

Email 1

Hi section 38(1)(b),

Please see attached correspondence from SAMS regarding move of Phyto RMP to Pod 84 from w/c 29/07/2019.

This was confirmed in RMP list.

Kind Regards,

Section 38(1)(b)

‘Dear Shellfish Team

The July RMP list was rather confusing, in that none of the changes to the Phytoplankton RMPs were actually highlighted - it took me a while to find them.

Can you confirm that these are now implemented?

Also, the changes proposed by ourselves and the biotoxin lab were as follows:

Current	Proposed	Comments
Pod 9 Loch Creran: Rubha Mor	Pod 84 Kerrera West: Oitir Mhor	OK on RMP list
Pod 80 Largo Bay	Pod 87 Anstruther	OK on RMP list
Pod 126 Loch Ailort: Eilean Dubh	Pod 28 Loch Beag: Ardnambuth	OK on RMP list
Pod 74 Barassie	Pod 53 Fairlie: Southannan Sands	Both these sites are still Phytoplankton RMPs on the list
Pod 1 Loch na Keal West	Pod 123 Gallochoille Pier	Pod 1 has been dropped, but not replaced by anything - will this be Gallochoille Pier or the biotoxin RMP at Sound of Gigha North?

Thanks

Section 38(1)(b)

Toxic Phytoplankton Monitoring Programme

SAMS Research Services Ltd.

Scottish Marine Institute

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From: section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot) <section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot)> on behalf of section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot) <section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot)>
Sent: 10 July 2019 12:43
Cc: section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot); section [38\(1\)\(b\)@fss.scot](mailto:38(1)(b)@fss.scot)
Subject: FOR INFO - July RMP List

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Good Afternoon,

Please see attached July 2019 RMP list for E. Coli/Biotoxin/Phyto for your information and attention.

Kind Regards,

Section 38(1)(b)
Food Standards Scotland
Pilgrim House, Old Ford Road, Aberdeen, AB11 5RL
foodstandards.gov.scot
[section 38\(1\)\(b\)@fss.scot](mailto:section 38(1)(b)@fss.scot)

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Email 2

Original query to section 38(1)(b) about the phyto point at Loch Creran.

Please note I am currently working from home, if you need to contact me use my mobile number listed below.

Section 38(1)(b)
Food Standards Scotland
Pilgrim House, Old Ford Road, Aberdeen, AB11 5RL
Section 38(1)(b)@fss.scot
www.foodstandards.gov.scot



From: section 38(1)(b)@cefas.co.uk
Sent: 05 November 2021 16:41
To: section 38(1)(b)@fss.scot
Subject: RE: Phyto monitoring query

Hi section 38(1)(b),

Sorry about the delay in replying. As I recall, we had monitored Creran for a number of years. The algal populations were very diverse and interesting but we never detected any toxins there so we were constantly asking for resamples with no real return.

Thanks
section 38(1)(b)

From: section 38(1)(b)@fss.scot
Sent: 26 October 2021 10:49
To: section 38(1)(b)@cefas.co.uk
Subject: Phyto monitoring query

WARNING - This email originated from outside of the organisation. Do not click links , forward or open attachments unless you recognise the sender and have established the content is safe.

Morning, section 38(1)(b).

Hope all is well with you.

Quick question – do you have any recollection as to the rational for moving the phyto monitoring away from Loch Creran in 2019?

See attached.

Cheers,

Section 38(1)(b)

Please note I am currently working from home, if you need to contact me use my mobile number listed below.

Section 38(1)(b)
Food Standards Scotland
Pilgrim House, Old Ford Road, Aberdeen, AB11 5RL

Section 38(1)(b)[@fss.scot](mailto:Section38(1)(b)@fss.scot)
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Email 3

-----Original Message-----

From: section 38(1)(b)@me.com
Sent: 28 October 2021 23:02
To: section 38(1)(b)@fss.scot
Cc: section 38(1)(b)@fss.scot
Subject: Re: Loch Creran

Thank you section 38(1)(b).

Please take this timeline into account then:

January 2019 - new salmon hatchery at Barcaldine started to discharge substantially increased quantities of dissolved nutrients into Loch Creran. This is in addition to the discharges from the existing salmon farm. Total discharges from these two sources are in excess of 80 tonnes of dissolved inorganic nitrogen pa.

July 2019 - FSS stopped monitoring phytoplankton in Loch Creran.

2020 - harmful algal bloom killed thousands of fish in the Loch Creran salmon farm.

It is unfortunate that you stopped monitoring blooms just as the nutrient discharges increased substantially, and that you missed sampling the bloom, which could be the first of many.

The hatchery is at the pre-application stages for a planned expansion of production. There is a risk of further blooms occurring, particularly as warmer late summer weather becomes more common.

Recent research by SAMS shows that the phytoplankton in Loch Creran is moving away from being dominated by diatoms, towards dinoflagellates. These can cause HABs. Would you like me to send you the reference to this research?

Please review the decision and reinstate phytoplankton monitoring in Loch Creran.

Section 38(1)(b)

On 29 Oct 2021, at 02:26, section 38(1)(b)@fss.scot wrote:

Dear section 38(1)(b),

All relevant considerations will be taken into account during our next review of monitoring points.

Regards,
Section 38(1)(b)
Food Safety and Hygiene Policy
Food Standards Scotland
Section 38(1)(b)@fss.scot

www.foodstandards.gov.scot

-----Original Message-----

From: section 38(1)(b)@me.com
Sent: 27 October 2021 00:36
To: section 38(1)(b)@fss.scot
Cc: section 38(1)(b)@fss.scot
Subject: Re: Loch Creran

Thanks section 38(1)(b)

Given the severity of the 2020 bloom, will you consider restarting monitoring in Loch Creran.

Best wishes

Section 38(1)(b)

On 27 Oct 2021, at 01:31, section 38(1)(b)@fss.scot wrote:

Hi section 38(1)(b),

Our phytoplankton monitoring points are reviewed each year to decide whether it would be more effective to relocate them. Algal bloom has been detected at Loch Creran but the monitoring point was moved to a higher risk area because only low levels of toxins were detected at the monitoring point.

Kind regards,

Section 38(1)(b)
Food Safety and Hygiene Policy
Food Standards Scotland
Section 38(1)(b)@fss.scot
www.foodstandards.gov.scot

-----Original Message-----

From: section 38(1)(b)@me.com
Sent: 25 October 2021 13:13
To: section 38(1)(b)@fss.scot
Subject: Re: Loch Creran

Thanks very much section 38(1)(b).

Why did the phytoplankton monitoring in Loch Creran stop?
There was an algal bloom there in 2020.

Best wishes

Section 38(1)(b)

On 25 Oct 2021, at 20:52, section 38(1)(b)@fss.scot wrote:

Dear section 38(1)(b),

Thank you for contacting Food Standards Scotland.

As of July 2019 we do not have a phytoplankton monitoring point in Loch Creran. However I have attached phytoplankton sampling results taken from Loch Crenan between July 2011 and July 2019.

We do take biotoxin data from the Loch Creran shellfish areas which I have also attached.

Generally speaking, our sampling results regarding phytoplankton, biotoxins and shellfish can be found here: <https://www.foodstandards.gov.scot/business-and-industry/industry-specific-advice/shellfish/shellfish-results>.

Feel free to respond to this email if you have more questions.

Regards,

Section 38(1)(b)
Food Safety and Hygiene Policy
Food Standards Scotland
Section 38(1)(b)@fss.scot
www.foodstandards.gov.scot

-----Original Message-----

From: section 38(1)(b)@me.com
Sent: 22 October 2021 09:13
To: section 38(1)(b)@fss.scot
Subject: Loch Creran

Hello

Do you sample the water in Loch Creran for phytoplankton and sample shellfish biotoxins? If so where can I find the results?

Many thanks.

Section 38(1)(b)
Loch Creran - Phyto Results (1).xlsx <Pod 9 - Loch Creran sites -
Biotoxin Results (1).xlsx>

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Email 4

Kind Regards,

Section 38(1)(b)

Please note I am currently working from home, if you need to contact me use my mobile number listed below.

Food Standards Scotland
Pilgrim House, Old Ford Road, Aberdeen, AB11 5RL
Section 38(1)(b)@fss.scot
www.foodstandards.gov.scot

From: section 38(1)(b)@sams.ac.uk>
Sent: 26 October 2021 14:22
To: section 38(1)(b)@fss.scot>
Subject: Fw: Potential changes to phytoplankton monitoring

Hi section 38(1)(b)

Attached is the review carried out by section 38(1)(b) at Cefas, which is usually done at the end of the calendar year to see whether the phytoplankton RMPs might be more effective if relocated elsewhere. Loch Creran used to get dense Alexandrium blooms, but there never seemed to be an issue with PSP toxicity.

Best wishes

Section 38(1)(b)

Toxic Phytoplankton Monitoring Programme
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web: www.uhi.ac.uk

Attachment

1. Phytoplankton update 2019

As part of the ongoing analysis of data, toxin monitoring results and phytoplankton monitoring results have been compared and discussed between Cefas and SAMS with a view to recommending changes to phytoplankton monitoring points which may increase the value of the phytoplankton programme, which monitors a reduced number of RMPs compared to the flesh monitoring programme.

For the purposes of this report, the term “bloom” refers to algal levels which exceed the agreed trigger level for a given species. All toxin levels referred to at the high level calculated from method uncertainty.

