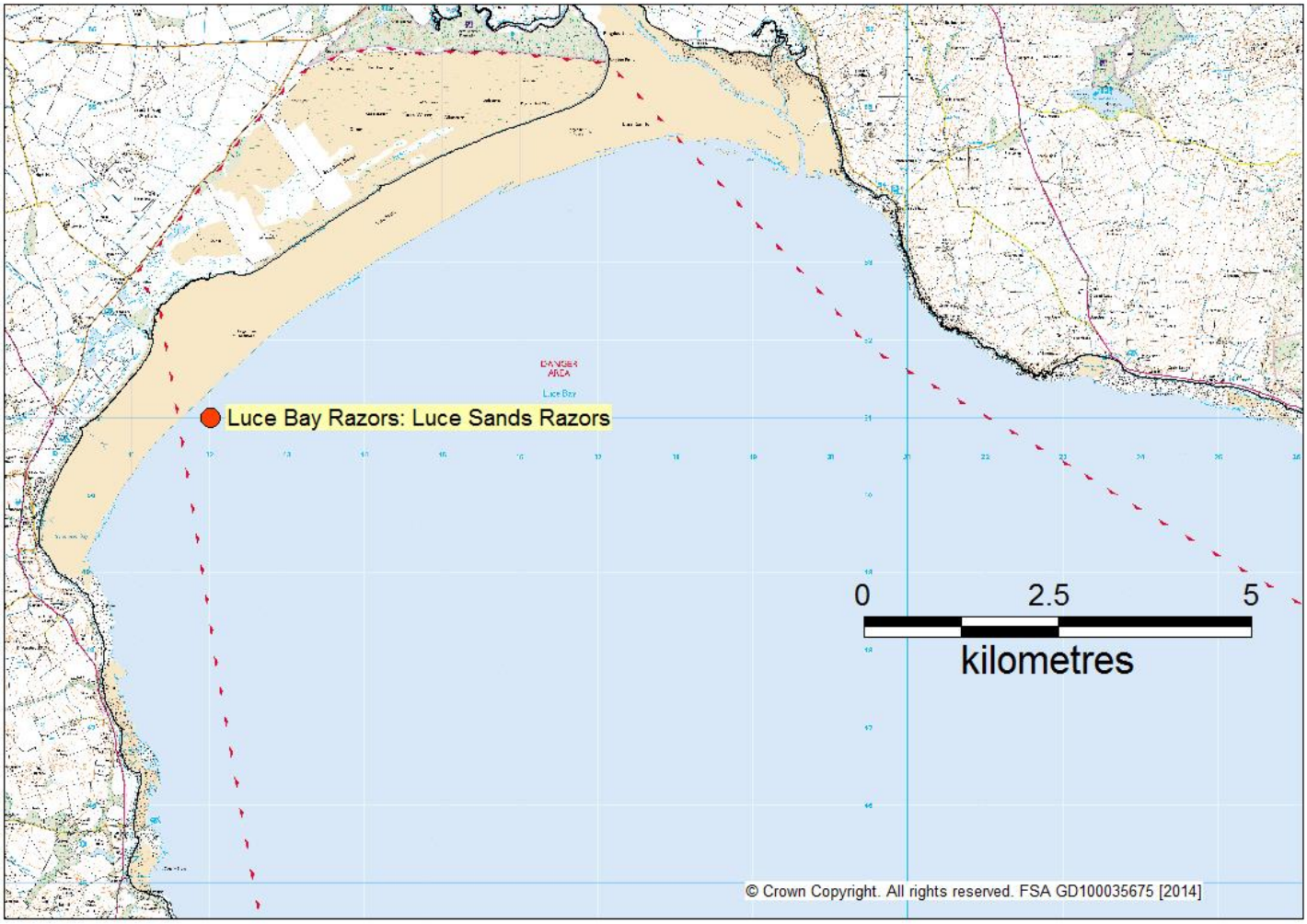
Biotoxin results from Loch Ryan: Loch Ryan (mussels)



Phytoplankton results from Loch Ryan: Loch Ryan



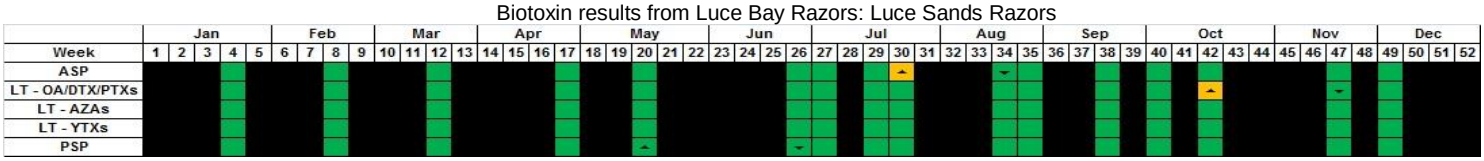
Pod 89



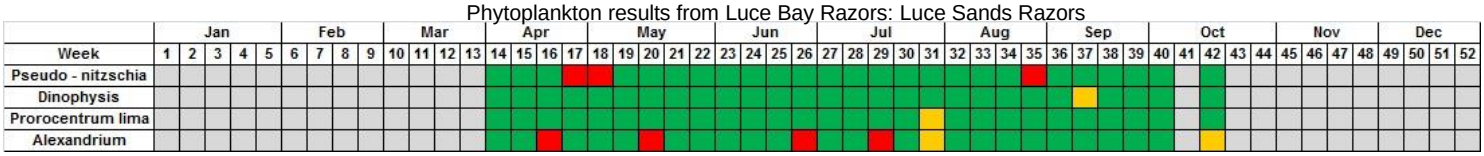
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
89	Dumfries and Galloway Council	Luce Bay Razors	Luce Sands Razors	DG 499 865 16	Razors	Yes	NX120510

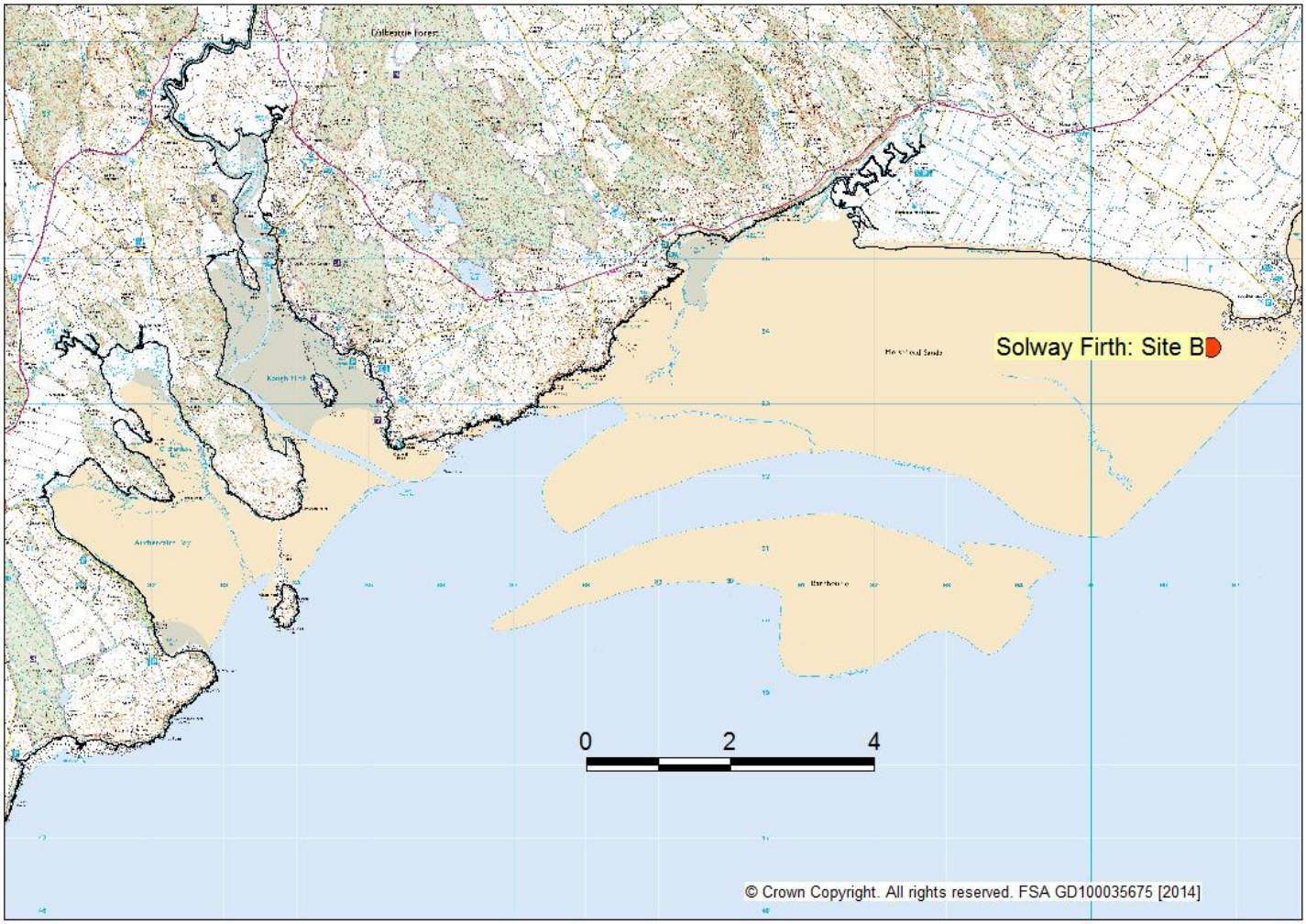
Biotoxin results from Luce Bay Razors: Luce Sands Razors



Phytoplankton results from Luce Bay Razors: Luce Sands Razors



Pod 142



RMP position: AHA position:

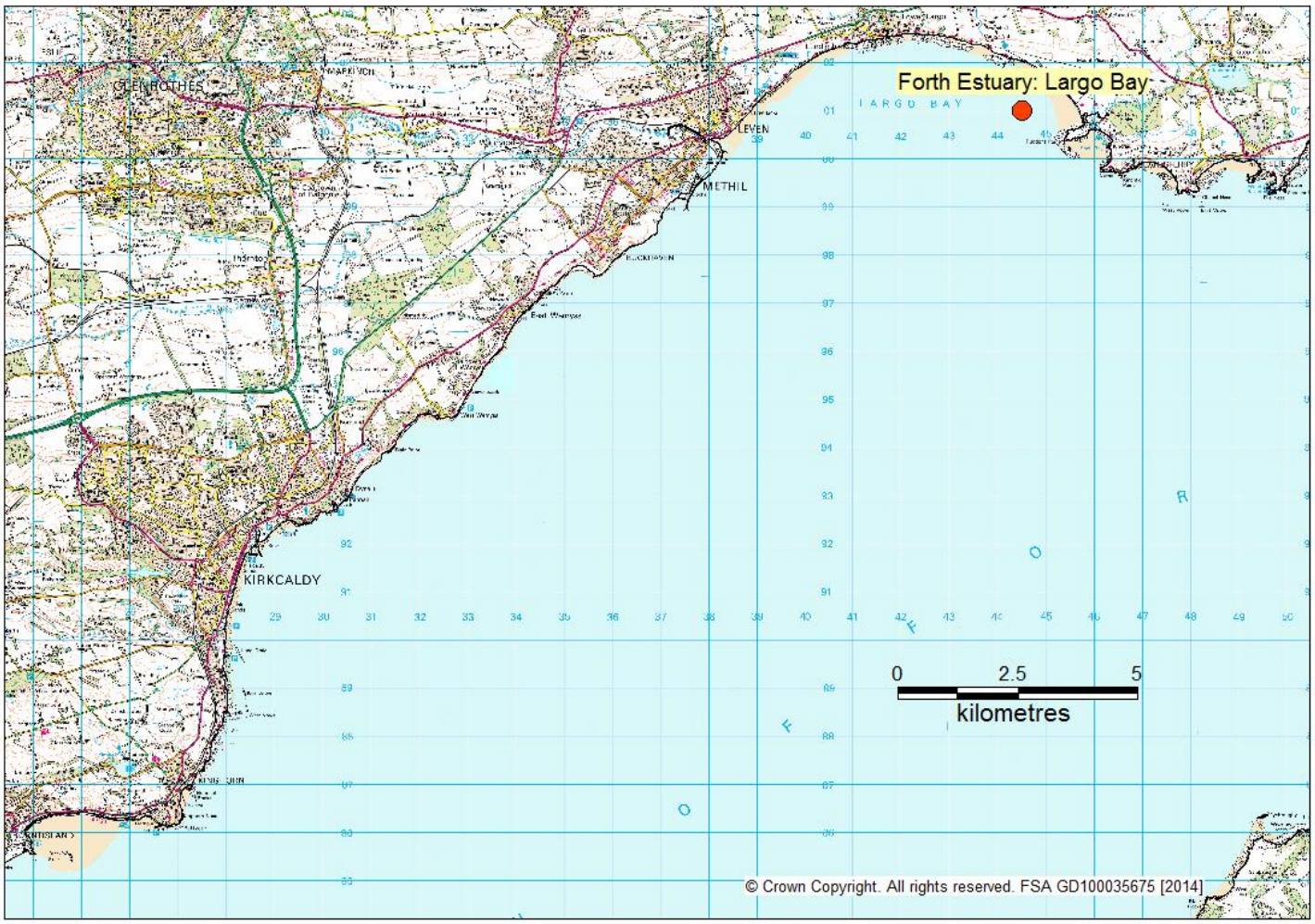
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
142	Dumfries and Galloway Council	Solway Firth	Site B	DG 253 1509 04	Common cockles	Yes	NX96665378

Biotoxin results from Solway Firth: Site B

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

6.5. FIFE COUNCIL

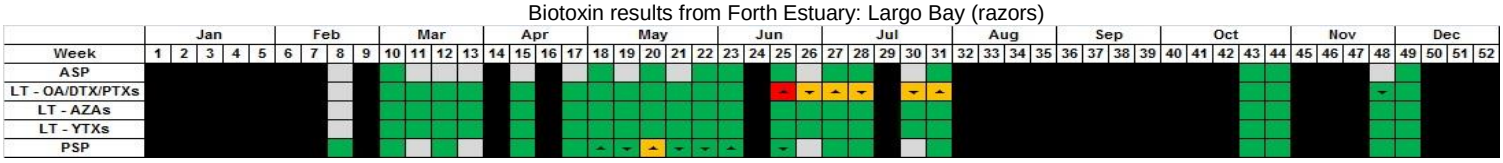
Pod 80



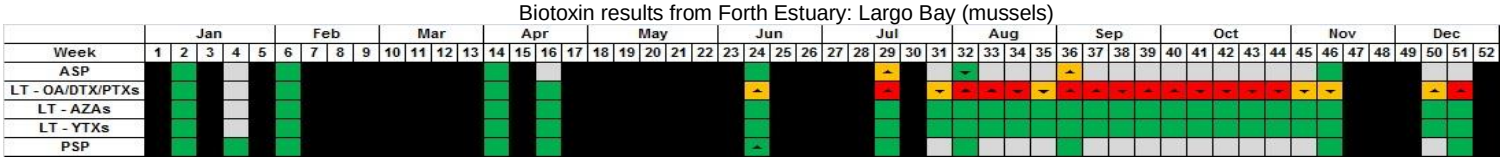
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
80	Fife Council	Forth Estuary: Largo Bay	Largo Bay	FF 072 188 16	Razors	Yes	NO445010

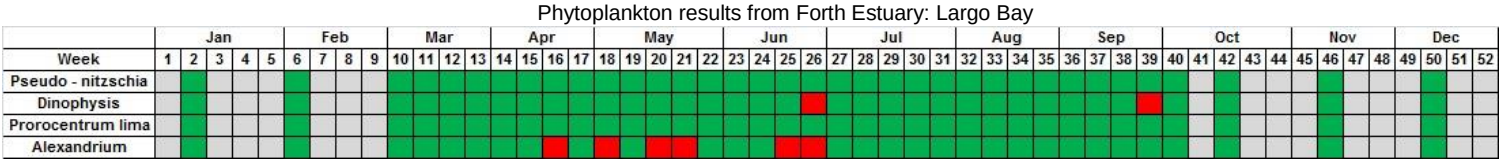
Biotoxin results from Forth Estuary: Largo Bay (razors)



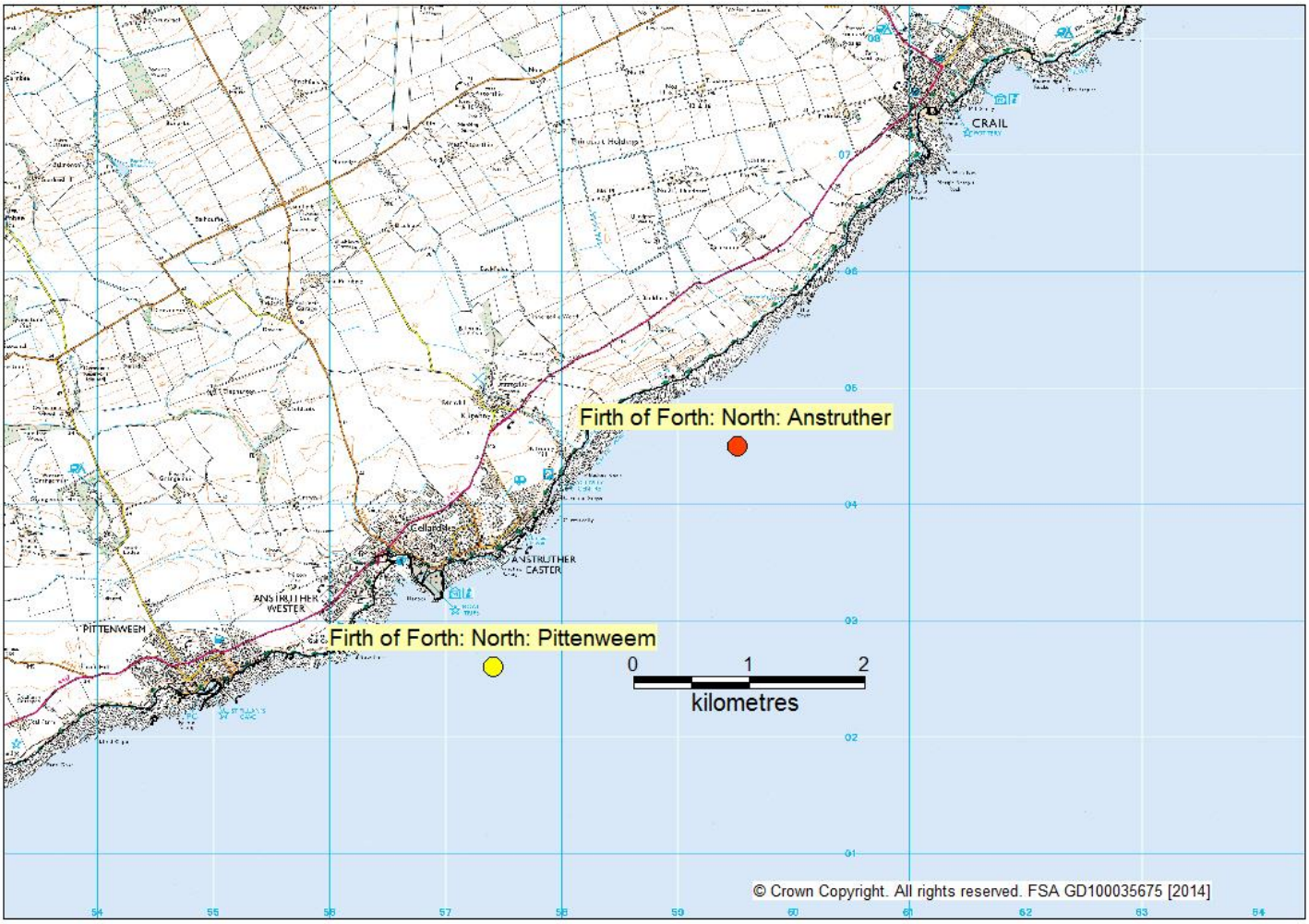
Biotoxin results from Forth Estuary: Largo Bay (mussels)



Phytoplankton results from Forth Estuary: Largo Bay



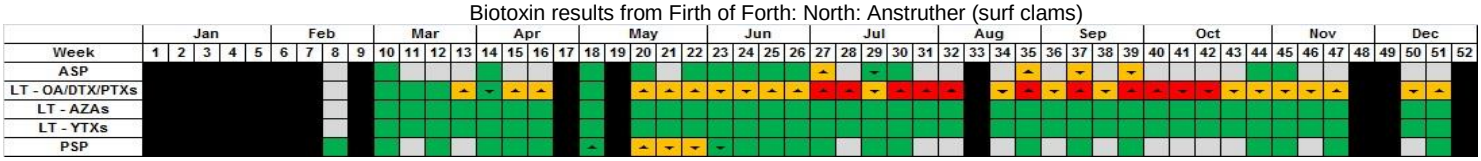
Pod 87



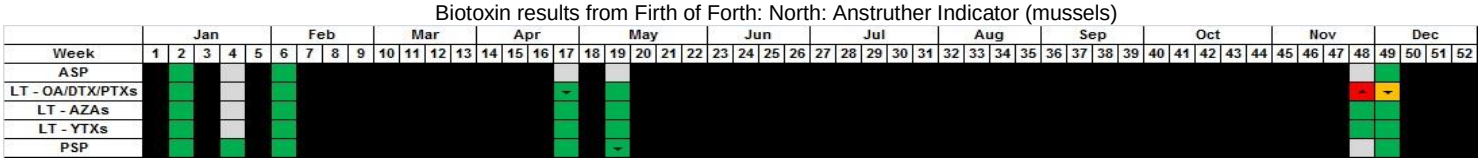
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
87	Fife Council	Firth of Forth: North	Anstruther	FF 068 184 19	Surf clams	Yes	NO59500450
87	Fife Council	Firth of Forth: North	Pittenweem	FF 073 189 19	Surf clams		NO574026

Biotoxin results from Firth of Forth: North: Anstruther (surf clams)



Biotoxin results from Firth of Forth: North: Anstruther Indicator (mussels)



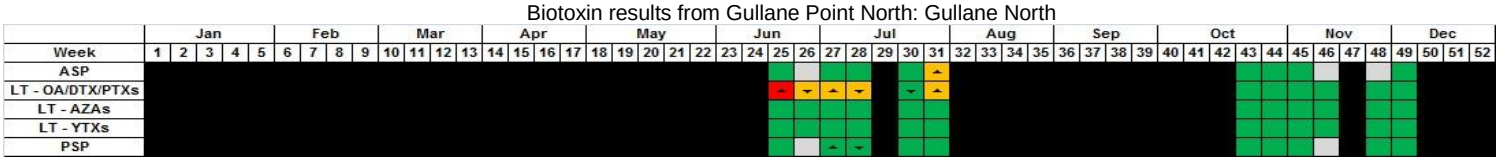
6.6. EAST LOTHIAN COUNCIL

Pod 90

RMP position: AHA position:

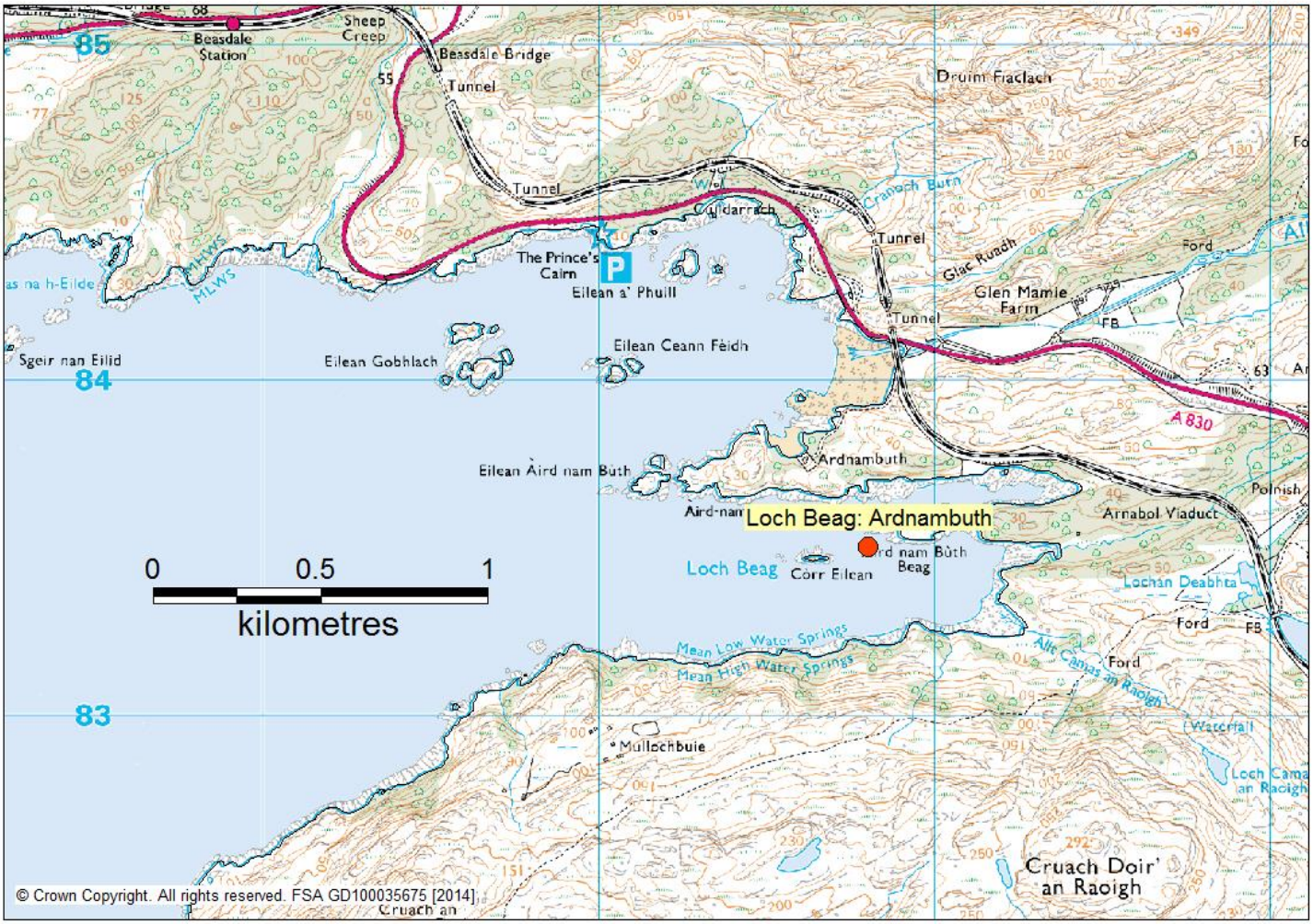
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
90	East Lothian Council	Gullane Point North	Gullane North	EL 601 1087 16	Razors	Yes	NT47008400
90	East Lothian Council	Gullane Point South	Gullane South	EL 703 1525 16	Razors		NT43508100

Biotoxin results from Gullane Point North: Gullane North



6.7. HIGHLAND COUNCIL: LOCHABER

Pod 28



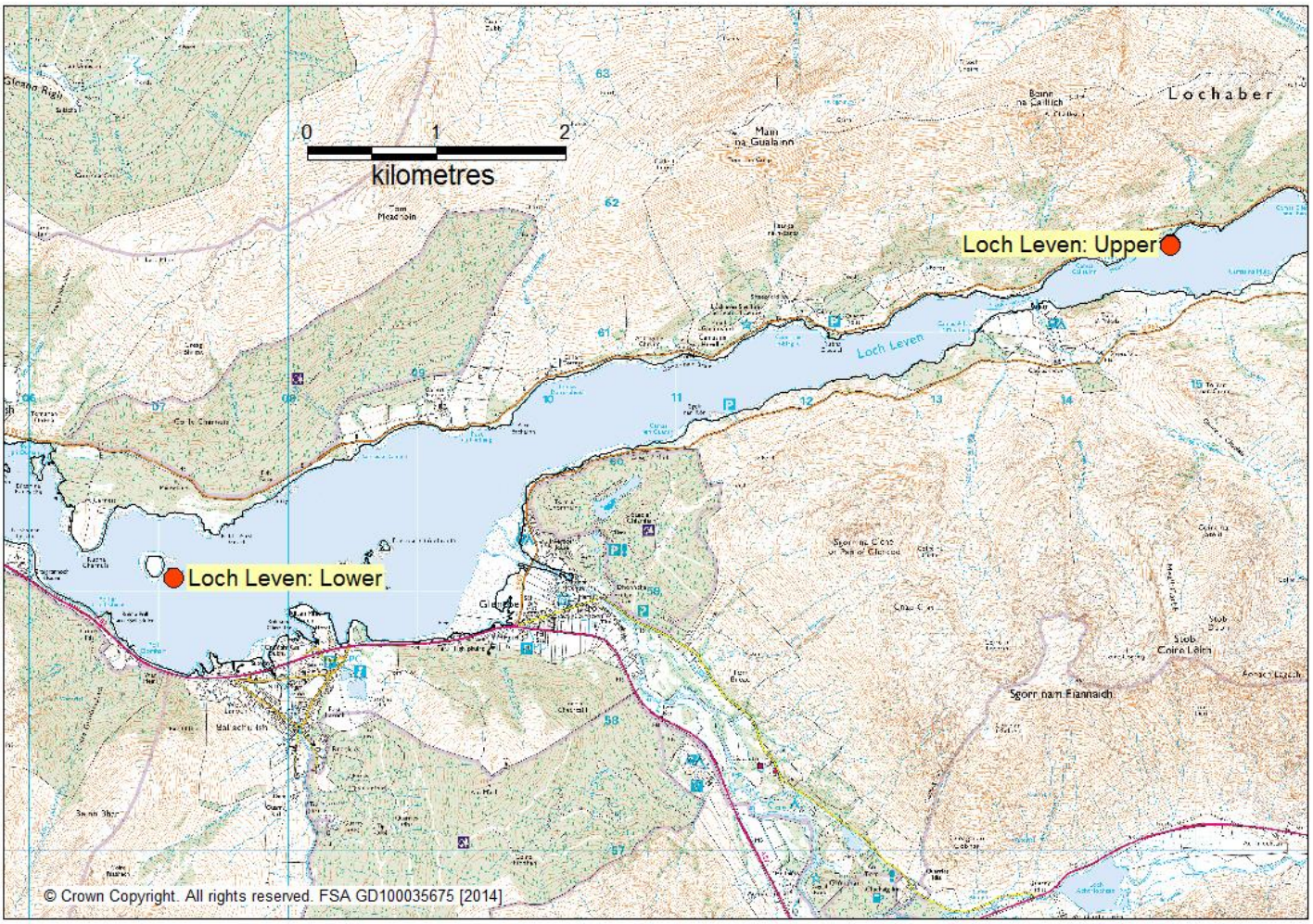
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
28	Highland Council: Lochaber	Loch Beag	Ardnambuth	HL 118 215 08	Common mussels	Yes	NM728835

