RISK ASSESSMENT OF THE SCOTTISH MONITORING PROGRAMME FOR MARINE BIOTOXINS IN SHELLFISH HARVESTED FROM CLASSIFIED PRODUCTION AREAS: REVIEW OF THE CURRENT SAMPLING SCHEME TO DEVELOP AN IMPROVED PROGRAMME BASED ON EVIDENCE OF RISK

FSS/2020/042

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Report date: September 2022

Executive summary

The aim of this study was to assess the Scottish inshore monitoring programme for biotoxins in shellfish from classified inshore production areas in Scotland. This programme, conducted by Food Standards Scotland (FSS), determines the prevalence in both farmed and wild bivalve molluscs of paralytic shellfish toxin (PST) (responsible for paralytic shellfish poisoning), domoic acid (DA) (responsible for amnesic shellfish poisoning (ASP)), and lipophilic toxins (LT) (some of which are responsible for diarrhetic shellfish poisoning (DSP)). These are produced by certain types of phytoplankton such as *Alexandrium* spp., *Pseudo-nitzschia* spp., *Dinophysis* spp., *Phalacroma rotundatum* (until recently included within the *Dinophysis* genus*), Azadinium* spp. and *Prorocentrum lima*, and these toxins then accumulate in the shellfish. Shellfish harvesting areas in Scotland have been assigned to larger groups, called pods. The current FSS monitoring programme consists of a combination of monthly, fortnightly and weekly monitoring of biotoxin concentrations in shellfish sampled from these pods. For about half the pods, data on potentially biotoxin-producing phytoplankton are also collected regularly. In this study, the biotoxin patterns observed in shellfish across Scotland throughout the year were established using data collected over a twenty-year period from April 2001 to March 2021. Using these data the current FSS monitoring programme was assessed to evaluate the risk of a toxic event at a particular location going undetected. Based on this, modified schemes are suggested.

The phytoplankton that produce biotoxins are normal members of the water column flora. Increases in their abundance (commonly termed harmful algal blooms - HABs) in Scottish waters are thought to be natural rather than anthropogenically stimulated events and are hence both spatially and temporally variable. As noted above, the harmful phytoplankton of greatest concern in Scottish waters belong to the genera *Alexandrium, Pseudo-nitzschia, Dinophysis, Azadinium* and *Prorocentrum*. Monitoring of *Alexandrium, Pseudo-nitzschia* and *Dinophysis* is conducted at genus level, and *Prorocentrum* at species level, through the enumeration of cell concentrations in the water column by light microscopy. The presence and density of these potentially harmful organisms therefore provides an indication of location and magnitude of likely shellfish toxicity.

Species belonging to the marine diatom *Pseudo-nitzschia* produce the neurotoxin DA, the ingestion of which may lead to ASP. In Scotland, cell counts at or above a threshold level of 50,000 cells/L for *Pseudo-nitzschia* spp. are thought to have the potential to cause an ASP event, should contaminated shellfish be consumed. Species belonging to the dinoflagellate genus *Alexandrium* are associated with the production of PST. In contrast to DA, for which relatively dense blooms of *Pseudo-nitzschia* are required before there is a cause for concern, the potentially high toxicity of some strains of *Alexandrium* means that a density of 40 cells/L is taken as an indication of the potential for a PST event. Other dinoflagellate phytoplankton produce toxins belonging to different LT groups. Okadaic acid (OA) and dinophysistoxins are associated with genera belonging to the family Dinophysiaceae (*Dinophysis* and *Phalacroma*), and also with the benthic dinoflagellate *Prorocentrum lima*. Cell counts at or above a threshold level of 100 cells/L for both *Dinophysis* spp. and *Prorocentrum lima* may cause an LT event in shellfish. Due to its epiphytic nature, *Prorocentrum lima* is only sporadically recorded in the water column and was therefore not included as part of this analysis. The microflagellate

Azadinium that produces azaspiracid (AZA) toxins is not currently monitored because its small size and indistinct morphology prevent its rapid enumeration in a monitoring setting.

Phytoplankton data (collected from April 2000 to December 2020) show that there was a very apparent seasonality in the HAB cell count threshold exceedance; exceedance was more frequent for all HAB-producing species during the period spring to autumn. A similar seasonal pattern is also seen in the associated concentrations of biotoxins in mussels (collected from April 2001 to March 2021). There was a high degree of variability in terms of threshold exceedance between pods. Of the three HAB-producing genera enumerated, *Dinophysis* (and associated LT, in mussels) most routinely exceeded the action thresholds, with some pods exceeding thresholds nearly 100% of the time for *Dinophysis* and LT during the summer. *Alexandrium* counts routinely exceeded the action threshold but this was only rarely associated with PST toxin concentrations in mussels exceeding the maximum permitted level (MPL), possibly attributable to the presence of non-toxic strains or species of *Alexandrium*. There were numerous occasions where *Dinophysis* counts were below threshold whilst contemporaneous LT concentrations in mussels were above the MPL. This asynchronicity is likely to be a consequence of the long LT retention-time in mussels (LT concentrations in mussels remain high while *Dinophysis* cell counts drop). *Pseudo-nitzschia* was present for more of the year compared with the other genera, being present all year round in some pods, and there was evidence of a spring-autumn bloom in *Pseudo-nitzschia*, unlike the other genera. However, the exceedance-frequency of the *Pseudo-nitzschia* toxin DA (in mussels) was low in all pods.

A range of methodologies has been used to test for biotoxins in shellfish over the last 20 years. These include the mouse bioassay (MBA), liquid chromatography mass spectrometry (LC-MS/MS), and high performance liquid chromatography (HPLC). LTs were previously monitored by MBA, which provided a ‘yes’ or ‘no’ outcome as to whether the toxin levels exceeded MPL. It is now monitored in more detail with LC-MS/MS for levels of OA, dinophysistoxins and pectenotoxins (these three toxins are combined and reported as OA equivalent), AZA, and yessotoxins (YTX). To allow for compatibility with the earlier MBA data, these more detailed test results were converted to whether or not the MPL was exceeded for any of the LC-MS/MS readings for AZA, OA and YTX.

Biotoxin results are presented for mussels (37,429 samples in total) and Pacific oysters (8,018 samples in total). The numbers of samples which have been analysed for each of the individual toxin groups are smaller than these. Other species have insufficient data to allow statistical modelling.

DA levels in shellfish were generally low. Only two (out of 1073) cockle samples, three (out of 1470) razor samples, and eleven (out of 18,010) mussel samples equalled or exceeded the MPL for DA of 20 mg/kg. When looking at half the MPL, this increased to five cockle samples, four razor samples, 39 mussel samples and three Pacific oyster samples. For PST, 1.0% of the mussel samples equalled or exceeded the MPL of 800 µg/kg, and this increased to 2.0% for samples equalling or exceeding half this limit. For Pacific oysters, 0.4% of samples exceeded half the MPL for PST and ten samples taken in the period 2015-20 exceeded the MPL; there were no Pacific oyster samples exceeding the MPL prior to 2015. For LTs the percentage of samples that equalled or exceeded the MPL was 7.9% for mussels, 1.6% for Pacific oysters and 6.7% for surf clams. In the five year period 2016-20 9.4% of mussel samples equalled or exceeded the MPL for LTs.

To allow for development of statistical models for biotoxin prevalence in shellfish, pods with limited data had to be combined with other pods. As a result, 106 mussel pods with data in the period 2001-

2021 were combined into 25 groups and 15 stand-alone pods. Only mussels and Pacific oysters yielded sufficient data for development of statistical models. These describe the chance of a sample exceeding a given toxin level, which was assumed to be a separate smooth function of week number in each pod group and a term for year was regarded as a random effect. For DA there were insufficient test results exceeding 10 or 20 mg/kg to allow for statistical modelling. For PST models were developed for PST ≥ 400 µg/kg and PST ≥ 800 µg/kg and LTs were modelled according to whether the sample exceeded the MPL.

The current monitoring scheme is based on sampling frequencies that range from weekly to monthly, depending on the location and time of the year. Its aim is to keep the risk of not detecting biotoxin levels exceeding MPL below 1%. For simplicity it is assumed that with weekly monitoring such an event would always be detected, whereas with fortnightly or monthly monitoring the risk of non-detection increases, depending on the actual biotoxin prevalence. To assess whether the current monitoring frequencies are still sufficient, these were compared against the model-derived biotoxin prevalence, allowing for determination of the risk of non-detection of a toxic event (i.e. biotoxin level exceeding the MPL or half the MPL) under the current scheme.

For mussels, the risk of PST ≥ 800 µg/kg was less than 1%, as intended, for all pod groupings. However, when the risk of not detecting PST ≥ 400 µg/kg was assessed there were a few cases where the risk exceeded 1%. For LTs there were also some months and pod groupings where the risk of non-detection exceeded 1%. Alternative monitoring frequencies for mussels are proposed based on the findings from the risk assessment of the current monitoring scheme and the model-derived biotoxin prevalence estimates.

For Pacific oysters, the risk assessment of the current monitoring scheme showed that there has been an increase in the proportion of samples exceeding half the MPL for PST in recent years and that the frequency of monitoring should be increased in some months in some of the pod groupings. There were also a few cases where the risk of not detecting LTs exceeding MPL was greater than 1%. The frequency of monitoring for PST in the minor species (cockles, razors and surf clams) should also be increased in some months.

The monitoring programme and its risk assessment are based on many assumptions, ranging from the test results from a small shellfish sample being representative for an entire pod, to the assumption that weekly monitoring is safe. It is therefore important that the monitoring programme should never be seen in isolation. Where possible, information from neighbouring pods, development of biotoxin prevalence during recent weeks, phytoplankton observations etc. should always be included in any decisions with respect to increasing the monitoring frequency and/or closing the site for harvesting.

Contents

Glossary

Abbreviation	Description
AHA	Associated Harvesting Area
ASP	Amnesic Shellfish Poisoning
AZA	Azaspiracid
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
DA	Domoic Acid
DSP	Diarrhetic Shellfish Poisoning
DTX	Dinophysistoxins
eq	equivalent
FSAS	Food Standards Agency Scotland
FSS	Food Standards Scotland
HAB	Harmful Algal Bloom
HPLC	High-Performance Liquid Chromatography
JRT	Jellett Rapid Test
LC-MS/MS	Liquid Chromatography Mass Spectrometry
LT	Lipophilic Toxin
LTs	Lipophilic Toxins
MBA	Mouse Bioassay
MPL	Maximum Permitted Level
N	North (used in names for pod groups)
NWC	North West Coast (used in names for pod groups)
OA	Okadaic Acid
PSP	Paralytic Shellfish Poisoning
PTX	Pectenotoxins
RL	Reporting Limit (minimum detection limit). For simplicity, when a test result falls below the RL it is assigned the value 0, and is referred to as a negative result.
RMP	Representative Monitoring Point
SAMS	Scottish Association for Marine Science
SE	South East (used in names for pod groups)
STX	Saxitoxin
SW	South West (used in names for pod groups)
W	West (used in names for pod groups)
WC	West Coast (used in names for pod groups)
YTX	Yessotoxin

1 Introduction

Legislation (Commission Implementing Regulation 2019/627) requires that a range of Official Controls (OCs) are carried out to ensure the safety of water bodies used for the harvesting of live bivalve molluscs (LBMs, shellfish). FSS is the competent authority in Scotland for the management of the majority of these OCs, including a programme of monitoring for marine biotoxins.

Marine biotoxins produced by certain types of marine algae (phytoplankton) can be accumulated in the tissues of filter feeding bivalve molluscs. On consumption of these contaminated shellfish, toxin-related illness can occur in humans. The purpose of the marine biotoxin monitoring programme is to determine the risk of shellfish growing in commercial harvesting areas becoming contaminated with biotoxins at concentrations that could lead to illness. Monitoring ensures that rising levels of biotoxins are detected, and that appropriate risk management action can be taken to prevent toxic shellfish being placed on the market. Risk management actions may include cessation of harvesting or increases in End Product Testing (EPT) undertaken by businesses or implementation of closure of harvesting sites by the Enforcement Authorities until toxin concentrations have reduced to safe levels.

The same regulation states 'the sampling frequency for toxin analysis in the mollusc is, as a general rule, to be weekly during periods when harvesting is allowed. This frequency may be reduced in specific areas, or for specific types of mollusc, 'if a risk assessment of toxins or phytoplankton occurrence suggests a very low risk of toxic episodes'. It also states that 'the risk assessment is to be periodically reviewed in order to assess the risk of toxins occurring in the bivalve mollusc from these areas', although it does not specify the frequency of reviews or the method to be applied in the conduct of the risk assessment. Several previous reviews of the Scottish biotoxin monitoring programme have been carried out in order to inform the development of the programme and to subsequently monitor its efficacy and ensure that it complies with regulatory requirements. Previous reviews were conducted in 2004, 2008, 2012 and 2015. The aim of the current monitoring scheme is to keep the risk of not detecting a toxin event at 1%.

There are currently approximately 165 classified shellfish harvesting areas in Scotland. These areas are assigned to larger groups (pods) where areas within a pod are thought to be similar hydrographically and environmentally, so that the risk of a toxic event is assumed to be similar within a pod. For each pod, one of the areas is assigned Representative Monitoring Point (RMP) status, with the remaining areas being assigned Associated Harvesting Area (AHA) status. For each RMP, a representative shellfish species (usually mussels) is sampled according to a set timetable, and the test result is assumed to represent the entire pod (i.e. the RMP itself as well as the AHA locations). If the test result requires the RMP to be closed due to the presence of biotoxins exceeding legal limits, then the shellfish areas in the entire pod (i.e. all of the AHAs as well as the RMP) are closed. The number of active pods varies from year to year, but in 2020 samples of molluscs were collected from 79 pods.

The Scottish biotoxin monitoring programme includes sampling and testing of shellfish flesh for the presence of biotoxins, and seawater samples for toxin-producing phytoplankton. The shellfish flesh monitoring programme samples are collected from inshore harvesting areas. Shellfish flesh samples are tested for three groups of algal toxins (for which Maximum Permitted Levels - MPLs are set by the regulation):

• Domoic acid (DA) which is responsible for amnesic shellfish poisoning (ASP)

• Paralytic shellfish toxins (PSTs)

• Lipophilic toxins (LTs) which include diarrhetic shellfish poisoning (DSP) toxins, pectenotoxins, yessotoxins and azaspiracids.

For the phytoplankton monitoring programme, water samples are collected from fixed sites within selected harvesting areas and the presence and types of toxic marine algae in the water are identified and enumerated.

The phytoplankton monitoring programme includes the following species of phytoplankton: *Pseudo-nitzschia* spp. (DA), Alexandrium spp. (PST), *Dinophysis* spp. and *Phalachroma* (OA/DTX/PTX), *Prorocentrum lima* (OA/DTX), *Protoceratium reticulatum* and *Lingulodinium polyedrum* (YTX) and *Prorocentrum cordatum*.