1.1 Pod 74 - North Bay: Barassie to Pod 53 - Fairlie: Southannan Sands

The current phytoplankton monitoring point at Pod 74 North Bay, Barassie has been in place from 2014. No monitoring has been undertaken at Pod 53 Fairlie since 2008 at least. Both representative monitoring points (RMPs) are situated within the Firth of Clyde but straddling the North Ayrshire (Pod 53) and South Ayrshire (Pod 74) boundary (Figure 1).

Comment from Section 38 (1) (b)

We have never monitored phytoplankton at this site (we started Sept 2005) - the only North Ayrshire location we have done is Arran: Lamlash Bay. They were often really busy samples, rich in dinoflagelles. I recall Lamlash Bay was frequently shut for toxins.

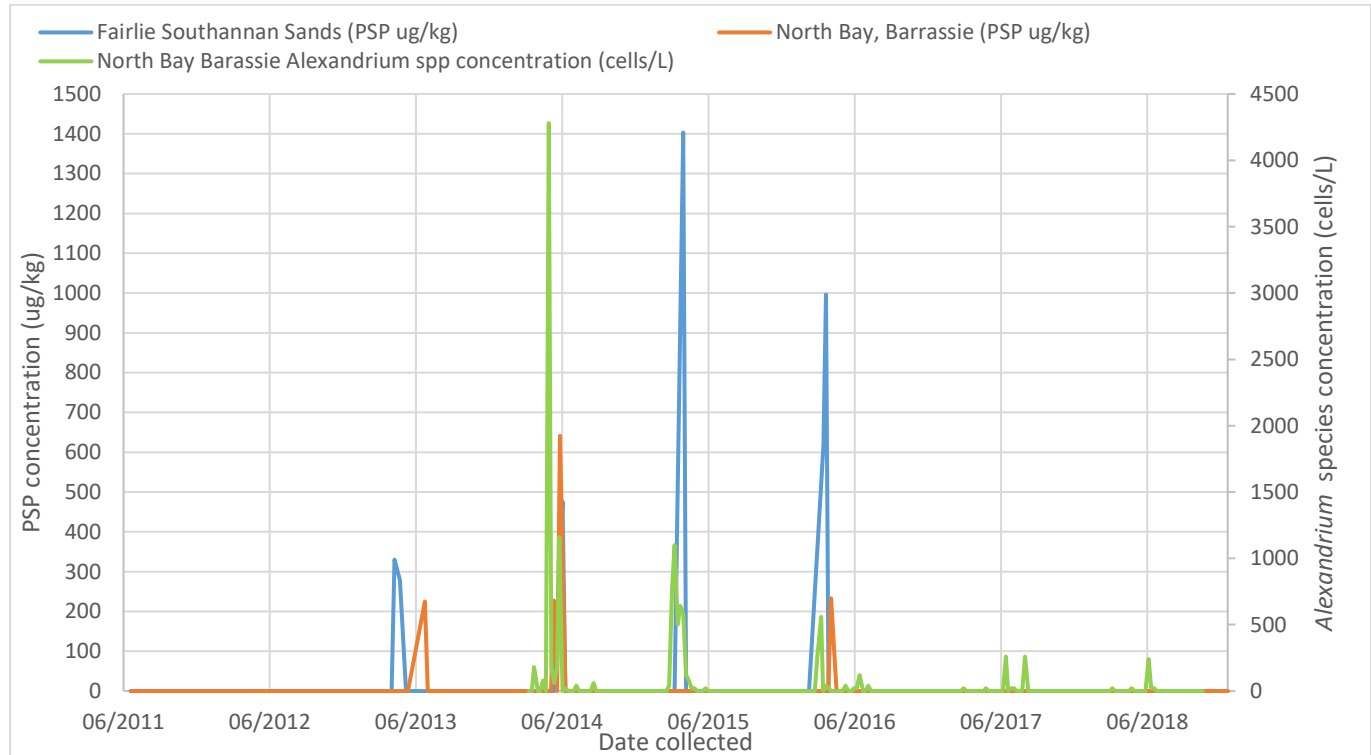
Figure 1. Map showing the location of the Fairlie: Southannan Sands and North Bay: Barassie RMPs



1.1.1 PSP and *Alexandrium* species analysis

Higher concentrations and more regular occurrences of PSP have been recorded at Fairlie over the past seven years (Figure 2). In 3 out of 4 cases, higher concentrations were recorded at Fairlie, with 2 of these events exceeding the maximum permitted level (MPL). Detection of *Alexandrium* species prior to toxin detection at North Bay occurred in every instance, (data since 2014 only), however it does not provide a similar level of warning for Fairlie which would appear to be a higher risk site for PSP toxins.

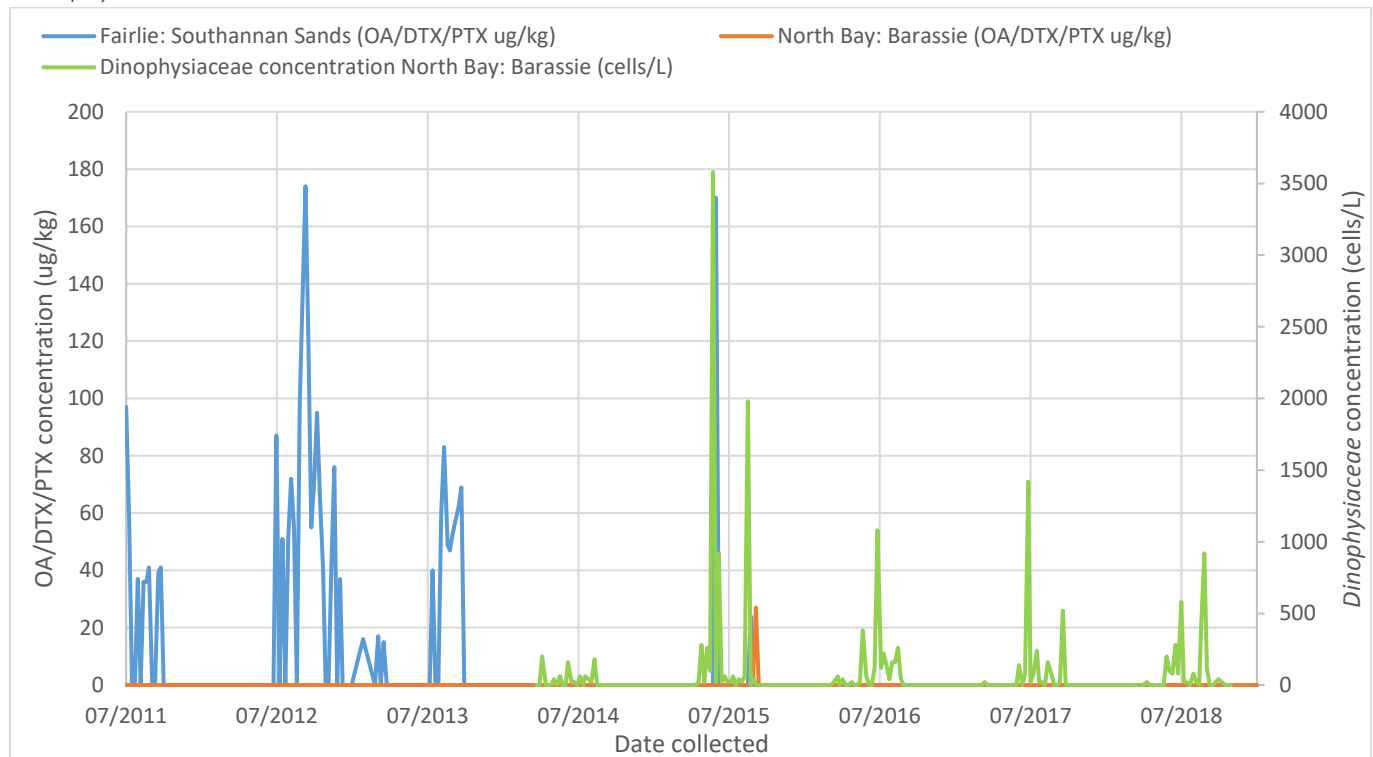
Figure 2. Comparison of PSP toxin and *Alexandrium* species concentrations



1.1.2 Lipophilic toxin and *Dinophysiaceae* analysis

Analysis of the data indicates the occurrence of repeated occurrence of Okadaic Acid/Dinophysis toxins/Pectenotoxins (OA/DTX/PTX) group at Fairlie: Southannan Sands between 2011 and 2015 (Figure 3). Unfortunately, the majority of the events occurred prior to phytoplankton monitoring at North Bay which commenced in 2014. Only one lipophilic toxin event was recorded at North Bay in 2015 and *Dinophysiaceae* was recorded prior to toxins. Since 2015, few lipophilic toxin events have been recorded between either monitoring point. However, again by comparison of the toxin results it would appear that Fairlie is the higher risk site.