Biotoxin results from Loch Beag: Ardnambuth

	Jan					Feb				Mar				Apr				May				Jun				Jul					Aug				Sep				Oct					Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																				
LT - OA/DTX/PTXs			▲			▼					▲	▼	▲	▲																																						
LT - AZAs																																																			
LT - YTXs																																																			
PSP											▲	▼	▲	▲																																						

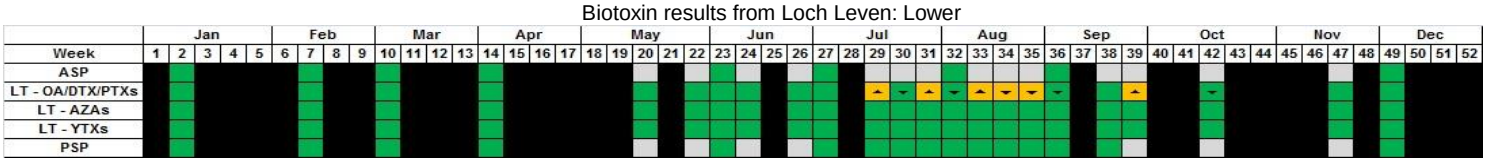
Pod 31



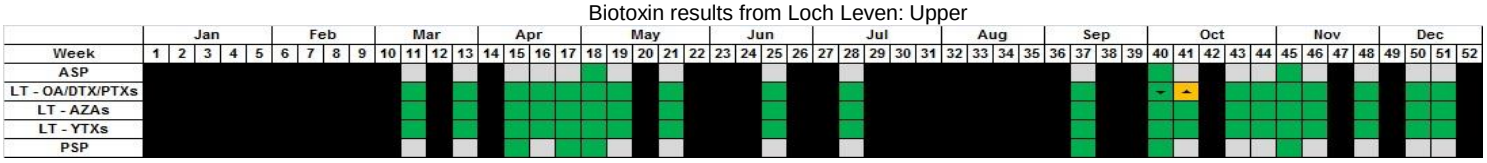
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
31	Highland Council: Lochaber	Loch Leven: Lower	Lower	HL 170 222 08	Common mussels	Yes	NN0710059105
31	Highland Council: Lochaber	Loch Leven : Upper	Upper	HL 171 223 08	Common mussels	Alternate RMP	NN1480061680

Biotoxin results from Loch Leven: Lower

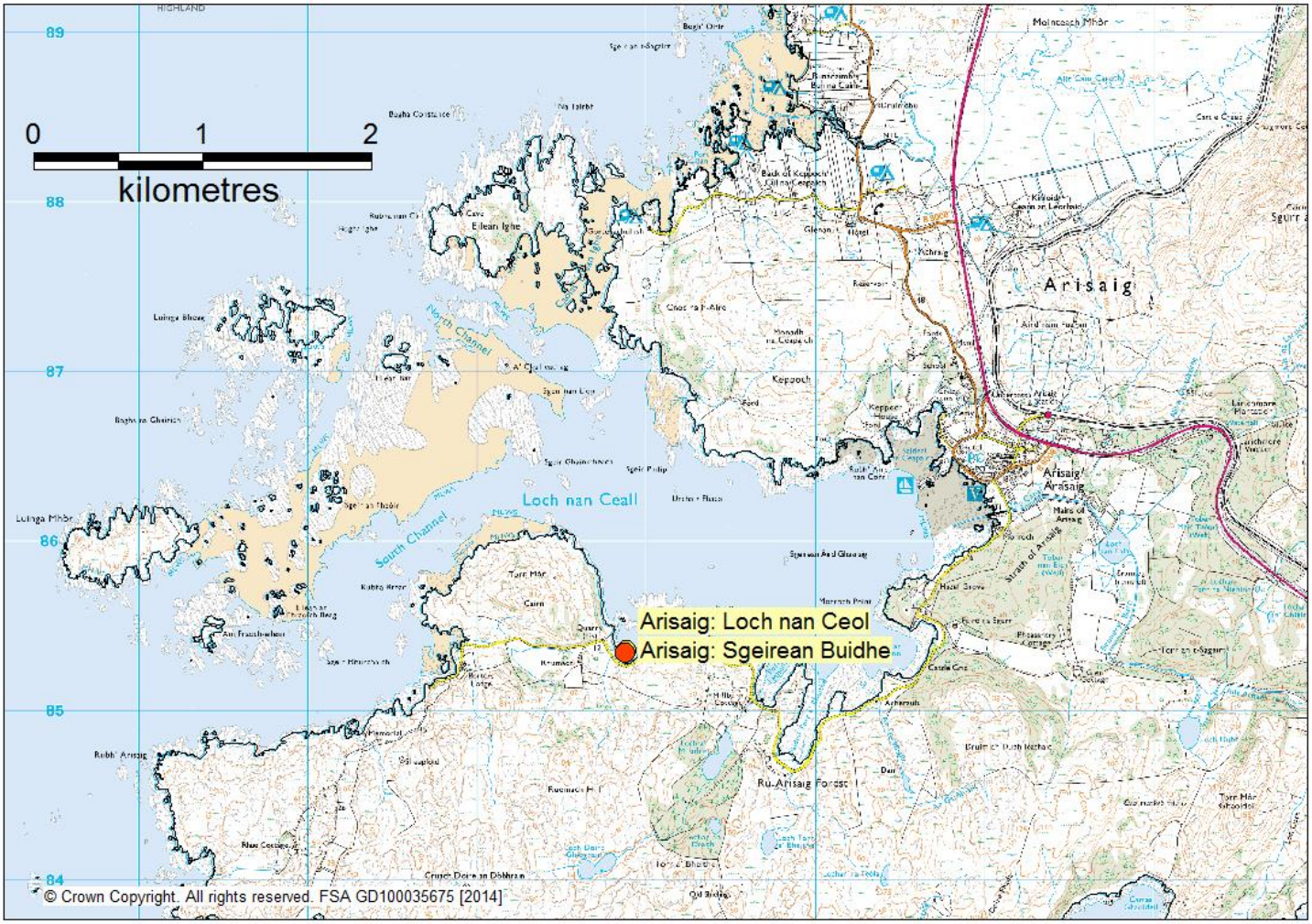


Biotoxin results from Loch Leven: Upper



Phytoplankton results from Loch Leven: Lower

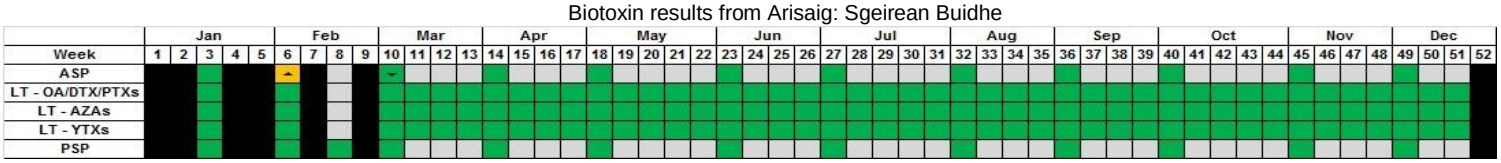
Pod 33



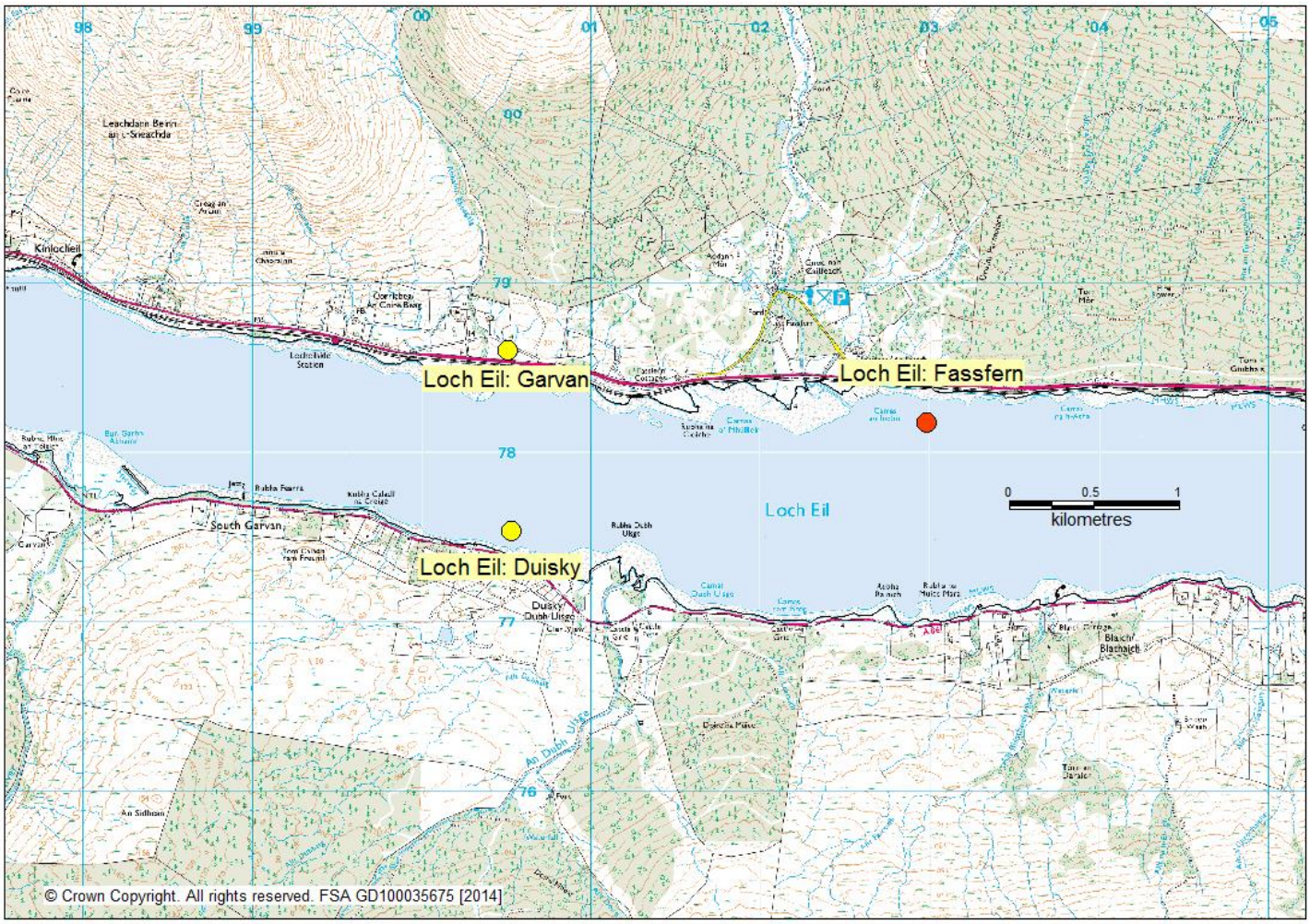
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
33	Highland Council: Lochaber	Arisaig	Sgeirean Buidhe	HL 004 202 13	Pacific oysters	Yes	NM6387085350
33	Highland Council: Lochaber	Arisaig	Loch nan Ceol	HL 004 198 13	Pacific oysters		NM6387085350

Biotoxin results from Arisaig: Sgeirean Buidhe



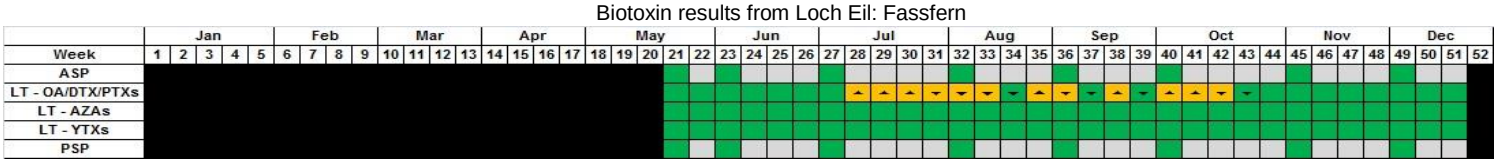
Pod 34



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
34	Highland Council: Lochaber	Loch Eil: Fassfern	Fassfern	HL 136 219 08	Common mussels	Yes	NN02977815
34	Highland Council: Lochaber	Loch Eil	Duisky	HL 134 216 08	Common mussels		NN00527753
34	Highland Council: Lochaber	Loch Eil	Garvan	HL 134 217 08	Common mussels		NN005786

Biotoxin results from Loch Eil: Fassfern

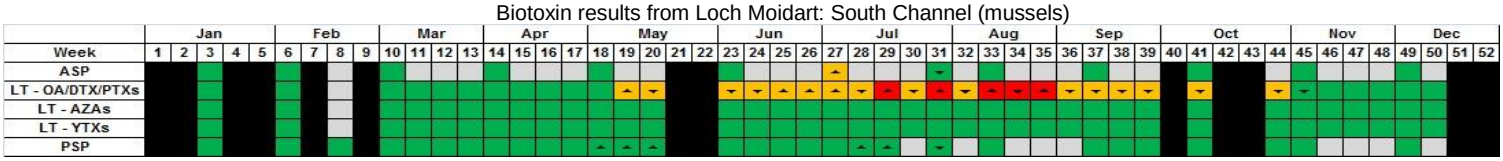


Pod 85

RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
85	Highland Council: Lochaber	Loch Moidart	South Channel	HL 179 227 13	Pacific oysters	Yes	NM64397197

Biotoxin results from Loch Moidart: South Channel (mussels)

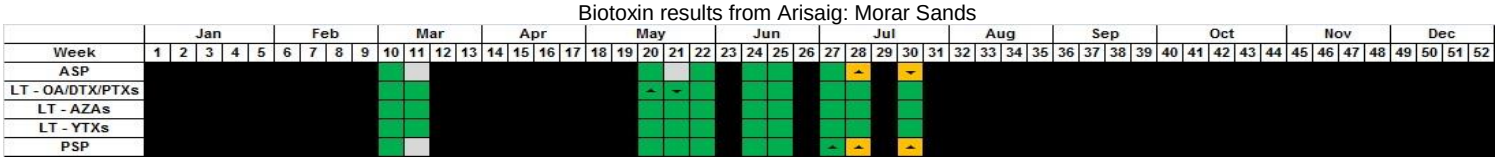


Pod 88

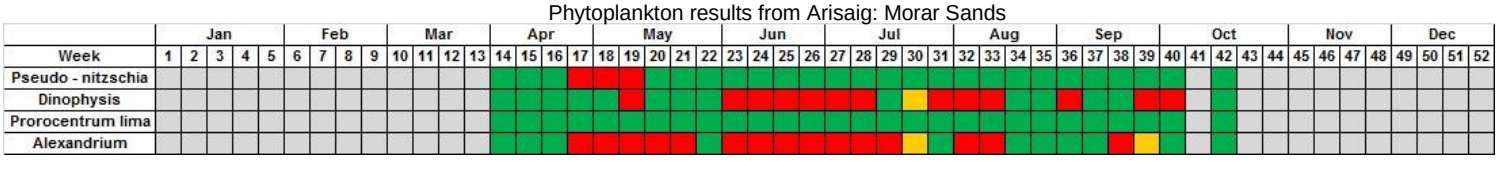
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
88	Highland Council: Lochaber	Arisaig: Morar Sands	Morar Sands	HL 005 204 16	Razors	Yes	NM66209280

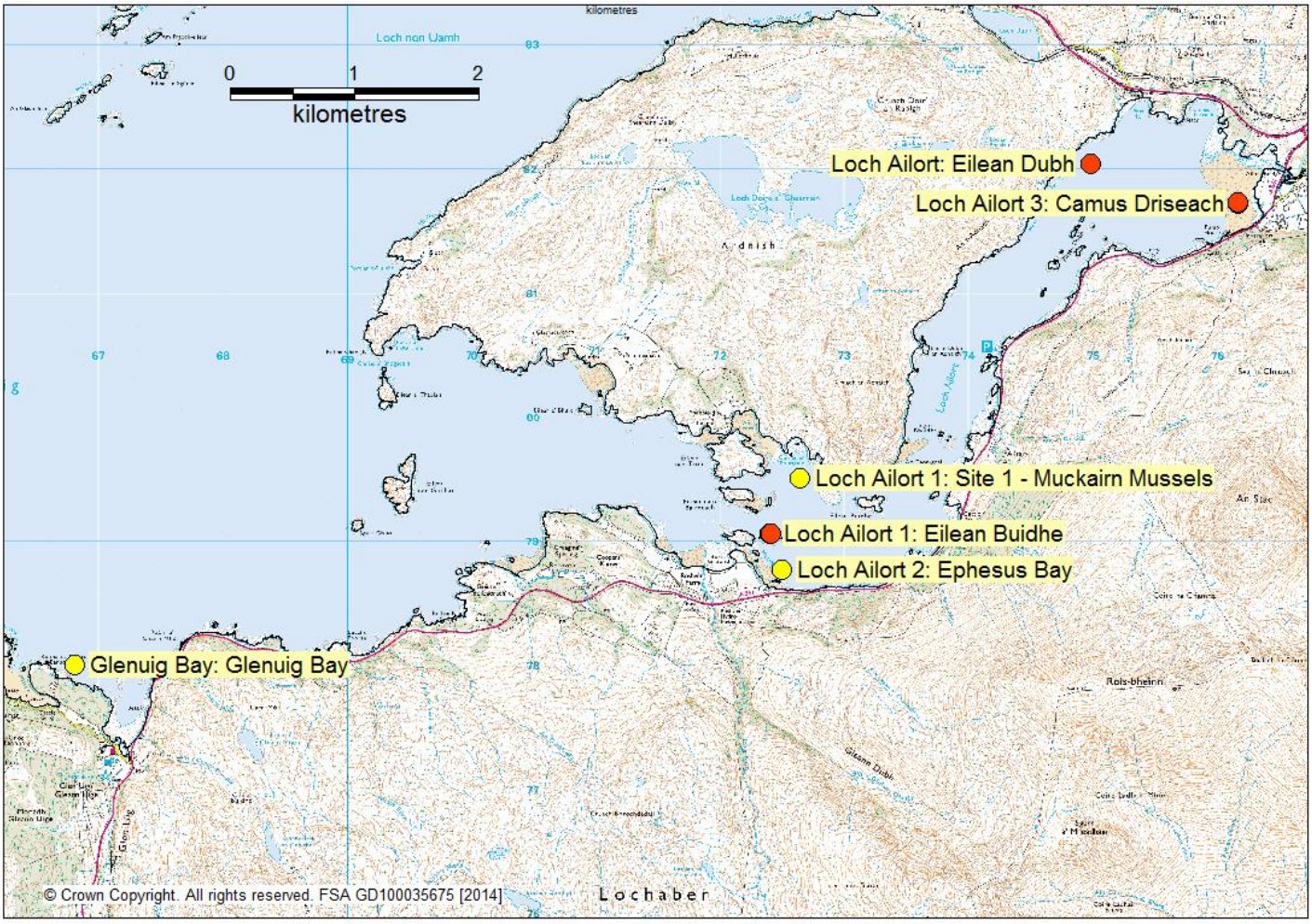
Biotoxin results from Arisaig: Morar Sands



Phytoplankton results from Arisaig: Morar Sands



Pod 126

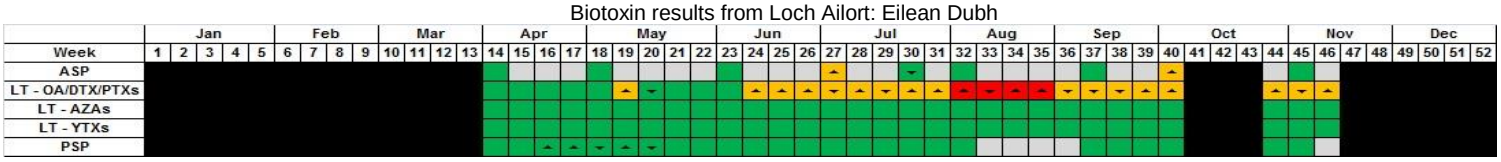


RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
126	Highland Council: Lochaber	Loch Ailort	Eilean Dubh	HL 114 937 08	Common mussels	Yes	NM7498082040
126	Highland Council: Lochaber	Glenuig Bay	Glenuig Bay	HL 075 205 08	Common mussels		NM668780
126	Highland Council: Lochaber	Loch Ailort 1	Site 1 – Muckairn Mussels	HL 114 214 08	Common mussels		NM7264079510
126	Highland Council: Lochaber	Loch Ailort 1	Eilean Buidhe	HL 114 209 08	Common mussels	Alternate RMP	NM72397906
126	Highland Council: Lochaber	Loch Ailort 3	Camus Driseach	HL 114 207 13	Pacific oysters	Alternate RMP	NM7616081720
126	Highland Council: Lochaber	Loch Ailort 2	Ephesus Bay	HL 539 968 12	Native oysters		NM72497877

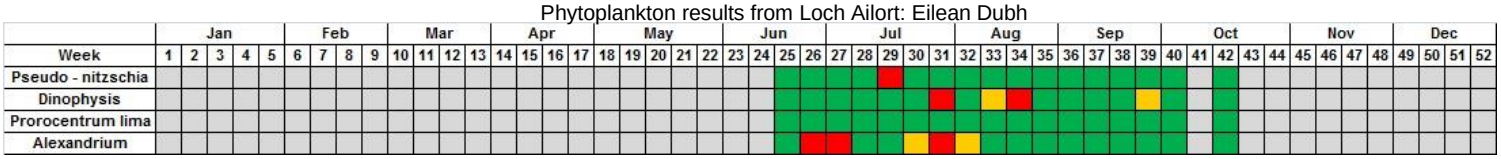
Biotoxin results from Loch Ailort 3: Camus Driseach

Biotoxin results from Loch Ailort: Eilean Dubh



Phytoplankton results from Glenuig Bay: Glenuig Bay

Phytoplankton results from Loch Ailort: Eilean Dubh



Pod 137

RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
137	Highland Council: Lochaber	Loch Sunart	Liddesdale	HL 206 1279 08	Common mussels	Yes	NM78306012

Biotoxin results from Loch Sunart: Liddesdale

	Jan					Feb				Mar				Apr				May					Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																									▲	▼				▲	▼	▲	▼	▲	▲	▼	▼	▼	▲	▼	▼	▲								
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

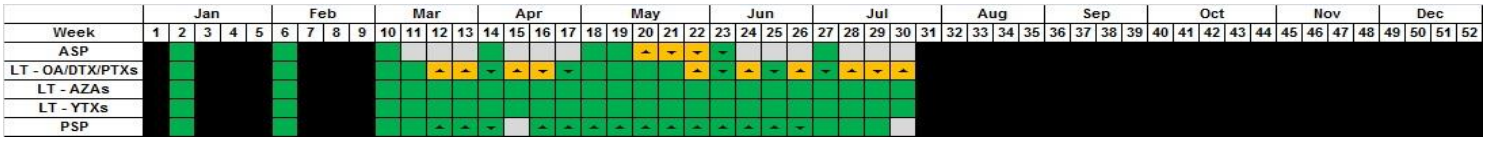
6.8. HIGHLAND COUNCIL: ROSS & CROMARTY

Pod 35

RMP position: AHA position:

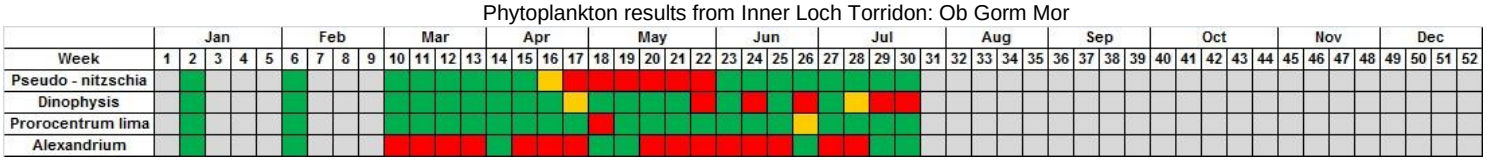
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
35	Highland Council: Ross & Cromarty	Inner Loch Torridon	Ob Gorm Mor	RC 090 245 08	Common mussels	Yes	NG86975502
35	Highland Council: Ross & Cromarty	Inner Loch Torridon	Ob Gorm Beag	RC 090 1617 08	Common mussels		NG860547
35	Highland Council: Ross & Cromarty	Inner Loch Torridon	Dubh Aird	RC 090 1616 08	Common mussels	Alternate RMP	NG8753655034

Biotoxin results from Inner Loch Torridon: Ob Gorm Mor

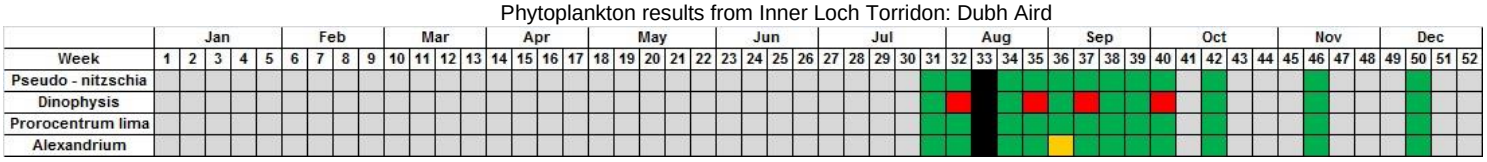


Biotoxin results from Inner Loch Torridon: Dubh Aird

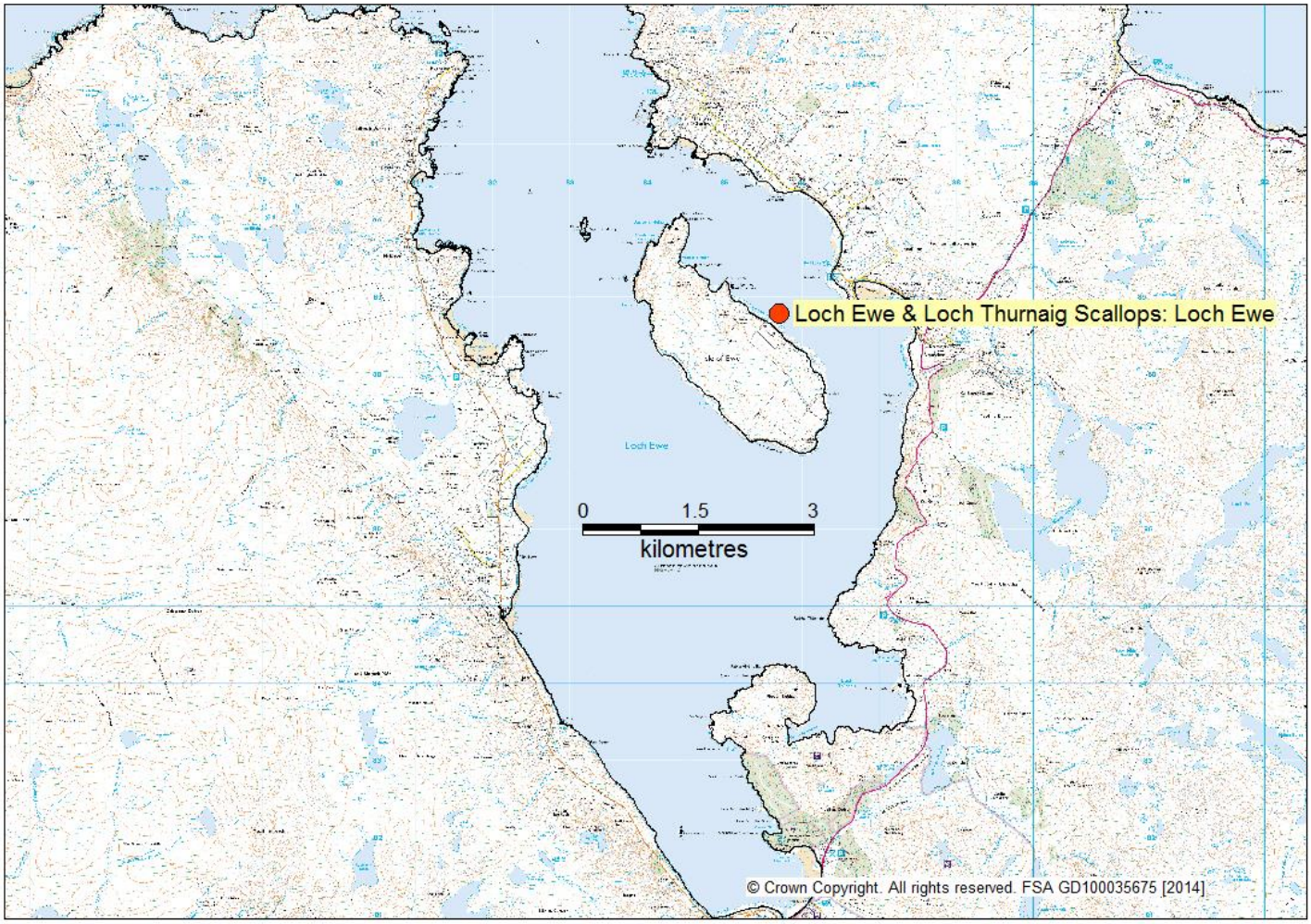
Phytoplankton results from Inner Loch Torridon: Ob Gorm Mor



Phytoplankton results from Inner Loch Torridon: Dubh Aird



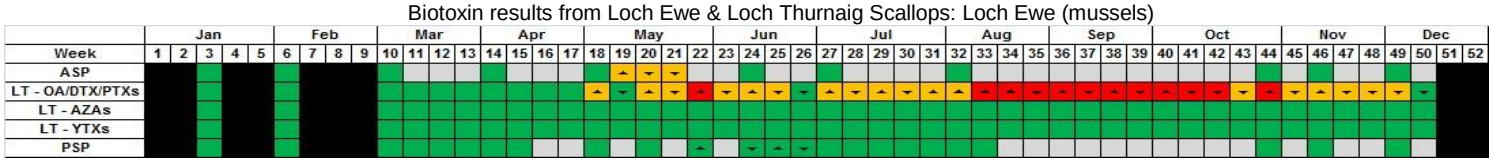
Pod 36



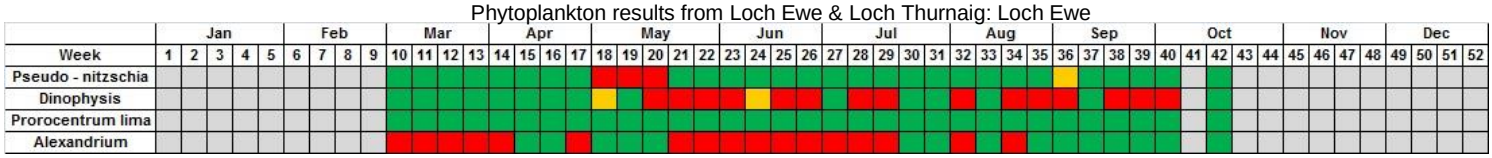
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
36	Highland Council: Ross & Cromarty	Loch Ewe & Loch Thurnaig Scallops	Loch Ewe	RC 142 250 07	King scallops	Yes	NG85708880