Samples are collected by shellfish sampling officers and submitted to the testing laboratory where the flesh is analysed for each group of biotoxins. In Scotland, shellfish harvesting areas can be classified for more than one species of shellfish (including mussels, king scallops, Pacific oysters, cockles, clams, etc.). In these areas/pods, blue mussels are frequently used as an indicator species to determine the biotoxin risk in the area, i.e. mussels are used to indicate whether or not toxins are present in the water and therefore could be taken up by any of the other shellfish species harvested in the area. However, in areas where mussels are not harvested, the most commercially significant species harvested in that area (cockles, native oysters, Pacific oysters, razors, or surf clams) is sampled and the results used to determine biotoxin risk in the area. For the majority of pods, where mussels are used as an indicator species for toxin monitoring, a summary of the current frequency for sampling and testing for mussels for existing pods is presented below:

• DA: Monthly all year

• LTs: Weekly, fortnightly or monthly testing dependent upon specific requirements of the site

• PST: Weekly, fortnightly or monthly testing dependent upon specific requirements of the site

The most recent review established that risk associated with DA and PST in Pacific oysters is very low and testing for DA and PST is conducted monthly.

With cockles and razor clams, monthly testing is conducted for all toxins in all pods throughout the year.

For surf clams, LTs are tested weekly from May to October and monthly between January to April and in November and December and DA and PST toxins are tested monthly for all active pods throughout the year.

In areas where there is insufficient historic data on the commercial species to inform risk assessment, sampling has been undertaken weekly for all toxins throughout the year. This currently includes areas which are classified solely for clams and any newly classified areas for which biotoxin data has not been previously collected.

A previous project (Holtrop, 2018) reviewed the statistical model used to inform the risk assessment of the biotoxin monitoring programme and compared the simple model used with a smooth model. A similar smooth model has been implemented as part of this review.

2 Materials and methods

2.1 Data

All data were supplied by FSS. Biotoxin data from April 2001 to September 2015 were taken from the cleaned data files used in the previous risk assessment (project FSS/2015/021, Holtrop *et al*. (2016)). Some further checks were carried out on this data file, particularly for situations where data from the same site appeared under more than one pod – for example some of the 2006-2009 data for Drovinish and Linngeam appeared under pod 23 whereas in subsequent years they were in pod 125. Shellfish production sites have changed over the last two decades and new pods created, as appropriate, to reflect harvesting activity. The Isle of Lewis is separated from the island of Great Bernera by a narrow strait which forms part of Loch Roag. Either side of this strait, the loch can be roughly divided into east Loch Roag (pod 24), west Loch Roag (pod 125), and the far west of Loch Roag (pod 23). Drovinish and Linngeam are geographically closer to other sites within pod 125 and are assigned to pod 125 under the current FSS classification. Therefore historic data where these sites had previously been assigned to pod 23 have been updated.

These were augmented by biotoxin data from October 2015 to March 2021 from data provided to FSS by CEFAS, who conduct the biotoxin testing under contract from FSS. Additional DA data collected during the summer of 2020, when there were *Pseudo-nitzschia* blooms around Shetland, while limited Official Control ASP testing was undertaken due to closures in response to DSP toxins exceeding regulatory limit, were included in the data set.

Phytoplankton data used in Holtrop *et al*. (2016) were augmented by data collected by SAMS as part of the official control monitoring programme from November 2015 to December 2020.

2.1.1 Biotoxins

Over time, various measurement methods have been employed (summarised in Table 1).

- DA is measured by high performance liquid chromatography (HPLC) and reported in mg/kg or below the limit of quantification. The MPL is 20 mg/kg.

- LT was measured as DSP by mouse bioassay (MBA) for all shellfish species until June 2011. From July 2011 liquid chromatography mass spectrometry (LC-MS/MS) was routinely used for mussels, cockles, Pacific oysters and razors. MBA was still used for surf clams and King scallops between July 2011 and April 2012, after which LC-MS/MS was also used for these species and MBA testing ceased. The LC-MS/MS method quantifies the following LT groups: okadaic acid, dinophysistoxins (including their ester forms) and pectenotoxins - reported as µg OA equivalent (eq)/kg shellfish flesh, azaspiracids – reported as µg AZA1 eq/kg and yessotoxins - reported as mg YTX eq/kg. The MPL for these toxins is 160 µg/kg for both OA and AZA, and 3.75 mg/kg for YTX.

- PST test results are based on a mixture of qualitative (Jellett rapid test (JRT) and HPLC screen, both of which report the test results as ‘not detected’ or ‘detected’), semi-quantitative (HPLC with outcome reported as < or ≥ 400 µg/kg), and quantitative methods (MBA with results reported in µg/100g, and quantitative HPLC with results initially reported in µg saxitoxin (STX) eq/100g shellfish flesh, which was later replaced with reporting in µg STX eq/kg shellfish flesh). The testing procedure consists of stages where initially a qualitative method is used, and if this gives a positive outcome it is followed by semi-quantitative analysis. If the semi-quantitative analysis gives '≥ 400 µg/kg' it is followed by quantitative analysis. The semi-quantitative analysis was introduced in 2014 and this step is missing from earlier data. The MPL for PST is 800 µg STX eq/kg.

If any of the toxins exceed the MPL the pod is closed for harvesting until two consecutive results below MPL are obtained which are at least 48 hours apart.

Table 1: Summary of measurement methods used between April 2001 and September 2021 for the various biotoxins.

Biotoxin	Method	Dates	Units reported	Maximum permitted level (MPL)
DA	HPLC	Full period	mg/kg	20 mg/kg
PST	MBA Jellett JRT HPLC screen HPLC semi-quantitative HPLC quantitative	Until 22/08/11 04/04/05 to 30/11/06 12/11/06 onwards 19/05/14 onwards 05/05/08 onwards	µg/100g Not detected or detected Not detected or detected < or ≥ 400 µg/kg µg/100g until 03/07/11 µg/kg 04/07/11 onwards	800 µg/kg
LT	MBA LC-MS/MS	Until 22/04/12 04/07/11 onwards	Absence or presence of DSP OA µg/kg AZA µg/kg YTX µg/kg	Presence of DSP 160 µg/kg 160 µg/kg 3.75 mg/kg

For consistency with the previous risk assessment (see Table 2 of Holtrop *et al*., 2016) for the purposes of summarising data and statistical modelling, samples were regarded as exceeding the MPL or half the MPL if values were recorded as equalling or exceeding the relevant threshold. However, results that are recorded as exactly equal to the MPL do not result in field closure.

2.1.2 Data cleaning

Biotoxin data were checked for consistency. Entries without test results (for example due to insufficient sample material) were removed.

On a few occasions a previously used pod number was reused at some later date for a different location. Where this was the case, the old pod allocation has been given the extension 'old'.

Where test results have been reported as an actual value supported with a low and a high value calculated from the method uncertainty, then the high-value result has been used as a precautionary approach. This is the case for the HPLC quantitative measurement for PST, and the LC-MS/MS measurements for AZA, OA and YTX.

Since 2001 various methods for analysing shellfish for the presence of biotoxins have been employed (summarised in Table 1). These test results have been 'unified' as follows:

- For DA the test result is reported as a quantitative value (in mg/kg), or as below the limit of quantification. For convenience the latter was replaced with a value of 0 but since the limit of quantification is well below half the MPL, the binary data threshold exceedance used in our statistical modelling would have been identical if a low positive value had been used instead of zero. For LT, the MBA results for DSP were recorded as 'not detected' or 'detected' (i.e. MPL exceeded). These were converted into 0 or 1, respectively. The OA, AZA and YTX toxin groups were measured by LC-MS/MS and give a reading (µg/kg for OA and AZA, mg/kg for YTX) or are reported as below the reporting limit (RL). For the latter, a value of 0 was assigned. In addition to working with the actual measured LC-MS/MS values, the LC-MS/MS results for the OA, AZA and YTX toxins were converted into a combined value of 0 or 1 to allow for compatibility with the MBA results. This was done as follows: when one or more of these three toxins equalled or exceeded their respective MPL, a value of 1 was assigned. If all three toxins were below their respective MPL, the sample was assigned a value of 0. This allows for combination with the MBA results to give a running recording of LT toxins exceeding MPL for 2001-21.

- For PST, all quantitative test results were converted to µg/kg. If the test result was reported as 'not detected' or as below the reporting limit it was replaced with 0. If more than one test result has been reported (when the qualitative test gave 'detected' it was followed by a test result from the semi-quantitative or quantitative methods), then the reading from the quantitative method was taken as the most appropriate reading. If the semi-quantitative method was the endpoint (note that this was only the case when its reading was '<400 µg/kg') it was replaced by 200 µg/kg as in Holtrop *et al*. (2016), since this is halfway between zero and 400 µg/kg. The models presented in this report are based on the proportion of samples equal to or exceeding 400 µg/kg so the results will not be dependent on the exact number chosen.

2.1.3 Grouping of pods

The 'pod' system for monitoring biotoxins was introduced by FSAS in November 2006. Shellfish harvesting sites were assigned to 'pods', where locations within a pod are thought to be similar hydrographically and environmentally, so that the risk of a toxic event is assumed similar within a pod. For each pod, one of the locations was assigned as RMP, with the remaining locations being assigned Associated Harvesting Area (AHA) status. For each RMP, a representative shellfish species (usually mussels) is sampled according to a set timetable, and the test result is assumed to represent the entire pod (i.e. the RMP itself as well as the associated AHA locations). If the test result requires a closure, then the shellfish areas in the entire pod are closed. It is possible for an individual AHA, however, to have samples tested to contest closure of their AHA.

To allow for statistical investigation of differences between pods, years and months, it was desirable to have 300 samples or more per (group of) pod(s), covering all 12 months of the year. Previous work found that with this number of samples convergence of the estimation routine was achieved and predicted effects for pods, months and years could be obtained (Holtrop *et al*., 2016). Pods with insufficient data were combined with other pods based on proximity and similarity of patterns observed in the prevalence of the three main phytoplankton genera (*Pseudo-nitzschia* spp., *Alexandrium* spp., *Dinophysis* spp.).

The FSS groupings of pods implemented in 2015 were taken as a starting point. To preserve information on differences in biotoxin patterns between locations, pods were treated as stand-alone where possible (i.e. sufficient data were available to allow for statistical modelling, with at least 1-2 samples per month per year). Three pods that were previously analysed as part of larger groupings were analysed separately this time (Pod 31, Pod 69 and Pod 125). There were five new pods since the previous risk assessment: pod 150 was added to G28, pod 151 to G71, pod 152 to G28, pod 153 to G80 and pod 154 to G1.

These groupings were analysed using the Bray-Curtis Similarity index for the phytoplankton data (based on the threshold concentrations for the three main phytoplankton genera, *Alexandrium* spp., *Pseudo-nitzschia* spp., and *Dinophysis* spp.) from 2000-2015. The groups could only be analysed if there was sufficient data to run the analysis. A similarity of 50% or greater (based on the average similarity of all individual pod-pair combinations) was required for the groups to be deemed similar. All the groups that had sufficient data to be analysed were found to have a similarity > 50%. In addition to similarities in phytoplankton prevalence, all groupings were assessed (based on expert knowledge) for proximity and similarity of hydrographical and environmental conditions.

For mussels the final grouping is shown in Table 2. To allow for statistical modelling of the Pacific oyster data it was necessary to combine some of the mussel groups as was done in the previous assessment (Holtrop *et al*., 2016), with their grouping detailed in Table 3. There were insufficient Pacific oyster samples from Orkney and Shetland to allow these to be analysed separately and these samples were grouped with Skye and Uist since this grouping was used in the previous assessment. The Pacific oyster grouping is preceded by the letters PO to differentiate it from the mussel grouping.

The two pods located around the Moray Firth (78 and 108) contain only cockle samples apart from a single mussel sample. For consistency with Holtrop *et al*. (2016) this was kept in G49 but if more mussel samples were to be taken from either of these pods in the future it would be better to combine them instead with P38.

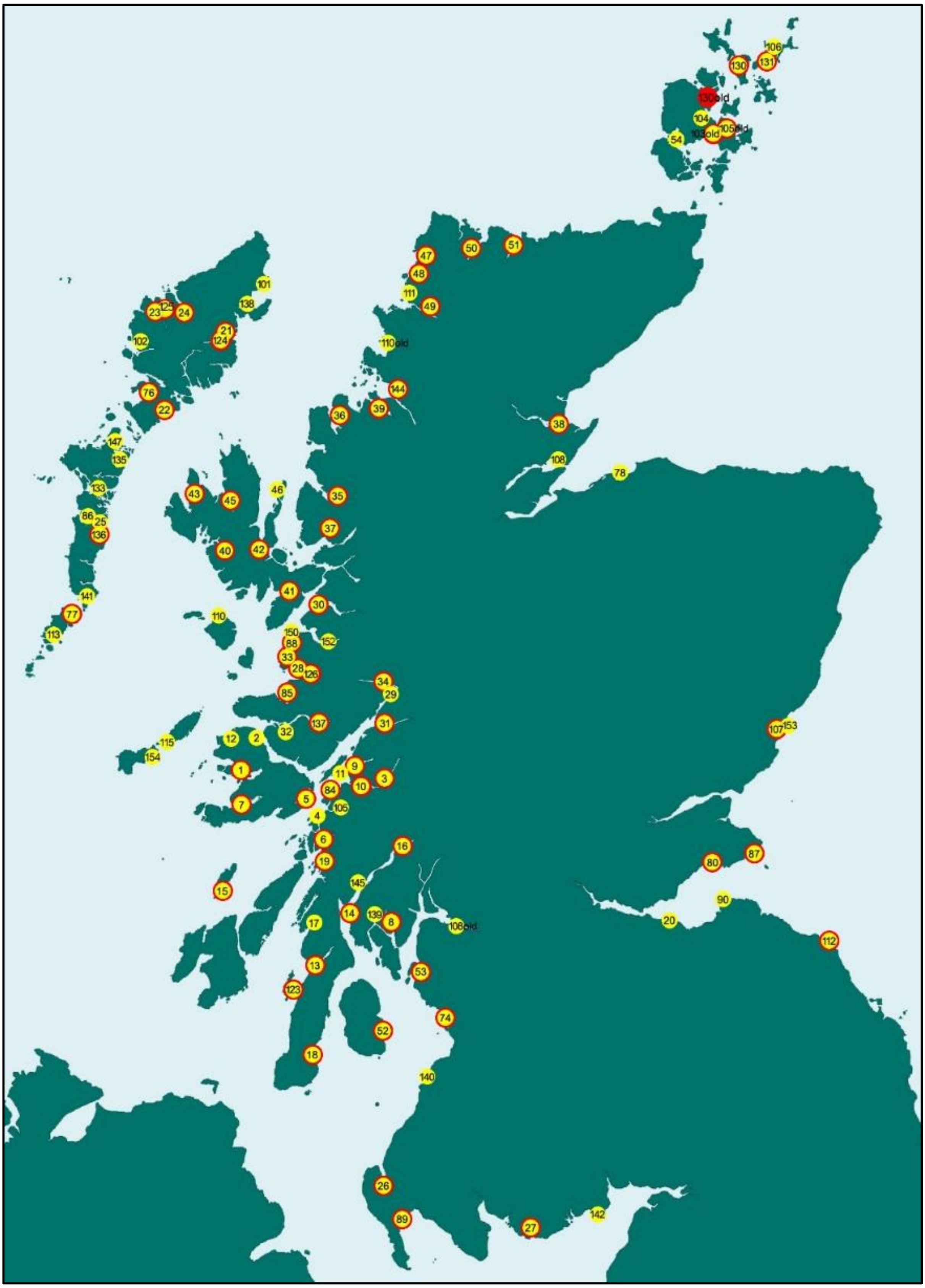


Figure 1a: Biotoxin and phytoplankton pods in mainland Scotland and the Orkney Islands. Yellow: pods with shellfish species (mussels, cockles, native oysters, Pacific oysters, razors or surf clams); red or circled in red: phytoplankton monitoring. The Shetland Islands are shown in Figure 1b.