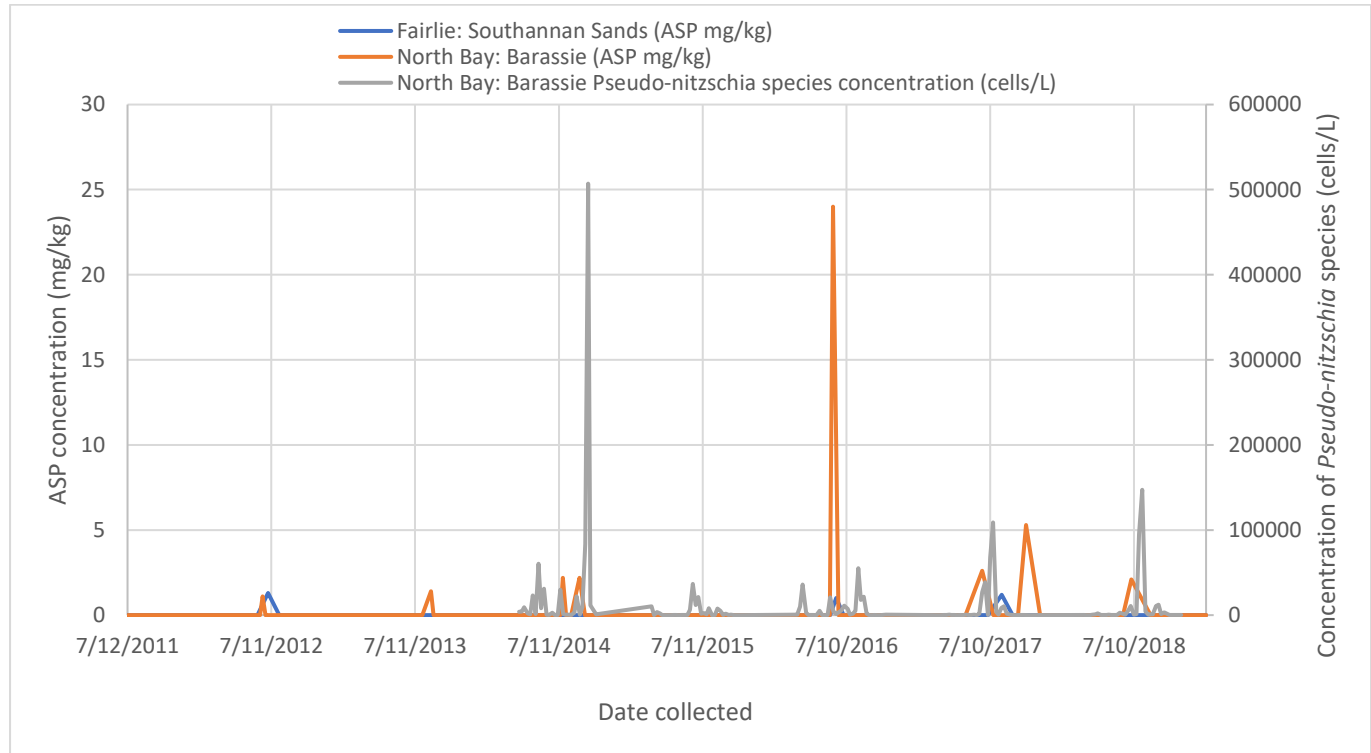
Figure 3. Comparison of Okadaic Acid/Dinophysis toxins/Pectenotoxin (OA/DTX/PTX) and *Dinophysiaceae*



1.1.3 ASP and *Pseudo-nitzschia* species comparison

Figure 4 shows the comparative data for ASP and *Pseudo-nitzschia* species. In the case of ASP, North Bay is the site which has recorded toxins above the regulatory limit and records toxins more frequently the Fairlie. It should be noted however, that also in this case the detection of *Pseudo-nitzschia* species, using the current trigger levels and analysis is less reliable for predicting the larger toxin event seen in 2016. Algal levels around the time of the event in June 2016 did not exceed 6,000 cells/L.

Figure 4. Comparison of ASP toxins and *Pseudo-nitzschia* species



The phytoplankton and toxin data from North Bay: Barassie indicate that the phytoplankton sampling adequately provides an early warning at this site, however a site in relatively close proximity has a higher occurrence of toxins, which may benefit more from the added safety of phytoplankton monitoring.

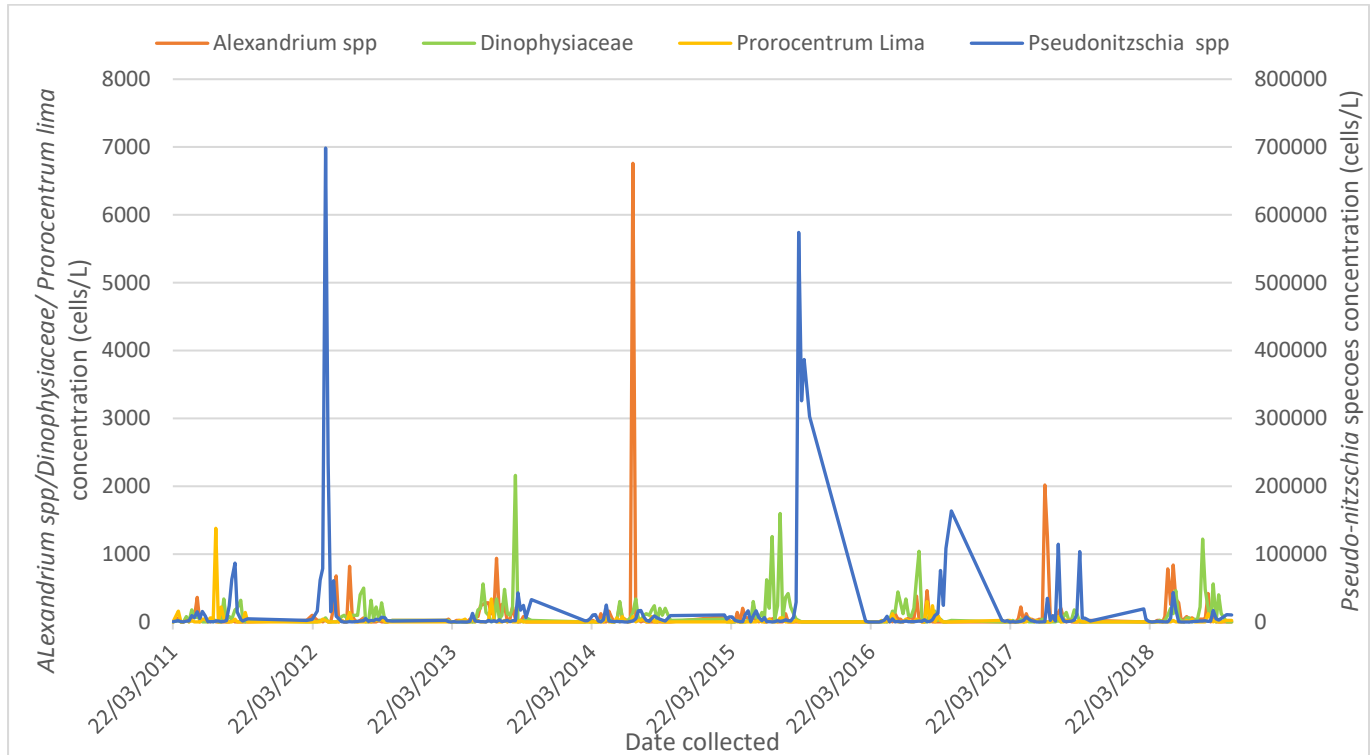
1.2 Pod 1 Loch na Keal West

This pod, which is situated on the western side of the Isle of Mull (Figure 5) has been monitored routinely for phytoplankton since 2011, during this time it has recorded a number of different bloom events (Figure 6).