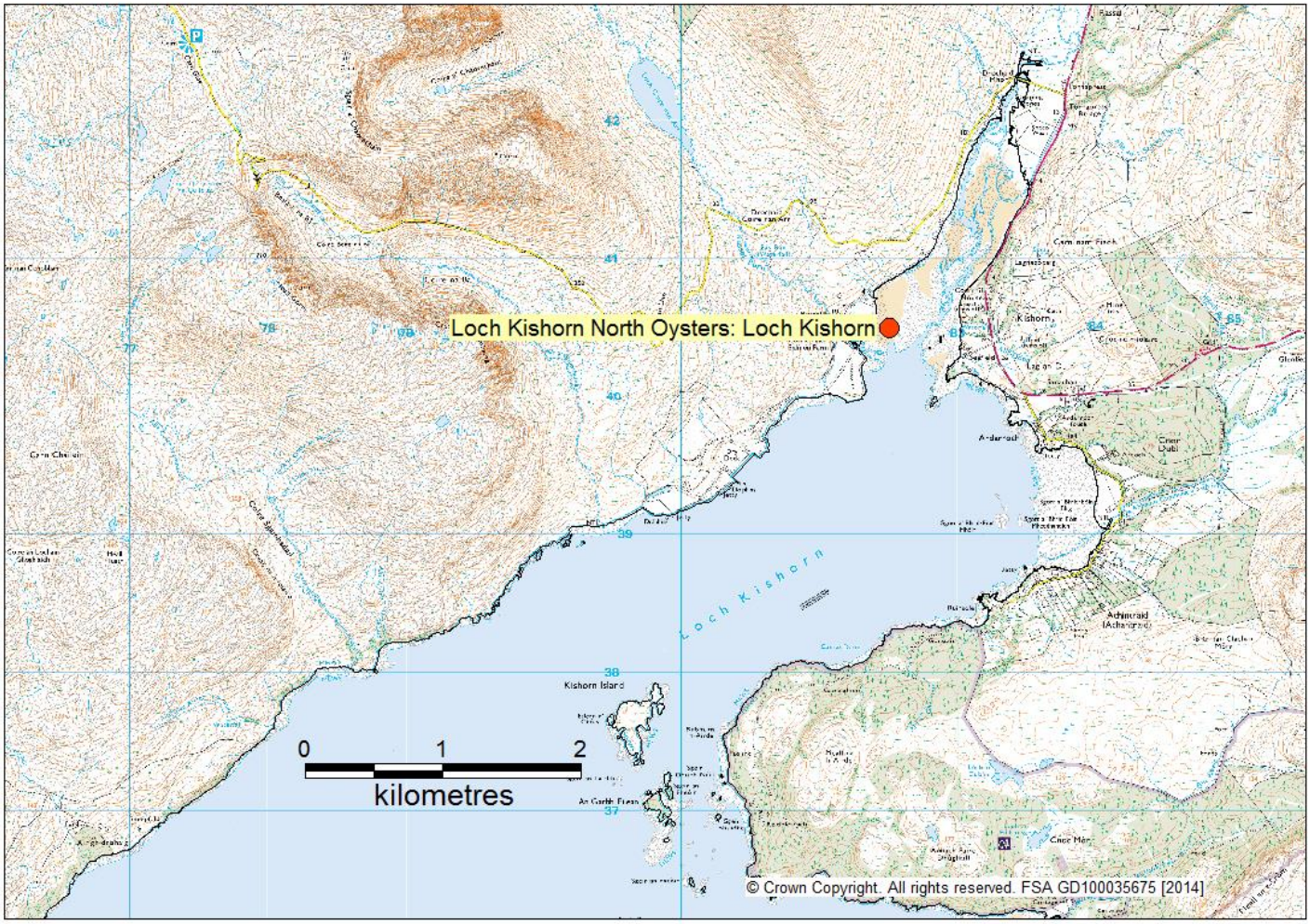
Biotoxin results from Loch Ewe & Loch Thurnaig Scallops: Loch Ewe (mussels)



Phytoplankton results from Loch Ewe & Loch Thurnaig: Loch Ewe



Pod 37



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
37	Highland Council: Ross & Cromarty	Loch Kishorn North Oysters	Loch Kishorn	RC 329 254 13	Pacific oysters	Yes	NG825405

No samples received from Pod 37 between 1st January and 31st December 2014

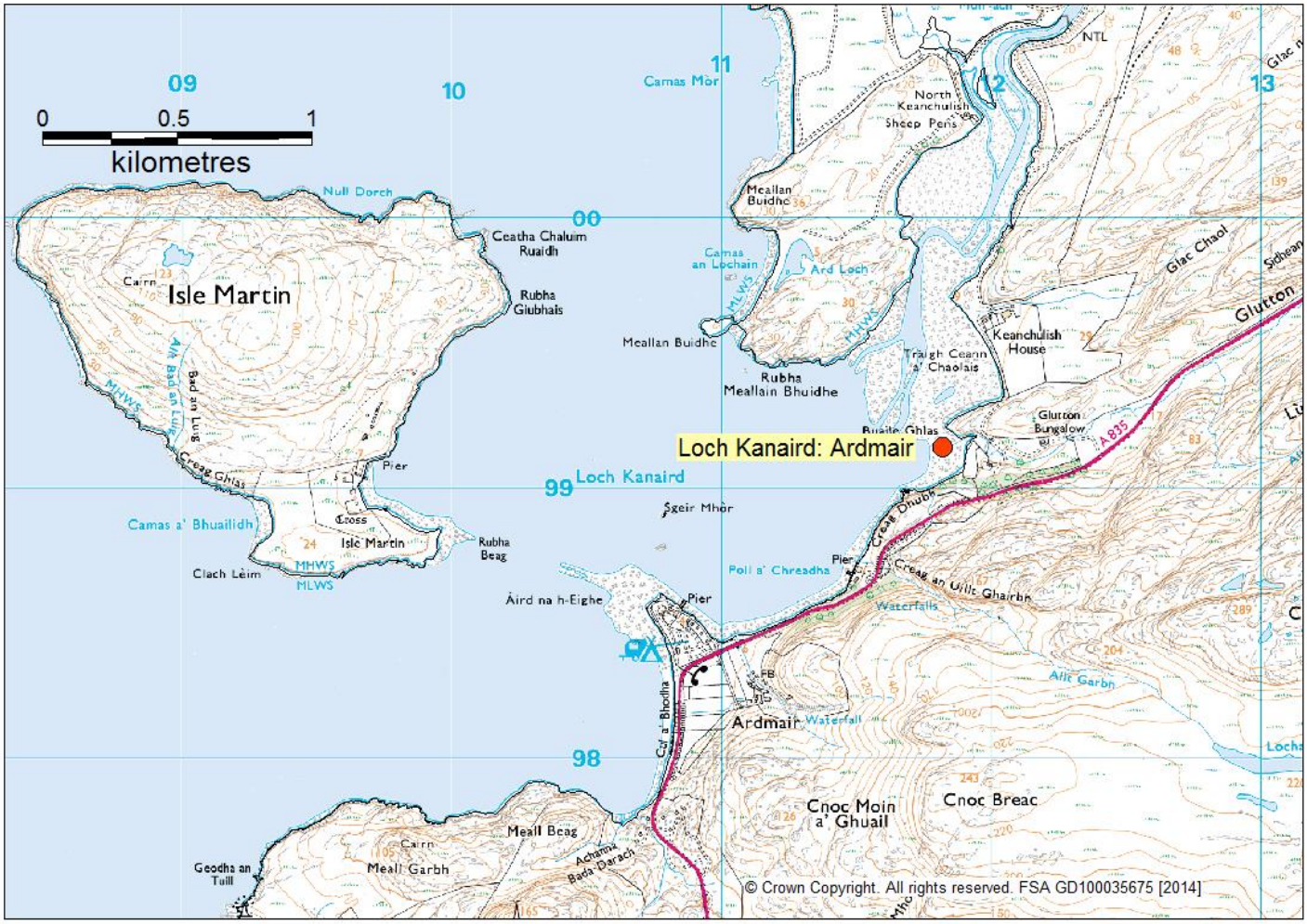
Pod 39

RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
39	Highland Council: Ross & Cromarty	Little Loch Broom	Little Loch Broom	RC 110 247 08	Common mussels	Yes	NH05028983

No samples received from Pod 39 between 1st January and 31st December 2014

Pod 144



RMP position: AHA position:

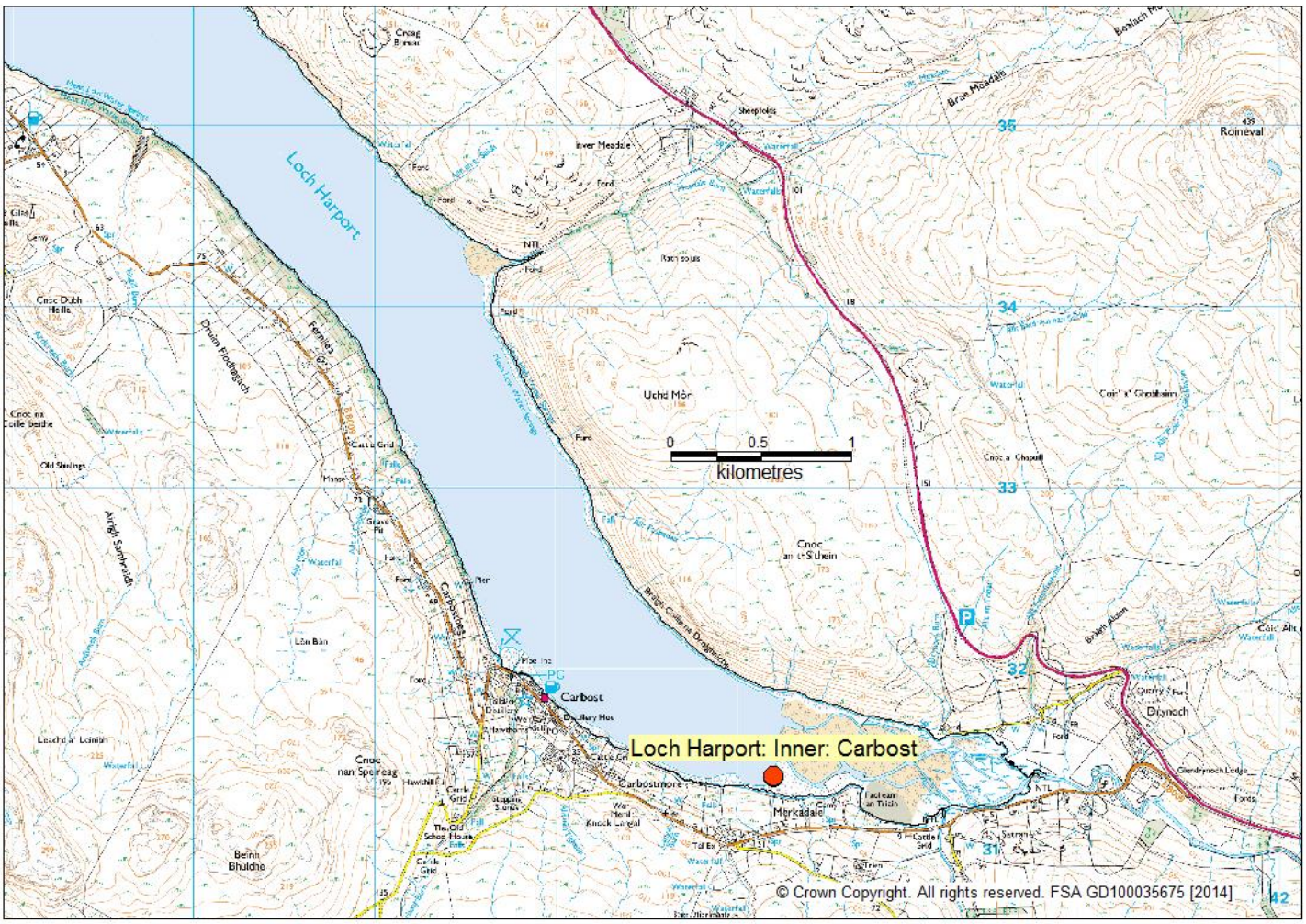
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
144	Highland Council: Ross & Cromarty	Loch Kanaird	Ardmair	RC 625 1233 13	Pacific oysters	Yes	NG11799917

Biotoxin results from Loch Kanaird: Ardmair

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																				▲	▲	▼		▲	▲	▼	▼													
LT - AZAs																																																			
LT - YTXs																																																			
PSP																																																			

6.9. HIGHLAND COUNCIL: SKYE & LOCHALSH

Pod 40



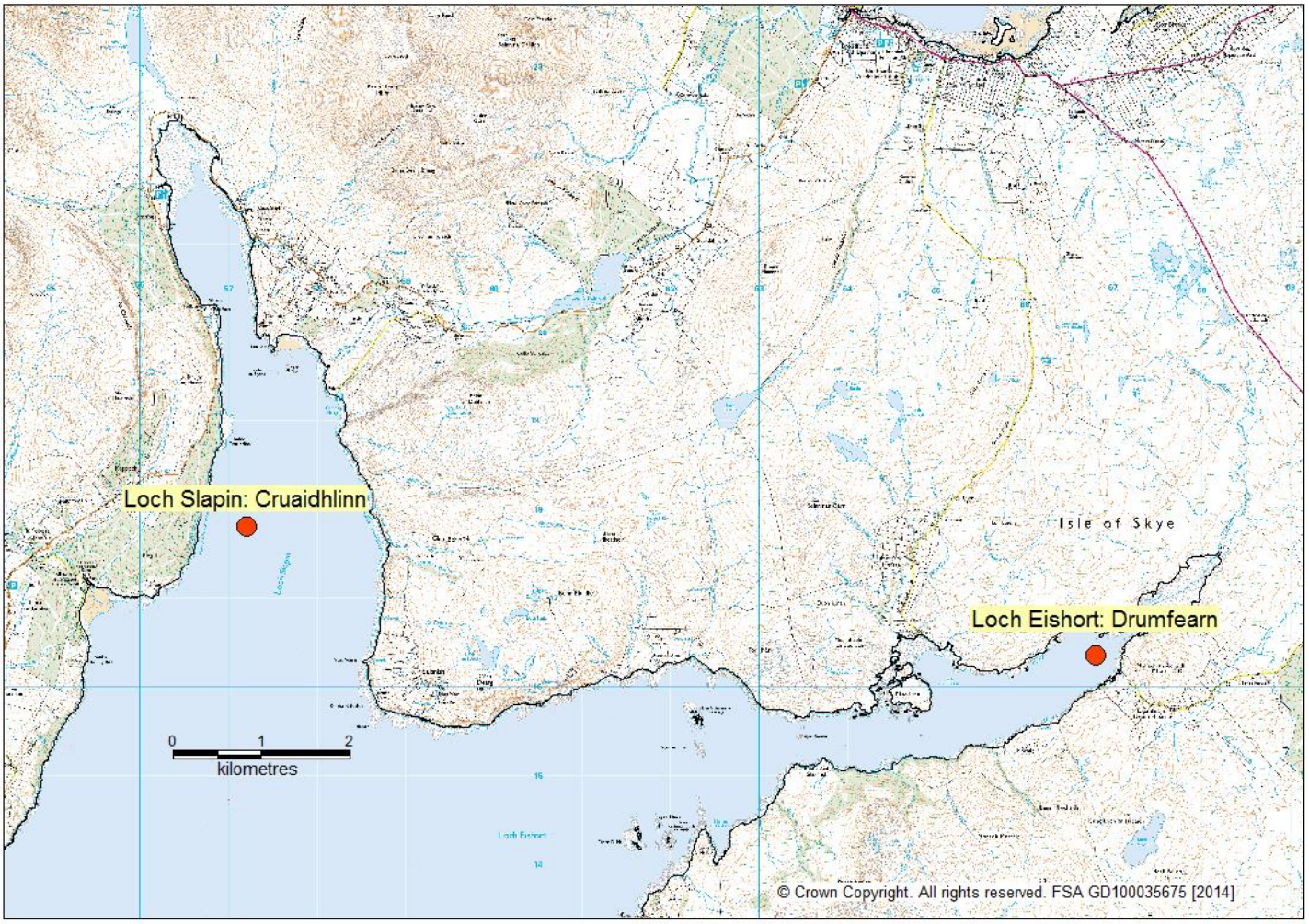
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
40	Highland Council: Skye & Lochalsh	Loch Harport: Inner	Carbost	SL 159 286 13	Pacific oysters	Yes	NG392314

Biotoxin results from Loch Harport: Inner: Carbost

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

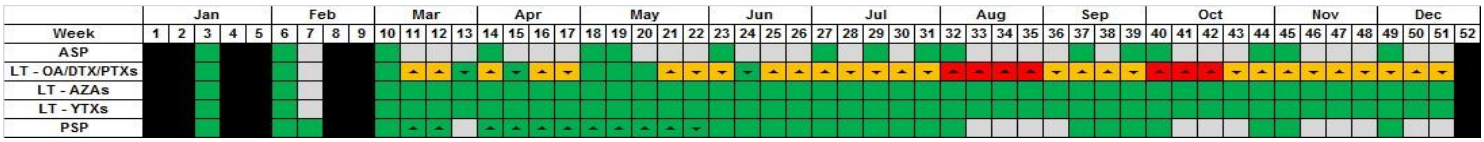
Pod 41



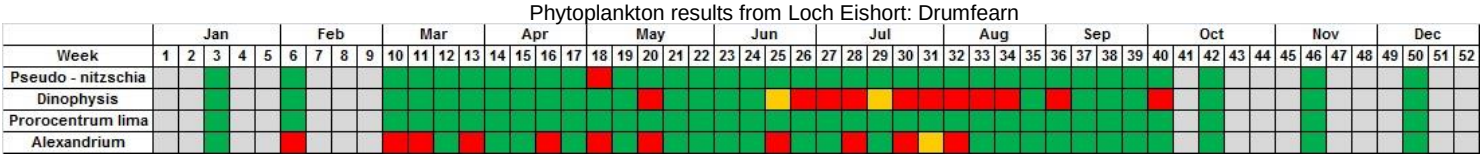
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
41	Highland Council: Skye & Lochalsh	Loch Eishort	Drumfearn	SL 137 281 08	Common mussels	Yes	NG66771629
41	Highland Council: Skye & Lochalsh	Loch Slapin	Cruaidhlinn	SL 194 290 08	Common mussels	Alternate RMP	NG572178

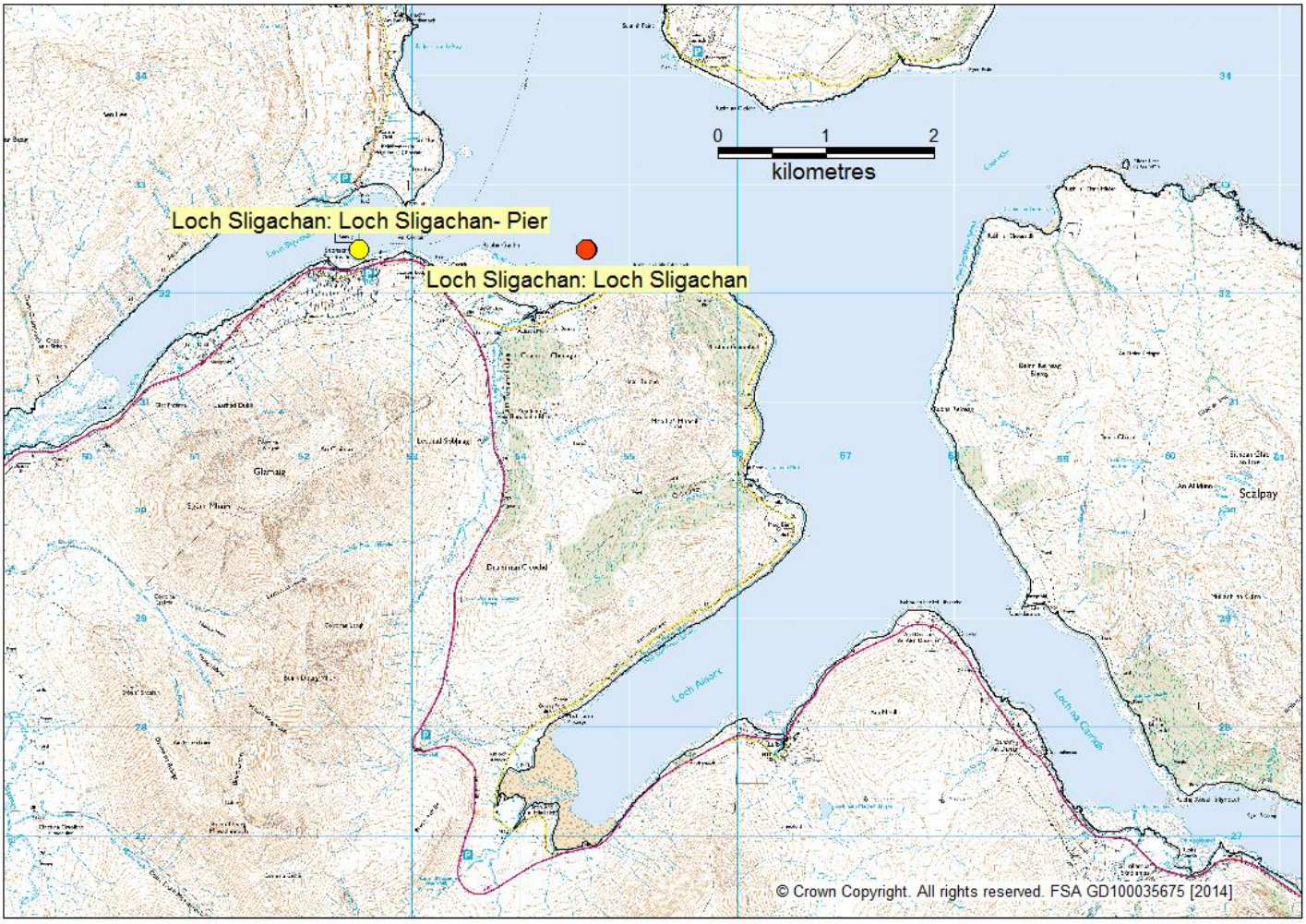
Biotoxin results from Loch Eishort: Drumfearn



Phytoplankton results from Loch Eishort: Drumfearn



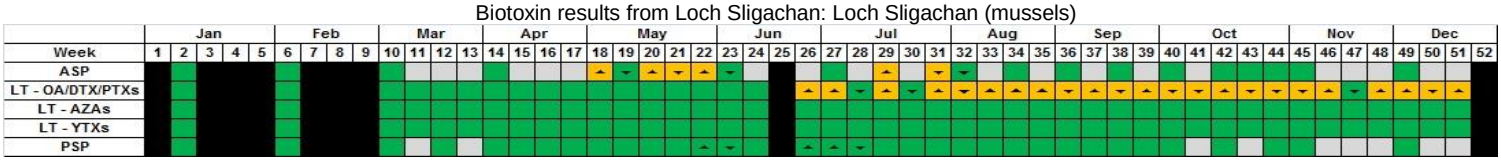
Pod 42



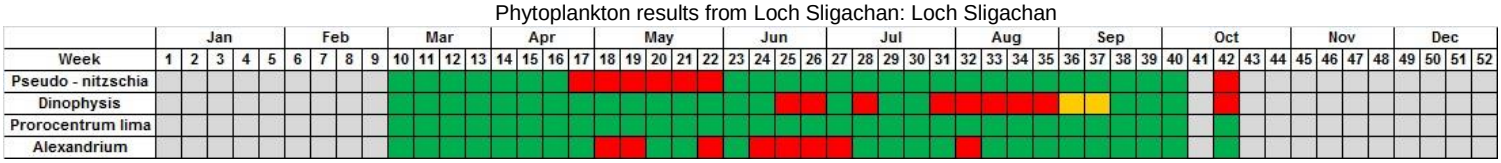
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
42	Highland Council: Skye & Lochalsh	Loch Sligachan	Loch Sligachan- Pier	SL 195 292 07	King scallops		NG525324
42	Highland Council: Skye & Lochalsh	Loch Sligachan	Loch Sligachan	SL 195 291 07	King scallops	Yes	NG546324

Biotoxin results from Loch Sligachan: Loch Sligachan (mussels)



Phytoplankton results from Loch Sligachan: Loch Sligachan



Pod 43

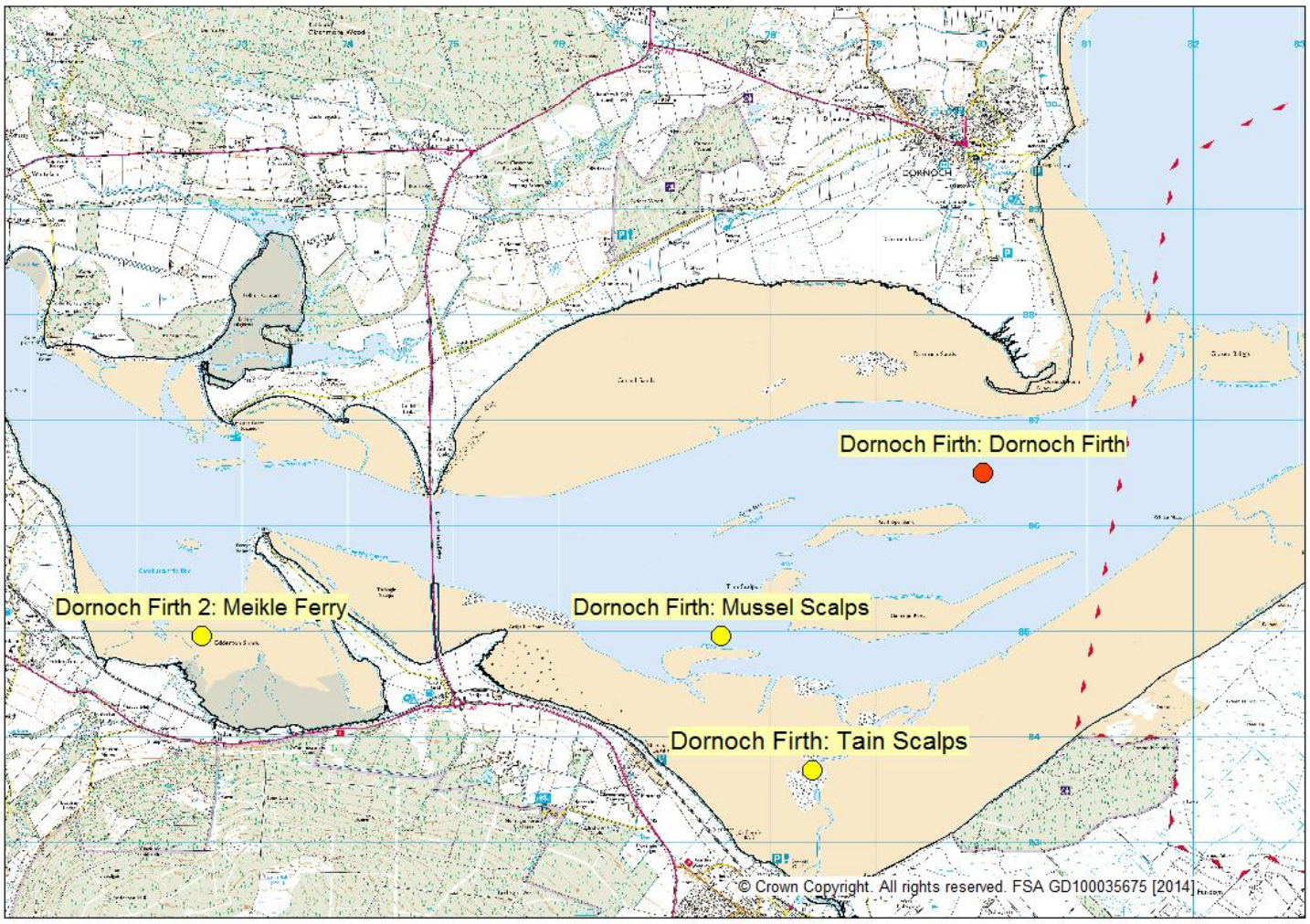
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
43	Highland Council: Skye & Lochalsh	Loch Bay	Loch Bay	SL 117 275 04	Common cockles	Yes	NG262541

No samples received from Pod 43 between 1st January and 31st December 2014

6.10. HIGHLAND COUNCIL: SUTHERLAND

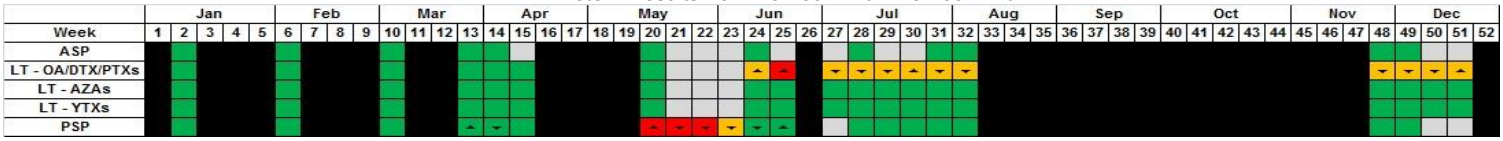
Pod 38



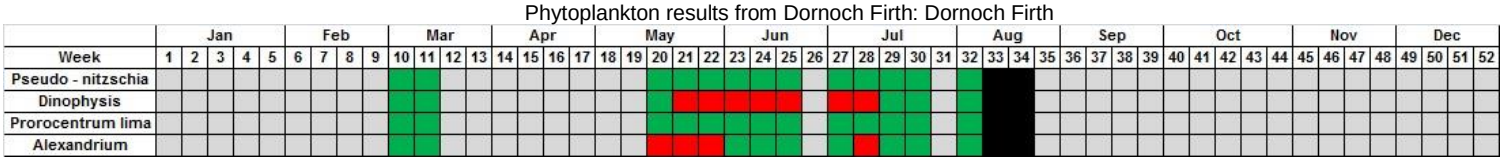
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
38	Highland Council: Sutherland	Dornoch Firth	Dornoch Firth	HS 054 239 08	Common mussels	Yes	NH800865
38	Highland Council: Sutherland	Dornoch Firth 2	Meikle Ferry	HS 466 876 08	Common mussels		NH72608495
38	Highland Council: Sutherland	Dornoch Firth	Mussel Scalps	HS 464 872 08	Common mussels		NH77528495
38	Highland Council: Sutherland	Dornoch Firth	Tain Scalps	HS 465 873 08	Common mussels		NH7735981952