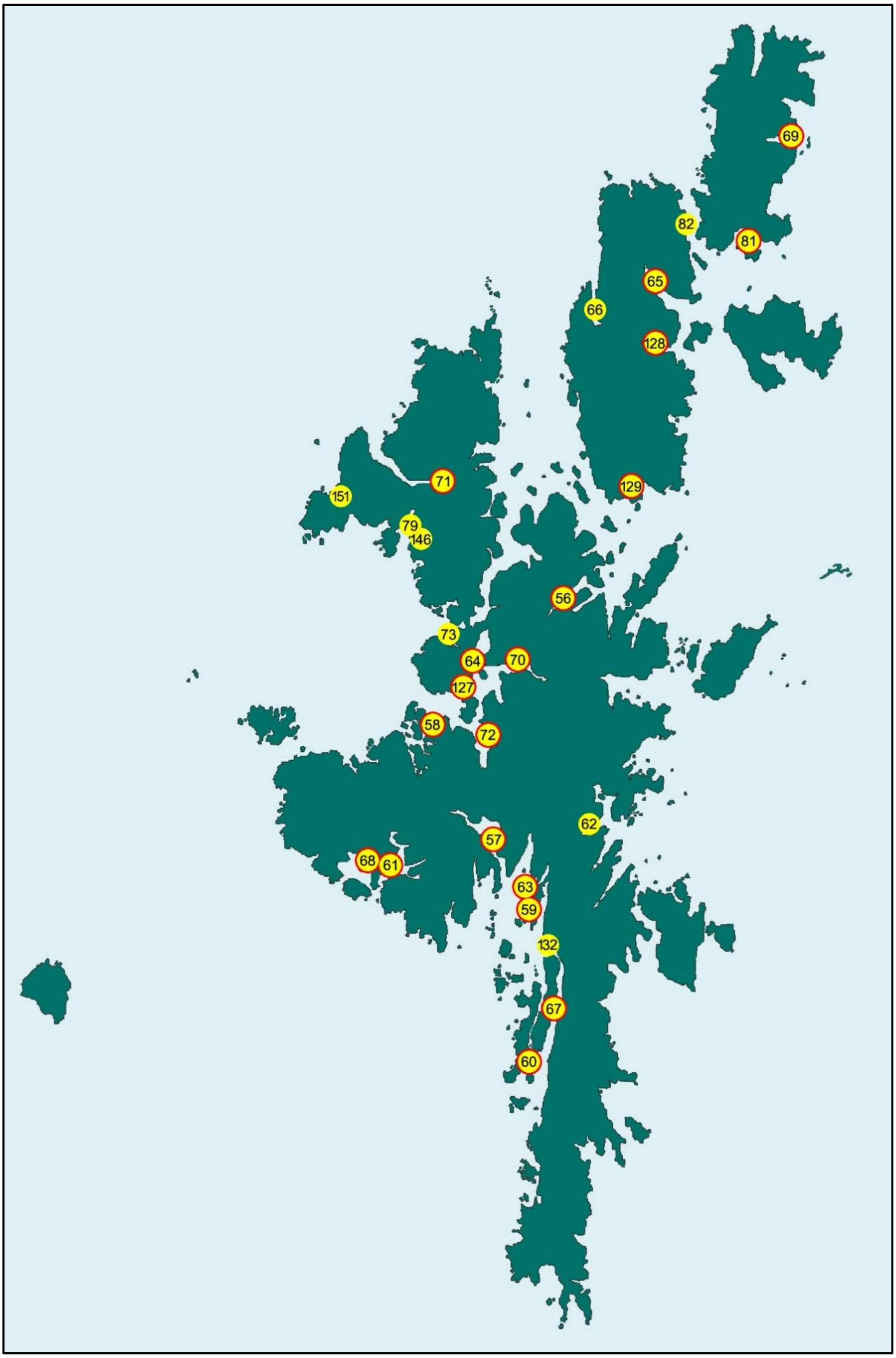


Figure 1b: as Figure 1a, for Shetland.

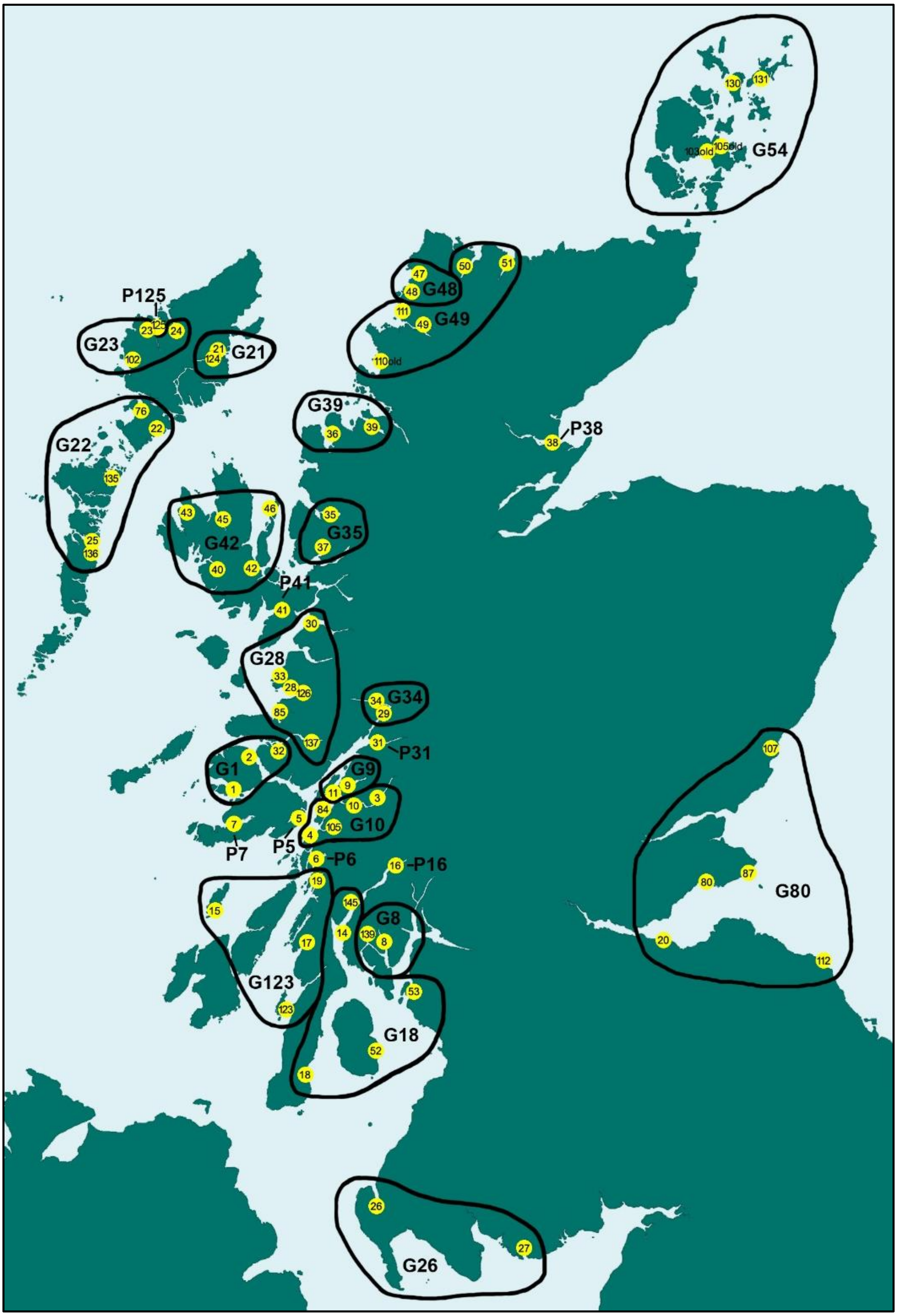


Figure 1c: Grouping of mussel pods in mainland Scotland and the Orkney Islands for statistical analysis. Pods with fewer than 10 mussel samples not shown. The Shetland Islands is shown in Figure 1d.

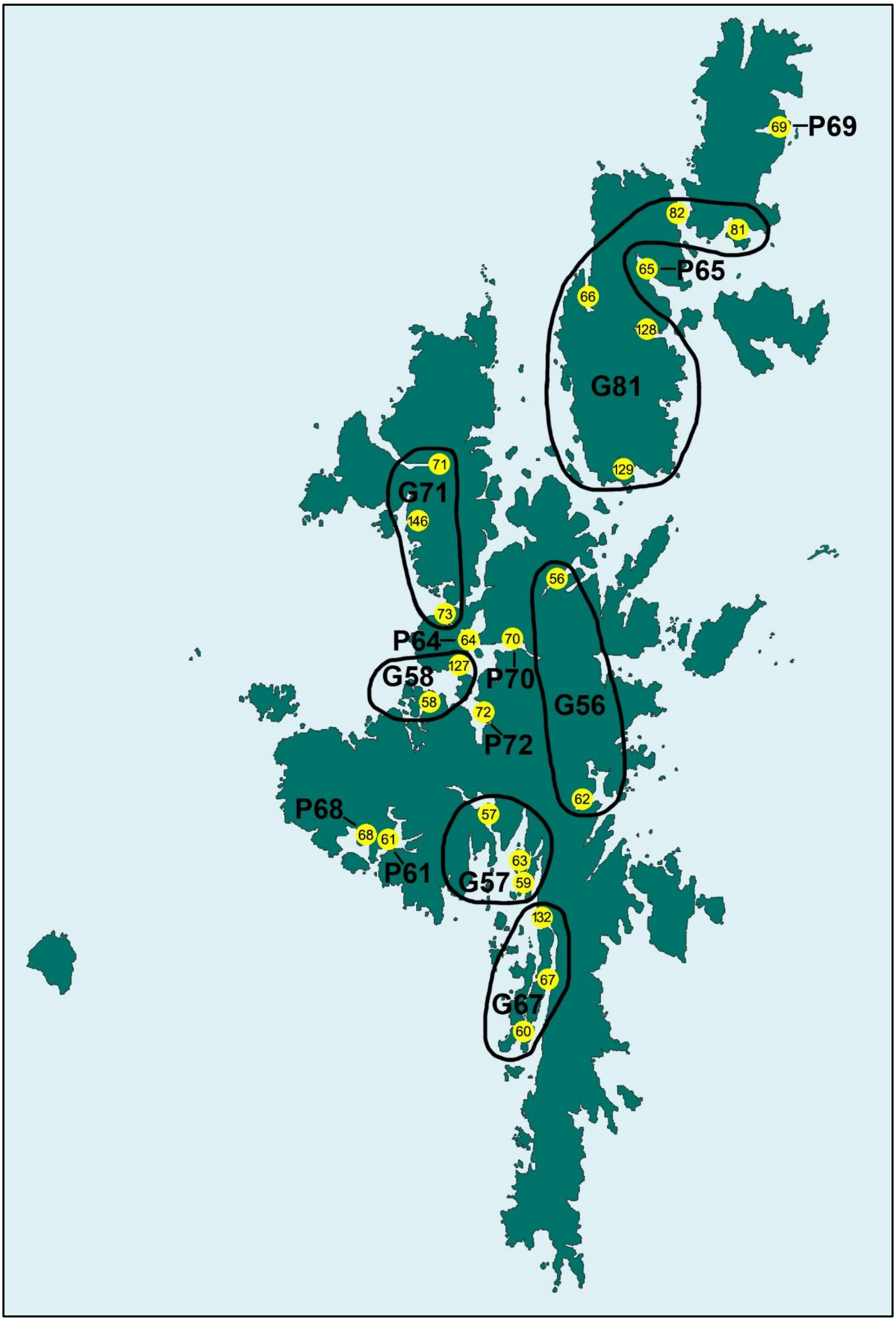


Figure 1d: As Figure 1c, for the Shetland Islands.

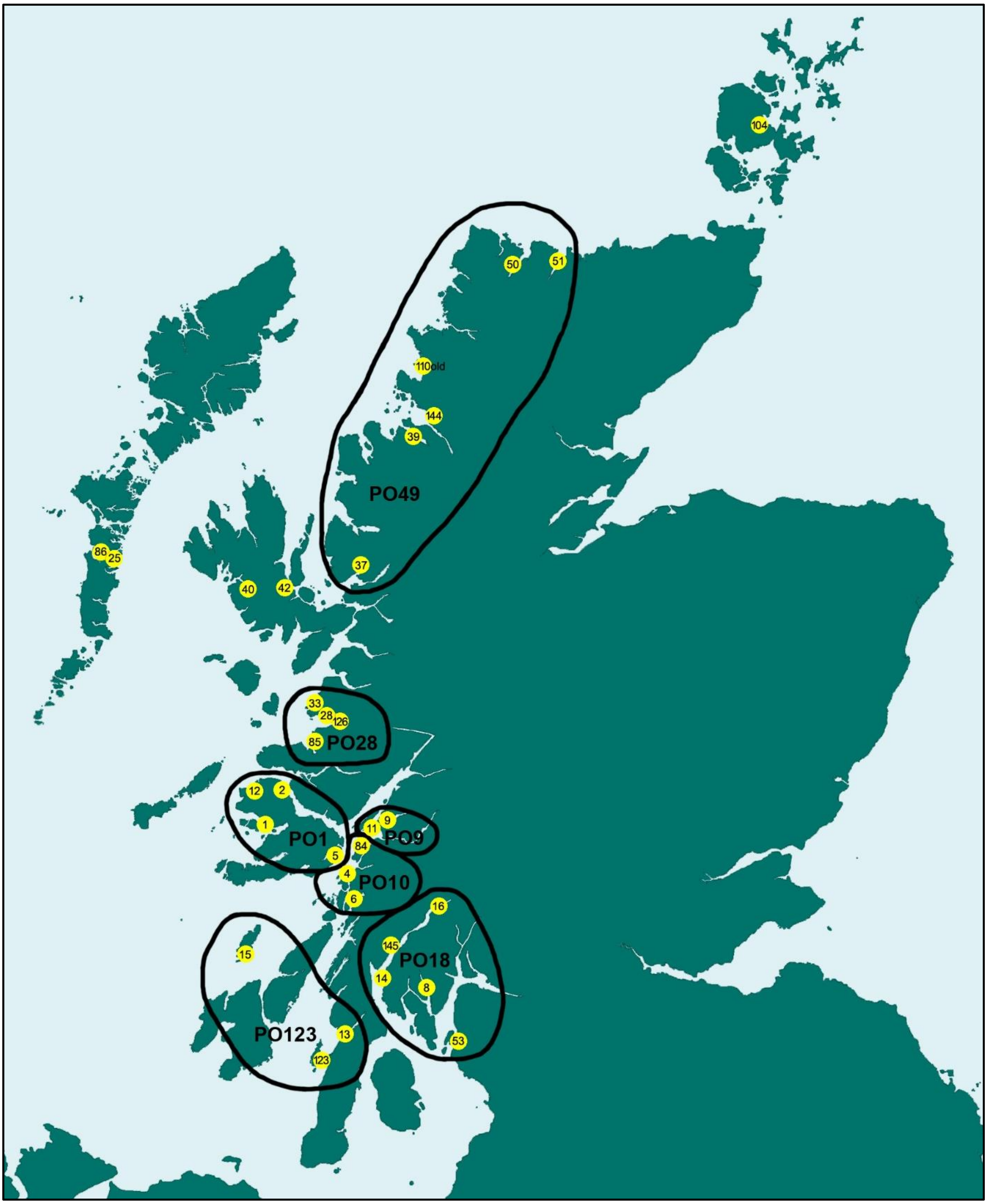


Figure 1e: Grouping of Pacific oyster pods for statistical analysis. Due to insufficient samples from Orkney and Shetland, Pods 104, 69 and 129 were combined with Skye and Uist into Group PO42 (not shown).