Figure 5. Location of Pod 1 Loch na Keal West

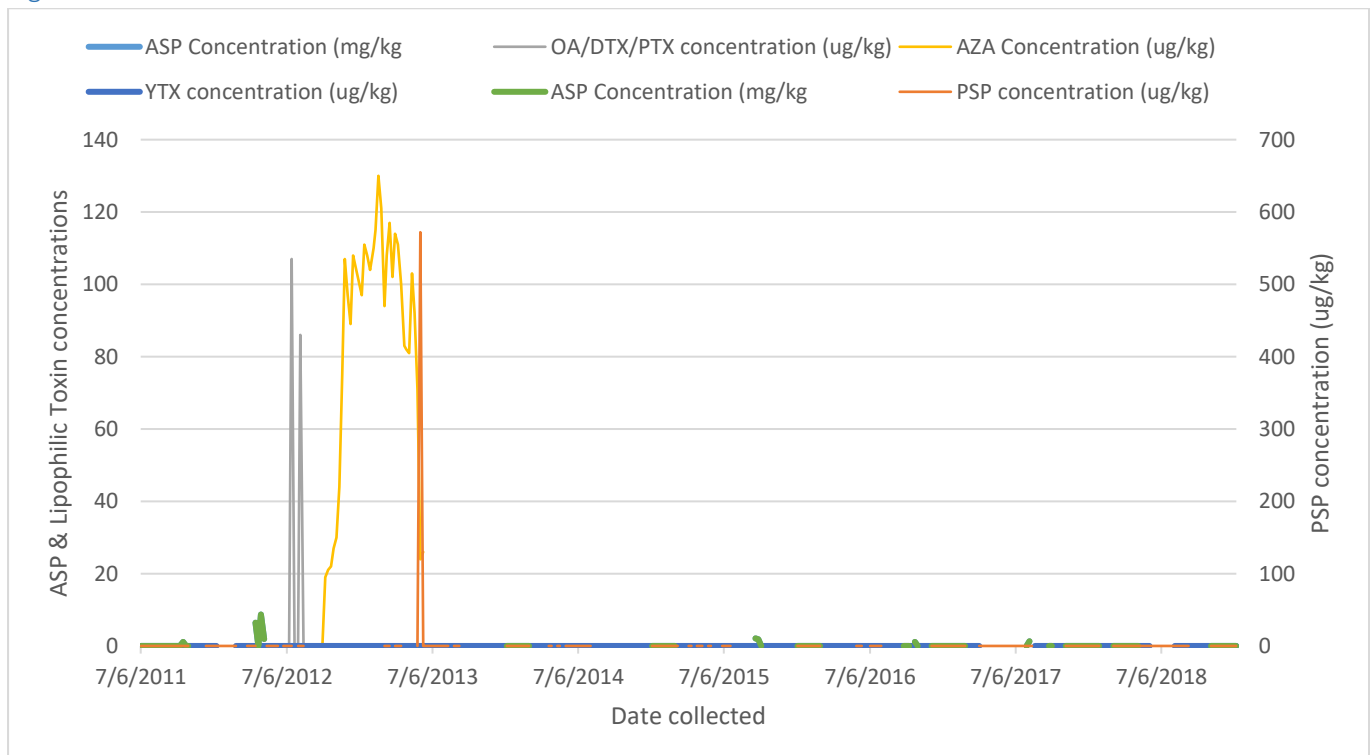


Figure 6. Algal bloom events recorded at Pod 1 Loch na Keal



The variety and regular occurrence of the blooms at this RMP are not regularly reflective of toxins in flesh samples. Since 2011, no toxins have been recorded above the regulatory limit (Figure 7).

Figure 7. Toxins occurrence and concentrations in Pod 1 Loch na Keal West



PSP toxins have been detected at quantifiable levels on one occasion (June 2013, high result of 572 ug/kg) this was in conjunction with persistent occurrence of *Alexandrium* species throughout May, June, July and August.

Lipophilic toxins from the OA/DTX/PTXs group have only been detected once in July/August 2012 (highest concentration 107 ug/kg). Like the PSP occurrence, it was in conjunction with persistent occurrence of *Dinophysiaceae* for several weeks prior to the detection of toxins.

AZAs were also recorded persistently from October 2012 to June 2016, with the highest result record of 130 ug/kg, recorded in February 2013. However, there is no current trigger level for any of the causative algal species.

Comment from Section 38 (1) (b)

The causative algal species (Azadinium spinosum, Azadinium poporum, Azadinium dexteroporum and Amphidoma languida) are not monitored as they are too difficult to identify to even genus level by light microscopy.

ASP toxins have been detected at lower levels in a number of years but not exceeding, the highest result (8.7 mg/kg) was recorded on 01/05/2012 just after a result of 698,505 cells/L was recorded for *Pseudo-nitzschia* species.

In summary, whilst the site records a number of phytoplankton bloom events, the presence of toxins is not evident from analysis of flesh samples. This may indicate that predominantly the algal species are either not toxic strains or strains producing a much lower toxin content, as evidenced by the scale of blooms required to elevate the toxin levels in flesh.

Comment from Section 38 (1) (b)

Could it also be that Pacific oysters are tested at this site – you might get a different toxin response if it was mussels.

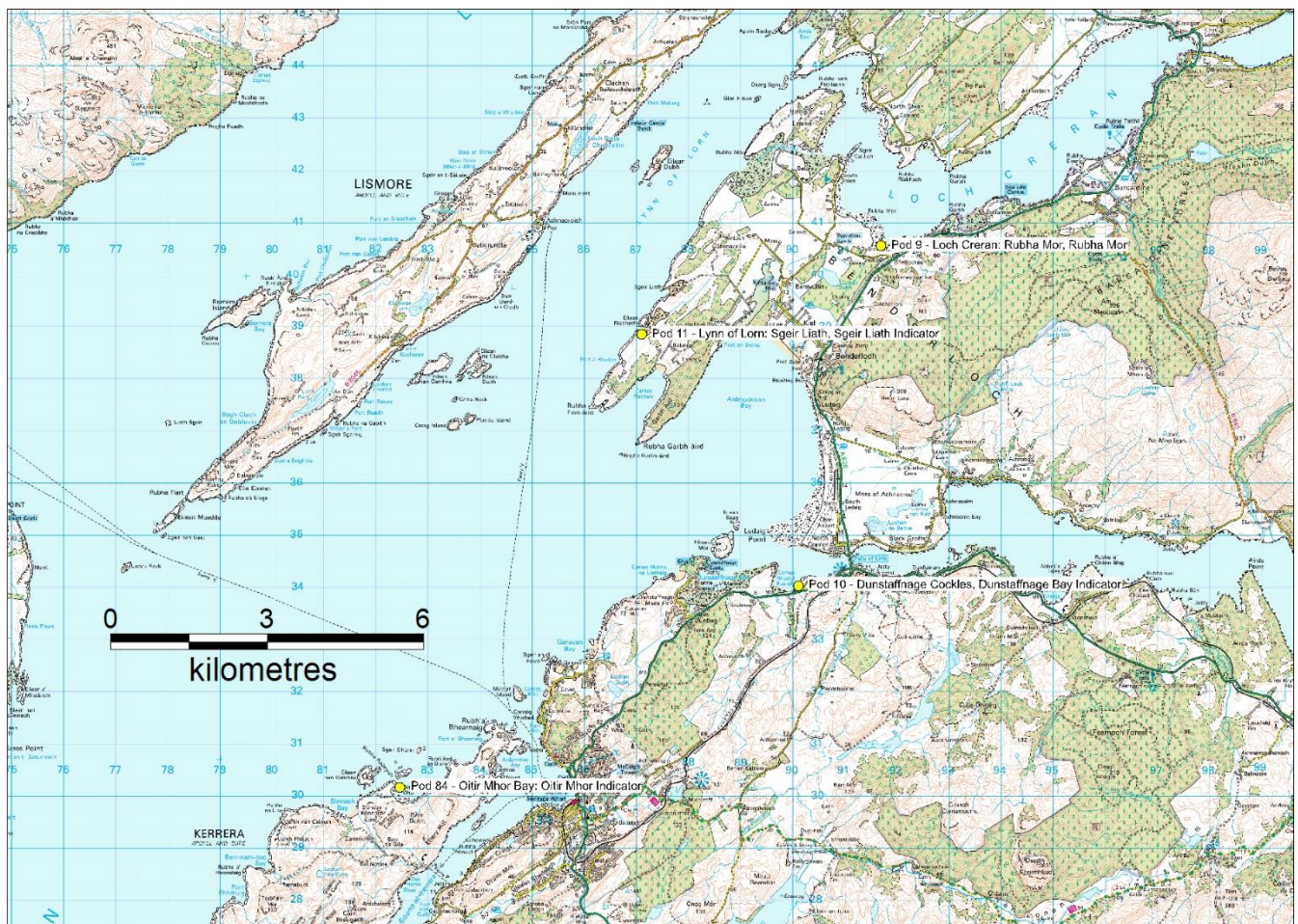
Therefore, the phytoplankton monitoring may be moved to an area which has a higher toxin occurrence. The only other site on Mull which is not monitored for phytoplankton is Loch a Chumhainn (Pod 12) which, as with Pod 1, does not record many toxic events. Pod 123, currently monitored from Gallochoille Pier, on the west coast of the Mull of Kintyre maybe a suitable replacement, having recorded a number of toxic events recently.

1.3 Pod 9 Loch Creran: Rubha Mor to Pod 84 Oitir Mhor Bay: Oitir Mhor Indicator

Spatially the sites are along the Firth of Lorn (Figure 8), with the Loch Creran RMP located in a tributary Loch. The two other toxin RMPs located in between (Pod 10 Dunstaffnage Bay Indicator & Pod 11 Lynn of Lorn: Sgeir Liath Indicator) have similar levels of toxins occurrence to Pod 84 however neither have exceeded the regulatory limit as yet.