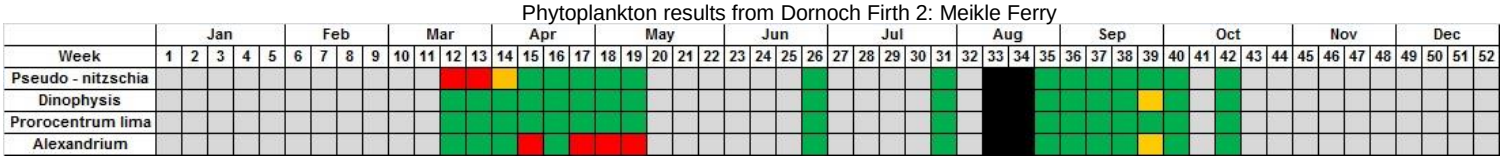
Biotoxin results from Dornoch Firth: Dornoch Firth



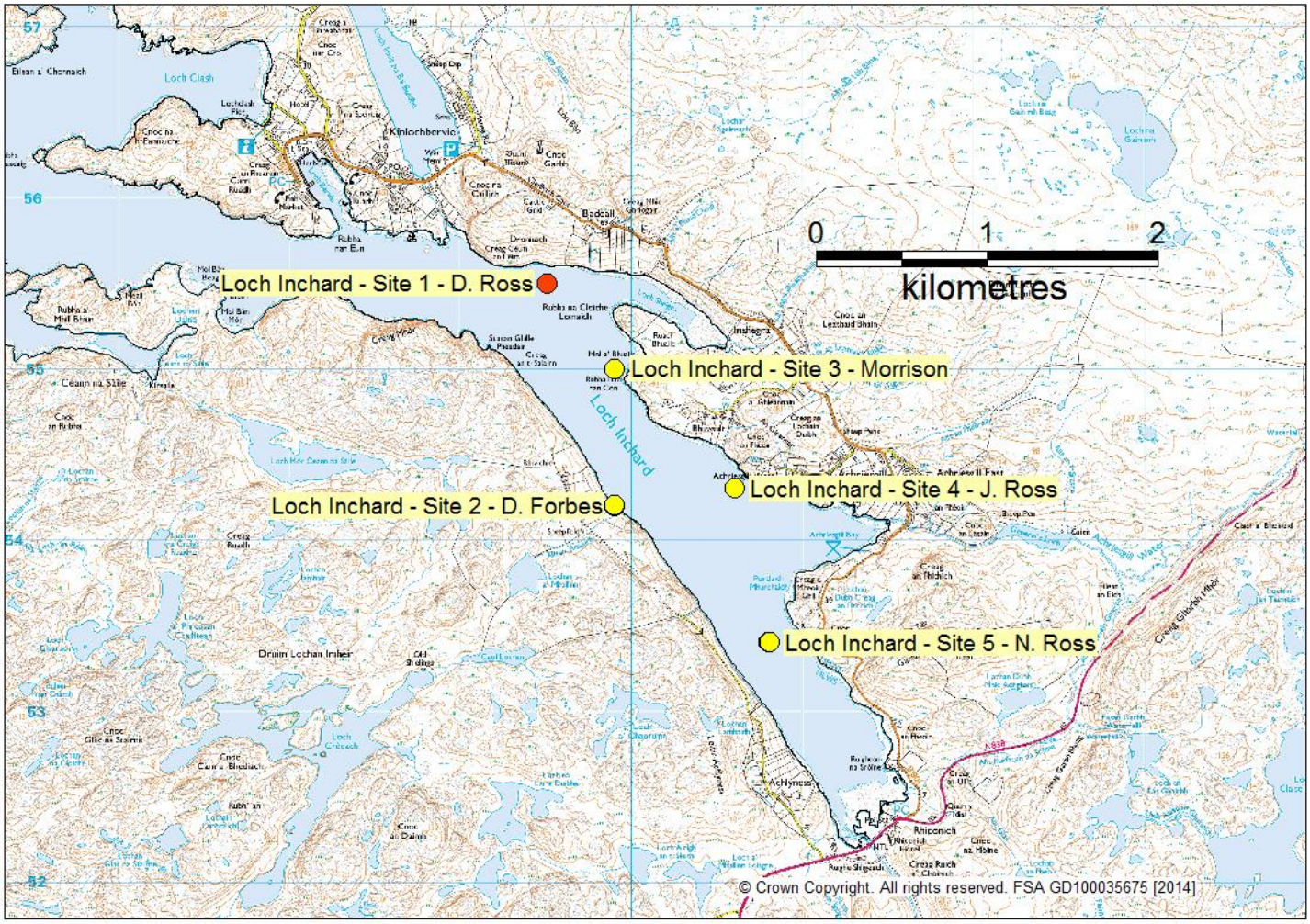
Phytoplankton results from Dornoch Firth: Dornoch Firth



Phytoplankton results from Dornoch Firth 2: Meikle Ferry



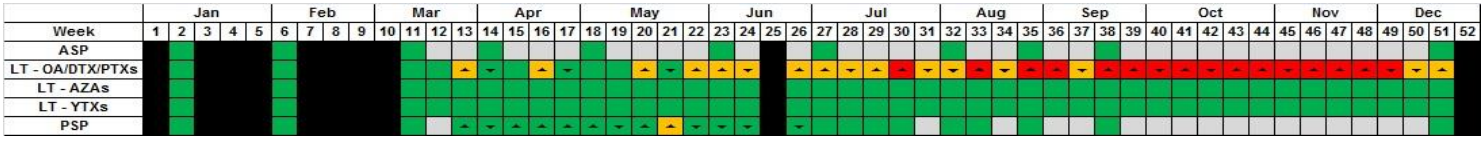
Pod 47



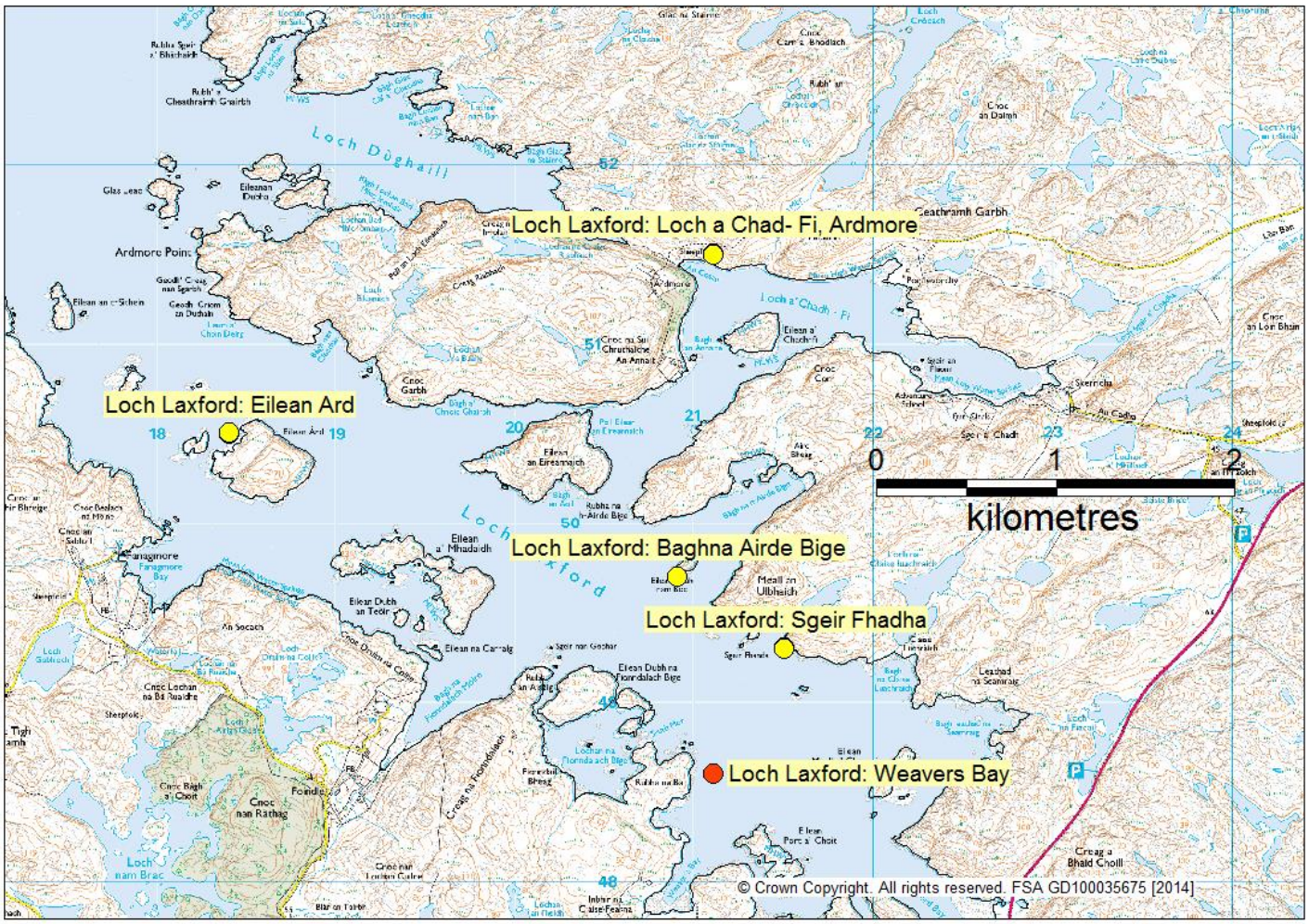
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
47	Highland Council: Sutherland	Loch Inchard	Loch Inchard - Site 1 - D. Ross	HS 162 311 08	Common mussels	Yes	NC235555
47	Highland Council: Sutherland	Loch Inchard	Loch Inchard - Site 2 - D. Forbes	HS 162 312 08	Common mussels		NC239542
47	Highland Council: Sutherland	Loch Inchard	Loch Inchard - Site 3 - Morrison	HS 162 313 08	Common mussels		NC239550
47	Highland Council: Sutherland	Loch Inchard	Loch Inchard - Site 4 - J. Ross	HS 162 314 08	Common mussels		NC246543
47	Highland Council: Sutherland	Loch Inchard	Loch Inchard - Site 5 - N. Ross	HS 162 315 08	Common mussels		NC248534

Biotoxin results from Loch Inchard: Loch Inchard – Site 1 – D. Ross



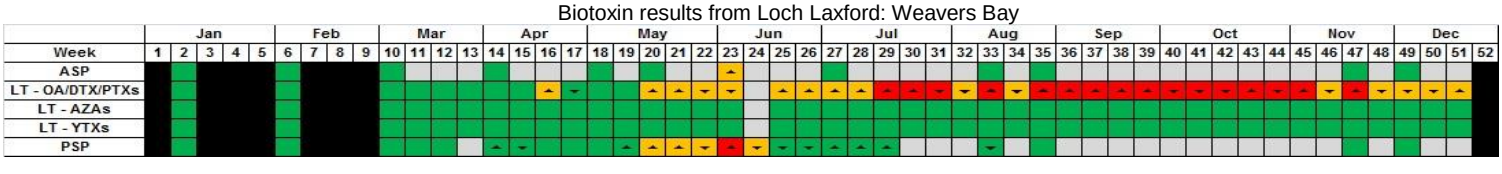
Pod 48



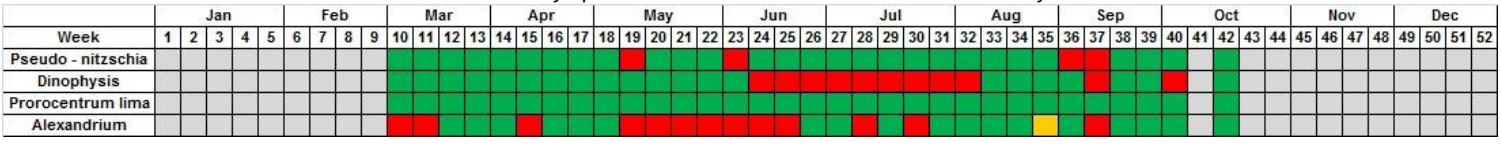
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
48	Highland Council: Sutherland	Loch Laxford	Weavers Bay	HS 167 320 08	Common mussels	Yes	NC211486
48	Highland Council: Sutherland	Loch Laxford	Eilean Ard	HS 167 317 08	Common mussels		NC184505
48	Highland Council: Sutherland	Loch Laxford	Baghna Airde Bige	HS 167 316 08	Common mussels		NC209497
48	Highland Council: Sutherland	Loch Laxford	Loch a Chad- Fi, Ardmore	HS 167 318 08	Common mussels		NC211515
48	Highland Council: Sutherland	Loch Laxford	Sgeir Fhadha	HS 167 319 08	Common mussels		NC215493

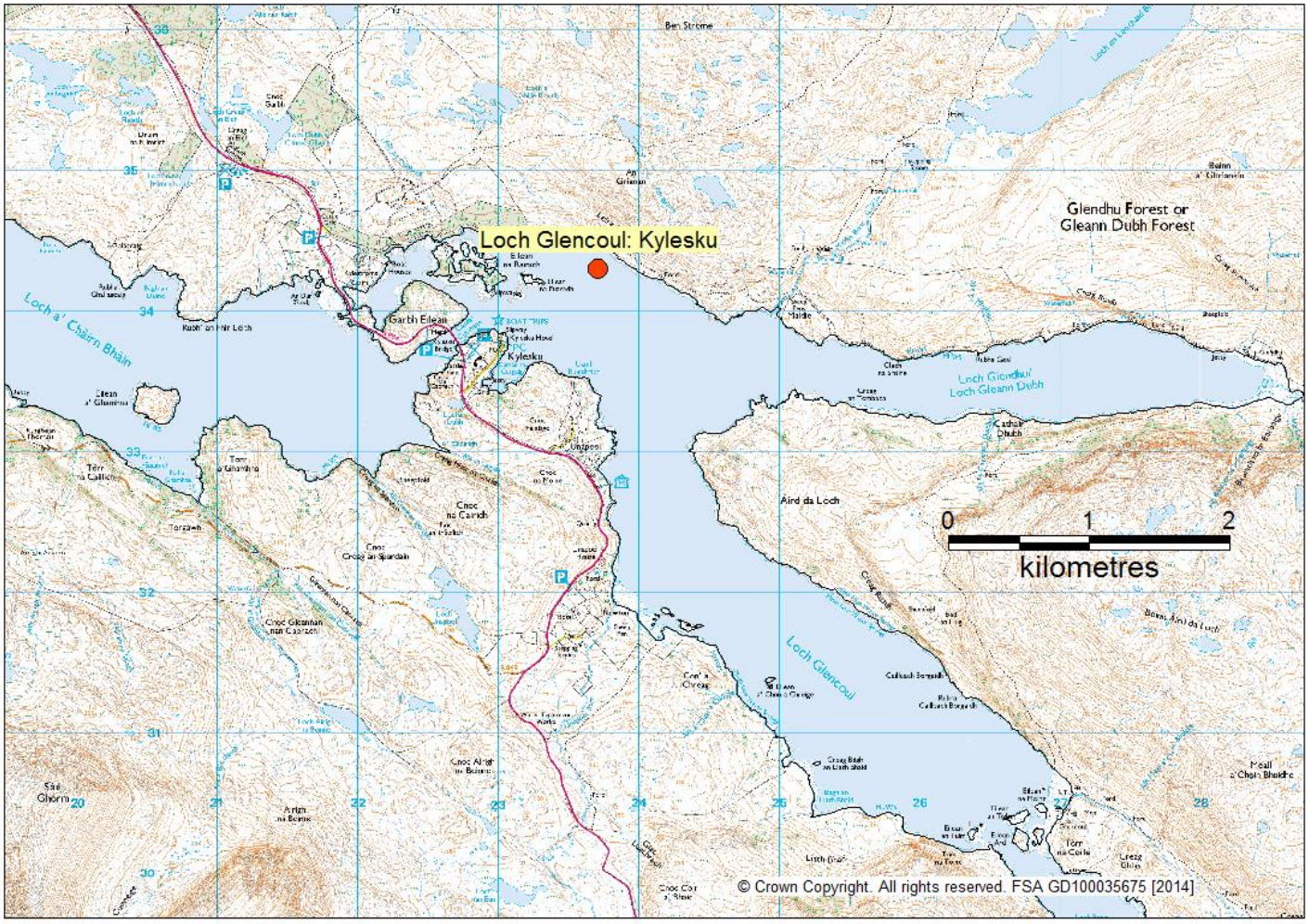
Biotoxin results from Loch Laxford: Weavers Bay



Phytoplankton results from Loch Laxford: Weavers Bay



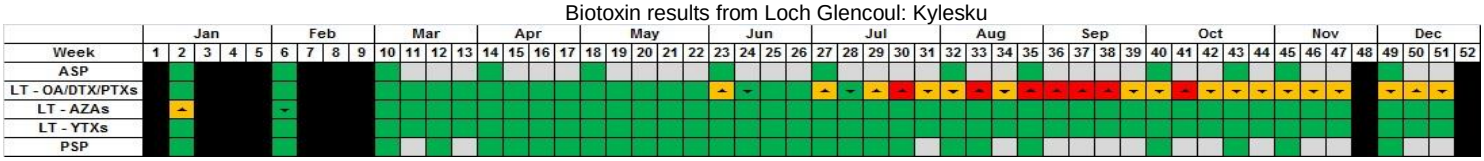
Pod 49



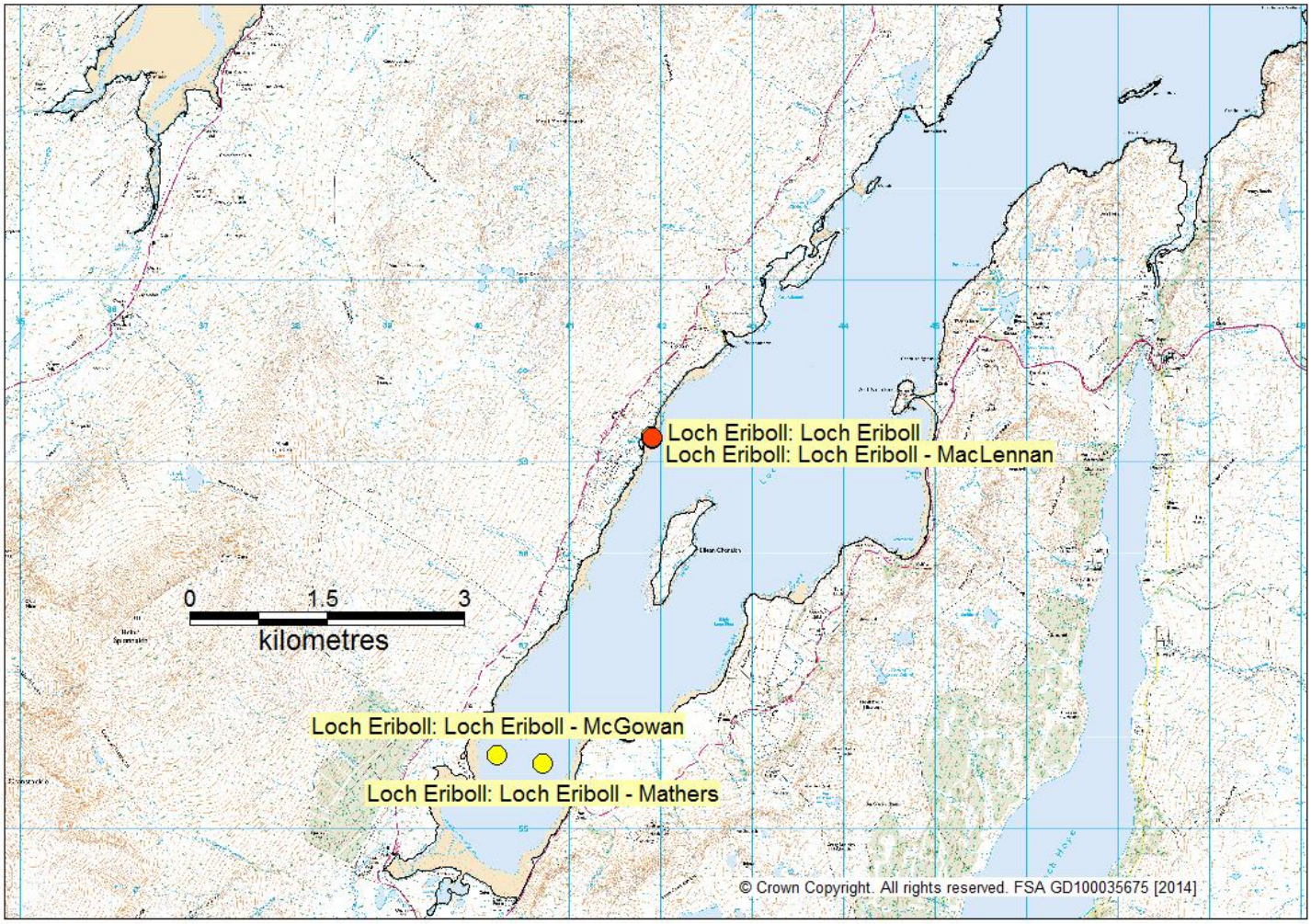
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
49	Highland Council: Sutherland	Loch Glencoul	Kylesku	HS 157 310 08	Common mussels	Yes	NC237343

Biotoxin results from Loch Glencoul: Kylesku



Pod 50

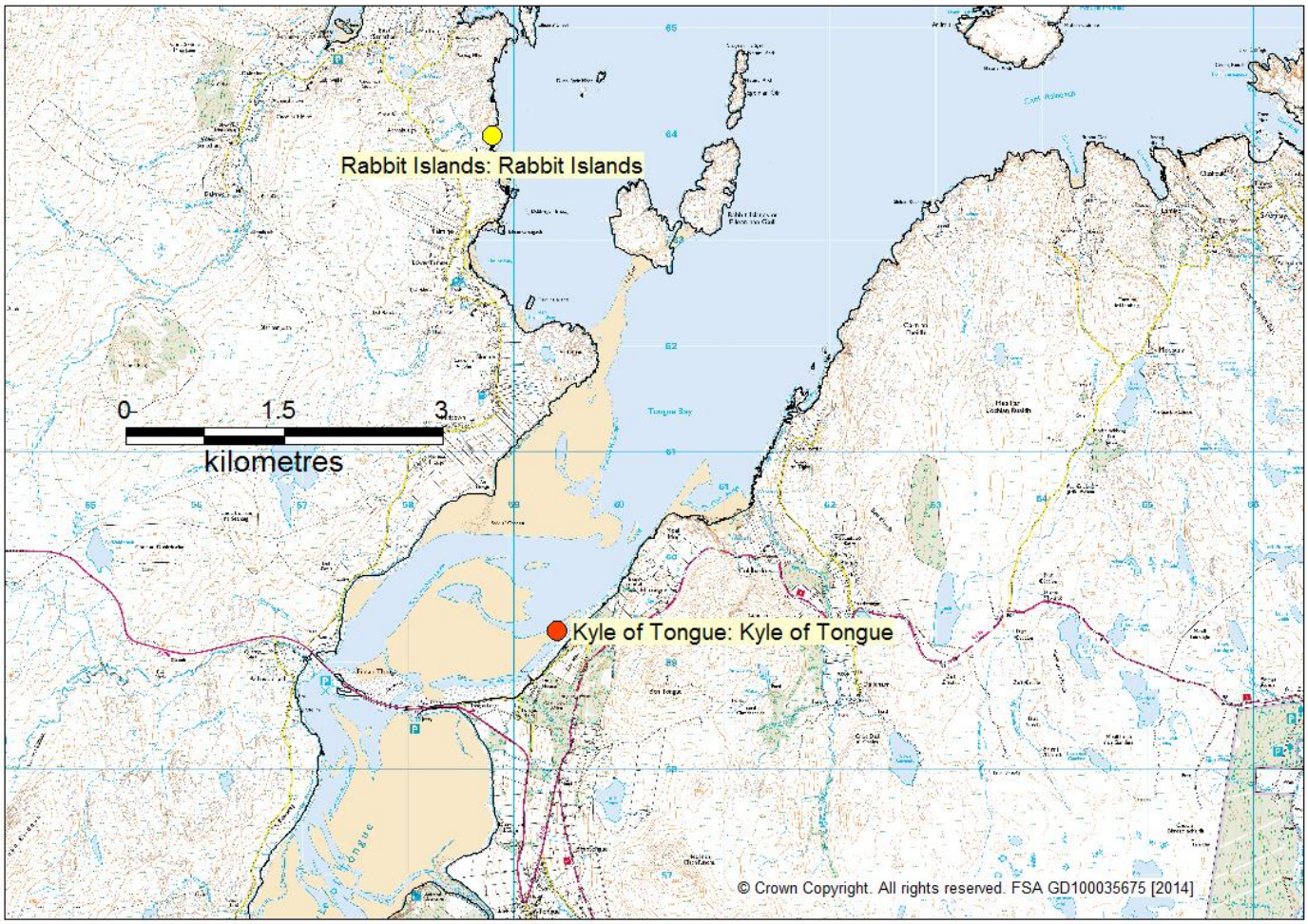


RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
50	Highland Council: Sutherland	Loch Eriboll	Loch Eriboll - MacLennan	HS 139 307 08	Common mussels		NC41885923
50	Highland Council: Sutherland	Loch Eriboll	Loch Eriboll - McGowan	HS 139 309 08	Common mussels		NC402558
50	Highland Council: Sutherland	Loch Eriboll	Loch Eriboll - Mathers	HS 139 308 08	Common mussels		NC407557
50	Highland Council: Sutherland	Loch Eriboll	Loch Eriboll	HS 139 305 08	Common mussels	Yes	NC41885923

No samples received from Pod 50 between 1st January and 31st December 2014

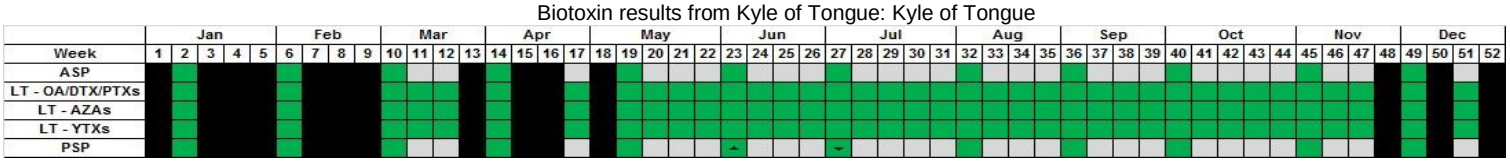
Pod 51



RMP position: AHA position:

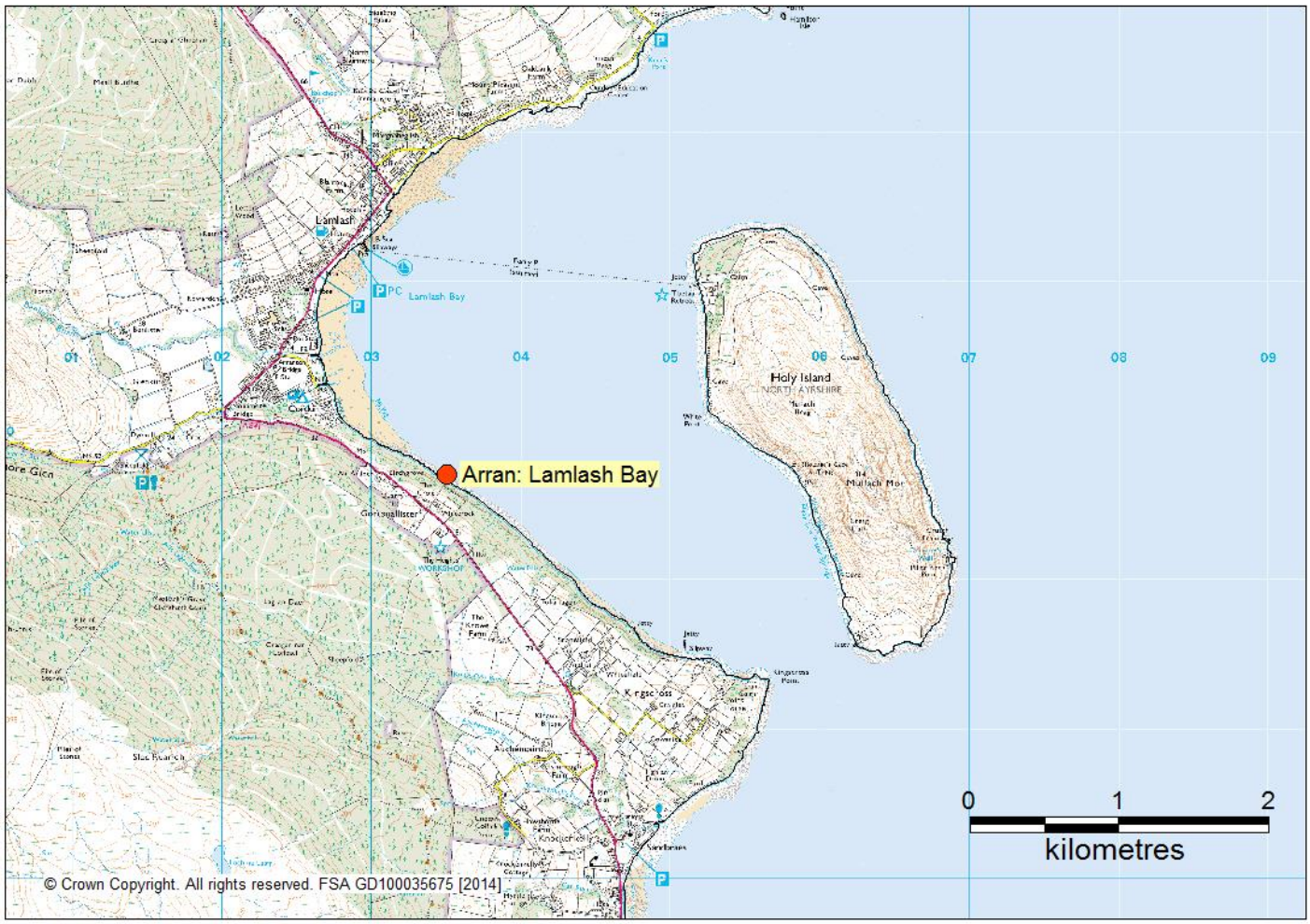
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
51	Highland Council: Sutherland	Kyle of Tongue	Kyle of Tongue	HS 103 303 13	Pacific oysters	Yes	NC59105900
51	Highland Council: Sutherland	Rabbit Islands	Rabbit Islands	HS 359 707 16	Razors		NC58766400