Table 2: New grouping of pods based on mussel data showing the number of samples over all toxins combined and the year range during which the samples were collected.

Grouping		Pod	Mussels		Pacific oysters		Cockles		Razors		Surf clams
G1	Mull-other	1	366	(01-09)	472	(01-21)					
		115							2	(09-09)	
		12			735	(01-21)					
		154							18	(18-19)	
		2	342	(03-13)	39	(01-21)					
		32	58	(01-05)							
G10	WC-LochEtive	10	613	(01-21)			3	(14-14)			
		105	16	(10-10)							
		3	138	(07-10)							
		4	30	(02-06)	744	(01-21)					
		84	440	(07-20)	1	(19-19)	20	(20-21)			
G123	WC-Gigha	123	399	(09-21)	3	(12-12)			42	(09-12)	
		13	1	(02-02)	515	(01-21)					
		15	43	(06-07)	765	(01-21)					
		17	29	(11-12)					2	(11-11)	
		19	338	(07-21)							
G18	Ayr-other	108old	8	(01-03)							
		14	279	(02-12)	501	(01-21)			21	(03-10)	
		145	75	(14-16)	1	(16-16)	40	(20-21)			
		18	525	(07-21)					77	(01-13)	
		52	334	(02-16)					7	(03-07)	
		53	474	(01-14)	367	(01-21)					
		74							237	(07-21)	
G21	Lewis-LochLeurbostErisort	101							9	(03-03)	
		124	447	(09-21)							
		138							156	(14-21)	
		21	810	(01-21)							
G22	HarrisUist	133					295	(11-21)			
		135	96	(13-15)							
		136	100	(13-15)							
		141					6	(03-04)	72	(13-17)	
		147							59	(14-20)	
		22	679	(01-21)					1	(03-03)	
		25	111	(01-05)	7	(01-04)	7	(02-03)			
		76	498	(01-21)			95	(01-14)			
		77					552	(02-21)	3	(04-04)	
		86			3	(02-03)	479	(03-21)			
G23	Lewis-LochRoag	102	13	(01-03)							
		23	597	(01-21)							
		24	640	(04-21)							
G26	Dumfries	140							95	(13-21)	
		142					5	(13-14)			
		26	478	(01-17)					8	(07-09)	
		27	194	(01-10)			23	(01-10)	84	(15-21)	

		89							120	(08-18)		
G28	WC-Lochaber	110							4	(09-09)		
		126	276	(01-21)	344	(02-20)			6	(04-05)		
		137	204	(13-21)								
		150							48	(18-21)		
		152							2	(17-17)		
		28	504	(01-21)	1	(02-02)						
		30	164	(01-11)			3	(05-05)				
		33	149	(02-10)	502	(04-21)					16	(02-06)
		85	274	(07-16)	139	(01-10)						
		88							101	(04-14)		
G34	WC-LochEil	29	44	(04-07)								
		34	436	(01-21)								
G35	NWC-LochTorridon	35	824	(01-21)								
		37	386	(01-13)	4	(01-01)			1	(17-17)		
G39	NWC-LochEweBroom	144	1	(17-17)	185	(14-21)						
		36	532	(01-16)								
		39	451	(01-20)	19	(19-21)						
G42	Skye-other	40	36	(01-07)	730	(01-21)	1	(03-03)				
		42	465	(01-16)	2	(01-01)	56	(01-21)	1	(03-03)		
		43	318	(01-12)			3	(07-09)				
		45	283	(01-10)			1	(09-09)				
		46	18	(07-07)								
G48	NWC-LochLaxfordInchard	47	517	(01-21)								
		48	720	(01-21)								
G49	NWC-other	108					2	(10-10)				
		110old	15	(01-02)	3	(01-01)						
		111	24	(09-10)								
		49	559	(01-21)								
		50	234	(01-18)	193	(01-21)						
		51	196	(01-12)	425	(01-21)						
		78	1	(01-01)			32	(02-06)				
G54	Orkney	103old	106	(01-02)			3	(01-01)				
		104	2	(01-01)	10	(01-02)						
		105old	26	(01-02)			21	(01-02)				
		106					5	(02-03)				
		130	40	(11-13)					63	(11-14)		
		131	34	(11-12)					3	(11-11)		
		54	6	(01-04)			1	(01-01)				
G56	Shetland-SE-DalesVoe	56	674	(01-21)								
		62	189	(01-21)								
G57	Shetland-SE-SandsoundWeisdale	57	753	(02-21)								
		59	219	(01-21)								
		63	580	(05-21)								
G58	Shetland-W-VementryVoe	127	315	(09-21)								
		58	830	(01-21)								
G67	Shetland-SE-CliftSound	132	28	(11-19)								

		60	480	(06-20)								
		67	704	(01-21)								
G71	Shetland-W-RonasVoe	146	55	(14-21)								
		151	6	(17-17)								
		71	375	(01-20)								
		73	14	(11-15)								
		79	1	(01-01)								
G8	Ayr-LochStriven	139	211	(14-21)			16	(13-20)				
		8	750	(01-18)	11	(02-06)						
G80	EastCoast	107	24	(01-02)							6	(03-03)
		112	99	(01-06)								
		153							4	(17-17)		
		20	52	(04-10)								
		80	203	(01-21)			9	(02-03)	420	(05-20)	37	(03-21)
		87	54	(13-21)					2	(05-05)	485	(03-21)
		90							171	(08-21)		
G81	Shetland-N-Uyea	128	443	(01-21)								
		129	187	(04-20)	4	(04-04)						
		66	96	(01-21)								
		81	454	(01-20)								
		82	17	(02-08)								
G9	WC-LochCreranLinnhe	11	705	(01-21)	97	(01-07)						
		9	473	(01-12)	605	(01-21)						
P125	Lewis-Linngeam	125	960	(01-21)								
P16	Ayr-LochFyneArdkinglas	16	647	(01-16)	397	(01-21)						
P31	WC-LochLeven	31	763	(01-21)								
P38	Tain	38	519	(01-16)								
P41	Skye-LochEishort	41	931	(01-21)								
P5	Mull-LochSpelve	5	749	(01-21)	2	(02-02)						
P6	WC-LochMelfort	6	671	(01-21)	130	(01-12)						
P61	Shetland-SW-GrutingVoe	61	894	(01-21)								
P64	Shetland-W-BustaVoe	64	843	(01-21)								
P65	Shetland-N-Basta	65	748	(01-21)								
P68	Shetland-SW-Vaila	68	914	(01-21)								
P69	Shetland-Baltasound	69	402	(01-20)	62	(03-13)						
P7	Mull-LochScridain	7	854	(01-21)								
P70	Shetland-W-OlnaFirth	70	763	(01-21)								
P72	Shetland-W-AithVoe	72	756	(01-21)								

WC, West Coast; NWC, North West Coast; SE, South East; SW, South West; W, West; N, North

Table 3: Grouping of pods for Pacific oysters. Each group contains at least one pod for which Pacific oysters are used as indicator species.

Groups	Group Name	Pods
PO1	Mull	1,2,5,12
PO10	WC-LochEtiveMelfort	4,6,84
PO123	WC-Gigha	13,15,123
PO18	Ayr	8,14,16,53,145
PO28	WC-Lochaber	28,33,85,126
PO42	SkyeShetland	25,40,42,69,86,104,129
PO49	NWC	37,39,50,51,144,110old
PO9	WC-LochCreranLinnhe	9,11

2.2 Models for estimation of proportions

Test results were formulated as 0 (below a given limit) or 1 (equal to or exceeding a given limit). Models were fitted to the proportion of samples equalling or exceeding a given limit, as follows. For a given genus and biotoxin, let p be the probability that a sample test result is positive (i.e. the toxin level equals or exceeds a given limit). This probability is likely to depend on the time of year (e.g. positive values are more likely to occur in summer than in winter) and the location the sample was taken from which was represented in the model by the pod grouping. There may also be year to year fluctuations with positive samples occurring more frequently in some years than others.

In order to allow for a smooth progression of the estimated proportion of samples exceeding a biotoxin threshold over the course of a year a similar approach was taken to that used in Holtrop (2018), which involved fitting generalised additive mixed models. However, as samples are not normally taken from the same location more frequently than once per week, modelling was done on the basis of week number rather than day number. As in Holtrop *et al*. (2018) each pod grouping was allowed its own toxin profile with pod grouping being treated as a fixed effect and year was regarded as a random effect. However, in order to speed up the computation, the models were fitted using the *bam* function in the R package *mgcv* (version 1.8-36, Wood, 2021) in place of the *gamm4* R package used by Holtrop (2018). This approach was chosen because a smooth model is more biologically realistic than a simple model based on monthly estimates. Holtrop (2018) concluded that the main drawback was that fitting these models is time consuming, but we have been able to overcome this through the use of an alternative package.

The model fitted was therefore:

$$\ln [p/(1-p)] = \text{smooth}(\text{Week, by=Group}) + \text{Group} + \text{Year}$$

where p denotes the probability of a sample exceeding a given limit and the odds be defined as p/(1-p) with ln denoting the natural logarithm.

A cubic spline was fitted to these data using the bam() function in R, as follows

```
model1<-bam(y~Group-1+s(week,bs="cc",by=Group)+s(Year,bs="re"),
knots =list(week=c(1,53)),
family=binomial(link="logit"),data=data,method="REML")
```

where week refers to the week of year calculated according to ISO 8601 and Group is a factor identifying the (group of) pod(s) the sample came from. Each group of pods was allowed its own specific smooth spline, where each spline was assumed cyclic to ensure continuity between the end and the start of the year. To allow for random variation from year to year, Year was included as a random effect. Predictions for each group for an average year extracted with the predict() function .

All statistical analyses were performed in R (R Core Team, 2020).

We used graphical plots to assess the fit of the model. Appendix D shows graphs of the fitted smooth models and the data. In the case of mussels, a comparison is shown with models similar to those in Holtrop *et al*. (2016) which have a fixed effect for each four week period and a random effect for the pod grouping.

2.3 Risk assessment of current and alternative monitoring schemes

2.3.1 Current monitoring scheme

Under the present monitoring scheme implemented in 2015 the sampling frequencies are as follows.

- For mussels, the testing frequency for PST (Table 4a) and LT (Table 4b) is group and month specific. Based on the very low historical prevalence of DA, the testing frequency for DA is monthly across all pods.
- For pods which only have Pacific oysters (Table 5), the testing frequency LT is group and month specific. Based on the very low historical prevalence of DA and PST, the testing frequency for these toxins is monthly across all pods.
- For the remaining pods (no Pacific oysters and no mussels), testing is monthly for all three toxin groups across all pods, with the exception of more frequent testing for LTs in surf clams.
- For new pods testing is weekly all year round for all three toxin groups.

Table 4a: Current sampling frequency for PST in mussels as implemented since 2015 (1= monthly, 2 = fortnightly, 4 = weekly).

Groups	GroupName	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G1	Mull-other	1	1	1	1	4	2	1	1	1	1	1	1
G10	WC-LochEtive	1	1	1	1	1	1	1	1	1	1	1	1
G123	WC-Gigha	1	1	1	1	4	4	4	1	1	1	1	1
G18	Ayr-other	1	1	2	4	4	4	4	1	1	1	1	1
G21	Lewis-LochLeurbostErisort	1	1	1	1	4	1	1	1	1	1	1	1
G22	HarrisUist	1	1	1	1	1	4	1	1	1	1	1	1
G23	Lewis-LochRoag	1	1	1	1	1	4	4	1	1	1	1	1
G26	Dumfries	1	1	1	1	1	1	1	1	1	1	1	1
G28	WC-Lochaber	1	1	4	1	4	4	4	1	1	1	1	1
G31	WC-LochLevenEil	1	1	1	1	1	1	1	1	1	1	1	1
G35	NWC-LochTorridon	1	1	1	1	4	4	4	1	1	1	1	1
G39	NWC-LochEweBroom	1	1	1	1	1	4	1	1	1	1	1	1
G42	Skye-other	1	1	1	1	4	4	4	1	1	1	1	1
G48	NWC-LochLaxfordInchard	1	1	1	4	4	4	4	1	1	1	1	1
G49	NWC-other	1	1	1	2	4	4	4	1	1	1	1	1
G54	Orkney	1	1	1	1	4	4	2	1	1	1	1	1
G56	Shetland-SE-DalesVoe	1	1	1	1	1	1	1	1	1	1	1	1
G57	Shetland-SE-SandsoundWeisdale	1	1	1	1	4	4	4	4	4	1	1	1
G58	Shetland-W-VementryVoe	1	1	1	1	4	2	1	4	4	4	1	1
G67	Shetland-SE-CliftSound	1	1	1	1	2	2	4	4	1	1	1	1
G71	Shetland-W-RonasVoe	1	1	1	1	4	4	4	4	4	1	1	1
G8	Ayr-LochStriven	1	1	1	4	4	4	4	1	1	1	1	1
G80	Eastcoast	1	1	1	1	4	4	4	1	1	1	1	1
G81	Shetland-N-Uyea	1	1	1	1	4	4	1	4	2	1	1	1
G9	WC-LochCreranLynnhe	1	1	1	1	1	1	1	1	1	1	1	1
P16	Ayr-LochFyneArdkinglas	1	1	1	4	4	2	2	1	1	1	1	1
P38	Tain	1	1	1	4	4	4	2	1	1	1	1	1
P41	Skye-LochEishort	1	1	2	4	4	4	4	1	1	1	1	1
P5	Mull-LochSpelve	1	1	1	1	1	1	1	1	1	1	1	1
P6	WC-LochMelfort	1	1	1	1	1	2	1	1	1	1	1	1
P61	Shetland-SW-GrutingVoe	1	1	1	1	1	2	4	1	4	1	1	1
P64	Shetland-W-BustaVoe	1	1	1	1	4	4	4	4	4	4	1	1
P65	Shetland-N-Balta	1	1	1	1	4	4	1	1	4	1	1	1
P68	Shetland-SW-VailaVoe	1	1	1	1	2	2	4	4	4	1	1	1
P7	Mull-LochScridain	1	1	1	1	4	4	4	1	1	1	1	1
P70	Shetland-W-OlnaFirth	1	1	1	1	2	4	1	1	4	1	1	1
P72	Shetland-W-AithVoe	1	1	1	1	4	4	4	4	4	2	1	1

Table 4b: Current sampling frequency for LT in mussels as implemented since 2015 (1= monthly, 2 = fortnightly, 4 = weekly).