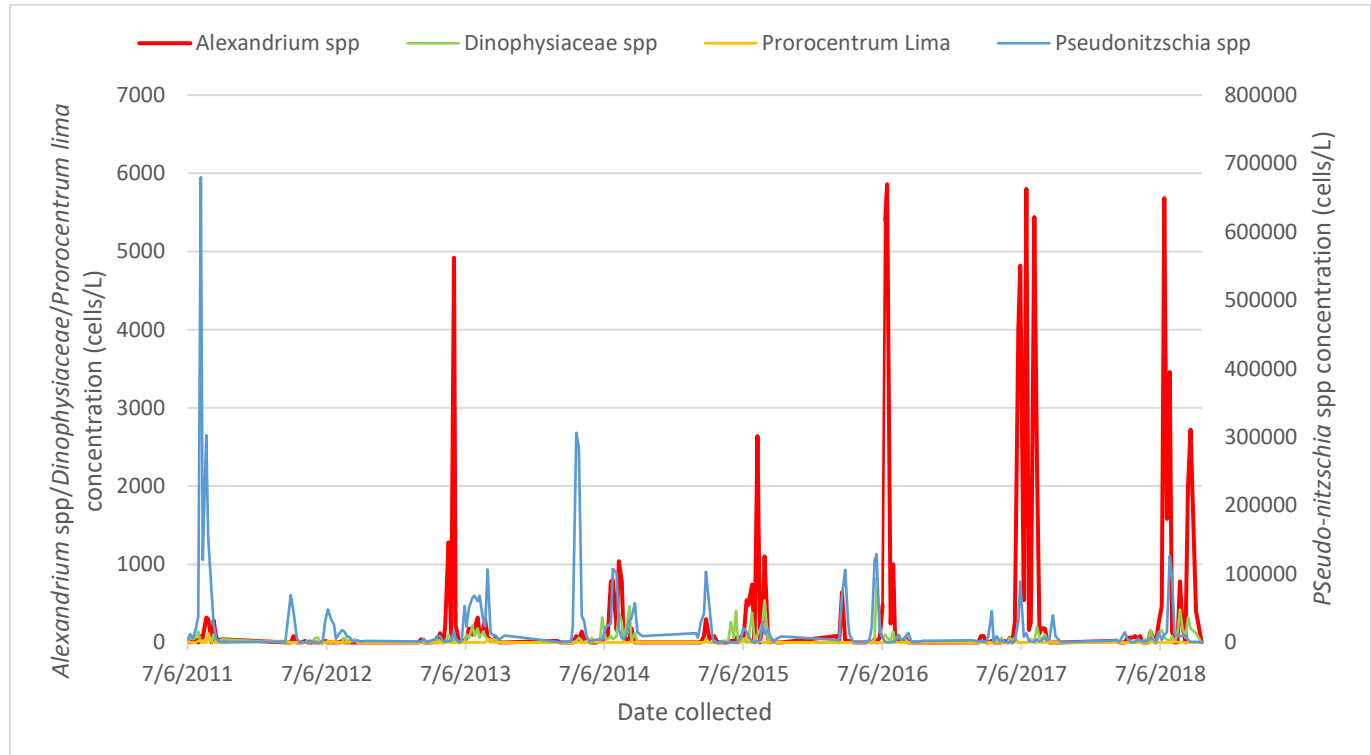
Comment from Section 38 (1) (b)
Again, is it Pacific oysters being tested?

Figure 8. Location of Pod 9 Loch Creran: Rubha Mor and Pod 84 Oitir Mhor Bay Indicator



Similar to Pod 1 Loch na Keal, the current monitoring point in Pod 9 Loch Creran, records a wide variety of bloom events for all the groups of algae which currently have trigger levels (Figure 9). In particular, *Alexandrium* species are recorded with annual regularity and to levels which exceed the trigger value.

Figure 9. Phytoplankton occurrence at Pod 9 Loch Creran



PSP toxins have not been recorded at quantifiable levels at either RMP (Figure 10 & 11) and at Loch Creran only relatively low levels of ASP have been detected but not at the frequency of larger *Pseudo-nitzschia* species blooms. The only other notable toxin occurrence at Loch Creran was the detection of AZAs in the winter of 2012/2013.

Figure 10. Toxin occurrence at Pod 9 Loch Creran: Rubha Mor

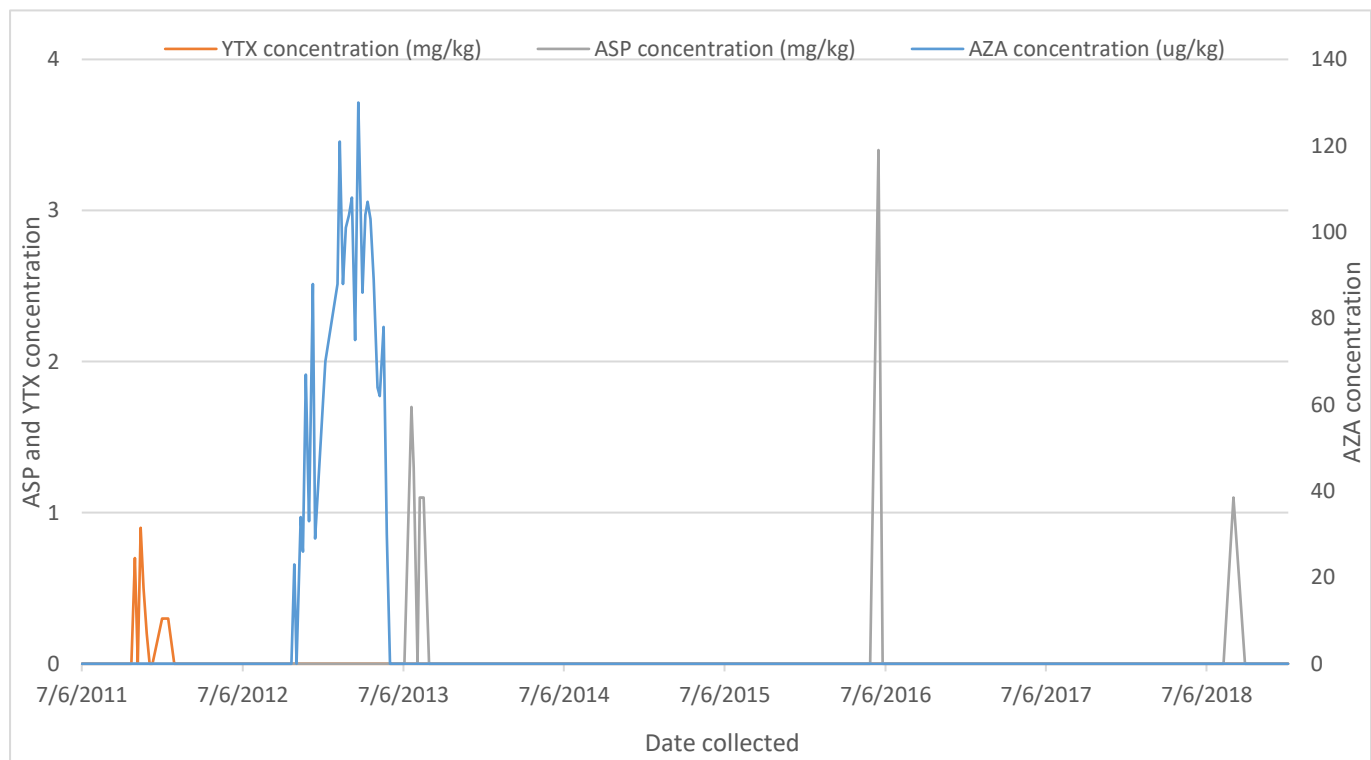
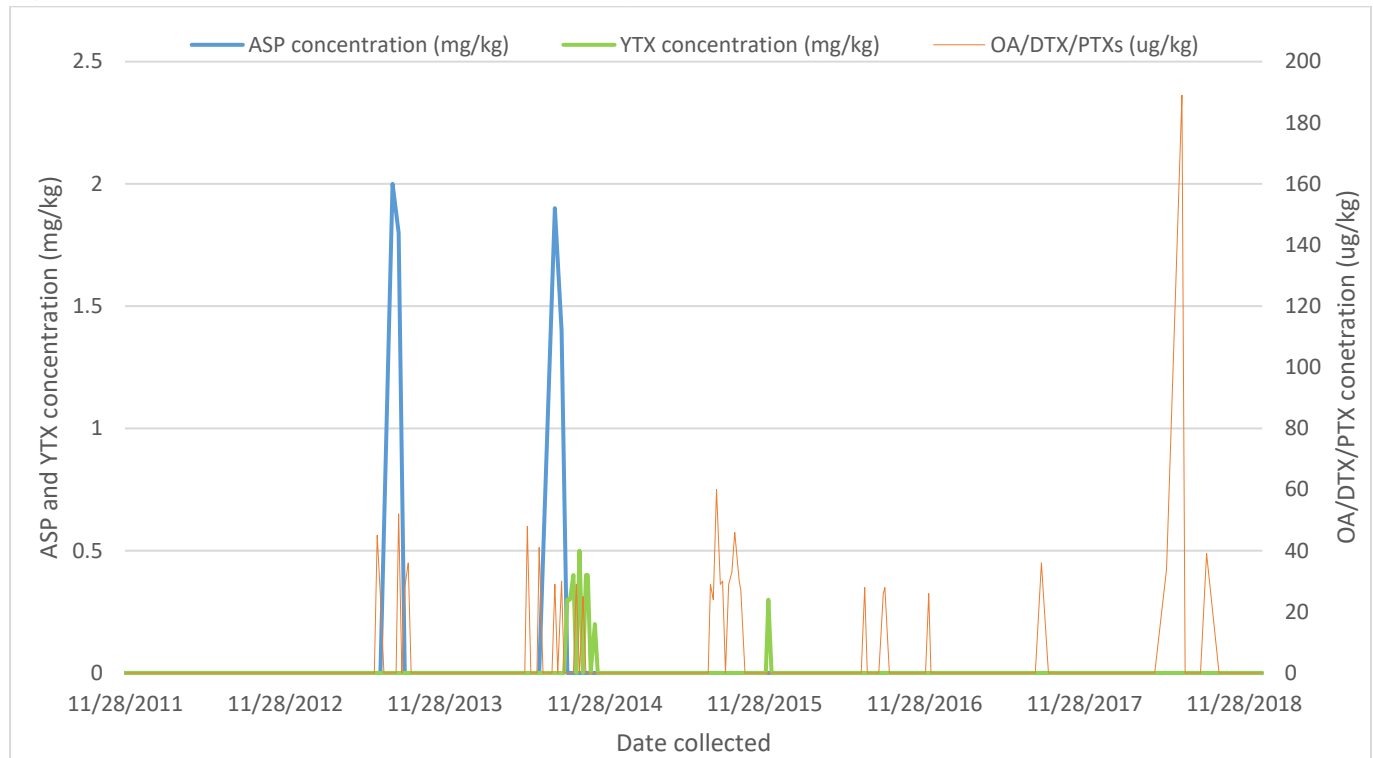