Biotoxin results from Kyle of Tongue: Kyle of Tongue



6.11. NORTH AYRSHIRE COUNCIL

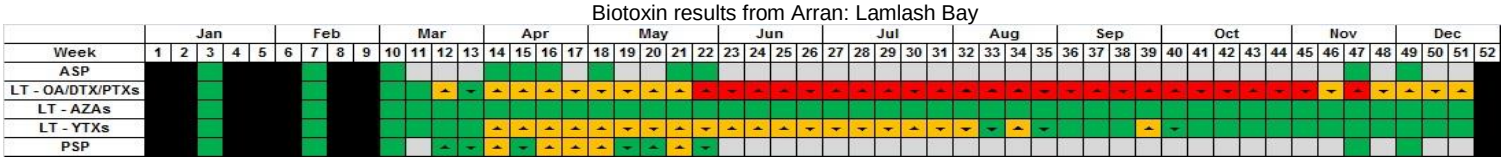
Pod 52



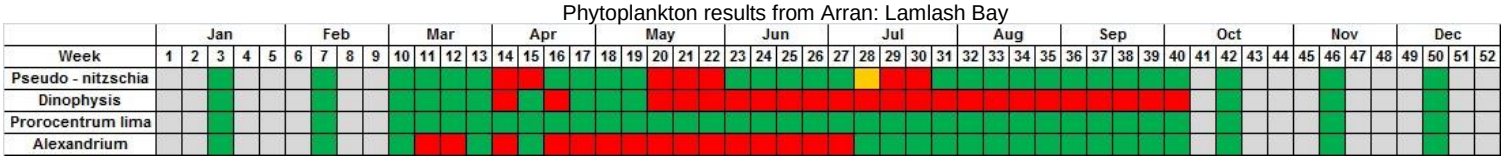
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
52	North Ayrshire Council	Arran: Lamlash Bay	Lamlash Bay	NA 007 329 08	Common mussels	Yes	NS035298

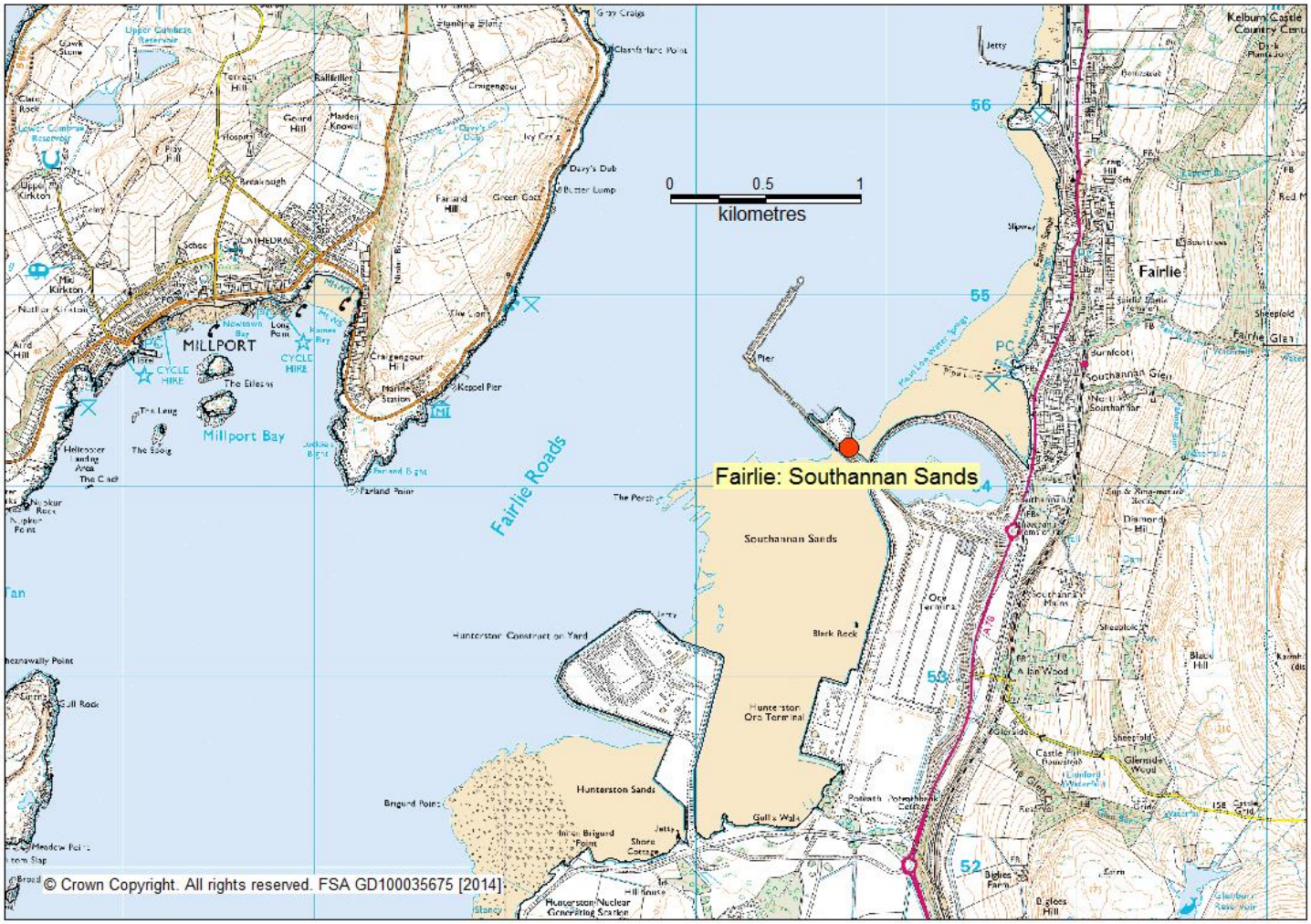
Biotoxin results from Arran: Lamlash Bay



Phytoplankton results from Arran: Lamlash Bay



Pod 53



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
53	North Ayrshire Council	Fairlie	Southannan Sands	NA 065 332 13	Pacific oysters	Yes	NS198542

Biotoxin results from Fairlie: Southannan Sands

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

Biotoxin results from Fairlie: Southannan Sands (mussels)

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

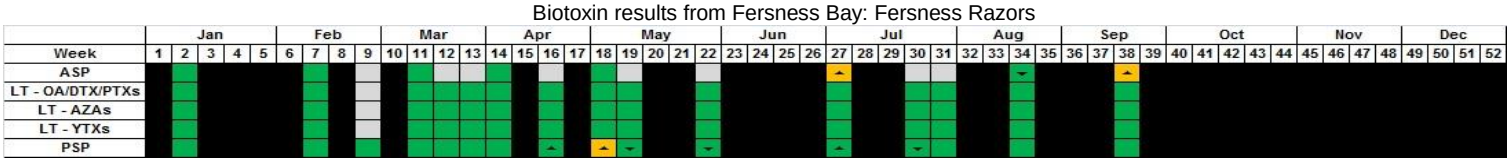
6.12. ORKNEY ISLANDS COUNCIL

Pod 130

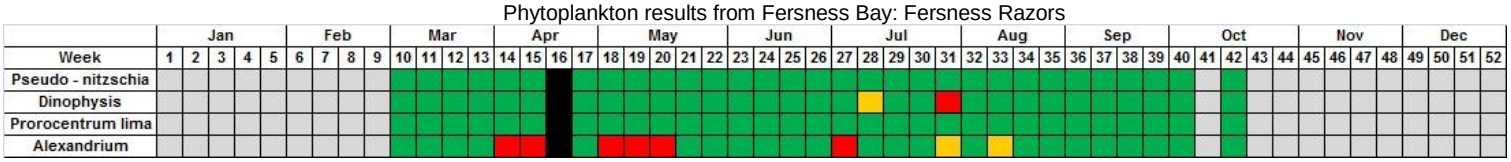
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
130	Orkney Islands Council	Fersness Bay	Fersness Razors	OI 455 859 16	Razors	Yes	HY54493358

Biotoxin results from Fersness Bay: Fersness Razors

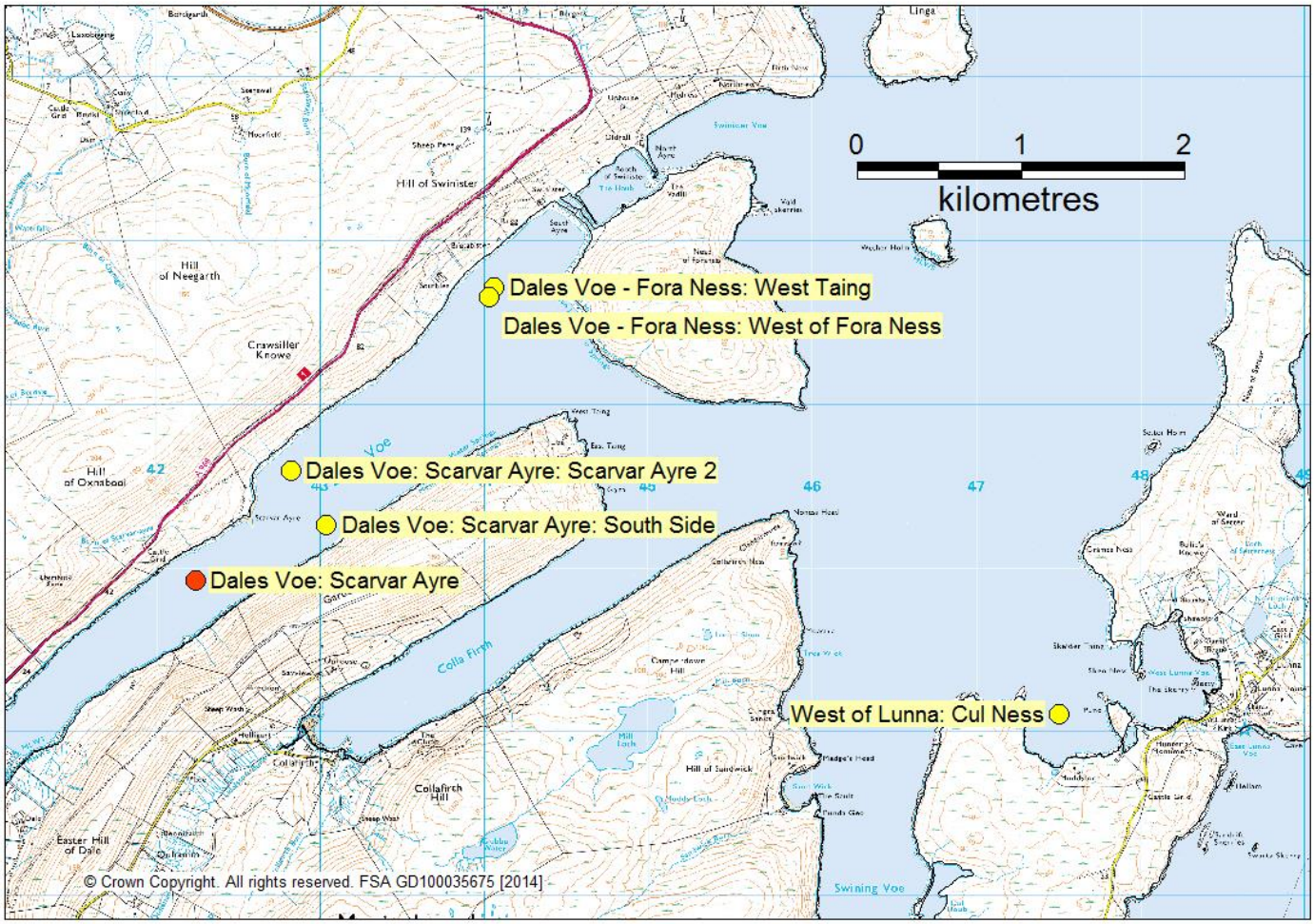


Phytoplankton results from Fersness Bay: Fersness Razors



6.13. SHETLAND ISLANDS COUNCIL

Pod 56

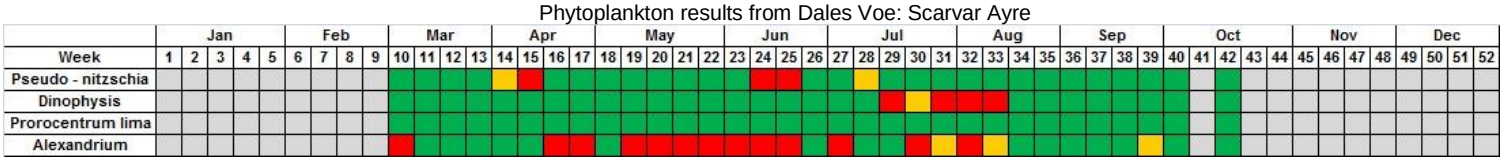


RMP position: AHA position:

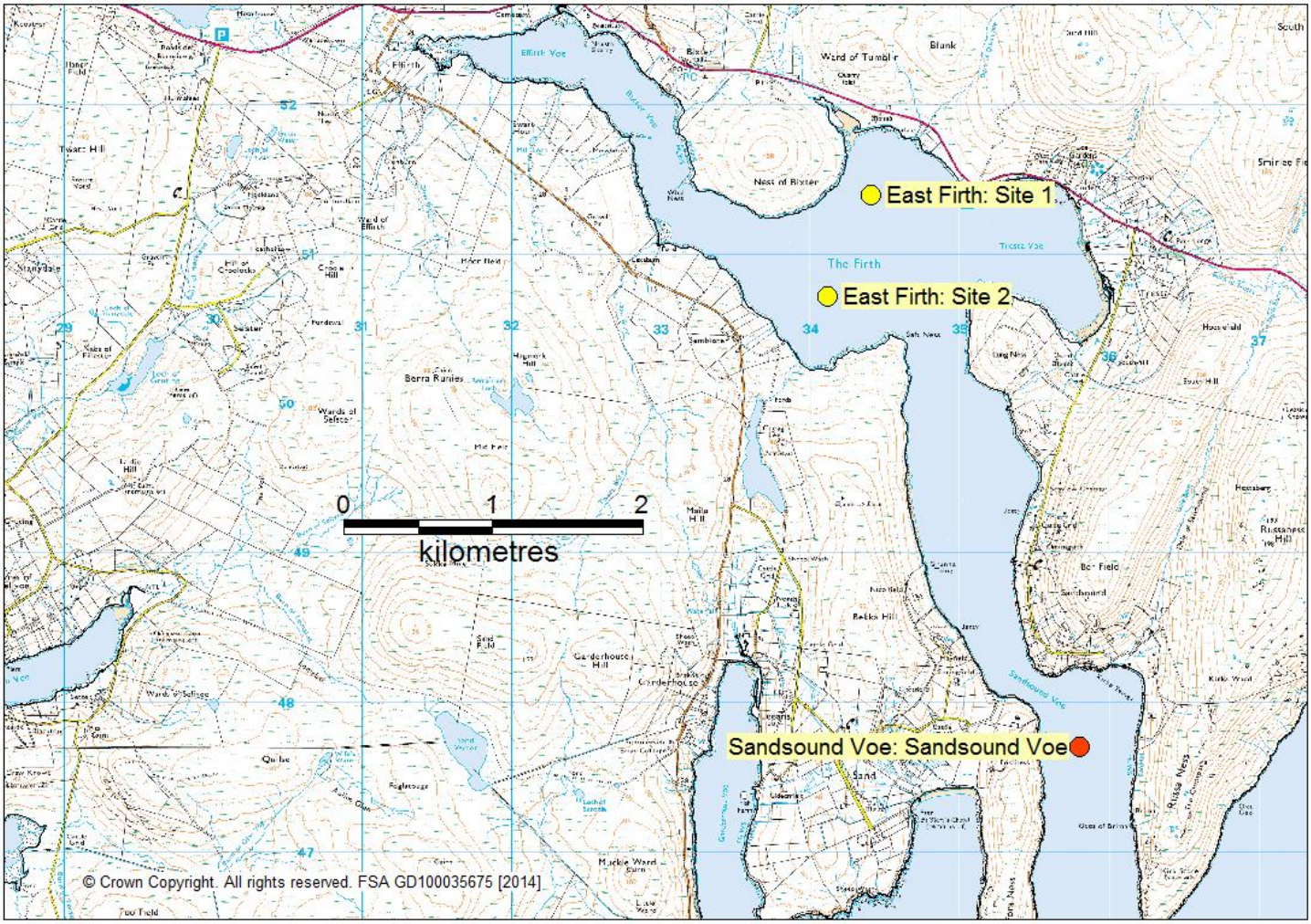
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
56	Shetland Islands Council	Dales Voe: Scarvar Ayre	Scarvar Ayre	SI 050 420 08	Common mussels	Yes	HU42236992
56	Shetland Islands Council	Dales Voe – Fora Ness	West Taing	SI 502 869 08	Common mussels		HU44057171
56	Shetland Islands Council	West of Lunna	Cul Ness	SI 380 770 08	Common mussels		HU475691
56	Shetland Islands Council	Dales Voe – Fora Ness	West of Fora Ness	SI 503 870 08	Common mussels		HU44027165
56	Shetland Islands Council	Dales Voe: Scarvar Ayre	South Side	SI 501 868 08	Common mussels		HU43037026
56	Shetland Islands Council	Dales Voe: Scarvar Ayre	Scarvar Ayre 2	SI 504 871 08	Common mussels		HU42817059

Biotoxin results from Dales Voe: Scarvar Ayre

Phytoplankton results from Dales Voe: Scarvar Ayre



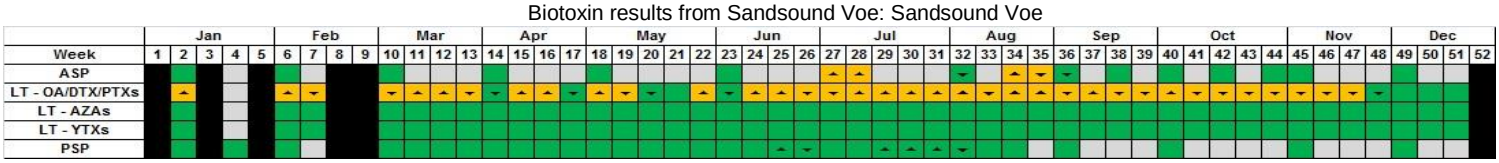
Pod 57



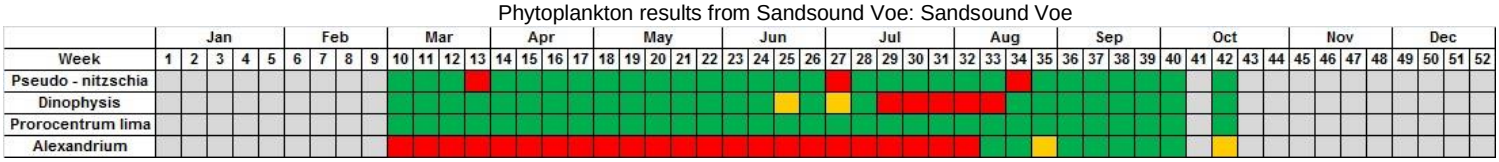
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
57	Shetland Islands Council	Sandsound Voe	Sandsound Voe	SI 242 443 08	Common mussels	Yes	HU358477
57	Shetland Islands Council	East Firth	Site 1	SI 379 769 08	Common mussels		HU344514
57	Shetland Islands Council	East Firth	Site 2	SI 379 831 08	Common mussels		HU34115072

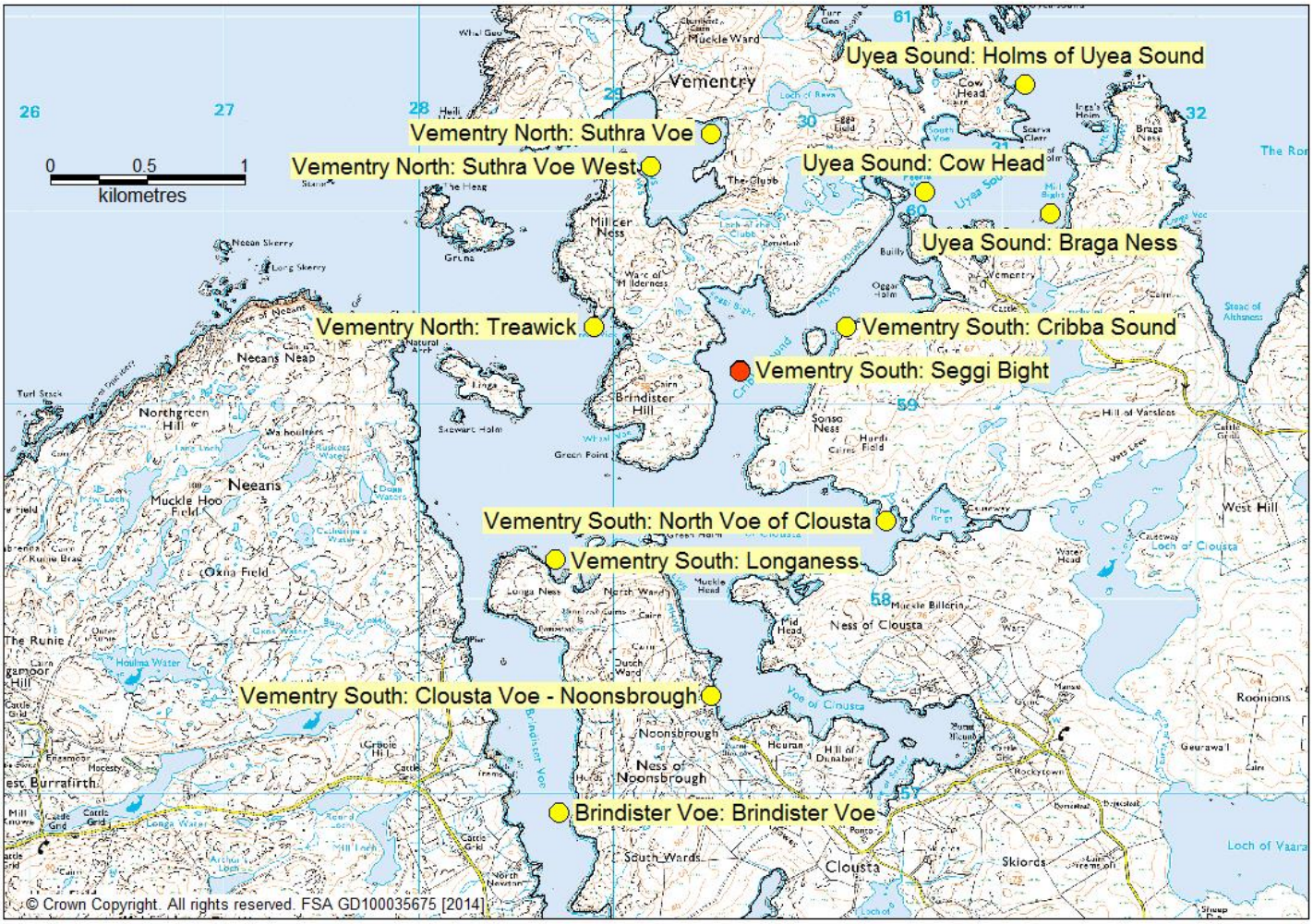
Biotoxin results from Sandsound Voe: Sandsound Voe



Phytoplankton results from Sandsound Voe: Sandsound Voe



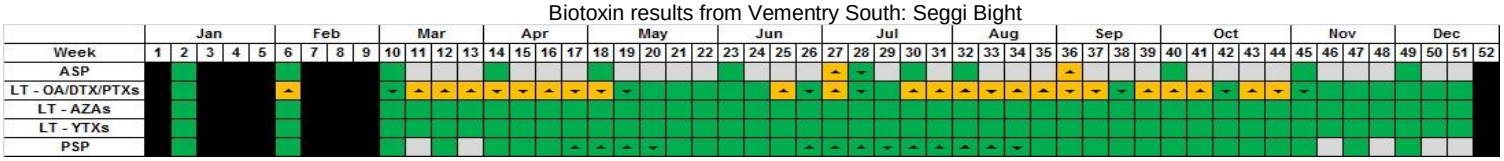
Pod 58



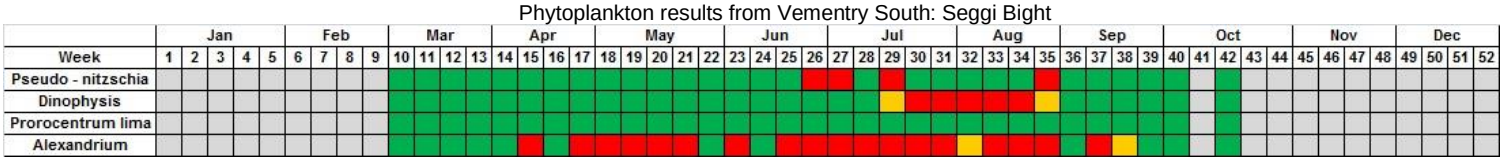
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
58	Shetland Islands Council	Vementry South	Seggi Bight	SI 321 462 08	Common mussels	Yes	HU29655918
58	Shetland Islands Council	Vementry South	Cribba Sound	SI 321 460 08	Common mussels		HU302594
58	Shetland Islands Council	Vementry South	Clousta Voe - Noonsbrough	SI 321 459 08	Common mussels		HU295575
58	Shetland Islands Council	Vementry South	North Voe of Clousta	SI 321 461 08	Common mussels		HU304584
58	Shetland Islands Council	Vementery North	Suthra Voe	SI 322 463 08	Common mussels		HU295604
58	Shetland Islands Council	Vementery North	Suthra Voe West	SI 322 464 08	Common mussels		HU29196023
58	Shetland Islands Council	Vementery North	Treawick	SI 322 465 08	Common mussels		HU289594
58	Shetland Islands Council	Brindister Voe	Brindister Voe	SI 023 406 08	Common mussels		HU28725690
58	Shetland Islands Council	Uyea Sound	Cow Head	SI 441 845 08	Common mussels		HU306601
58	Shetland Islands Council	Vementry South	Longaness	SI 321 885 08	Common mussels		HU287582
58	Shetland Islands Council	Uyea Sound	Holms of Uyea Sound	SI 487 842 08	Common mussels		HU31126065
58	Shetland Islands Council	Uyea Sound	Braga Ness	SI 508 874 08	Common mussels		HU31255999

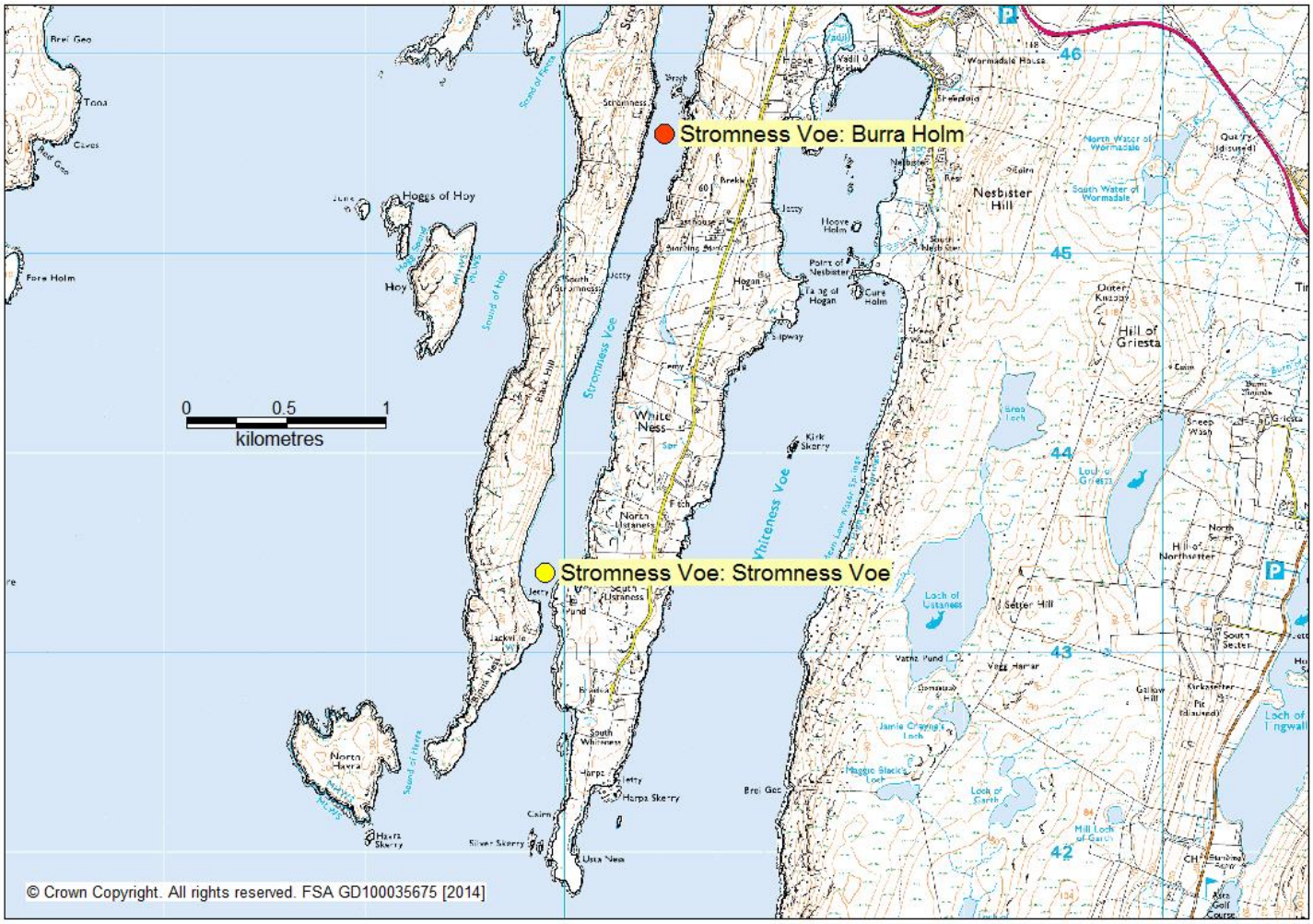
Biotoxin results from Vementry South: Seggi Bight