Groups	GroupName	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G1	Mull-other	1	1	1	1	2	4	4	4	4	2	1	1
G10	WC-LochEtive	1	1	1	1	1	1	1	2	1	1	1	1
G123	WC-Gigha	1	1	1	1	1	2	4	4	4	1	1	1
G18	Ayr-other	1	1	1	4	4	4	4	4	4	4	4	4
G21	Lewis-LochLeurbostErisort	1	1	1	1	2	4	4	4	4	2	1	1
G22	HarrisUist	1	1	1	1	1	1	4	4	2	1	1	1
G23	Lewis-LochRoag	1	1	1	1	4	4	4	4	4	4	2	1
G26	Dumfries	1	1	1	1	1	1	2	4	2	1	1	1
G28	WC-Lochaber	1	1	1	4	4	4	4	4	4	4	4	1
G31	WC-LochLevenEil	1	1	1	1	1	1	1	2	1	1	1	1
G35	NWC-LochTorridon	1	1	1	2	4	4	4	4	4	4	2	1
G39	NWC-LochEweBroom	1	1	1	2	4	4	4	4	4	4	2	1
G42	Skye-other	1	1	1	1	4	4	4	4	4	4	2	1
G48	NWC-LochLaxfordInchard	1	1	1	4	4	4	4	4	4	4	4	4
G49	NWC-other	1	1	1	1	4	4	4	4	4	4	2	1
G54	Orkney	1	1	1	2	4	4	4	4	4	4	4	1
G56	Shetland-SE-DalesVoe	1	1	1	4	4	4	4	4	4	4	4	1
G57	Shetland-SE-SandsoundWeisdale	1	1	1	4	4	4	4	4	4	4	2	1
G58	Shetland-W-VementryVoe	1	1	1	2	4	4	4	4	4	4	4	1
G67	Shetland-SE-CliftSound	1	1	1	4	4	4	4	4	4	4	4	1
G71	Shetland-W-RonasVoe	1	1	1	4	4	4	4	4	4	4	4	4
G8	Ayr-LochStriven	1	1	1	4	4	4	4	4	4	4	4	4
G80	Eastcoast	1	1	1	4	4	4	4	4	4	4	4	2
G81	Shetland-N-Uyea	1	1	1	2	4	4	4	4	4	4	4	1
G9	WC-LochCreranLynnhe	1	1	1	1	1	2	4	4	4	1	1	1
P16	Ayr-LochFyneArdkinglas	1	1	1	4	4	4	4	4	4	4	4	2
P38	Tain	1	1	1	1	2	4	4	4	4	4	1	1
P41	Skye-LochEishort	1	1	1	4	4	4	4	4	4	4	4	2
P5	Mull-LochSpelve	1	1	1	1	1	1	2	4	2	1	1	1
P6	WC-LochMelfort	1	1	1	2	4	4	4	4	4	4	2	1
P61	Shetland-SW-GrutingVoe	1	1	1	4	4	4	4	4	4	4	4	1
P64	Shetland-W-BustaVoe	1	1	1	2	4	4	4	4	4	4	4	1
P65	Shetland-N-Balta	1	1	1	4	4	4	4	4	4	4	4	2
P68	Shetland-SW-VailaVoe	1	1	1	4	4	4	4	4	4	4	4	2
P7	Mull-LochScridain	1	1	1	4	4	4	4	4	4	4	4	2
P70	Shetland-W-OlnaFirth	1	1	1	1	4	4	4	4	4	4	2	1
P72	Shetland-W-AithVoe	1	1	1	4	4	4	4	4	4	4	4	1

Table 5: Current sampling frequency for LT in Pacific oysters, as implemented since 2015 (1= monthly, 2 = fortnightly, 4 = weekly).

Groups	GroupName	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PO1	Mull	1	4	1	1	1	1	1	2	4	2	1	1
PO10	WC-LochEtiveMelfort	1	2	1	1	1	1	1	1	4	1	1	1
PO123	WC-Gigha	2	4	4	4	4	2	1	4	4	4	4	4
PO18	Ayr	1	4	4	2	2	1	1	4	4	4	2	4
PO28	WC-Lochaber	1	4	4	2	2	1	1	4	4	4	2	4
PO42	SkyeShetland	1	4	4	2	2	1	1	4	4	4	2	4
PO49	NWC	1	2	1	1	1	1	1	2	4	2	1	1
PO9	WC-LochCreranLynnhe	1	4	2	1	1	1	1	4	4	4	1	1

2.3.2 Risk assessment approach

The aim of the sampling strategy employed in the monitoring programme is to maximise confidence that a harvesting site is clear (i.e. toxin levels are below a given limit). This is equivalent to minimising the risk that toxin levels at a pod unknowingly exceed a given limit. For the purposes of this study, this will be referred to as the 'risk of non-detection', and can be applied to any of the three biotoxins and any toxin level (limit) of interest. It is defined as follows:

Risk of non-detection is defined as the chance that biotoxin levels unknowingly exceed a given limit in a particular week, averaged over a four week period

The averaging over weeks can also be interpreted as the risk of non-detection for a randomly chosen week in that period. In other words, it looks at the probability that the pod is not sampled while toxin levels exceed a given limit (such as MPL).

The risk of non-detection depends on two factors, namely

a. the chance that the pod is toxic (i.e. probability that toxin levels exceed a given limit), and
b. the sampling frequency.

An increase in biotoxin prevalence or a decrease in the sampling frequency lead to an increased risk of non-detection.

The risk of non-detection was calculated as follows. Let the chance that toxin levels exceed a given limit in week i (i =1,…4) in a four week period be denoted by p_I . For each toxin/species combination, our model (see Section 2.2) provides an estimate of p_I for each group of pods. For simplicity, it was assumed that a negative test result (i.e. toxin level below a given limit such as MPL) is valid for one week. This implies that if samples were to be taken every week, the risk of the field unknowingly exceeding a given biotoxin limit is zero. Likewise, if samples were taken every fortnight, the risk is (p_I +0+ p_j +0)/4, where i and j denote the weeks in which no sampling took place. To be on the safe side our calculations always used the weeks with the two highest probabilities within the four week period in this calculation. If samples were taken every four weeks, the average risk of non-detection is (p_I +p_j + p_k +0)/4 , where again we chose the weeks i,j and k with highest risk of a toxic event. In other words, our definition of the risk of non-detection is the probability of the biotoxin event going undetected in a particular week, averaged over four weeks. To summarise:

- Weekly sampling: risk of non-detection is zero
- Fortnightly sampling: risk of non-detection is (p_I +p_j)/4, where i and j denote the weeks with highest risk in the given period
- Four-weekly sampling: risk of non-detection is (p_I +p_j + p_k)/4, where i, j and k denote the weeks with highest risk in the given period

2.3.3 Risk assessment of the current monitoring scheme

For each toxin/species combination, the model (see Section 2.2.1) provides an estimate p_I (i=1,…,52) of (the chance that toxin levels exceed the MPL) for each pod group for each week of the year. Based on the sampling frequencies employed in the current monitoring scheme, the risk of non-detection was calculated as outlined above for each group of pods and each four-week period.

2.3.4 Formulation of alternative monitoring schemes

Alternative sampling schemes were developed considering three possible frequencies, namely *every four weeks* when toxin levels are *unlikely* to exceed a given limit, *once per week* when toxin levels are *likely* to exceed this given limit, and fortnightly otherwise. Let R_{max} be a given maximum acceptable risk of non-detection. Then the most efficient (i.e. requiring the least samples) monitoring scheme is given by four-weekly sampling for (p_I +p_j + p_k) < 4 R_{max} (i,j,k denoting weeks with highest risks within the period), fortnightly sampling for (p_I +p_j + p_k)≥ 4 R_{max} but (p_I +p_j) < 4 R_{max}, and weekly sampling for p_I +p_j ≥ 4 R_{max} (i and j again denoting the weeks with highest risk). It was agreed by FSS to set the maximum acceptable risk R_{max} to 1% but to consider also setting this at 2%.

For DA and PST the intention was to keep the risk of the biotoxin not exceeding half the MPL below 1%. For DA there were insufficient samples exceeding this cut-off for statistical modelling and the risk assessment is based on data alone. For LT, as about half of the data are based on the MBA which gives a below or above MPL result, the proposed schemes are based on keeping the risk of not detecting LT exceeding MPL below 1%.

3 Data summaries

3.1 Grouping of pods

To allow for statistical modelling of the biotoxin data, pods with limited data had to be combined with other pods. With the 2015 FSS grouping taken as a starting point, these were revised such that pods with large amounts of test results (more than 300 samples in total, covering all months of the year) were regarded as stand-alone pods. The remaining pods were grouped appropriately, taking into account proximity and similarities in prevalence of phytoplankton (*Pseudo-nitzschia* spp., *Alexandrium* spp., *Dinophysis* spp.) as described in Section 2.1.3. The aim was for each (group of) pod(s) to have mussel data for each year and for each month (but not necessarily for each month in each year). This resulted in 25 groups and 15 stand-alone pods (see Table 2, Figure 1).

In what follows, each stand-alone pod or group of pods will be referred to as a 'Group'. All biotoxin data and model summaries will be based on these groupings, with the exception of the model results for Pacific oysters, for which coarser grouping has been used (details in Table 3). These groups of pods have been given names that are roughly indicative of the area they cover. For example, group G39 is called NWC-LochEweBroom, indicative of the north-west coast of Scotland, and that these pods cover mainly Loch Ewe and Loch Broom. See Table 2 for details.

3.2 Observed phytoplankton patterns

A total of 18,958 phytoplankton samples were analysed between April 2000 and December 2020. The overall patterns are shown in Figures 2 and 3. No phytoplankton data are available between April and August 2005. Data were summarised according to the revised group or stand-alone pod pattern used for the biotoxin analysis. Most of the samples were collected between the months of April and September, as phytoplankton is rarely abundant in Scottish coastal waters over winter due to low light levels.

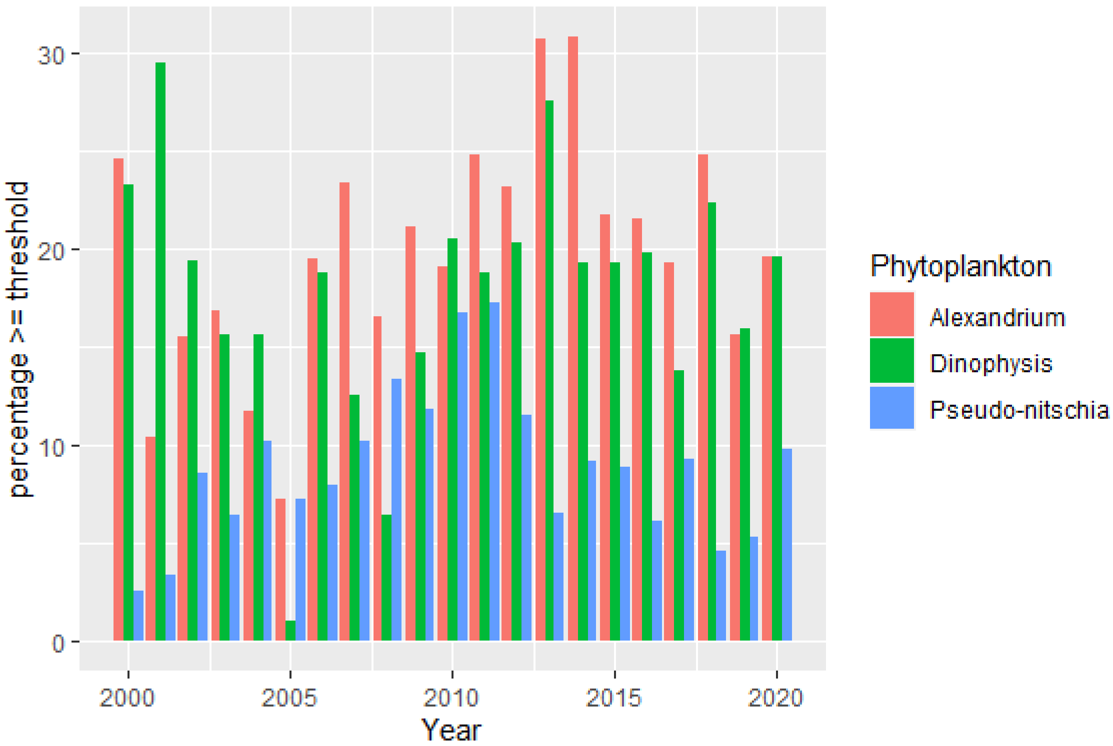


Figure 2: Percentage of samples with phytoplankton genera equal to or exceeding threshold, by year. Based on 18,958 samples collected in 2000-2020. No phytoplankton data are available between April and August 2005.

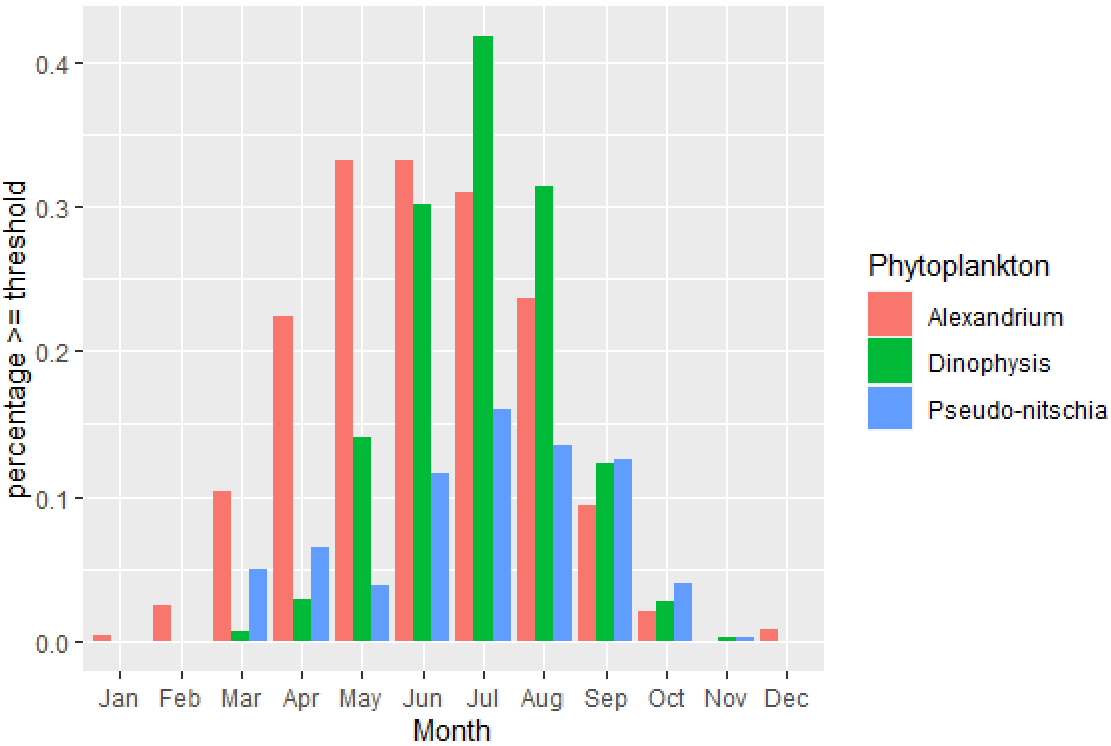


Figure 3: Percentage of samples with phytoplankton genera equal to or exceeding threshold, by month. Based on 18,958 samples collected in 2000-2020.