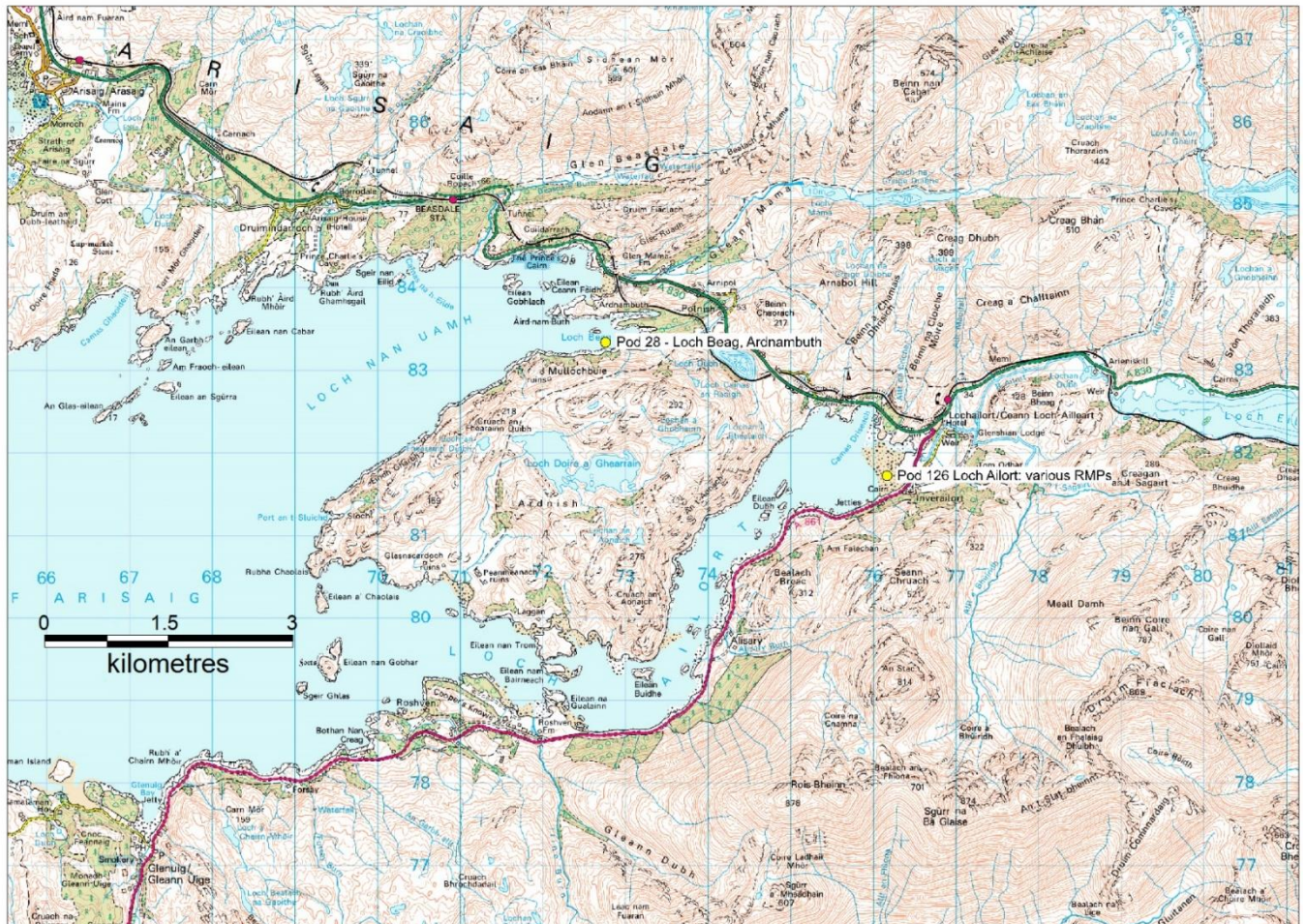
Figure 11 below shows the toxin occurrence at Pod 84 Oitir Mhor Bay, which has recently recorded its first closure result for OA/DTX/PTX group toxins, this toxin group was previously recorded at low levels at this RMP. Low levels of ASPs toxins and YTX have also been detected.

Figure 11. Toxin occurrence at Pod 84 Oitir Mhor Bay



1.4 Pod 126 Loch Ailort: Eilean Dubh to Pod 28 Loch Beag Ardnambuth
Both Loch Beag and Loch Ailort are located in tributaries to the Sound of Arisaig on the West coast (Figure 12). Since 2009 both RMPs have been monitored for phytoplankton (Loch Beag from 2009 to 2011 & Loch Ailort from 2014 to the present).

Figure 12. Location of Pod 28 Loch Beag and Pod 126 Loch Ailort



The phytoplankton monitoring and toxin monitoring aspects of both these sites are broadly similar in that both record blooms of all the relevant algal species and have recorded PSP, OA/DTX/PTX group toxins along with lower levels of ASP and AZAs at similar times. The only difference between the two sites is that Loch Beag tends to record OA/DTX/PTX events with more regularity (Figure 13) and PSP toxins more frequently and to a relatively higher concentration (Figure 14). Therefore, it may be prudent to return phytoplankton monitoring from Loch Ailort to Loch Beag as this appears to be the higher risk site in the area.

Figure 13 Comparison of OA/DTX/PTX results from Pod 28 Loch Beag and Pod 126 Loch Ailort