Phytoplankton results from Vementry South: Seggi Bight



Pod 59



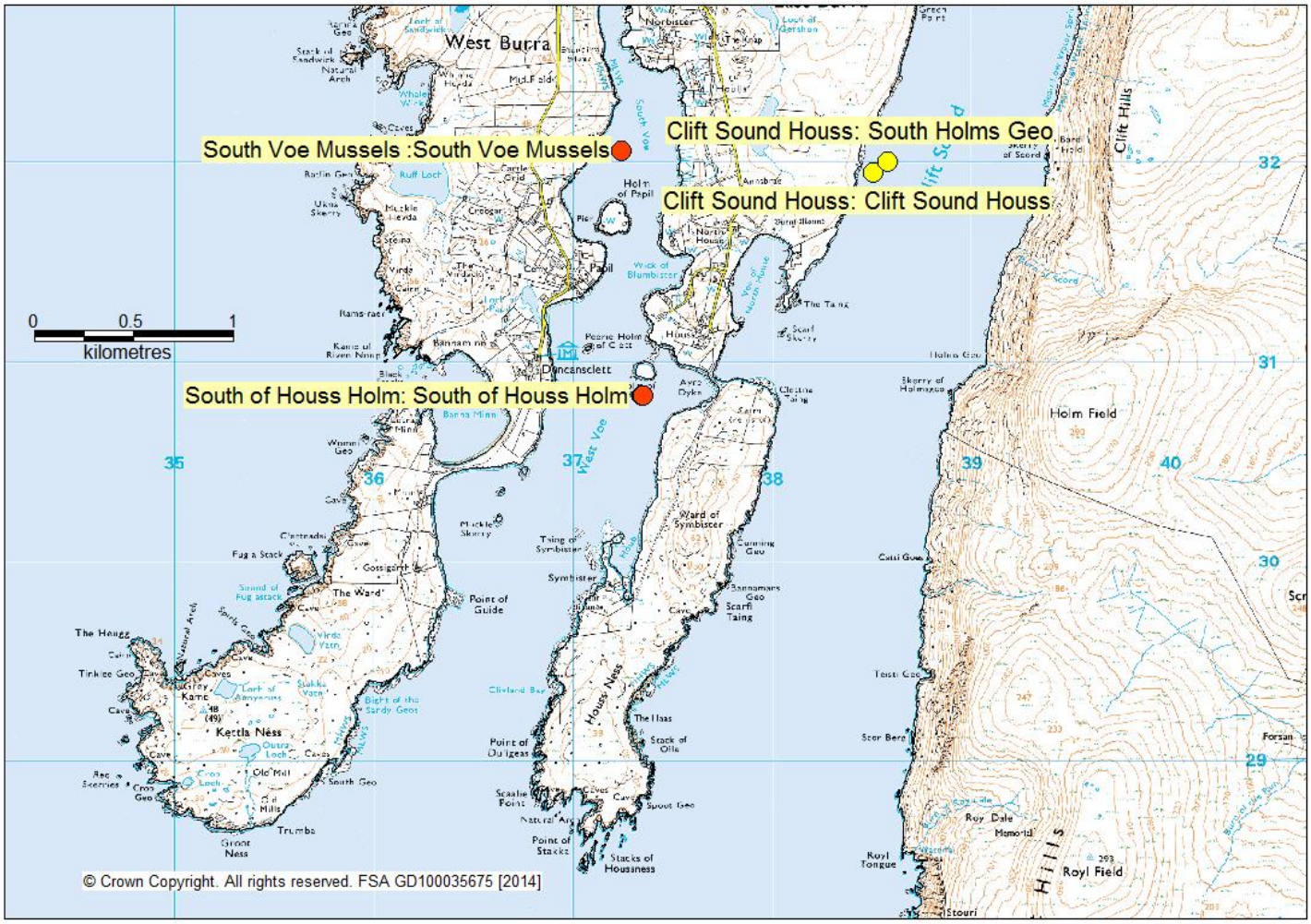
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
59	Shetland Islands Council	Stromness Voe	Burra Holm	SI 273 467 08	Common mussels	Yes	HU385456
59	Shetland Islands Council	Stromness Voe	Stromness Voe	SI 273 446 08	Common mussels		HU379434

Biotoxin results from Stromness Voe: Burra Holm

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																				
LT - OA/DTX/PTXs																																																				
LT - AZAs																																																			
LT - YTXs																																																			
PSP																																																			

Pod 60

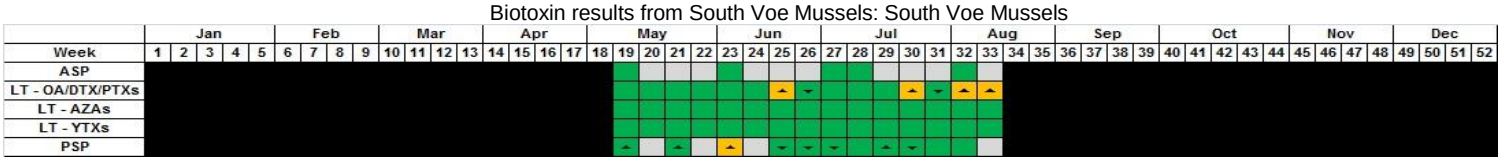


RMP position: AHA position:

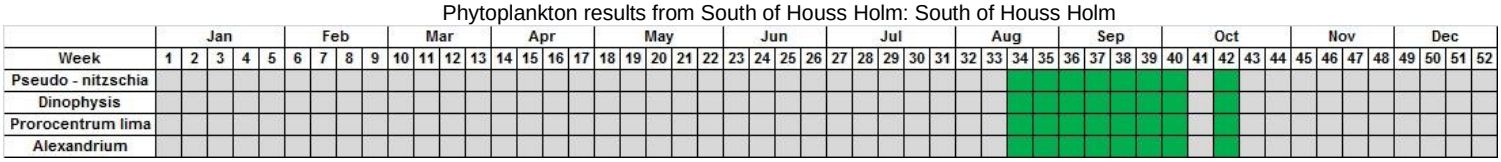
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
60	Shetland Islands Council	South of Houss Holm	South of Houss Holm	SI 261 444 08	Common mussels	Yes	HU37343083
60	Shetland Islands Council	South Voe Mussels	South Voe Mussels	SI 421 825 08	Common mussels	Alternate RMP	HU37243206
60	Shetland Islands Council	Clift Sound Houss	Clift Sound Houss	SI 633 1270 08	Common mussels		HU38503195
60	Shetland Islands Council	Clift Sound Houss	South Holms Geo	SI 633 1690 08	Common mussels		HU38573195

Biotoxin results from South of Houss Holm: South of Houss Holm

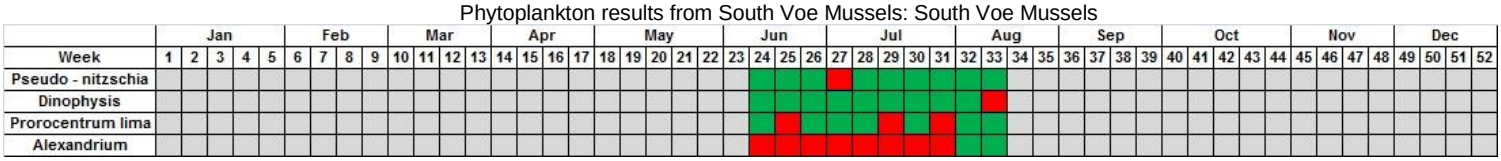
Biotoxin results from South Voe Mussels: South Voe Mussels



Phytoplankton results from South of Houss Holm: South of Houss Holm



Phytoplankton results from South Voe Mussels: South Voe Mussels

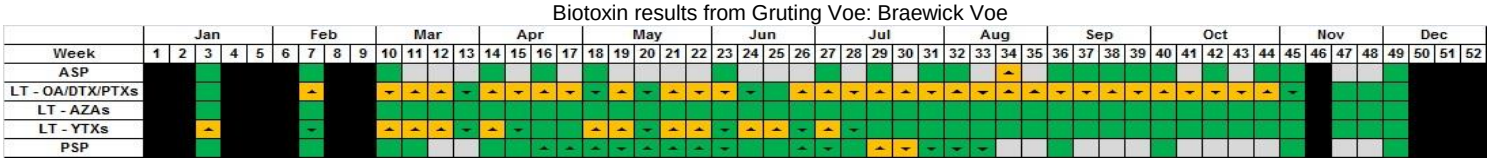


Pod 61

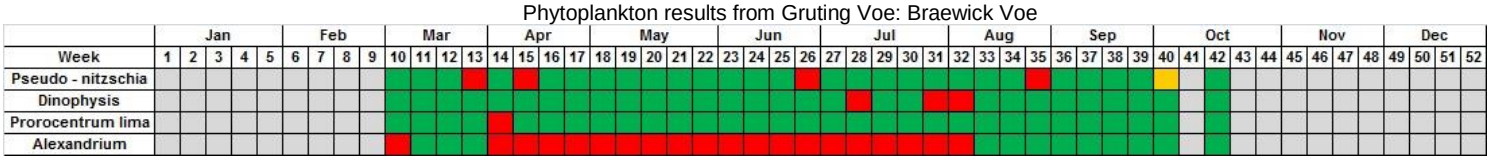
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
61	Shetland Islands Council	Gruting Voe: Browland Voe	Browland Voe	SI 081 425 08	Common mussels	Alternate RMP	HU26674969
61	Shetland Islands Council	Gruting Voe: Seli Voe	Seli Voe	SI 084 428 08	Common mussels	Alternate RMP	HU281481
61	Shetland Islands Council	Gruting Voe: Quilse	Quilse	SI 083 427 08	Common mussels		HU267485
61	Shetland Islands Council	Gruting Voe: Braewick Voe	Braewick Voe	SI 080 424 08	Common mussels	Yes	HU25784770
61	Shetland Islands Council	Gruting Voe: Braewick Voe	North of Green Head	SI 442 846 08	Common mussels		HU252471

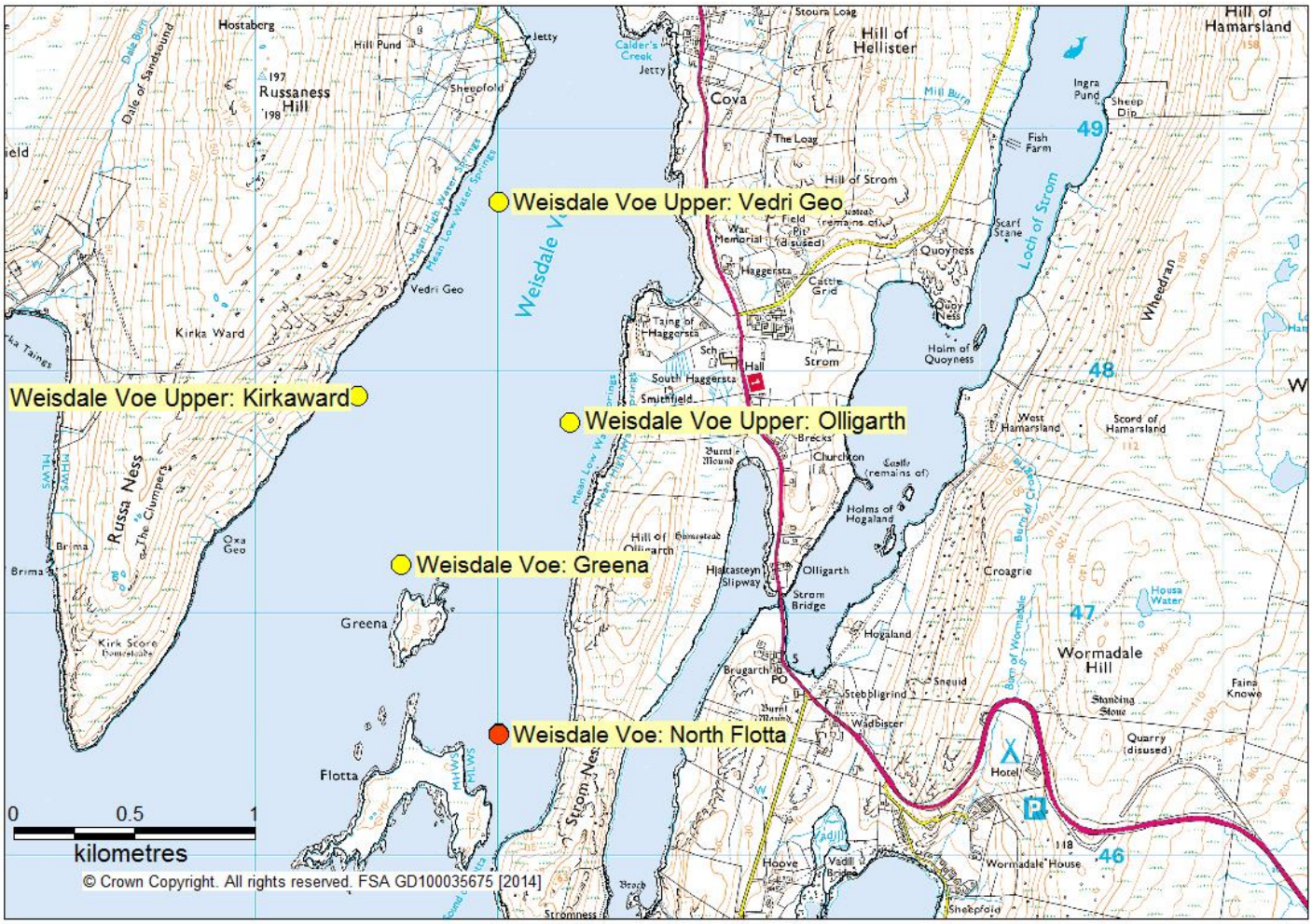
Biotoxin results from Gruting Voe: Braewick Voe



Phytoplankton results from Gruting Voe: Braewick Voe



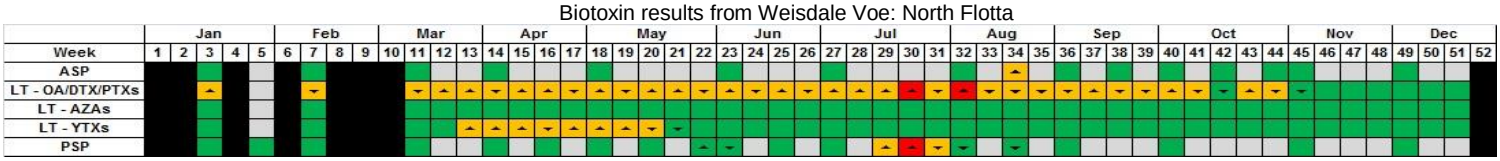
Pod 63



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
63	Shetland Islands Council	Weisdale Voe	North Flotta	SI 297 469 08	Common mussels	Yes	HU380465
63	Shetland Islands Council	Weisdale Voe	Greena	SI 297 468 08	Common mussels		HU376472
63	Shetland Islands Council	Weisdale Voe Upper	Vedri Geo	SI 378 768 08	Common mussels		HU380487
63	Shetland Islands Council	Wesidale Voe Upper	Kirkaward	SI 378 1523 08	Common mussels		HU374479
63	Shetland Islands Council	Weisdale Voe Upper	Olligarth	SI 378 1521 08	Common mussels		HU383478

Biotoxin results from Weisdale Voe: North Flotta

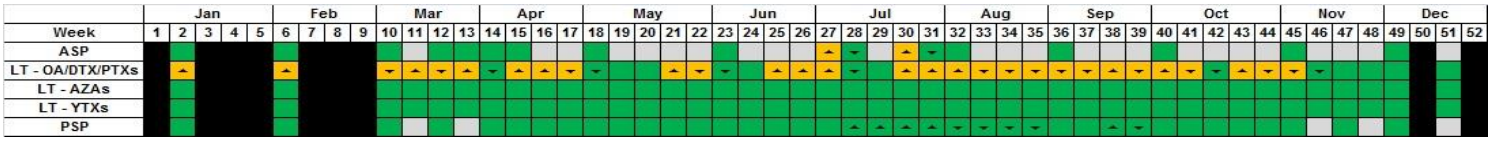


Pod 64

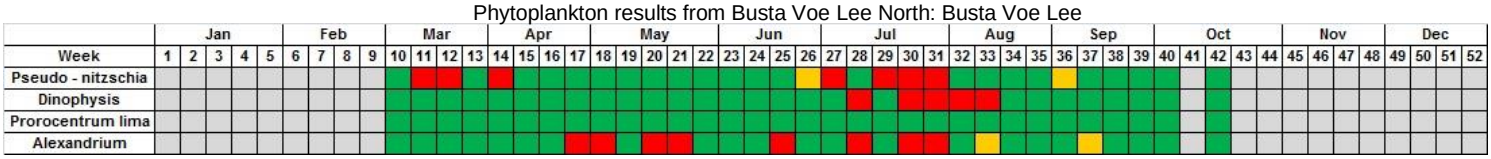
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
64	Shetland Islands Council	Busta Voe Lee North	Busta Voe Lee	SI 327 410 08	Common mussels	Yes	HU34596500
64	Shetland Islands Council	Busta Voe Lee North	Busta Voe	SI 327 409 08	Common mussels		HU347663
64	Shetland Islands Council	Busta Voe Lee North	Wetherstaness	SI 327 754 08	Common mussels		HU359648
64	Shetland Islands Council	Busta Voe Lee North	Hevden Ness	SI 327 755 08	Common mussels		HU357662
64	Shetland Islands Council	Busta Voe Lee North	North of Linga	SI 327 753 08	Common mussels		HU354645
64	Shetland Islands Council	Busta Voe Lee South	Linga	SI 328 411 08	Common mussels		HU358639
64	Shetland Islands Council	Busta Voe Lee South	Greentaing	SI 328 767 08	Common mussels		HU344643
64	Shetland Islands Council	Busta Voe Lee South	Buddascord	SI 328 963 08	Common mussels		HU34176369

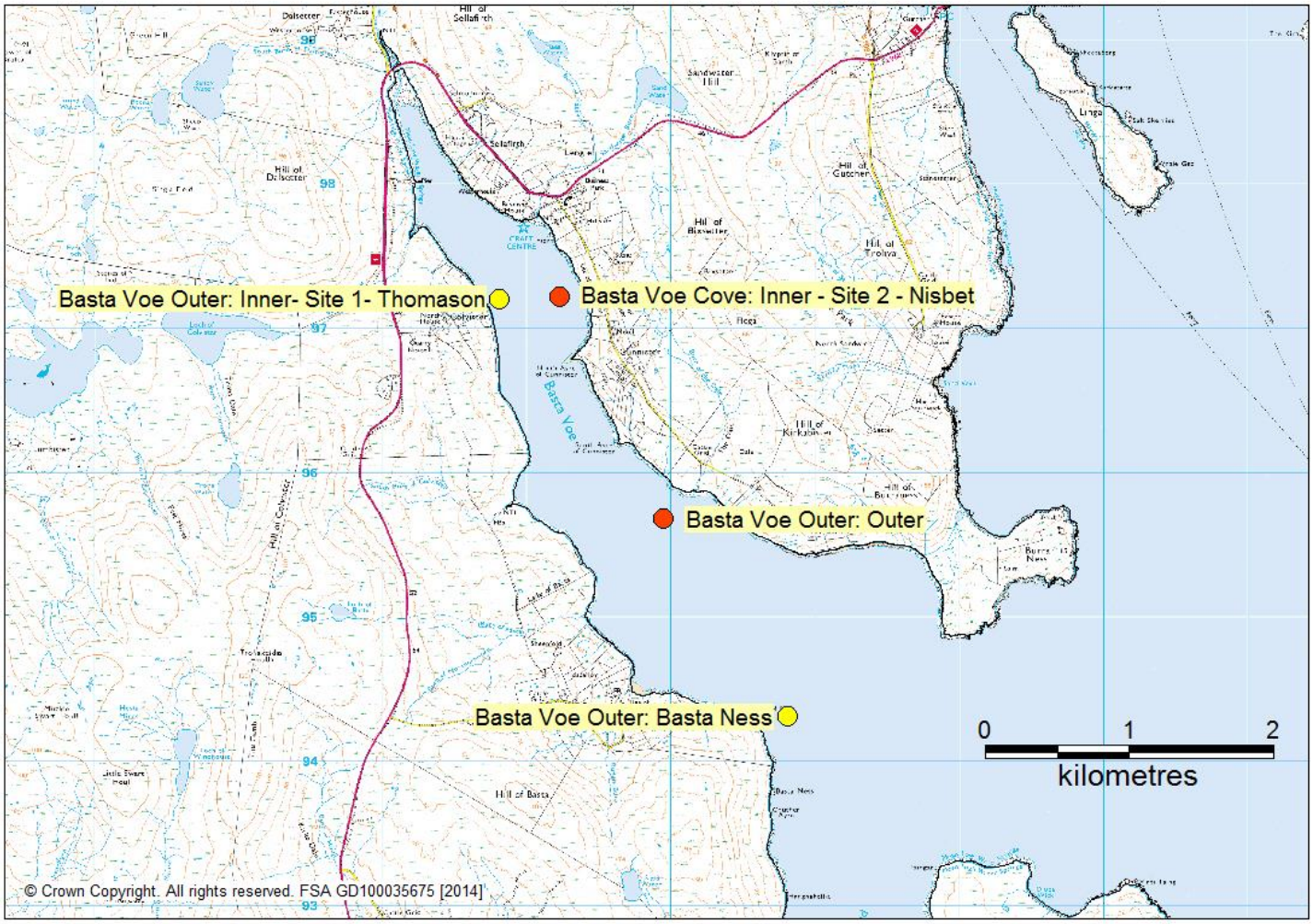
Biotoxin results from Busta Voe Lee North: Busta Voe Lee



Phytoplankton results from Busta Voe Lee North: Busta Voe Lee



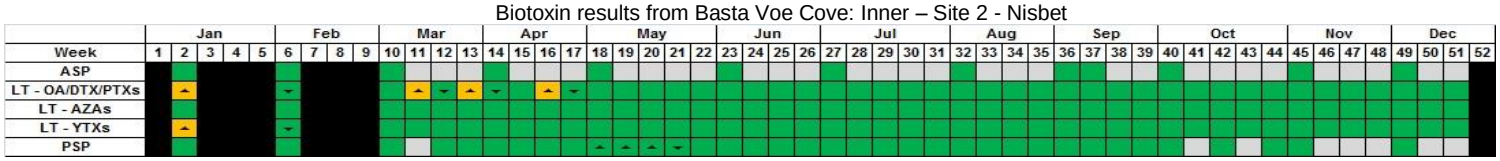
Pod 65



RMP position: AHA position:

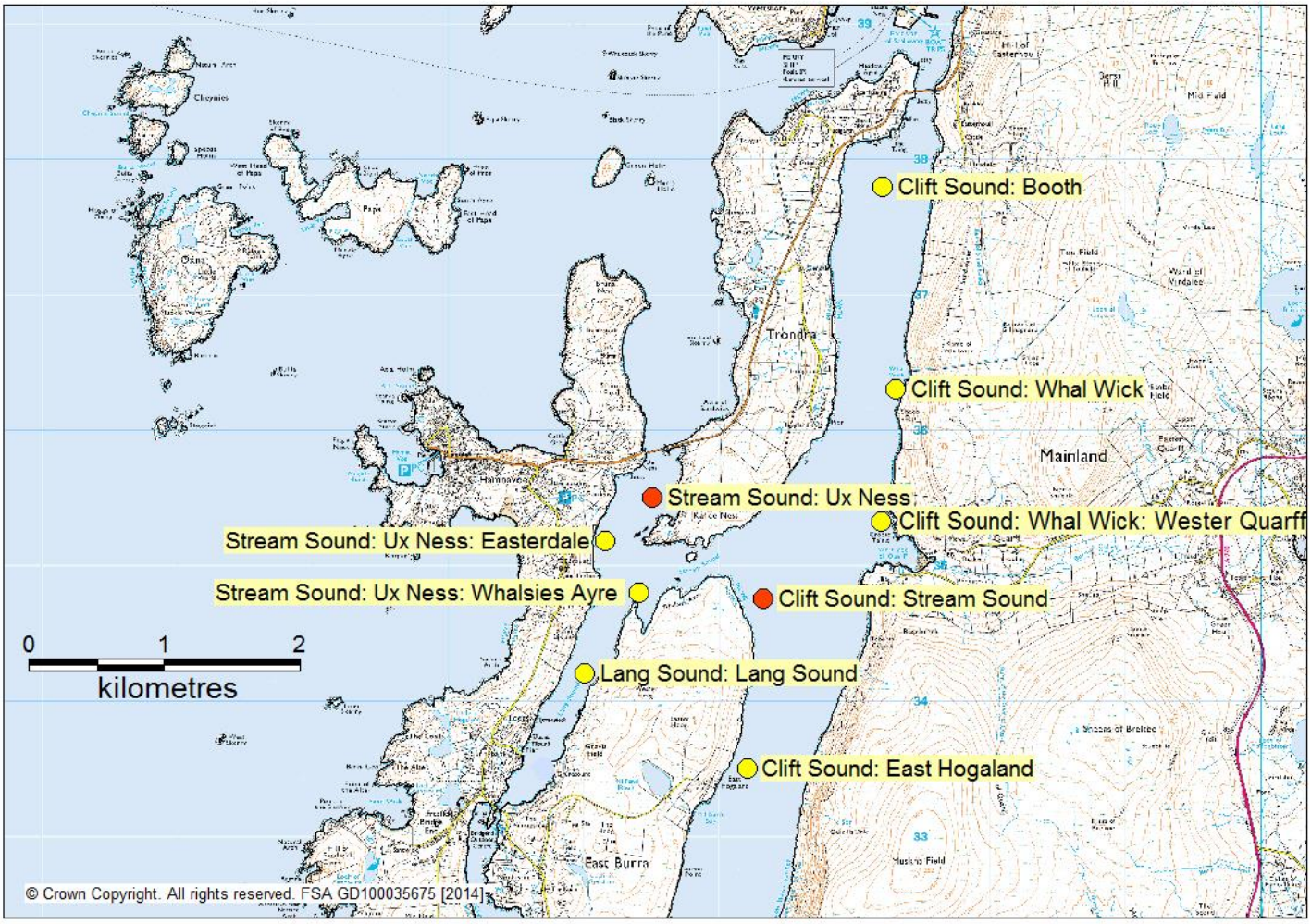
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
65	Shetland Islands Council	Basta Voe Outer	Outer	SI 323 403 08	Common mussels	Yes	HU52949568
65	Shetland Islands Council	Basta Voe Outer	Basta Ness	SI 323 396 08	Common mussels		HU538943
65	Shetland Islands Council	Basta Voe Outer	Inner- Site 1- Thomason	SI 323 399 08	Common mussels		HU518972
65	Shetland Islands Council	Basta Voe Cove	Inner - Site 2 - Nisbet	SI 324 400 08	Common mussels	Alternate RMP	HU52239724

Biotoxin results from Basta Voe Cove: Inner – Site 2 - Nisbet



Phytoplankton results from Basta Voe Cove: Inner – Site 2 - Nisbet

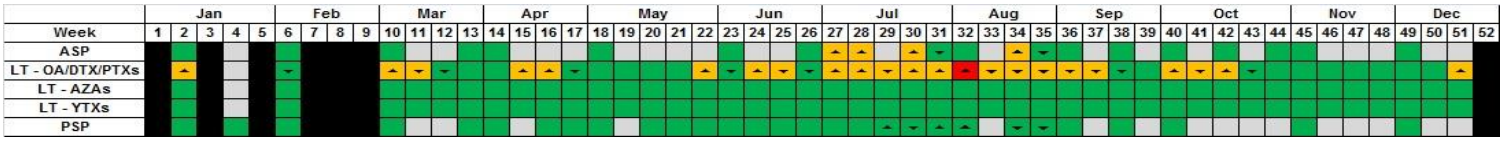
Pod 67



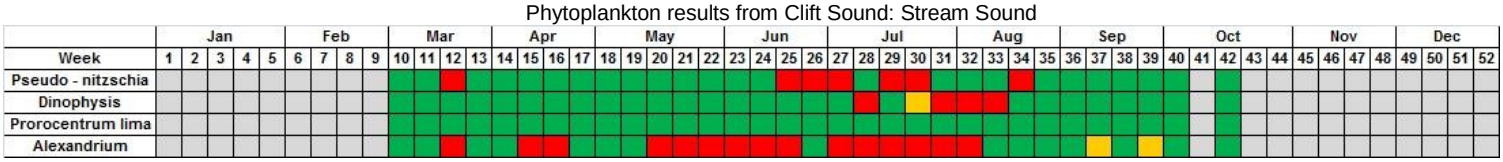
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
67	Shetland Islands Council	Clift Sound: Stream Sound	Stream Sound	SI 037 415 08	Common mussels	Yes	HU39323475
67	Shetland Islands Council	Clift Sound: Whal Wick	Whal Wick	SI 038 416 08	Common mussels		HU403363
67	Shetland Islands Council	Clift Sound: Booth	Booth	SI 036 413 08	Common mussels		HU402378
67	Shetland Islands Council	Stream Sound: Ux Ness	Whalsies Ayre	SI 518 945 08	Common mussels		HU384348
67	Shetland Islands Council	Lang Sound	Lang Sound	SI 107 429 08	Common mussels		HU380342
67	Shetland Islands Council	Stream Sound: Ux Ness	Easterdale	SI 373 1096 08	Common mussels		HU38153518
67	Shetland Islands Council	Stream Sound: Ux Ness	Ux Ness	SI 373 762 08	Common mussels	Alternate RMP	HU385355
67	Shetland Islands Council	Clift Sound	East Hogaland	SI 035 414 08	Common mussels		HU392335
67	Shetland Islands Council	Clift Sound: Whal Wick	Wester Quarff	SI 038 1522 08	Common mussels		HU40183532

Biotoxin results from Clift Sound: Stream Sound



Phytoplankton results from Clift Sound: Stream Sound

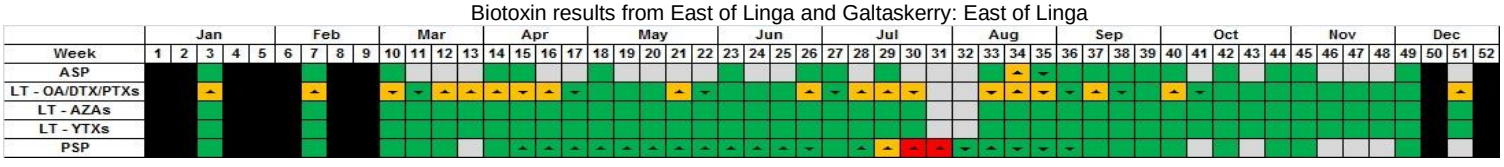


Pod 68

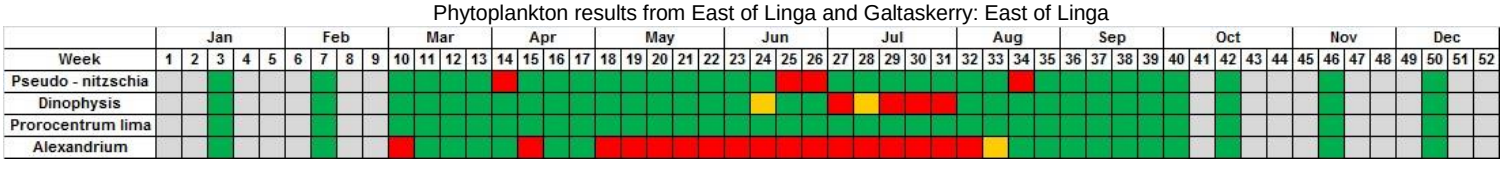
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
68	Shetland Islands Council	Vaila Sound: Riskaness	Riskaness	SI 289 458 08	Common mussels	Alternate RMP	HU232483
68	Shetland Islands Council	East of Linga and Galtaskerry	East of Linga	SI 288 455 08	Common mussels	Yes	HU242480
68	Shetland Islands Council	East of Linga and Galtaskerry	Whitesness	SI 288 1061 08	Common mussels		HU244470
68	Shetland Islands Council	Vaila Sound	Linga	SI 288 457 08	Common mussels		HU240484
68	Shetland Islands Council	Vaila Sound: Riskaness	Lera Voe	SI 289 805 08	Common mussels		HU221483