Alexandrium spp. is above the threshold if levels are equal to or exceed 40 cells/L. Appendix Table B1 shows the percentage of samples with *Alexandrium* spp. equal to or exceeding the threshold level of 40 cells/L by month. Although *Alexandrium* may be present in the water column all year round, there is a noticeable increase in samples containing *Alexandrium* above threshold from March through to September (Figure 3).

Appendix Table B2 shows the percentage of samples with *Dinophysis* spp. equal to or exceeding the threshold level of 100 cells/L by month. *Dinophysis* blooms are most frequent during the summer months with the percentage of samples exceeding the threshold peaking in July (Figure 3).

Appendix Table B3 shows the percentage of samples with *Pseudo-nitzschia* spp. equal to or exceeding the threshold level of 50,000 cells/L by month. *Pseudo-nitzschia* is usually present in the water column all year round, but cell abundance often increases in March/April when the spring bloom occurs. Blooms occur most frequently from June to September (Figure 3).

3.3 Observed biotoxin patterns for cockles, mussels, Pacific oysters, razors and surf clams

Mussels, Pacific oysters, razors, surf clams and cockles were tested over the full period. Only mussels and Pacific oysters have a large number of test results available for a large number of pods.

3.3.1 Observed DA

General patterns

The average concentration levels of DA were generally low (Figure 4). The proportion of samples for which DA equalled or exceeded 5 mg/kg is shown in Appendix Figure A1. The annual values shown in Figure 4 for the minor species (cockles, razors and surf clams) should be treated with some caution due to low sample numbers. In particular, the high average DA concentration in surf clams 2017 is based on just six samples. Only two (out of 1073) cockle samples, three (out of 1470) razor samples and eleven (out of 18,010) mussel samples equalled or exceeded the MPL for DA of 20 mg/kg. When looking at half the MPL, this increased to five cockle samples, four razor samples (all in 2016), 39 mussel samples and three Pacific oyster samples.

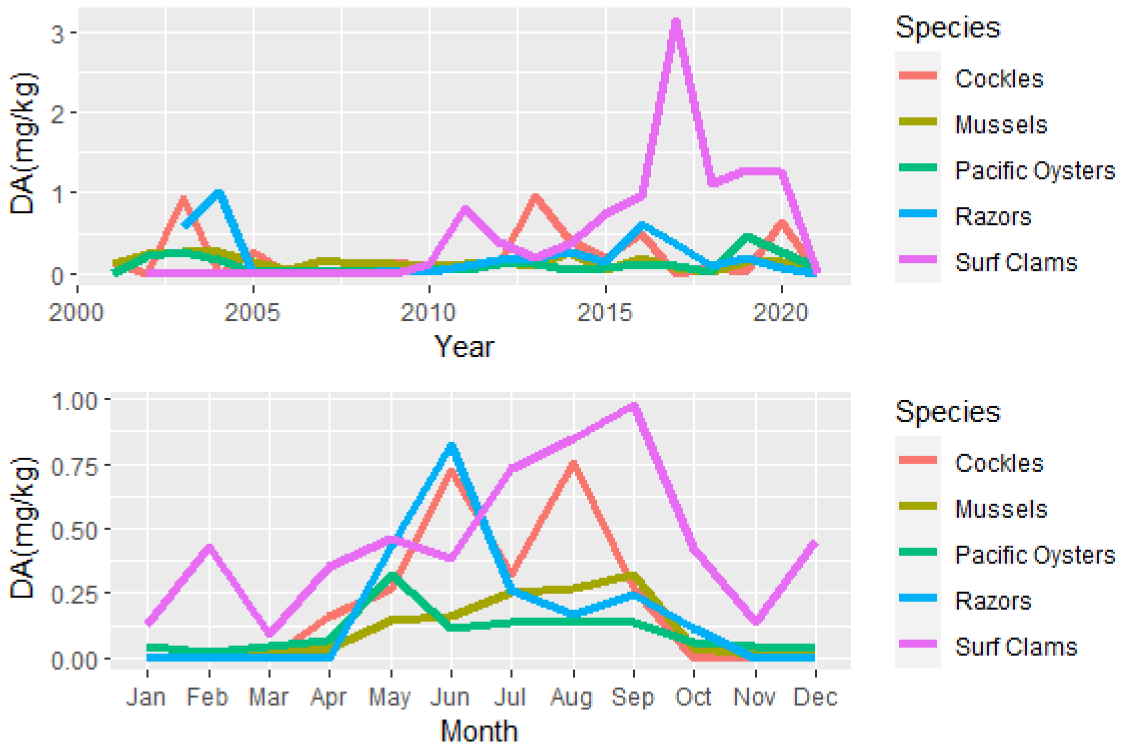


Figure 4: Average DA concentration (mg/kg) over years and months

Appendix Figures A6 and A9 show concentrations of DA and the proportion of samples for which DA equalled or exceeded 5 mg/kg over months in the last five years (2016-21).

Appendix Tables B4 and B5 show the percentage of samples with DA equalling or exceeding 5 mg/kg for each group and four week period for mussels and Pacific oysters respectively.

3.3.2 Observed PST

General patterns

Pacific oysters had a lower average concentration of PST than mussels (Figures 5). The annual values shown in Figure 5 for the minor species (cockles, razors and surf clams) should be treated with some caution due to low sample numbers. The proportion of samples that equalled or exceeded 400 µg/kg is shown in Appendix Figure A2. For PST, 1.0% of the mussel samples equalled or exceeded the MPL of 800 µg/kg, and this increased to 2.0% for samples equalling or exceeding half this limit.

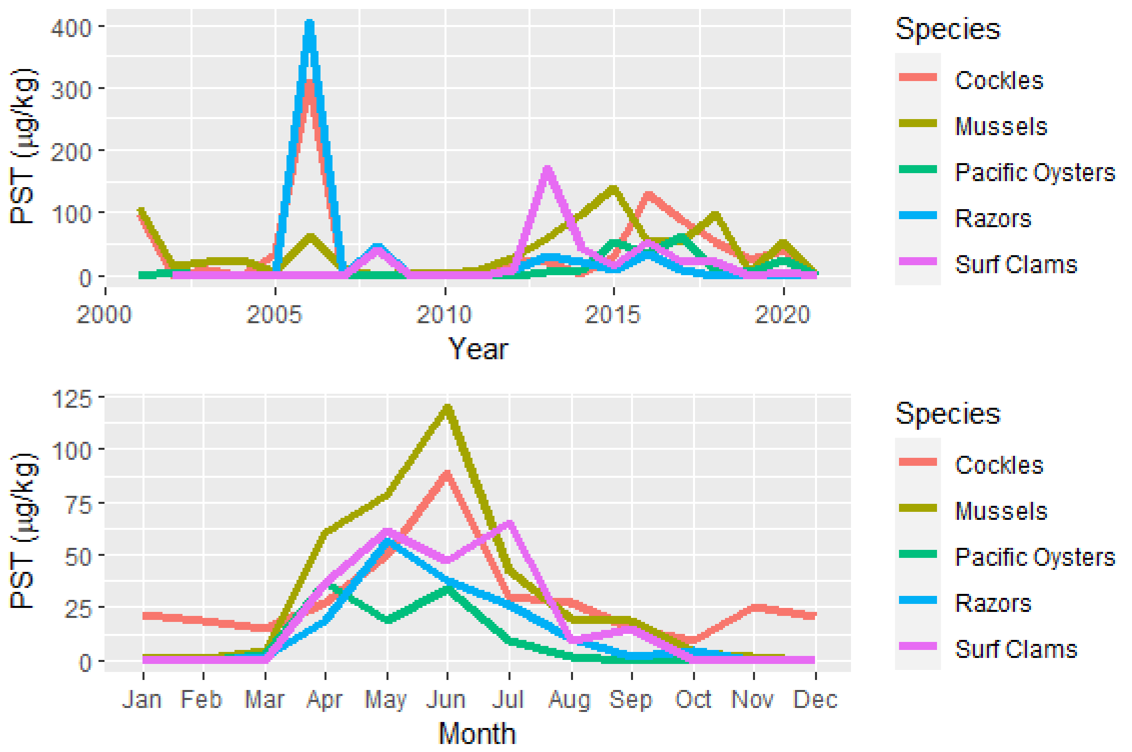


Figure 5 Average PST concentration (µg/kg) over years and months

Appendix Figures A7 and A10 show concentrations of PST and the proportion of samples that equalled or exceeded 400 µg/kg over months in the last five years (2016-21).

Appendix Tables B6 & B7 and B8 & B9 show the percentage of mussel and Pacific oyster samples with PST equalling or exceeding 800 µg/kg and 400 µg/kg respectively for each group and four week period.

3.3.3 Observed LTs - exceeding MPL

General patterns

As the MBA was used until 2011 we present in Figure 6 the proportion of samples exceeding the MPL rather than the average concentration. This is defined as those giving a positive value for the MBA or exceeding the MPL for any of the three LTs in the more recent data. The overall percentage of samples that exceeded the MPL was 7.9% for mussels, 1.6% for Pacific oysters and 6.7% for surf clams. Testing of specific LTs (AZA, OA and YTX) started in 2011. OA levels tend to be higher in mussels, whereas AZA levels tend to be higher in Pacific oysters (Appendix Figures A3 and A4). Only a very small proportion of samples tested positive for YTX (Appendix Figure A5). None of the samples exceeded the MPL for YTX and only nine mussel samples exceeded half the MPL.

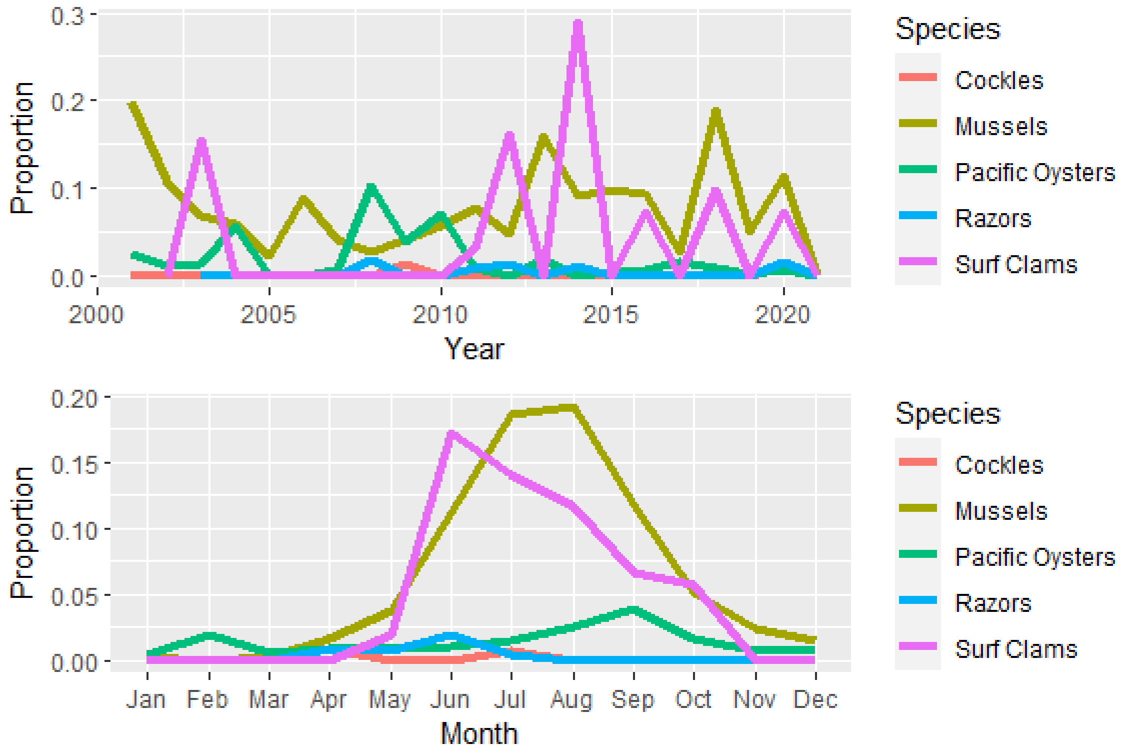


Figure 6: Proportion of samples with LT levels exceeding the MPL over years and months

Appendix Figure A8 shows the proportion of samples with LT levels exceeding the MPL and Appendix Figures A10, A11 and A12 show the individual LTs over months in the last five years (2016-21).

Appendix Tables B10 & B11, B12 & B13, B14 & B15, and B16 show the percentage of mussel and Pacific oyster samples with LTS exceeding the MPL, AZA equalling or exceeding 160 µg/kg, OA equalling or exceeding 160 µg/kg, and YTX exceeding 0, respectively for each group and four week period.

4 Risk assessment for mussels

For DA, due to very few mussel samples exceeding 10 and 20 mg/kg these cut-off levels could not be modelled. For PST, models were fitted to PST ≥ 800 and ≥400 µg/kg. For LTs, models were fitted to the number of samples for which LTs (either based on the MBA or on more recent LC-MS/MS results) exceeded the MPL.

Tables 4a and 4b gives the current monitoring frequencies for DA, PST and LTs in mussels. These are monthly, fortnightly or weekly. Combining these monitoring frequencies with the prevalence estimated from our models allows for determination of the likelihood of missing a toxic event based on the current monitoring frequencies.

DA in mussels

Current monitoring frequency is monthly in all pods. High levels of DA are a rare event, with less than 0.1% of the samples (eleven out of 18,010 samples tested) equalling or exceeding the MPL of 20 mg/kg and with only an additional 28 samples equalling or exceeding half the MPL. Tables 6 and 7 show the group by month combinations for which one or more samples had test results equalling or exceeding 20 or 10 mg/kg respectively. Model predictions for the probability of DA equalling or exceeding 5 mg/kg are shown in Appendix Table B17. As model predictions are not available for DA exceeding the MPL or half the MPL monitoring frequencies are suggested based on Tables 6 and 7. In order to keep the risk of not detecting a toxic event below 1%, weekly monitoring is suggested when the proportion of samples equalling or exceeding the MPL or half the MPL is greater than 2% and fortnightly sampling when it is between 1.33% and 2%. To keep the risk below 2% weekly monitoring is suggested when the proportion of samples equalling or exceeding the MPL or half the MPL is greater than 4% and fortnightly sampling when it is between 2.67% and 4%.