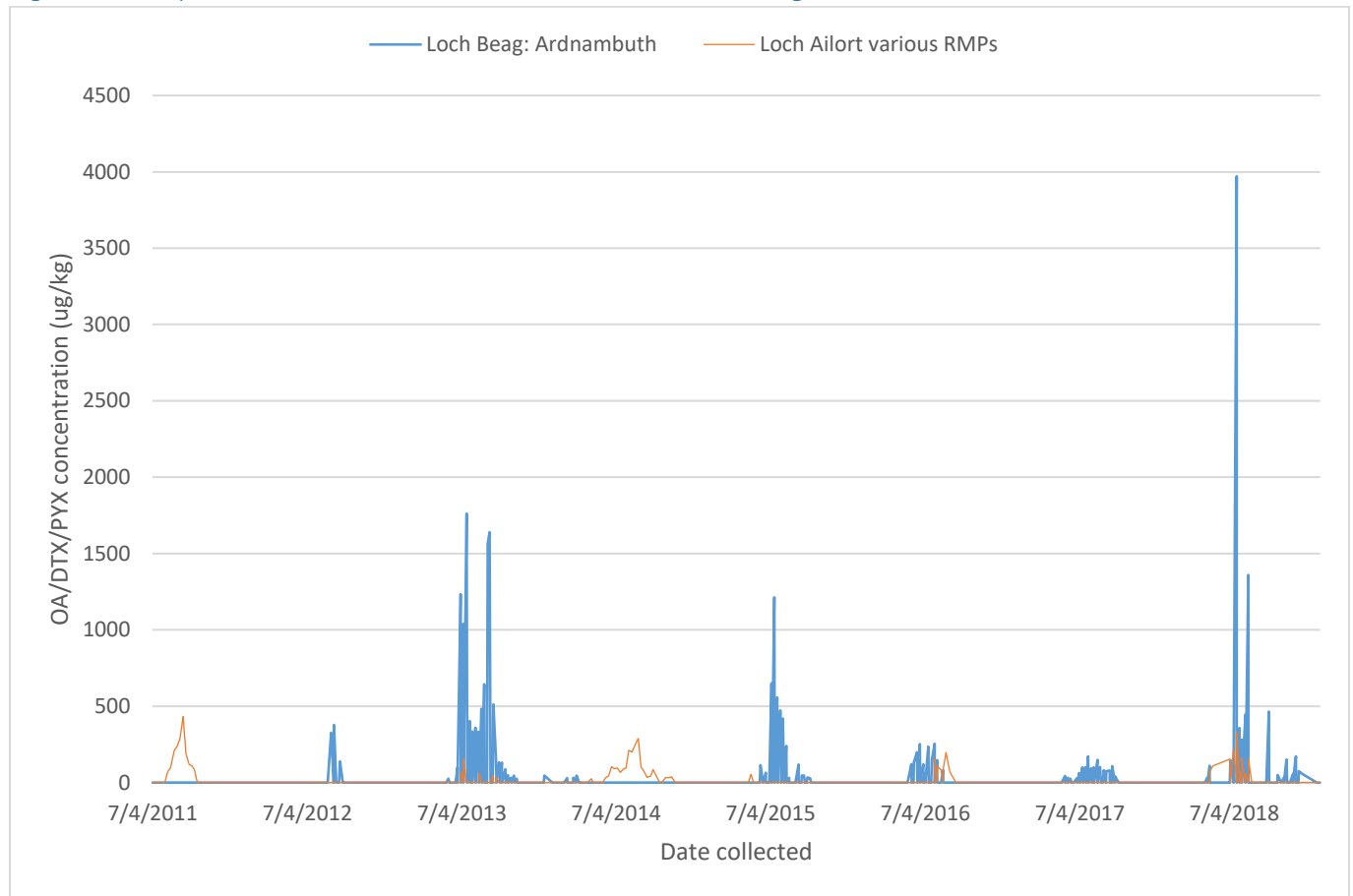
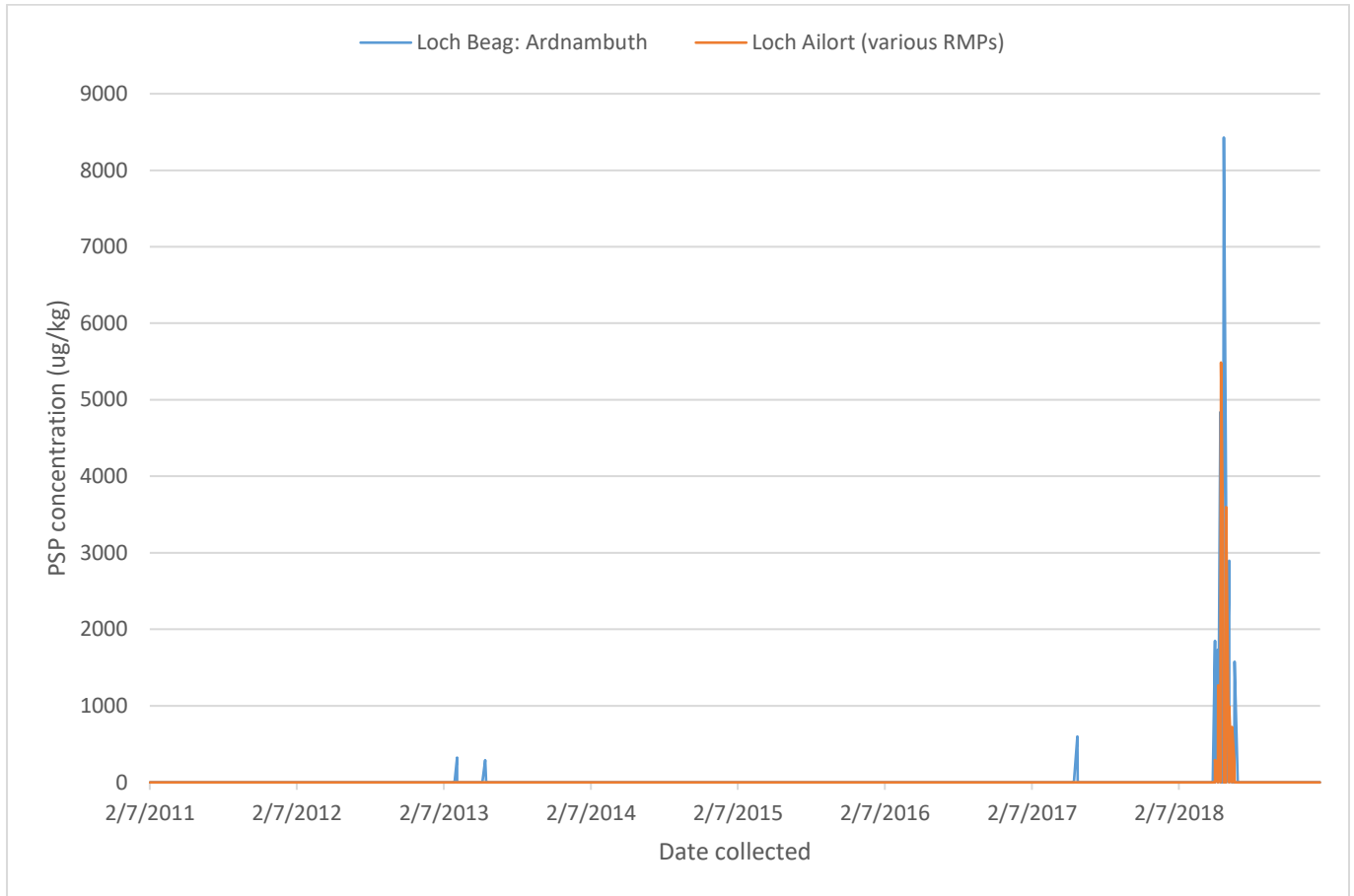


Figure 14. Comparison of PSP results from Loch Beag and Loch Ailort



1.5 Pod 80 Forth Estuary: Largo Bay to Pod 87 Forth Estuary: Anstruther
Both the Pod 80 Largo Bay and Pod 87 Anstruther are situated on the north coast of the Firth of Forth on the east coast (Figure 15). The phytoplankton monitoring point is located at a shore site in Largo Bay as access to the shellfish beds is restricted due to the requirement for very long trips of dredging/electrofishing boats.

Comment from Section 38 (1) (b)
The phyto sample used to be collected from Elie

Figure 15. Location of Pod 80 Largo Bay and Pod 87 Anstruther in the Forth Estuary



Phytoplankton monitoring in the Firth of Forth has been undertaken at Pod 80 Largo Bay since 2012 and regularly detected blooms of *Pseudo-nitzschia* species (Figure 16). A large bloom of *Alexandrium* species was detected in 2018 reaching 7,200 cells/L on 29/05/2018, subsequently PSP levels in the flesh did not follow suite with only moderate levels (381ug/kg at Anstruther and 216 ug/kg at Largo Bay – Figure 17), prior to the water sample being taken.