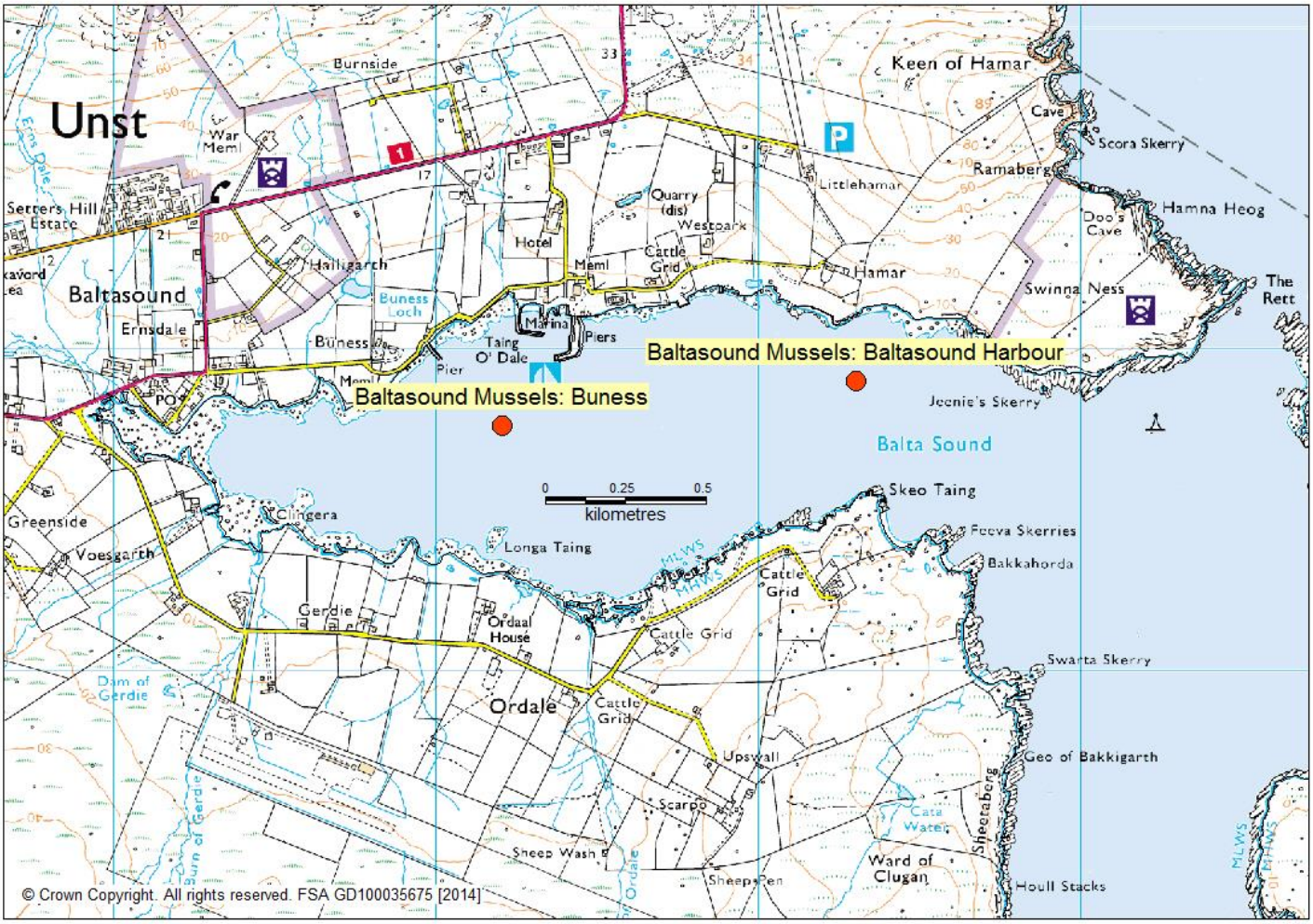
Biotoxin results from East of Linga and Galtaskerry: East of Linga



Phytoplankton results from East of Linga and Galtaskerry: East of Linga



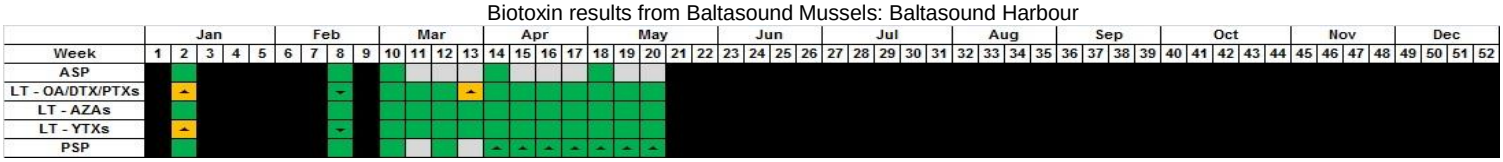
Pod 69



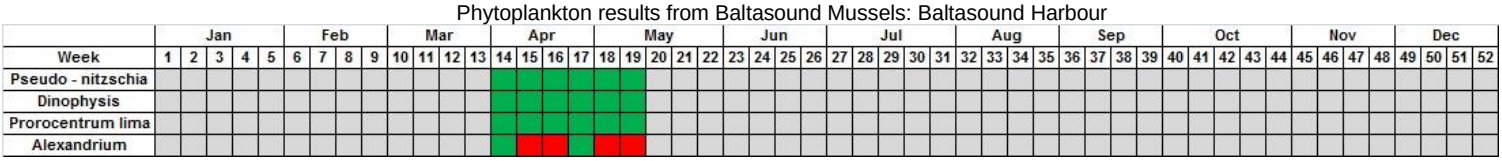
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
69	Shetland Islands Council	Baltasound Mussels	Baltasound Harbour	SI 010 395 08	Common mussels	Yes	HP643089
69	Shetland Islands Council	Baltasound Mussels	Buness	SI 010 1128 08	Common mussels	Alternate RMP	HP63200876

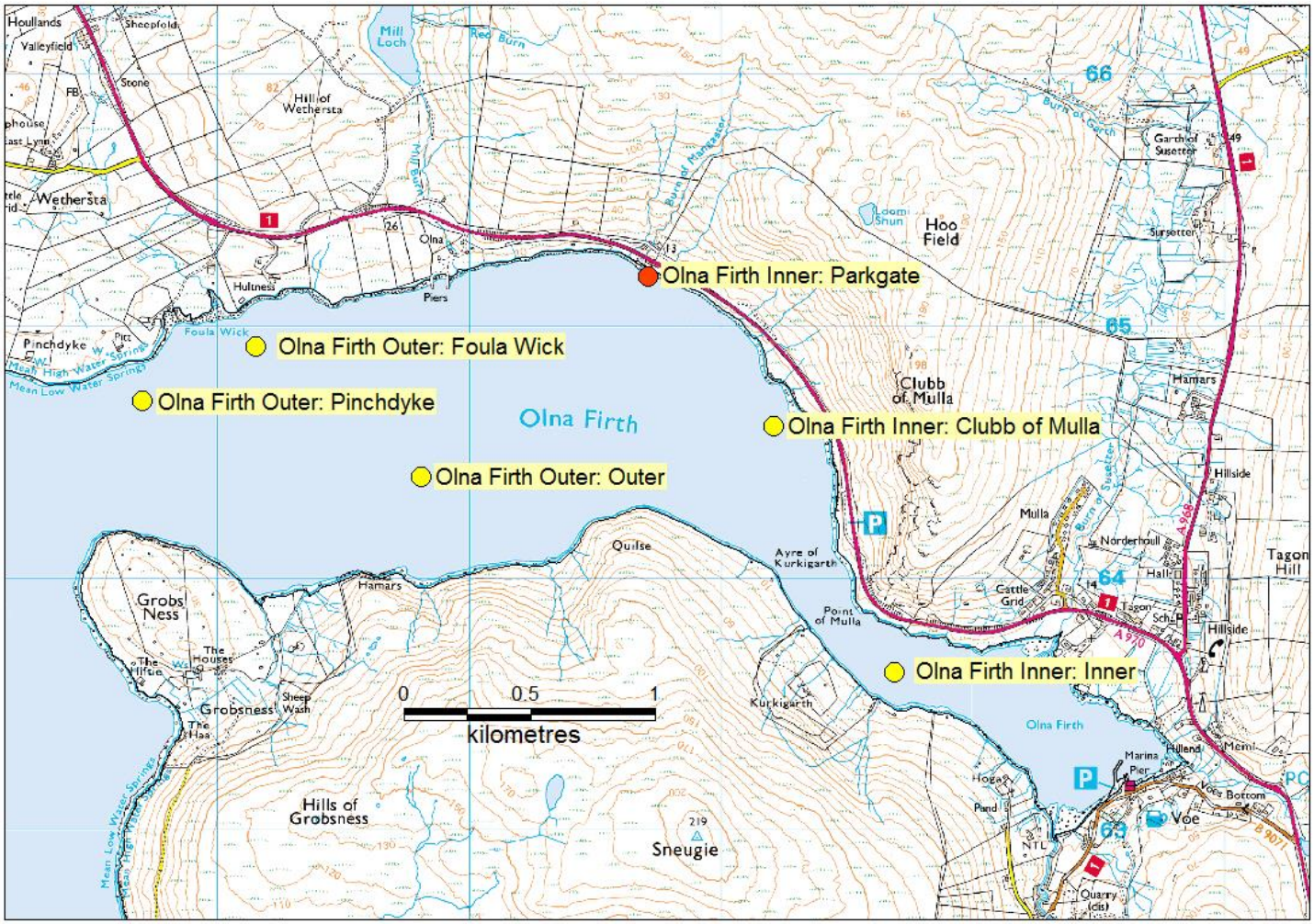
Biotoxin results from Baltasound Mussels: Baltasound Harbour



Phytoplankton results from Baltasound Mussels: Baltasound Harbour



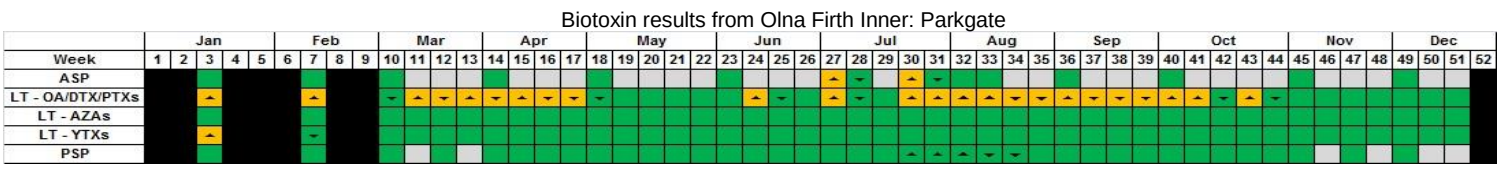
Pod 70



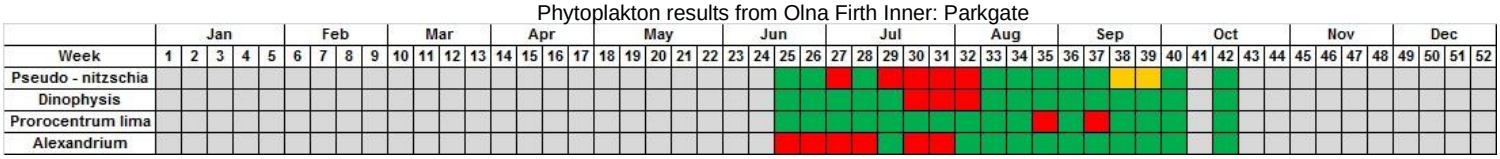
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
70	Shetland Islands Council	Olna Firth Inner	Parkgate	SI 232 438 08	Common mussels	Yes	HU387652
70	Shetland Islands Council	Olna Firth Outer	Foula Wick	SI 232 434 08	Common mussels		HU37146492
70	Shetland Islands Council	Olna Firth Inner	Inner	SI 232 435 08	Common mussels		HU39686363
70	Shetland Islands Council	Olna Firth Outer	Outer	SI 232 437 08	Common mussels		HU378644
70	Shetland Islands Council	Olna Firth Outer	Pinchdyke	SI 232 439 08	Common mussels		HU367647
70	Shetland Islands Council	Olna Firth Inner	Clubb of Mulla	SI 232 731 08	Common mussels		HU392646

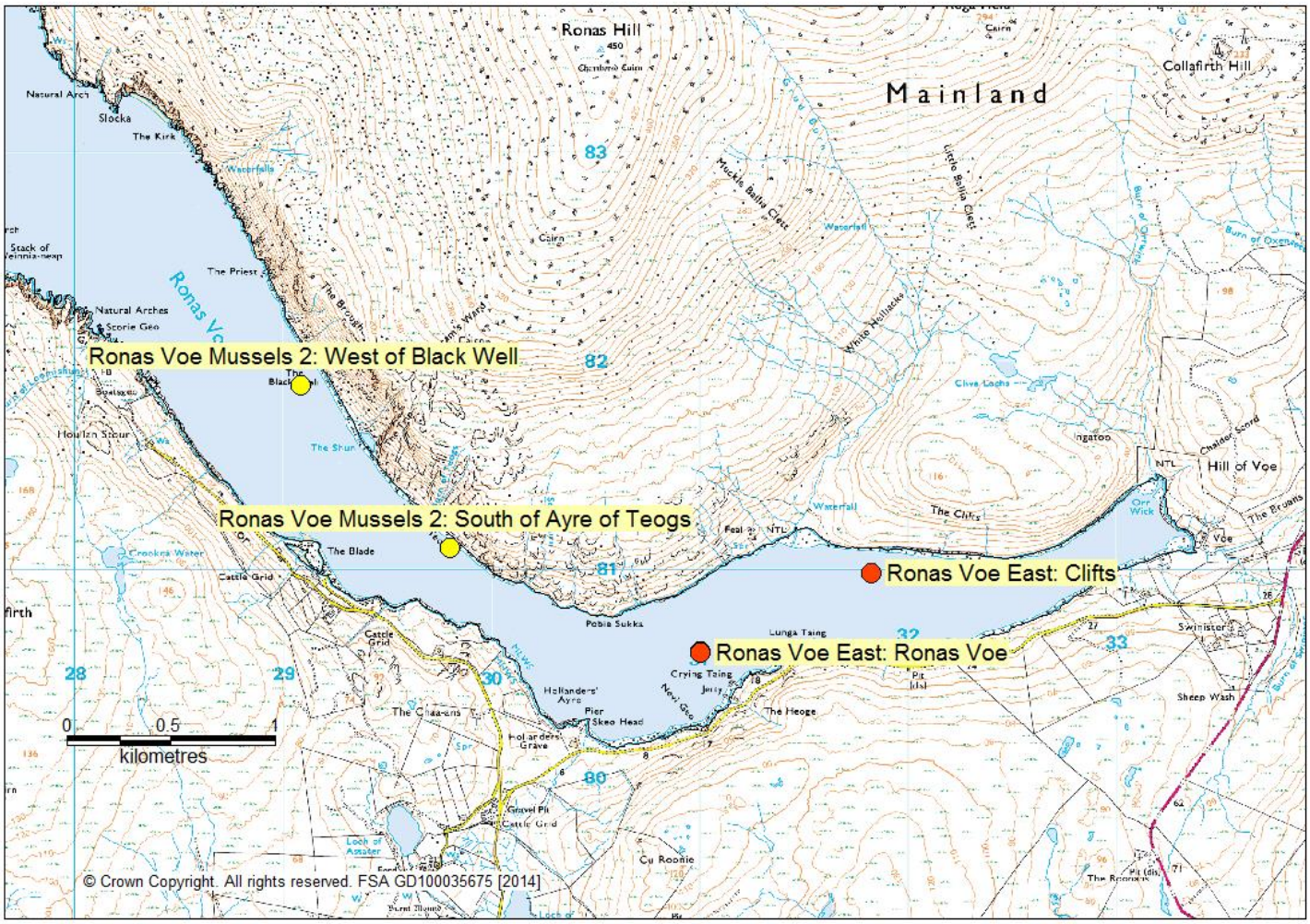
Biotoxin results from Olna Firth Inner: Parkgate



Phytoplakton results from Olna Firth Inner: Parkgate



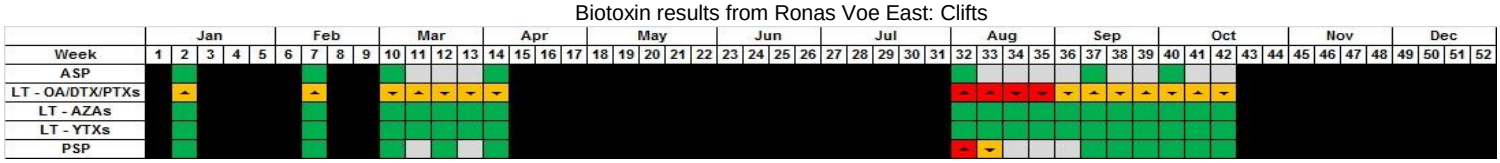
Pod 71



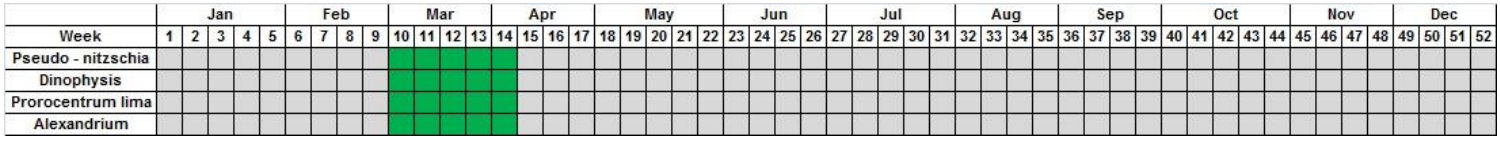
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
71	Shetland Islands Council	Ronas Voe East	Ronas Voe	SI 239 441 08	Common mussels	Alternate RMP	HU310806
71	Shetland Islands Council	Ronas Voe Mussels 2	South of Ayre of Teogs	SI 239 442 08	Common mussels		HU298811
71	Shetland Islands Council	Ronas Voe East	Clifts	SI 523 919 08	Common mussels	Yes	HU31828098
71	Shetland Islands Council	Ronas Voe Mussels 2	West of Black Well	SI 522 918 08	Common mussels		HU29088188

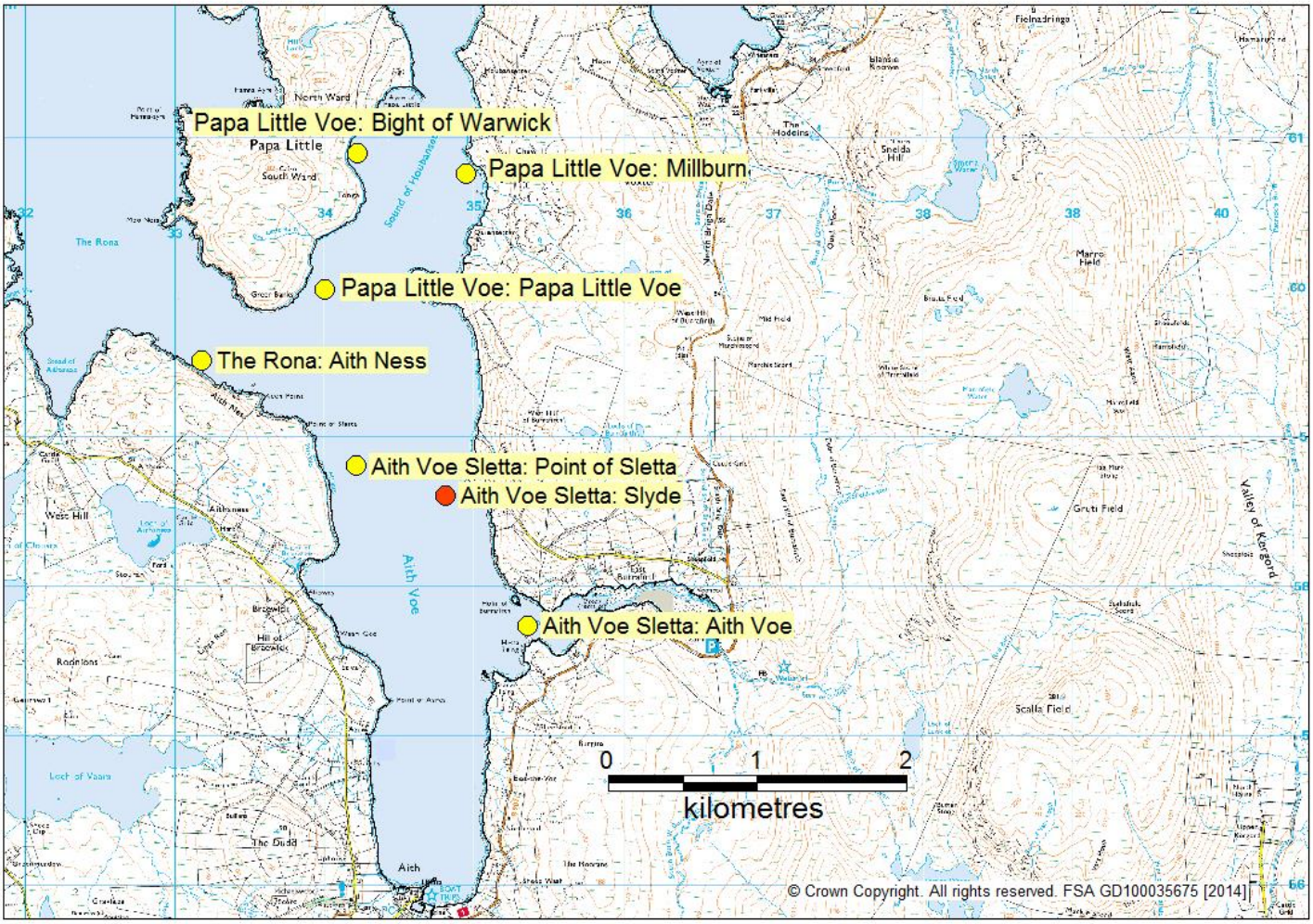
Biotoxin results from Ronas Voe East: Clifts



Phytoplankton results from Ronas Voe East: Clifts



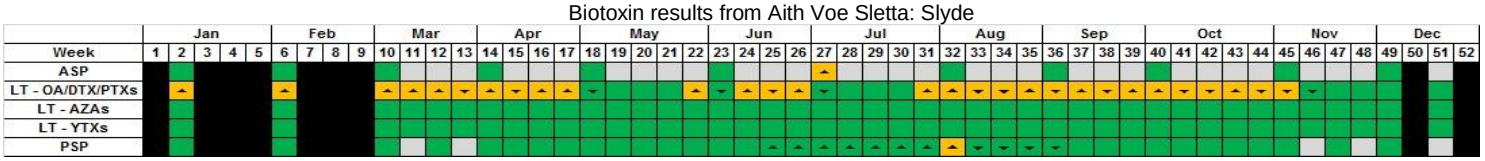
Pod 72



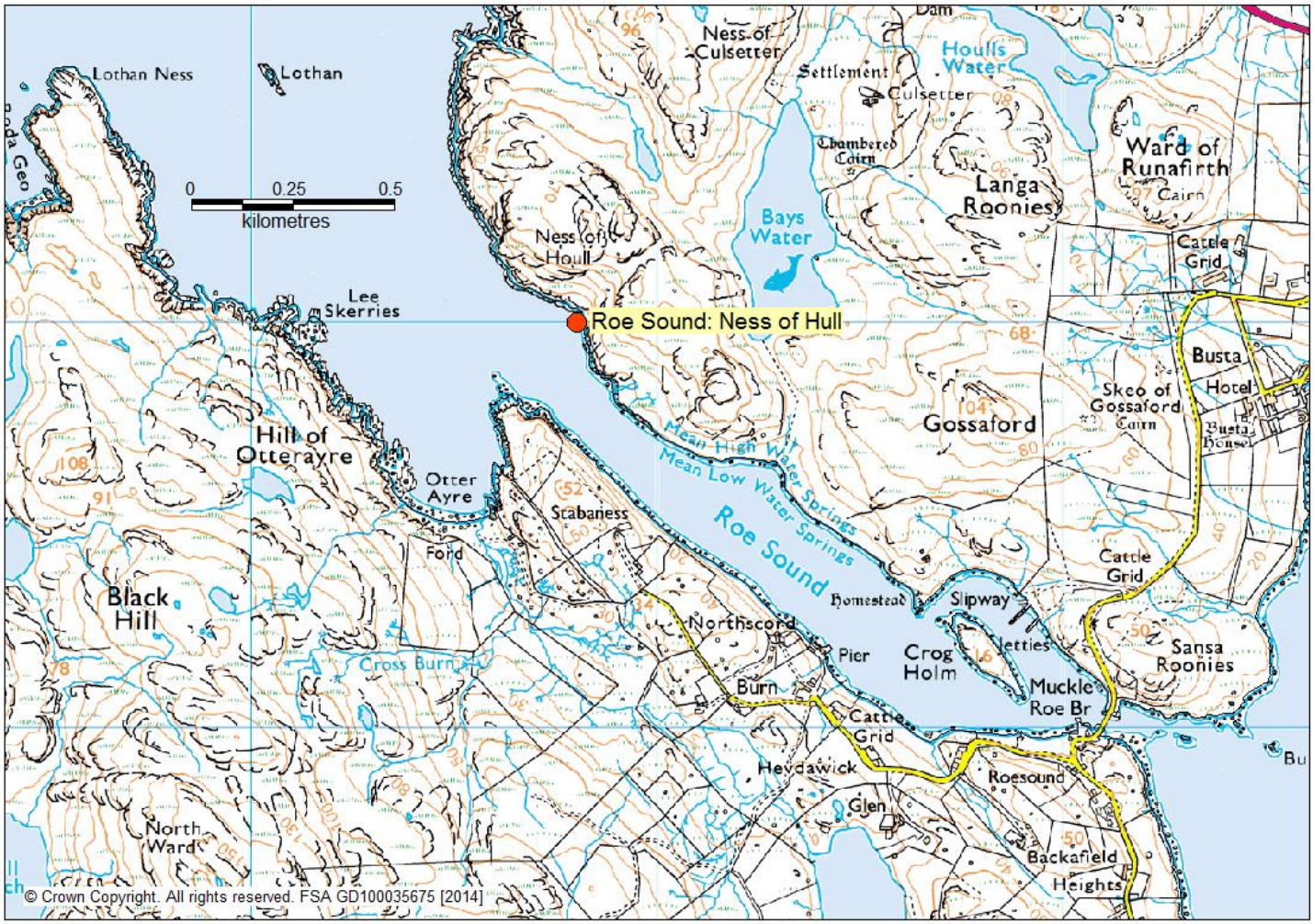
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
72	Shetland Islands Council	Aith Voe Sletta	Slyde	SI 326 733 08	Common mussels	Yes	HU348586
72	Shetland Islands Council	Aith Voe Sletta	Point of Sletta	SI 326 393 08	Common mussels		HU342588
72	Shetland Islands Council	Aith Voe Sletta	Aith Voe	SI 055 863 08	Common mussels		HU35355773
72	Shetland Islands Council	The Rona	Aith Ness	SI 517 944 08	Common mussels		HU33175951
72	Shetland Islands Council	Papa Little Voe	Papa Little Voe	SI 235 1271 08	Common mussels		HU339600
72	Shetland Islands Council	Papa Little Voe	Bight of Warwick	SI 235 1351 08	Common mussels		HU342609
72	Shetland Islands Council	Papa Little Voe	Millburn	SI 235 1350 08	Common mussels		HU34936076

Biotoxin results from Aith Voe Sletta: Slyde



Pod 73



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
73	Shetland Islands Council	Roe Sound	Ness of Hull	SI 334 715 08	Common mussels	Yes	HU328670

No samples received from Pod 73 between 1st January and 31st December 2014

Pod 81

RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
81	Shetland Islands Council	North Uyea	North	SI 230 453 08	Common mussels	Yes	HU60119997
81	Shetland Islands Council	South Uyea	South	SI 263 454 08	Common mussels		HU607981

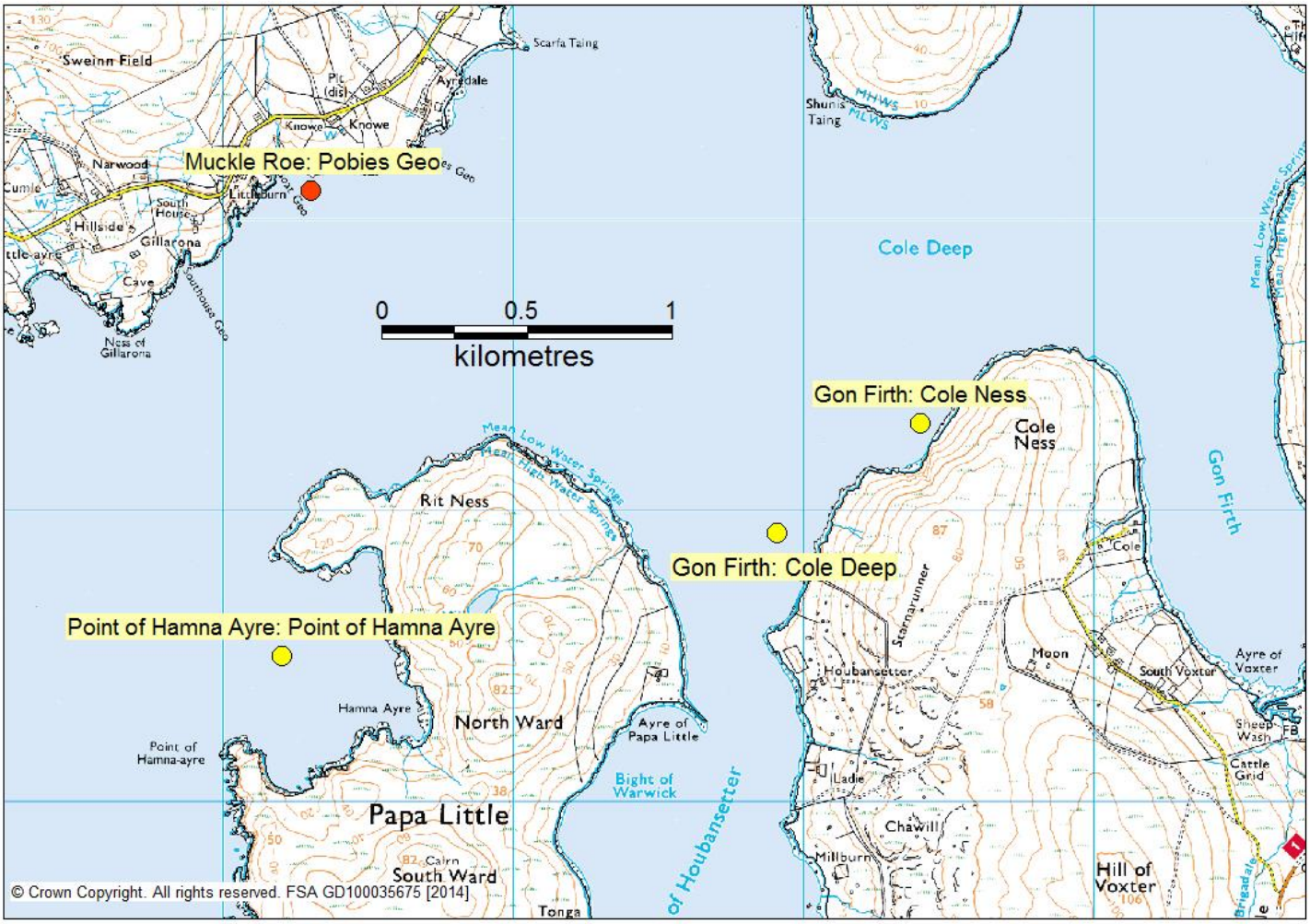
Biotoxin results from North Uyea: North

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																																																			
LT - OA/DTX/PTXs																																																			
LT - AZAs																																																		
LT - YTXs																																																		
PSP																																																		