Table 6: Percentage of mussel samples for which DA ≥20 mg/kg with recommended sampling frequencies. % of samples equalling or exceeding the MPL greater than 2% (for which weekly sampling is suggested) are highlighted in red, and % of samples between 1.33% and 2% (for which fortnightly sampling is suggested) are highlighted in yellow.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G18	0.00	0.00	0.00	0.00	0.00	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	2.56	0.00	0.00	0.00
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	0.00	0.00	0.00	0.00	0.00
G57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	0.00
G58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.00	0.00	0.00	0.00
P16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.96	2.08	0.00	0.00	0.00
P6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7: Percentage of mussel samples for which DA ≥ 10 mg/kg with recommended sampling frequencies. % of samples equalling or exceeding half the MPL greater than 2% highlighted in red and % of samples between 1.33% and 2% highlighted in yellow.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G18	0.00	0.00	0.00	0.00	0.00	1.85	0.00	1.52	0.00	0.00	0.00	0.00	0.00
G21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.04	1.20	0.00	0.00	0.00
G23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49	1.35	2.56	0.00	0.00	0.00
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	0.00	0.00	0.00	0.00
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44	0.00	0.00	0.00	0.00	0.00
G48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.67	0.00	0.00	0.00	0.00
G49	0.00	0.00	0.00	0.00	0.00	0.00	1.85	0.00	0.00	0.00	0.00	0.00	0.00
G54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	0.00	3.70	0.00	0.00	0.00
G57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.00	0.00	0.00	0.00
G58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69	0.00	0.00	0.00	0.00	0.00
G71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.00	0.00	0.00	0.00	0.00	2.44	3.77	0.00	1.75	1.72	0.00	0.00	0.00
P16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	1.96	2.08	0.00	0.00	0.00
P6	0.00	0.00	0.00	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00
P64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	0.00
P69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7	0.00	0.00	0.00	0.00	2.94	2.44	0.00	0.00	2.86	0.00	0.00	0.00	0.00
P70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.38	0.00	0.00	0.00	0.00	0.00
P72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PST in mussels

The current monitoring frequencies for PST in mussels are month and pod specific (Table 4a). With the current frequencies, the risk of not detecting PST equal to or exceeding 800 µg/kg is less than 1% (Table 8). However, there are a few locations and months where the risk of not detecting PST ≥ 400 µg/kg (Table 9).

Table 8: Risk (%) of not detecting PST equal to or exceeding 800 µg/kg in mussels, based on the current monitoring scheme, for an average year. Risk between 1% and 2% is highlighted in yellow, risk exceeding 2% is highlighted in red.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.03	0.05	0.09	0.19	0.11	0.00	0.00	0.18	0.35	0.14	0.07	0.04	0.04
G18	0.02	0.08	0.43	0.32	0.00	0.00	0.00	0.09	0.11	0.03	0.01	0.01	0.01
G21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G22	0.00	0.00	0.00	0.00	0.03	0.08	0.37	0.27	0.01	0.00	0.00	0.00	0.00
G23	0.01	0.02	0.05	0.14	0.39	0.21	0.00	0.06	0.10	0.04	0.02	0.01	0.01
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.00	0.00	0.00	0.12	0.18	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
G39	0.10	0.10	0.10	0.10	0.10	0.03	0.03	0.10	0.10	0.10	0.10	0.10	0.13
G42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G48	0.01	0.02	0.08	0.05	0.00	0.00	0.00	0.26	0.33	0.06	0.02	0.01	0.01
G49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
G54	0.00	0.00	0.00	0.01	0.02	0.00	0.14	0.01	0.00	0.00	0.00	0.00	0.00
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G57	0.15	0.15	0.15	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.21
G58	0.26	0.26	0.26	0.26	0.09	0.09	0.26	0.17	0.00	0.00	0.00	0.26	0.34
G67	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.47	0.04	0.01	0.00
G71	0.42	0.42	0.42	0.42	0.14	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.56
G8	0.07	0.18	0.66	0.41	0.00	0.00	0.00	0.56	0.89	0.23	0.08	0.05	0.06
G80	0.14	0.14	0.14	0.14	0.05	0.00	0.00	0.05	0.14	0.14	0.14	0.14	0.18
G81	0.03	0.03	0.05	0.08	0.04	0.00	0.16	0.35	0.00	0.16	0.11	0.06	0.05
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.00	0.00	0.00	0.01	0.07	0.07	0.00	0.20	0.21	0.02	0.00	0.00	0.00
P16	0.12	0.26	0.63	0.32	0.00	0.39	0.61	0.13	0.11	0.06	0.04	0.04	0.08
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.36	0.52	0.86	0.39	0.00	0.00	0.34	0.42	0.42	0.30	0.26	0.25	0.37
P41	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6	0.06	0.08	0.11	0.18	0.31	0.31	0.55	0.43	0.27	0.16	0.10	0.07	0.08
P61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P64	0.12	0.11	0.12	0.17	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.24
P65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P68	0.00	0.00	0.00	0.00	0.01	0.02	0.13	0.00	0.00	0.04	0.05	0.01	0.00
P69	0.04	0.04	0.05	0.08	0.04	0.00	0.37	0.88	0.00	0.36	0.23	0.10	0.07
P7	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P70	0.17	0.17	0.17	0.17	0.11	0.06	0.06	0.17	0.17	0.06	0.17	0.17	0.23
P72	0.18	0.18	0.18	0.18	0.06	0.00	0.00	0.00	0.00	0.00	0.12	0.18	0.24

Table 9: Risk (%) of not detecting PST equal to or exceeding 400 µg/kg in mussels, based on the current monitoring scheme, for an average year. Risk between 1% and 2% is highlighted in yellow, risk exceeding 2% is highlighted in red.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	0.06	0.11	0.21	0.42	0.20	0.26	0.54	0.26	0.13	0.07	0.05	0.04	0.06
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.02	0.03	0.08	0.27	0.20	0.00	0.00	0.30	0.44	0.11	0.04	0.02	0.02
G18	0.04	0.18	1.23	0.94	0.00	0.00	0.00	0.35	0.47	0.10	0.03	0.02	0.03
G21	0.01	0.03	0.11	0.49	0.32	0.43	0.24	0.04	0.01	0.00	0.00	0.00	0.01
G22	0.00	0.00	0.00	0.01	0.13	0.17	1.37	1.91	0.16	0.01	0.00	0.00	0.00
G23	0.01	0.02	0.04	0.14	0.51	0.32	0.00	0.09	0.13	0.03	0.01	0.01	0.01
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.07	0.22	0.00	1.24	0.87	0.00	0.00	0.09	0.11	0.03	0.01	0.01	0.03
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.03	0.05	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00
G39	0.00	0.00	0.00	0.00	0.16	0.29	0.14	0.08	0.00	0.00	0.00	0.00	0.00
G42	0.00	0.01	0.05	0.37	0.37	0.00	0.00	0.17	0.21	0.03	0.01	0.00	0.00
G48	0.03	0.09	0.42	0.29	0.00	0.00	0.00	0.44	0.53	0.09	0.03	0.01	0.02
G49	0.01	0.03	0.09	0.17	0.22	0.00	0.00	0.38	0.40	0.05	0.02	0.01	0.01
G54	0.00	0.00	0.00	0.02	0.05	0.00	0.36	0.03	0.00	0.00	0.00	0.00	0.00
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G57	0.06	0.07	0.10	0.18	0.09	0.00	0.00	0.00	0.00	0.00	0.23	0.11	0.09
G58	0.03	0.04	0.10	0.43	0.30	0.33	0.57	0.32	0.00	0.00	0.00	0.16	0.05
G67	0.38	0.29	0.12	0.06	0.03	0.04	0.11	0.00	0.00	0.89	0.20	0.13	0.31
G71	0.07	0.07	0.10	0.16	0.08	0.00	0.00	0.00	0.00	0.00	0.65	0.23	0.14
G8	0.04	0.16	1.01	0.75	0.00	0.00	0.00	0.88	1.13	0.18	0.04	0.02	0.03
G80	0.02	0.04	0.08	0.22	0.13	0.00	0.00	0.23	0.39	0.13	0.05	0.03	0.03
G81	0.00	0.00	0.01	0.06	0.05	0.00	0.54	1.36	0.00	0.58	0.05	0.01	0.00
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.00	0.00	0.00	0.01	0.09	0.10	0.00	0.22	0.15	0.01	0.00	0.00	0.00
P16	0.05	0.16	0.63	0.41	0.00	0.53	0.53	0.06	0.04	0.02	0.01	0.01	0.03
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.00	0.00	0.04	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P41	0.03	0.11	0.50	0.54	0.00	0.00	0.00	0.07	0.09	0.02	0.01	0.01	0.01
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6	0.07	0.10	0.14	0.24	0.43	0.45	0.79	0.60	0.36	0.20	0.12	0.09	0.10
P61	0.03	0.02	0.02	0.03	0.05	0.07	0.17	0.41	1.59	0.00	0.63	0.21	0.10
P64	0.07	0.06	0.09	0.17	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.16
P65	0.46	0.46	0.46	0.46	0.15	0.00	0.15	0.46	0.46	0.00	0.46	0.46	0.61
P68	0.00	0.00	0.00	0.01	0.02	0.09	0.40	0.00	0.00	0.53	0.61	0.07	0.02
P69	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.90	0.00	0.21	0.00	0.00	0.00
P7	0.00	0.00	0.01	0.21	0.32	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
P70	0.26	0.25	0.27	0.31	0.25	0.15	0.22	0.68	0.70	0.20	0.53	0.40	0.42
P72	0.73	0.73	0.82	1.00	0.38	0.00	0.00	0.00	0.00	0.00	0.93	1.08	1.13

Table 10 shows the proposed monitoring frequency to keep the risk of non-detection of PST ≥ 400 µg/kg below 1% and Table 11 the frequency to keep the risk below 2%. Appendix Tables B18 and B19 show the same for PST ≥ 800 µg/kg. These are derived using the method described in Section 2.3.4. Model predictions for the probability of PST ≥ 800 µg/kg are shown in Appendix Table B20.

Table 10: Proposed sampling frequency to keep the risk of non-detection of PST in mussels equal to or exceeding 400 µg/kg below 1% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	1	1	1	1	1	1	1	1	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	2	4	4	4	1	1	1	1	1
G18	1	1	2	4	4	4	4	4	1	1	1	1	1
G21	1	1	1	1	4	4	1	1	1	1	1	1	1
G22	1	1	1	1	1	4	4	4	1	1	1	1	1
G23	1	1	1	1	1	2	2	1	1	1	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	4	4	4	4	1	1	1	1	1	1
G34	1	1	1	1	1	1	1	1	1	1	1	1	1
G35	1	1	1	1	2	4	4	4	1	1	1	1	1
G39	1	1	1	1	1	4	4	1	1	1	1	1	1
G42	1	1	1	1	4	4	4	4	1	1	1	1	1
G48	1	1	1	4	4	4	4	4	1	1	1	1	1
G49	1	1	1	1	4	4	4	4	1	1	1	1	1
G54	1	1	1	1	4	4	4	1	1	1	1	1	1
G56	1	1	1	1	1	1	1	1	1	1	1	1	1
G57	1	1	1	1	1	2	2	2	1	1	1	1	1
G58	1	1	1	1	4	4	1	1	4	4	1	1	1
G67	1	1	1	1	1	1	1	1	1	1	1	1	1
G71	1	1	1	1	1	2	4	4	4	4	1	1	1
G8	1	1	2	4	4	4	4	4	2	1	1	1	1
G80	1	1	1	1	1	4	4	2	1	1	1	1	1
G81	1	1	1	1	1	1	4	4	4	1	1	1	1
G9	1	1	1	1	1	1	1	1	1	1	1	1	1
P125	1	1	1	1	1	2	4	4	1	1	1	1	1
P16	1	1	1	4	4	4	1	1	1	1	1	1	1
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	4	4	4	1	1	1	1	1	1	1
P41	1	1	1	4	4	4	4	1	1	1	1	1	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	1	1	1	1	1	1	1	1	1
P61	1	1	1	1	1	1	1	2	2	2	1	1	1
P64	1	1	1	1	1	4	4	4	4	4	2	1	1
P65	1	1	1	1	1	1	1	1	1	1	1	1	1
P68	1	1	1	1	1	1	4	4	4	4	1	1	1
P69	1	1	1	1	1	1	1	4	4	1	1	1	1
P7	1	1	1	1	4	4	4	1	1	1	1	1	1
P70	1	1	1	1	1	1	1	1	1	1	1	1	1
P72	1	1	1	1	2	4	4	4	4	4	2	2	1

Table 11: Proposed sampling frequency to keep the risk of non-detection of PST in mussels equal to or exceeding 400 µg/kg below 2% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	1	1	1	1	1	1	1	1	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	1	4	4	1	1	1	1	1	1
G18	1	1	1	4	4	4	4	2	1	1	1	1	1
G21	1	1	1	1	1	1	1	1	1	1	1	1	1
G22	1	1	1	1	1	1	4	2	1	1	1	1	1
G23	1	1	1	1	1	1	1	1	1	1	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	1	4	4	4	1	1	1	1	1	1
G34	1	1	1	1	1	1	1	1	1	1	1	1	1
G35	1	1	1	1	1	4	4	1	1	1	1	1	1
G39	1	1	1	1	1	4	2	1	1	1	1	1	1
G42	1	1	1	1	4	4	4	1	1	1	1	1	1
G48	1	1	1	2	4	4	4	4	1	1	1	1	1
G49	1	1	1	1	2	4	4	4	1	1	1	1	1
G54	1	1	1	1	4	4	4	1	1	1	1	1	1
G56	1	1	1	1	1	1	1	1	1	1	1	1	1
G57	1	1	1	1	1	1	1	1	1	1	1	1	1
G58	1	1	1	1	2	1	1	1	1	2	1	1	1
G67	1	1	1	1	1	1	1	1	1	1	1	1	1
G71	1	1	1	1	1	1	2	2	4	1	1	1	1
G8	1	1	1	4	4	4	4	4	1	1	1	1	1
G80	1	1	1	1	1	1	1	1	1	1	1	1	1
G81	1	1	1	1	1	1	1	4	4	1	1	1	1
G9	1	1	1	1	1	1	1	1	1	1	1	1	1
P125	1	1	1	1	1	1	4	4	1	1	1	1	1
P16	1	1	1	2	4	2	1	1	1	1	1	1	1
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	1	4	4	1	1	1	1	1	1	1
P41	1	1	1	4	4	4	4	1	1	1	1	1	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	1	1	1	1	1	1	1	1	1
P61	1	1	1	1	1	1	1	1	1	1	1	1	1
P64	1	1	1	1	1	1	2	4	4	4	1	1	1
P65	1	1	1	1	1	1	1	1	1	1	1	1	1
P68	1	1	1	1	1	1	1	4	4	4	1	1	1
P69	1	1	1	1	1	1	1	4	4	1	1	1	1
P7	1	1	1	1	4	4	4	1	1	1	1	1	1
P70	1	1	1	1	1	1	1	1	1	1	1	1	1
P72	1	1	1	1	1	1	1	2	2	1	1	1	1

LTs in mussels

The current monitoring frequency is month and pod specific (Table 4b). As a consequence, the estimated risk of not detecting LTs exceeding MPL is estimated to be zero in many cases (Table 12). However, having fitted the smooth models there are some cases where the risk exceeds 1% or even 2%. As the data for LTs (which are expressed as below or above MPL) encompass the AZA, OA and YTX results, a separate risk assessment of these biotoxins has not been performed. However, model predictions for the probability of LT, AZA and OA exceeding the MPL are shown in Appendix Tables B21-B23.