Figure 16. Phytoplankton results from Pod 80 Forth Estuary: Largo Bay

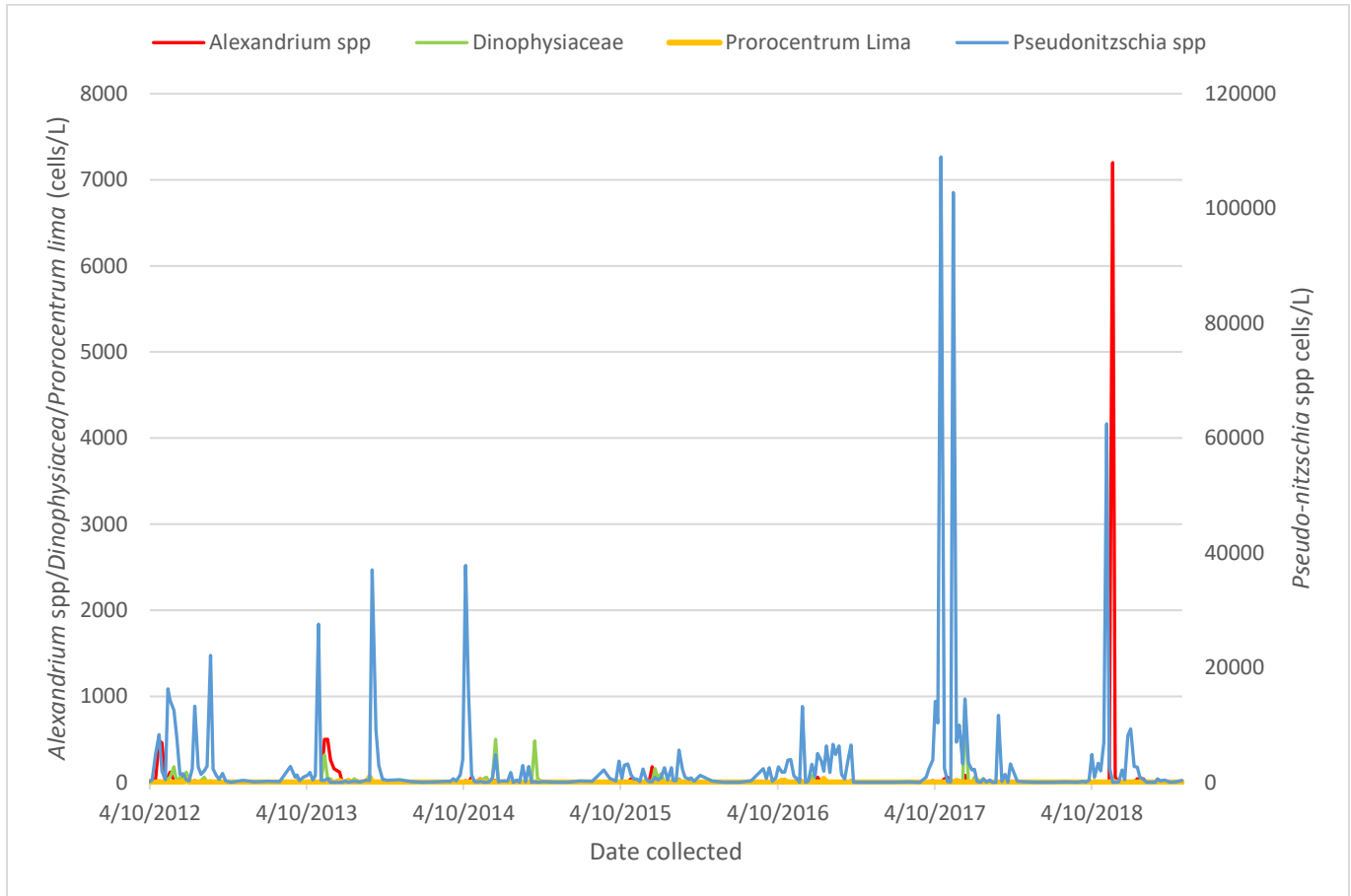
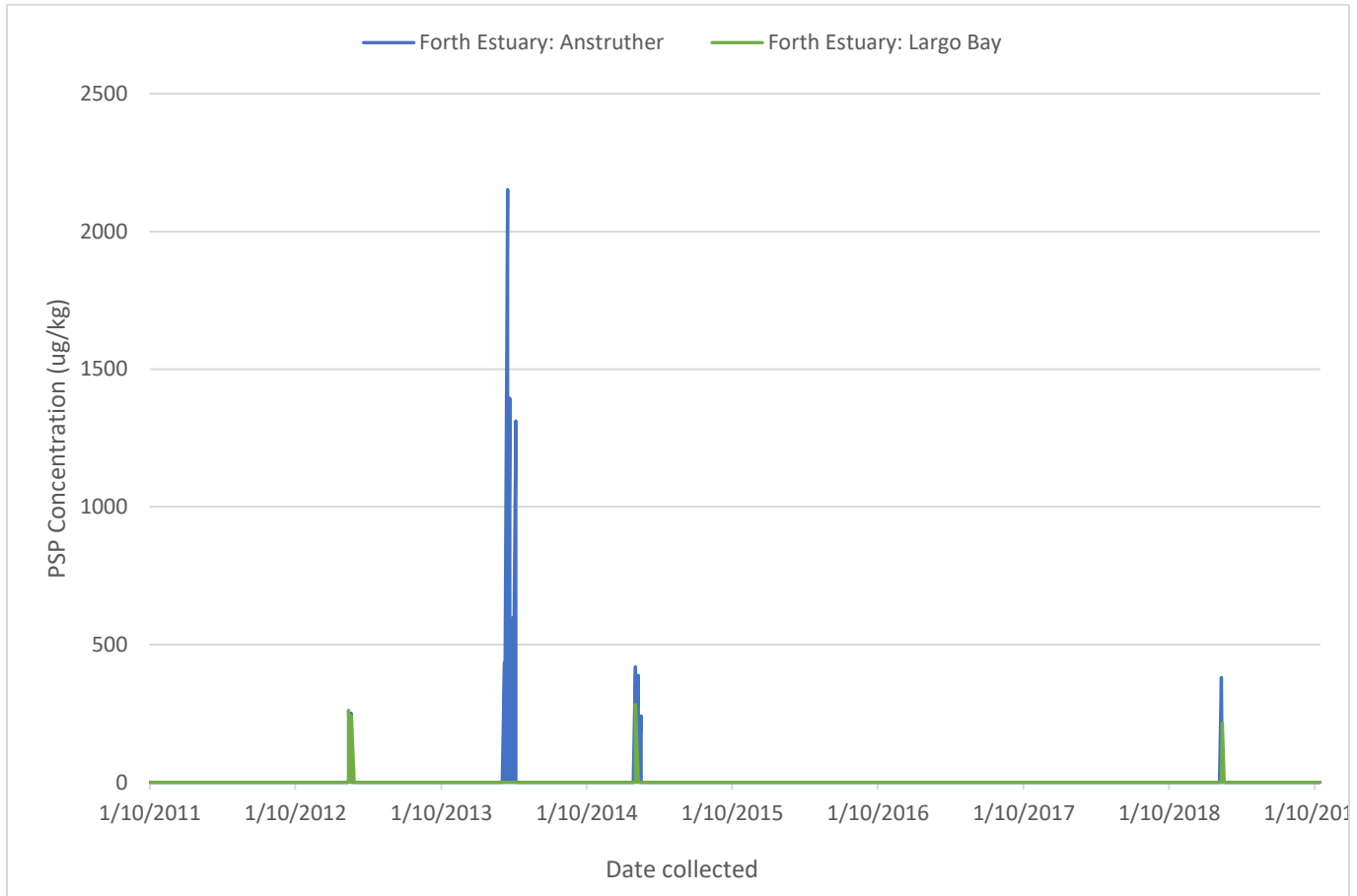
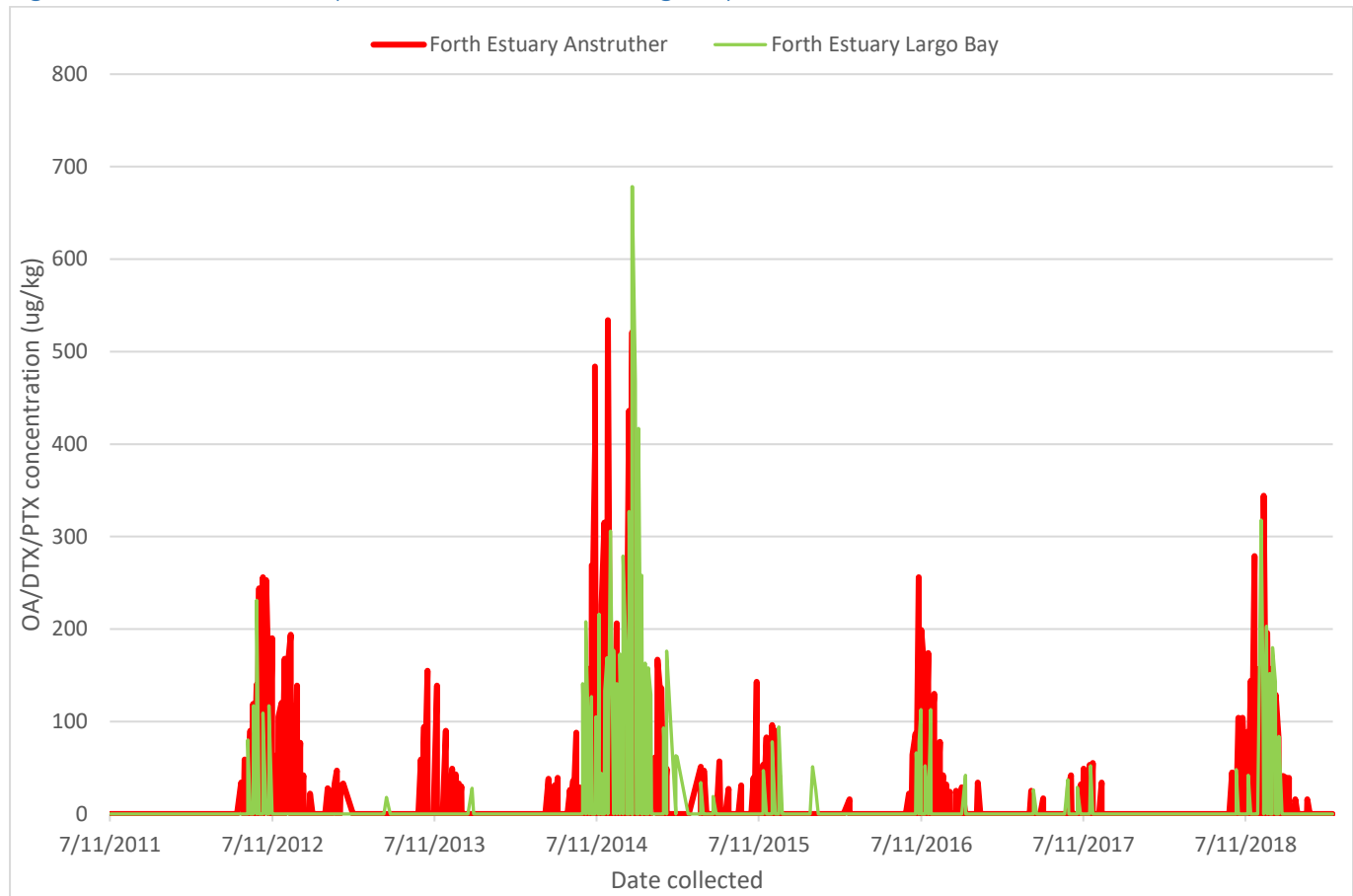


Figure 17. PSP comparison between Pod 80 Largo Bay and Pod 87 Anstruther



The most predominant toxin group at both Forth Estuary RMPs is lipophilic toxins from the OA/DTX/PTX group (Figure 16)

Figure 16. OA/DTX/PTX comparison between Pod 80 Largo Bay and Pod 87 Anstruther



The largest bloom of *Dinophysiaceae* recorded at Largo Bay was 900 cells/L in June 2017, which only accompanied low levels of OA/DTX/PTX toxins in the flesh samples from both sites. Concurrently, the largest flesh event for OA/DTX/PTXs was recorded from May to December 2014, with levels reaching 678 ug/kg in late September of that year. Levels of *Dinophysiaceae* only exceeded the trigger level on 2 occasions once in late June (500 cells/L) and once in late September (480 cells/L). The RMP in its current location does not appear to reflect/represent the levels of toxins recorded in flesh. However, this is the only phytoplankton monitoring point on the east coast currently and one should be maintained within the Forth Estuary. As access to boats is restricted, as highlighted above, the site will also need to be a shore-based site. A possible alternative would be to use the piers around Anstruther town.

From: section 38(1)(b)@cefas.co.uk>

Sent: 11 February 2019 11:44

To: section 38(1)(b)@sams.ac.uk; section 38(1)(b)@hallmarkscotland.com>

Subject: Potential changes to phytoplankton monitoring

Hi section 38(1)(b) and section 38(1)(b),

Apologies this ended up taking a lot longer than first thought.

Section 38(1)(b) – hopefully this should cover most of our discussions, please let me know if there is anything else to add or wish to alter

Section 38(1)(b) – the changes recommended are those we mentioned last week.

You had highlighted the presence of rock armour around the piers at Anstruther which may make life harder but if there are other comments on the other sites that would be appreciated.

Thanks,

Section 38(1)(b)

Section 38(1)(b),

Cefas

Barrack Road,

The Nothe,

Weymouth,

Dorset,

DT4 8UB

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