Phytoplankton results from North Uyea: North

	Jan					Feb				Mar				Apr				May				Jun				Jul				Aug				Sep				Oct				Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Pseudo - nitzschia																																																			
Dinophysis																																																			
Prorocentrum lima																																																		
Alexandrium																																																		

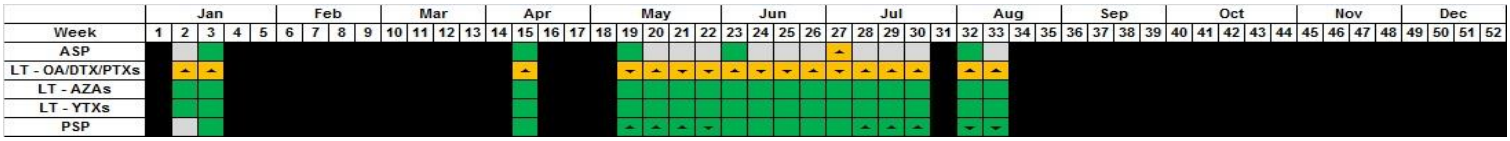
Pod 127



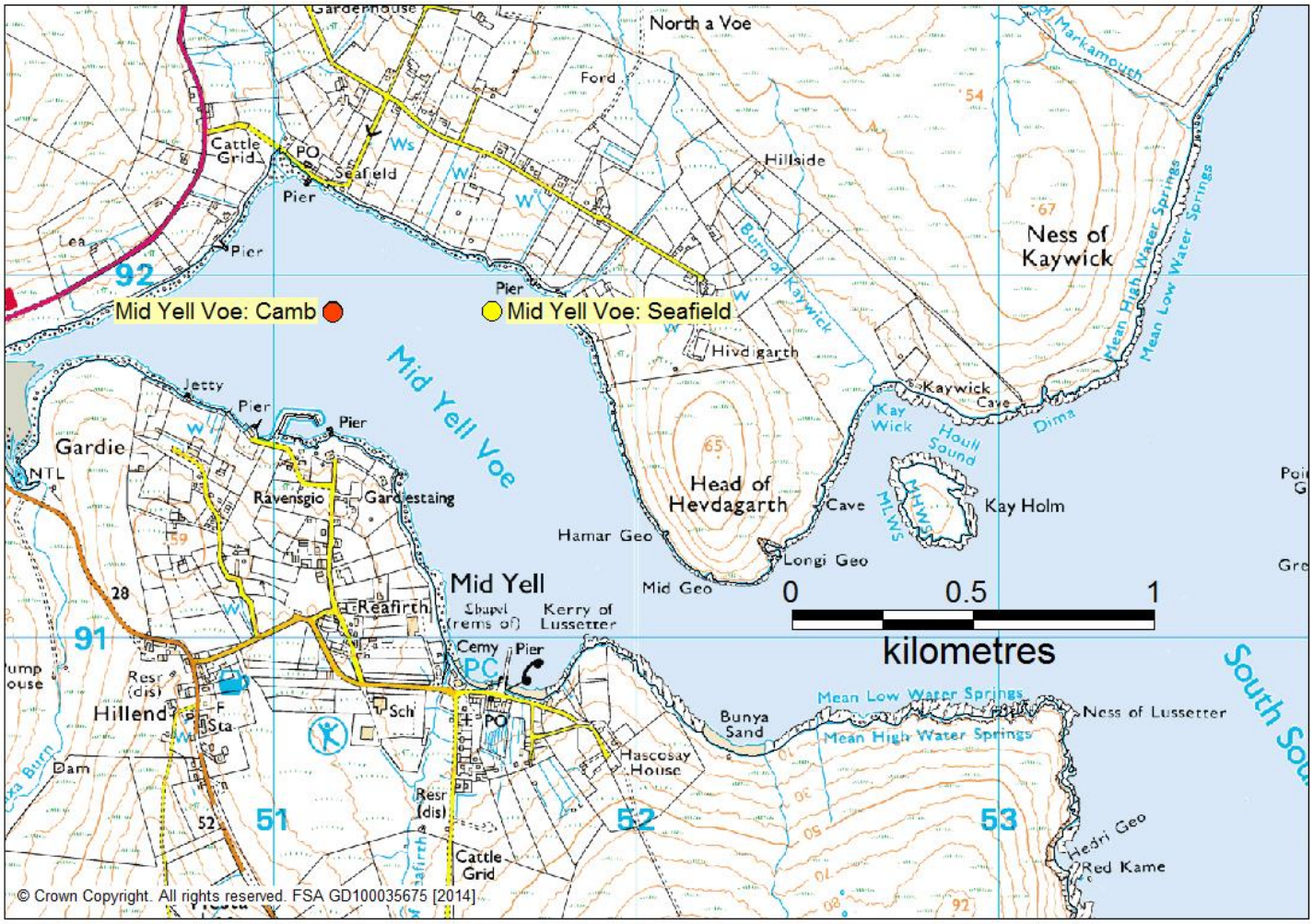
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
127	Shetland Islands Council	Muckle Roe	Pobies Geo	SI 221 433 08	Common mussels	Yes	HU333631
127	Shetland Islands Council	Point of Hamna Ayre	Point of Hamna Ayre	SI 374 763 08	Common mussels		HU332615
127	Shetland Islands Council	Gon Firth	Cole Ness	SI 076 423 08	Common mussels		HU354623
127	Shetland Islands Council	Gon Firth	Cole Deep	SI 076 1338 08	Common mussels		HU34916192

Biotoxin results from Muckle Roe: Pobies Geo



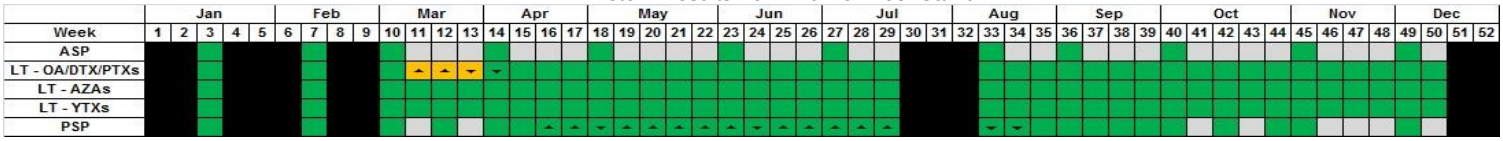
Pod 128



RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
128	Shetland Islands Council	Mid Yell Voe	Camb	SI 216 430 08	Common mussels	Yes	HU51169190
128	Shetland Islands Council	Mid Yell Voe	Seafield	SI 216 432 08	Common mussels		HU516919

Biotoxin results from Mid Yell Voe: Camb

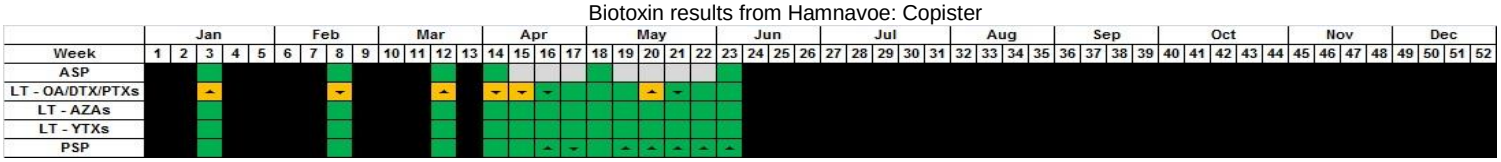


Pod 129

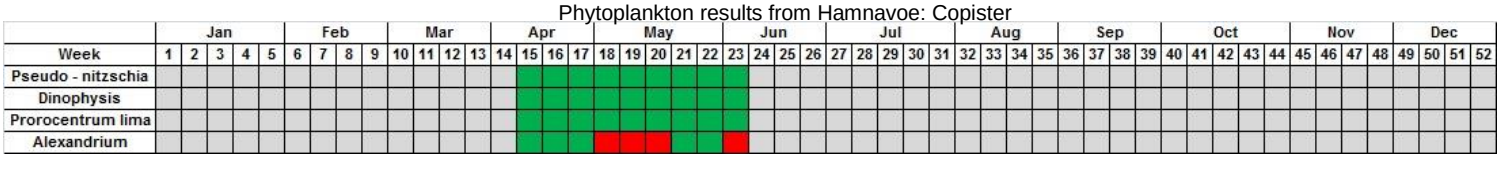
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
129	Shetland Islands Council	Hamnavoe	Copister	SI 348 736 08	Common mussels	Yes	HU486795

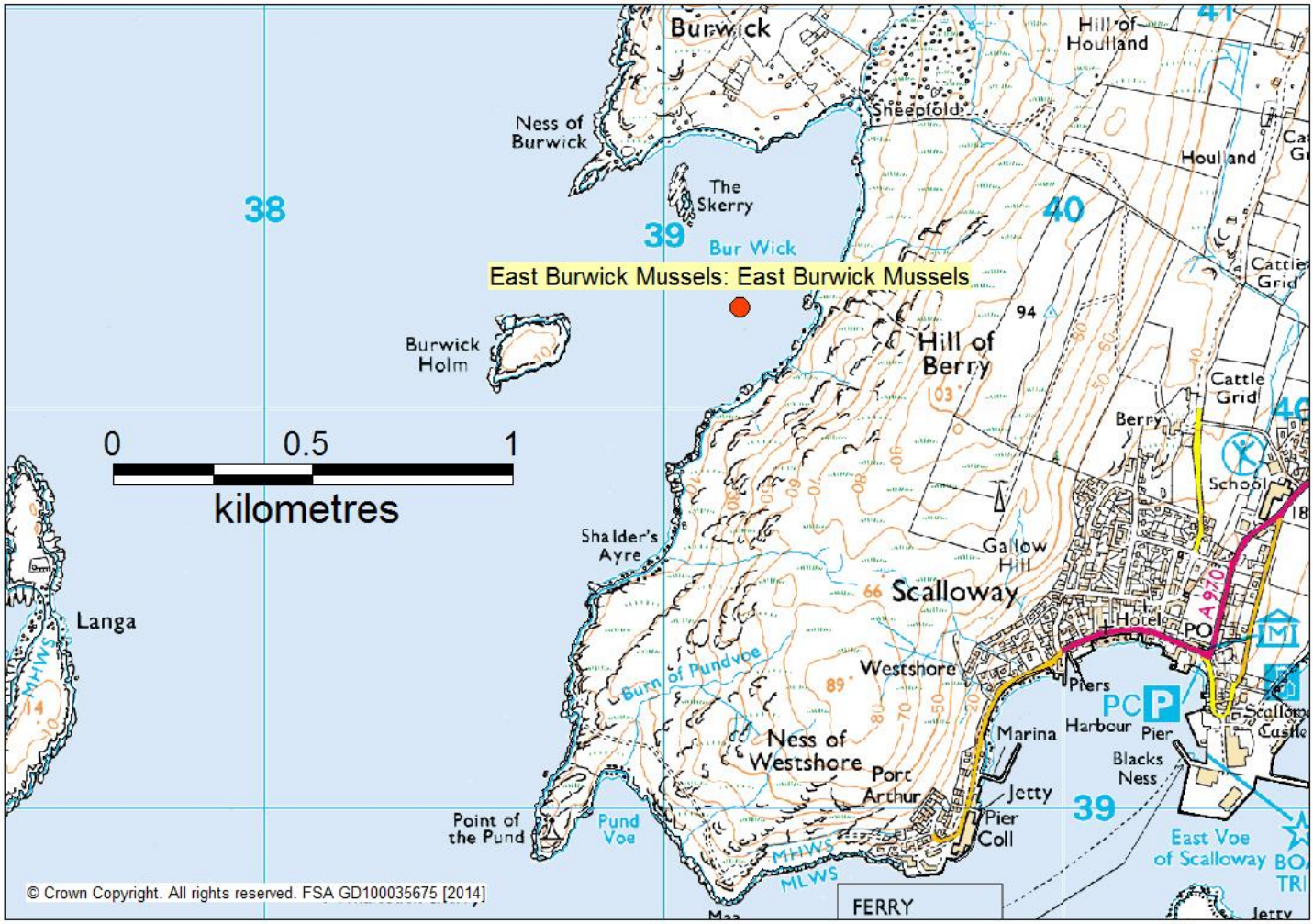
Biotoxin results from Hamnavoe: Copister



Phytoplankton results from Hamnavoe: Copister



Pod 132



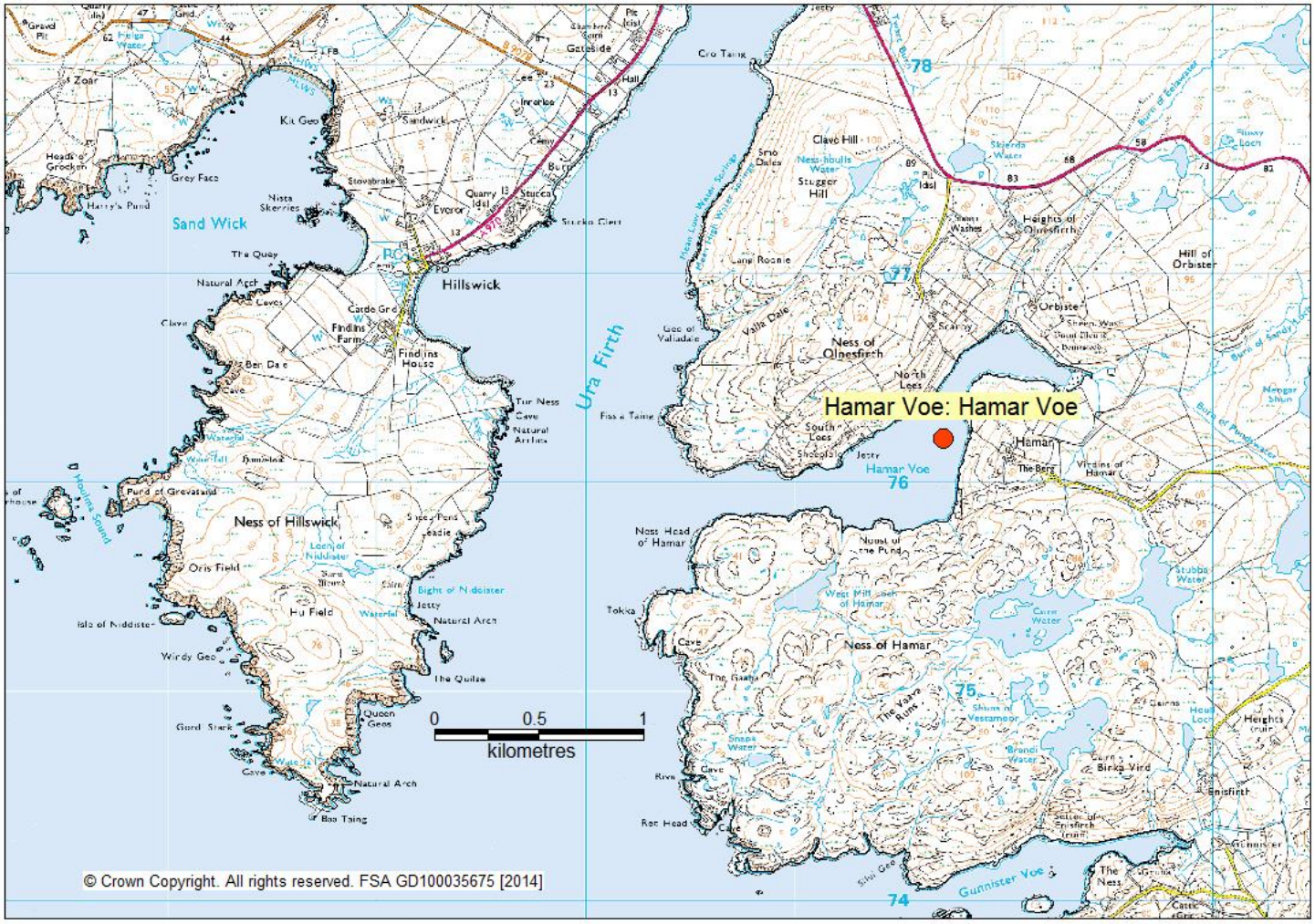
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
132	Shetland Islands Council	East Burwick Mussels	East Burwick Mussels	SI 583 1060 08	Common mussels	Yes	HU39194027

Biotoxin results from East Burwick Mussels: East Burwick Mussels

	Jan					Feb				Mar				Apr				May					Jun				Jul					Aug					Sep				Oct					Nov				Dec		
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																											▲	▼	▲	▼			▲	▼	▲	▼																	
LT - OA/DTX/PTXs																											▲	▼	▲	▲	▲	▼	▲	▼	▼																	
LT - AZAs																																																				
LT - YTXs																																																				
PSP																											▲	▲	▲	▲	▲	▲	▼	▼	▼																	

Pod 146



RMP position: AHA position:

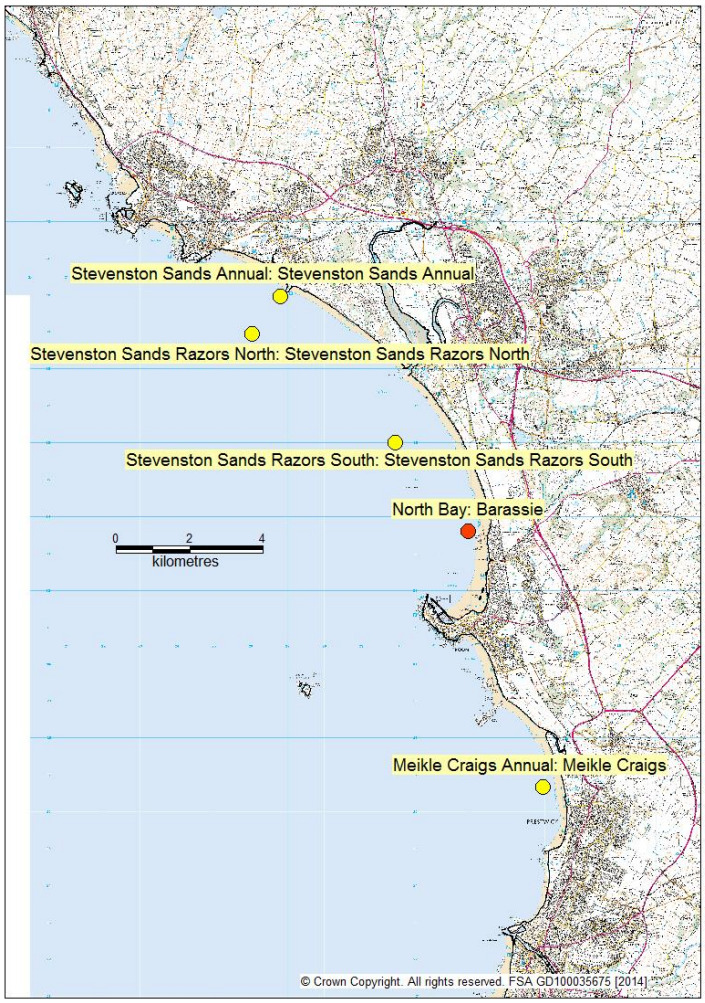
Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
146	Shetland Islands Council	Hamar Voe	Hamar Voe	SI 655 1404 08	Common mussels	Yes	HU30717621

Biotoxin results from Hamar Voe: Hamar Voe

	Jan					Feb				Mar				Apr				May					Jun				Jul				Aug					Sep				Oct					Nov				Dec			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
ASP																														▲	▼																							
LT - OA/DTX/PTXs																														▲	▲	▲	▼	▲	▲	▼	▲	▼	▼		▼	▼	▼	▼	▼								
LT - AZAs																																																					
LT - YTXs																																																				
PSP																														▲	▲	▼	▼	▼				▲		▼													

6.14. SOUTH AYRSHIRE COUNCIL

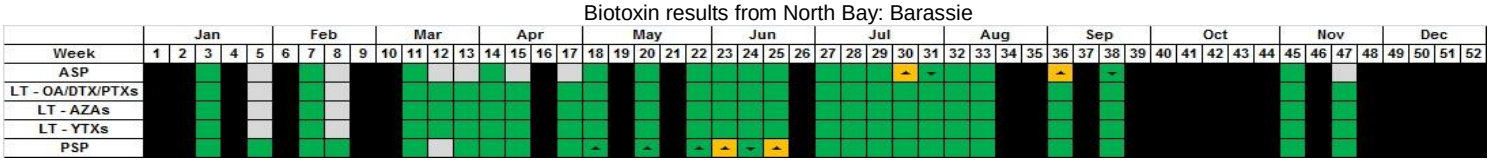
Pod 74



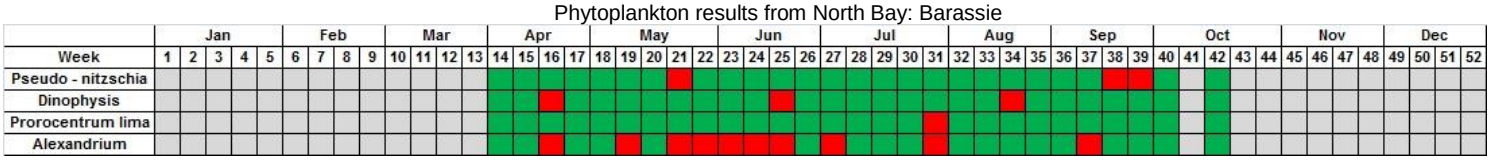
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
74	South Ayrshire Council	North Bay	Barassie	SA 337 719 16	Razors	Yes	NS319334
74	North Ayrshire Council	Stevenston Sands Annual	Stevenston Sands Annual	NA 207 1238 23	Wedge clams		Not given
74	South Ayrshire Council	Meikle Craigs Annual	Meikle Craigs	SA 643 1316 16	Razors		NS33892672
74	North Ayrshire Council	Stevenston Sands Razors North	Stevenston Sands Razors North	NA 647 1355 16	Razors		Not given
74	North Ayrshire Council	Stevenston Sands Razors South	Stevenston Sands Razors South	NA 694 1503 16	Razors		Not given

Biotoxin results from North Bay: Barassie



Phytoplankton results from North Bay: Barassie

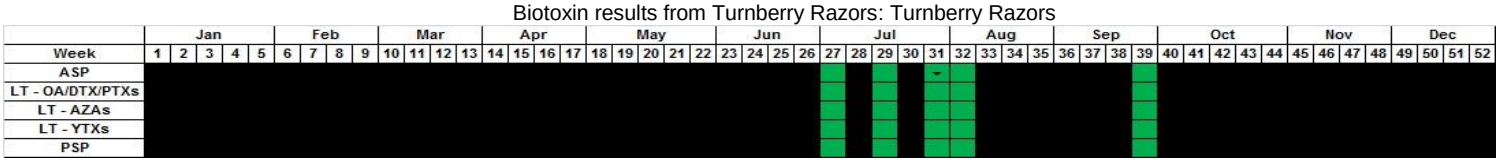


Pod 140

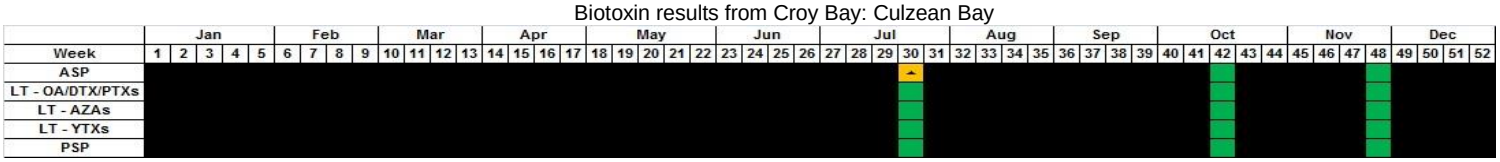
RMP position: AHA position:

Pod Number	Local Authority	Production Area	Site Name	Site SIN Number	Species	Biotoxin RMP	Grid Reference for Sample
140	South Ayrshire Council	Turnberry Razors	Turnberry Razors	SA 688 1489 16	Razors	Yes	NS19720269
140	South Ayrshire Council	Croy Bay	Culzean Bay	SA 681 1482 16	Razors		NS24161088

Biotoxin results from Turnberry Razors: Turnberry Razors



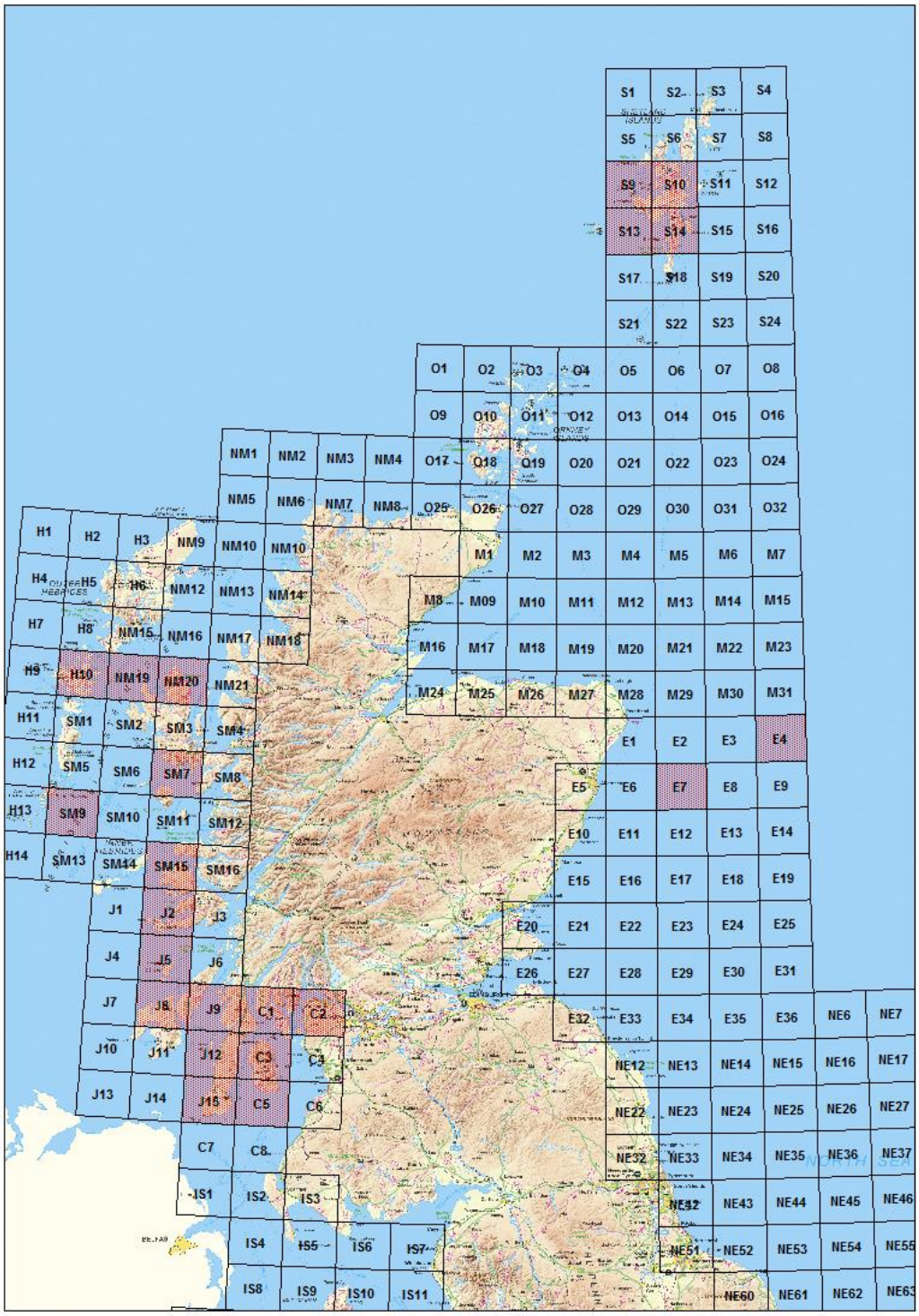
Biotoxin results from Croy Bay: Culzean Bay



7. Results of the wild pectinidae onshore verification programme

ASP, PSP and LTs analyses were performed on 43 samples from 14 separate establishments received via the wild pectinidae onshore verification programme. The origin of harvest for the scallop samples received during the reporting period (when specified by the sampling officer) is indicated by the shaded cells in Figure 24.

Figure 24: Origins of the wild pectinidae samples received via the FSAS onshore official control verification programme in 2014



ASP was detected in 23 king scallop verification samples from 11 establishments. Toxin levels ranged between 1.1 and 60mg/kg DA/shellfish flesh. These shellfish samples were originally harvested in the following offshore scallop grounds; Jura (12 samples), Clyde (5 samples), East Coast (2 samples), North Minch (2 samples), South Minch (1 sample) and Shetlands (1 sample) between January and December 2014. Eight of these samples comprised of whole king scallop material, the remaining fifteen of shucked product. The two samples which exceeded the MPL comprised of whole scallop samples originating from the Clyde 02 and Jura 09 offshore scallop grounds collected by Argyll & Bute Council in February and June respectively.

OA/DTX/PTX group toxins below the MPL were detected in two whole king scallop verification samples from the Clyde 05 scallop ground received in March and April 2014 (38µg/kg and 29µg/kg respectively).

No AZA and YTX group toxins were detected in the 43 samples analysed via the onshore verification programme.

PSP toxins above reporting levels were detected in two shucked king scallop verification samples received in June 2014. One sample originating from the Jura 15 scallop ground exceeded the MPL, recording a result of 1,222µg/kg. This was the first instance in which PSP toxins above the MPL have been recorded in shucked product since Cefas began monitoring in Scotland in 2005. The remaining sample originating from the East 07 scallop ground recorded a result below the MPL at 296µg/kg.
In addition, trace levels of PSP toxins were detected in three whole king scallop and fifteen shucked product samples originating from Clyde, East Coast, Jura, North Minch, Shetland and South Minch scallop grounds between January and October 2014.

8. References:

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