Table 12: Risk (%) of not detecting LTs exceeding MPL in mussels, based on the current monitoring scheme, for an average year. Risk between 1% and 2% is highlighted in yellow, risk exceeding 2% is highlighted in red.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	0.61	0.56	0.62	0.81	0.75	0.52	0.00	0.00	0.00	0.00	1.23	0.82	1.08
G10	0.02	0.03	0.06	0.12	0.29	0.57	0.66	0.42	0.10	0.07	0.03	0.02	0.02
G123	0.01	0.01	0.02	0.12	0.78	1.48	1.47	0.00	0.00	0.00	0.62	0.06	0.02
G18	1.37	0.76	0.98	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94
G21	0.06	0.06	0.09	0.20	0.34	0.39	0.00	0.00	0.00	0.00	0.40	0.24	0.13
G22	0.01	0.01	0.01	0.02	0.08	0.47	1.07	0.00	0.00	0.52	0.21	0.05	0.02
G23	0.01	0.02	0.05	0.19	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.03
G26	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.08	0.00	0.16	0.24	0.24	0.32
G28	0.28	0.20	0.22	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79
G34	0.01	0.03	0.12	0.65	2.28	2.25	0.75	0.11	0.01	0.01	0.00	0.00	0.01
G35	0.12	0.09	0.12	0.15	0.17	0.00	0.00	0.00	0.00	0.00	0.00	1.15	0.49
G39	0.06	0.05	0.08	0.14	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.27
G42	0.43	0.29	0.27	0.38	0.18	0.00	0.00	0.00	0.00	0.00	0.00	1.10	1.14
G48	0.23	0.09	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48
G49	0.17	0.21	0.30	0.44	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.27
G54	2.87	2.29	2.04	1.36	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23
G56	0.20	0.30	0.77	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34
G57	0.10	0.14	0.33	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.17
G58	0.19	0.13	0.13	0.12	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52
G67	0.06	0.11	0.36	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
G71	2.28	1.81	2.02	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22
G8	1.72	0.97	0.93	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.44
G80	0.72	0.42	0.33	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85
G81	0.77	0.65	0.65	0.49	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.47
G9	0.01	0.01	0.01	0.01	0.04	0.08	0.32	0.00	0.00	0.00	0.19	0.05	0.02
P125	0.20	0.11	0.10	0.15	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.46
P16	1.13	0.92	1.15	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02
P31	0.25	0.26	0.29	0.32	0.35	0.39	0.40	0.40	0.25	0.33	0.29	0.27	0.33
P38	0.18	0.17	0.21	0.36	0.48	0.49	0.00	0.00	0.00	0.00	0.00	0.56	0.38
P41	0.21	0.16	0.22	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
P5	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.11	0.00	0.21	0.32	0.32	0.42
P6	0.04	0.06	0.14	0.20	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.10
P61	0.01	0.03	0.17	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
P64	0.09	0.09	0.14	0.19	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
P65	0.93	1.06	1.49	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68
P68	0.06	0.13	0.55	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
P69	0.39	0.30	0.32	0.28	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07
P7	0.01	0.01	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
P70	0.07	0.07	0.13	0.36	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.15
P72	0.04	0.04	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10

Table 13 shows the suggested monitoring frequency to keep the risk of non-detection of LTs > MPL below 1% and Table 14 to keep the risk below 2%.

Table 13: Proposed sampling frequency to keep the risk of non-detection of LTs in mussels exceeding the MPL below 1% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	2	4	4	4	4	4	4	2	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	1	4	4	4	4	4	1	1	1
G18	4	1	1	4	4	4	4	4	4	4	4	4	4
G21	1	1	1	1	1	4	4	4	4	4	1	1	1
G22	1	1	1	1	1	1	4	4	4	1	1	1	1
G23	1	1	1	1	1	4	4	4	4	4	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	1	2	4	4	4	4	4	4	2	1
G34	1	1	1	1	4	4	1	1	1	1	1	1	1
G35	1	1	1	1	2	4	4	4	4	4	4	4	1
G39	1	1	1	1	4	4	4	4	4	4	4	2	1
G42	1	1	1	1	1	4	4	4	4	4	4	4	1
G48	1	1	1	1	1	4	4	4	4	4	4	4	2
G49	1	1	1	1	2	4	4	4	4	4	4	1	1
G54	4	4	4	4	4	4	4	4	4	4	4	4	4
G56	1	1	1	4	4	4	4	4	4	4	4	1	1
G57	1	1	1	1	4	4	4	4	4	4	4	1	1
G58	1	1	1	1	1	4	4	4	4	4	4	1	1
G67	1	1	1	4	4	4	4	4	4	4	1	1	1
G71	4	4	4	4	4	4	4	4	4	4	4	4	4
G8	4	2	1	4	4	4	4	4	4	4	4	4	4
G80	1	1	1	1	1	4	4	4	4	4	4	4	4
G81	1	1	1	1	2	4	4	4	4	4	4	4	2
G9	1	1	1	1	1	1	1	4	4	1	1	1	1
P125	1	1	1	1	1	4	4	4	4	4	2	1	1
P16	2	1	2	4	4	4	4	4	4	4	4	4	4
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	1	1	4	4	4	4	4	2	1	1
P41	1	1	1	1	4	4	4	4	4	4	4	2	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	2	4	4	4	4	4	4	1	1
P61	1	1	1	4	4	4	4	4	4	4	1	1	1
P64	1	1	1	1	4	4	4	4	4	4	4	1	1
P65	1	2	4	4	4	4	4	4	4	4	4	4	2
P68	1	1	1	4	4	4	4	4	4	4	1	1	1
P69	1	1	1	1	1	4	4	4	4	4	4	4	1
P7	1	1	1	1	1	4	4	4	4	4	4	1	1
P70	1	1	1	1	4	4	4	4	4	4	2	1	1
P72	1	1	1	1	4	4	4	4	4	4	4	1	1

Table 14: Proposed sampling frequency to keep the risk of non-detection of LTs in mussels exceeding the MPL below 2% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	1	1	2	4	4	2	1	1	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	1	2	2	2	4	4	1	1	1
G18	1	1	1	2	4	4	4	4	4	4	4	4	4
G21	1	1	1	1	1	2	4	4	4	1	1	1	1
G22	1	1	1	1	1	1	4	4	2	1	1	1	1
G23	1	1	1	1	1	4	4	4	4	4	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	1	1	4	4	4	4	4	2	1	1
G34	1	1	1	1	2	2	1	1	1	1	1	1	1
G35	1	1	1	1	1	4	4	4	4	4	4	1	1
G39	1	1	1	1	1	4	4	4	4	4	4	1	1
G42	1	1	1	1	1	2	4	4	4	4	2	1	1
G48	1	1	1	1	1	4	4	4	4	4	4	4	1
G49	1	1	1	1	1	4	4	4	4	4	1	1	1
G54	4	2	2	2	2	4	4	4	4	4	4	4	4
G56	1	1	1	2	4	2	4	4	4	4	1	1	1
G57	1	1	1	1	2	4	4	4	4	4	1	1	1
G58	1	1	1	1	1	2	4	4	4	4	1	1	1
G67	1	1	1	1	4	4	4	4	4	4	1	1	1
G71	2	1	2	4	4	4	4	4	4	4	4	4	4
G8	2	1	1	1	4	4	4	4	4	4	4	4	4
G80	1	1	1	1	1	2	4	4	4	4	4	4	1
G81	1	1	1	1	1	1	4	4	4	4	4	1	1
G9	1	1	1	1	1	1	1	2	2	1	1	1	1
P125	1	1	1	1	1	4	4	4	4	4	1	1	1
P16	1	1	1	2	4	4	4	4	4	4	4	2	1
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	1	1	2	4	4	4	2	1	1	1
P41	1	1	1	1	2	4	4	4	4	4	4	1	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	1	4	4	4	4	4	4	1	1
P61	1	1	1	1	4	4	4	4	4	4	1	1	1
P64	1	1	1	1	1	4	4	4	4	4	1	1	1
P65	1	1	1	2	4	4	4	4	4	4	4	1	1
P68	1	1	1	4	4	4	4	4	4	4	1	1	1
P69	1	1	1	1	1	2	4	4	4	4	4	2	1
P7	1	1	1	1	1	4	4	4	4	4	1	1	1
P70	1	1	1	1	1	4	4	4	4	4	1	1	1
P72	1	1	1	1	1	4	4	4	4	4	1	1	1

5 Risk assessment for Pacific oysters

To allow for statistical modelling of the Pacific oyster data some of the groups used for mussels had to be combined. This is detailed in Table 3. Each group contains at least one pod for which Pacific oysters act as indicator species. To differentiate the Pacific oyster grouping from that of mussels, the groups are preceded by the letters 'PO'.

For DA, due to only three Pacific oyster samples exceeding 10 and none exceeding 20 mg/kg these cut-off levels could not be modelled. For PST, models were fitted to PST ≥ 800 and ≥ 400 µg/kg . For LT, models were fitted to the number of samples for which LT (either based on the MBA or on more recent LC-MS/MS results) exceeded the MPL.

The current monitoring frequency is monthly throughout the year for all sites for both DA and PST, Monitoring frequencies for LT are shown in Table 5. As with mussels, it is assumed that the aim of the monitoring scheme is to keep the risk of a toxic event going unnoticed below 1%.

DA in Pacific oysters

There were only two Pacific oyster samples exceeding 10 mg/kg (half the MPL), taken from pod 14 in 2019. These samples were taken five days apart and do not therefore represent independent events. A third sample taken from pod 85 in 2002 equalled half the MPL. Monthly monitoring is therefore sufficient to keep the risk of a toxic event going unnoticed below 1%.

PST in Pacific oysters

There are some groupings where the risk of not detecting a toxic event exceeds 1% or 2% in early summer (Table 15).

Table 15: Risk (%) of not detecting PST equal to or exceeding 400 µg/kg in Pacific oysters, based on the current monitoring scheme, for an average year. Risk exceeding 1% is highlighted in yellow, risk exceeding 2% is highlighted in red.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	0.09	0	0.09	0.09	0.09	0.09	0.09	0.09	0.06	0	0.06	0.09	0.12
PO10	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
PO123	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
PO18	0.08	0	0.00	0.98	2.13	1.33	0.46	0.12	0.00	0	0.00	0.01	0.03
PO28	0.00	0	0.00	0.03	0.19	1.26	0.98	0.20	0.00	0	0.00	0.00	0.00
PO42	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
PO49	0.00	0	0.03	0.12	0.76	2.67	2.28	0.53	0.04	0	0.00	0.00	0.00
PO9	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00

Table 16 shows the suggested monitoring frequencies based on the models for PST ≥ 800 µg/kg and Table 17 the frequency to keep the risk below 2%. These are derived using the method described in Section 2.3.4. Tables 18 and 19 show the corresponding monitoring frequencies based on the models for PST ≥ 400 µg/kg.

Table 16: Proposed sampling frequency to keep the risk of non-detection of PST in Pacific oysters equal to or exceeding 800 µg/kg below 1% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	1	1	1	1	1	1	1	1	1	1	1	1	1
PO18	1	1	1	4	4	1	1	1	1	1	1	1	1
PO28	1	1	1	1	1	2	2	1	1	1	1	1	1
PO42	1	1	1	1	1	1	1	1	1	1	1	1	1
PO49	1	1	1	1	1	1	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 17: Proposed sampling frequency to keep the risk of non-detection of PST in Pacific oysters equal to or exceeding 800 µg/kg below 2% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	1	1	1	1	1	1	1	1	1	1	1	1	1
PO18	1	1	1	1	4	1	1	1	1	1	1	1	1
PO28	1	1	1	1	1	1	1	1	1	1	1	1	1
PO42	1	1	1	1	1	1	1	1	1	1	1	1	1
PO49	1	1	1	1	1	1	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 18: Proposed sampling frequency to keep the risk of non-detection of PST in Pacific oysters equal to or exceeding 400 µg/kg below 1% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	**Wk1-4**	**Wk5-8**	**Wk9-12**	**Wk13-16**	**Wk17-20**	**Wk21-24**	**Wk25-28**	**Wk29-32**	**Wk33-36**	**Wk37-40**	**Wk41-44**	**Wk45-48**	**Wk49-52**
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	1	1	1	1	1	1	1	1	1	1	1	1	1
PO18	1	1	2	4	4	4	1	1	1	1	1	1	1
PO28	1	1	1	1	1	4	2	1	1	1	1	1	1
PO42	1	1	1	1	1	1	1	1	1	1	1	1	1
PO49	1	1	1	1	1	4	4	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 19: Proposed sampling frequency to keep the risk of non-detection of PST in Pacific oysters equal to or exceeding 400 µg/kg below 2% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	1	1	1	1	1	1	1	1	1	1	1	1	1
PO18	1	1	1	4	4	1	1	1	1	1	1	1	1
PO28	1	1	1	1	1	1	1	1	1	1	1	1	1
PO42	1	1	1	1	1	1	1	1	1	1	1	1	1
PO49	1	1	1	1	1	4	4	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

LTs in Pacific oysters

The risk of not detecting a toxic event exceeds 1% or 2% in some cases, particularly in group PO18 (Table 20).

Table 20: Risk (%) of not detecting LT exceeding MPL in Pacific oysters, based on the current monitoring scheme, for an average year. Risk exceeding 1% is highlighted in yellow, risk exceeding 2% is highlighted in red.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	0.57	0.00	0.42	0.26	0.15	0.11	0.10	0.12	0.12	0	0.23	0.38	0.62
PO10	0.34	0.27	0.42	0.35	0.23	0.14	0.10	0.08	0.07	0	0.11	0.17	0.33
PO123	0.80	0.00	0.00	0.00	0.00	0.27	0.87	0.65	0.00	0	0.00	0.00	0.88
PO18	0.14	0.00	0.00	0.15	0.49	1.37	2.34	2.23	0.00	0	0.00	0.23	0.11
PO28	0.98	0.00	0.00	0.13	0.18	0.21	0.25	0.28	0.00	0	0.00	0.23	0.25
PO42	0.01	0.00	0.00	0.01	0.03	0.14	0.28	0.40	0.00	0	0.00	0.06	0.01
PO49	0.09	0.06	0.11	0.15	0.26	0.51	0.88	1.19	0.71	0	0.28	0.22	0.17
PO9	0.41	0.00	0.26	0.39	0.40	0.42	0.44	0.31	0.00	0	0.00	0.46	0.58

Table 21 shows the suggested monitoring frequency to keep the risk of non-detection of LTs > MPL in below 1% and Table 20 to keep the risk below 2%. Model predictions for the probability of LT exceeding the MPL and AZA and OA exceeding half the MPL are shown in Appendix Tables B24-B26.

Table 21: Proposed sampling frequency to keep the risk of non-detection of LTs in Pacific oysters exceeding the MPL below 1% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	2	2	1	1	1	1	1	2	2	2	4	2	2
PO18	1	1	1	1	1	4	4	4	4	4	1	1	1
PO28	1	4	2	1	1	1	1	1	4	4	2	1	1
PO42	1	1	1	1	1	1	1	2	4	4	1	1	1
PO49	1	1	1	1	1	1	1	2	2	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 22: Proposed sampling frequency to keep the risk of non-detection of LTs in Pacific oysters exceeding the MPL below 2% for an average year. 4 = weekly (red), 2 = fortnightly (yellow), 1 = every four weeks (white).

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
PO1	1	1	1	1	1	1	1	1	1	1	1	1	1
PO10	1	1	1	1	1	1	1	1	1	1	1	1	1
PO123	1	1	1	1	1	1	1	1	1	1	1	1	1
PO18	1	1	1	1	1	1	2	4	4	1	1	1	1
PO28	1	1	1	1	1	1	1	1	2	2	1	1	1
PO42	1	1	1	1	1	1	1	1	4	4	1	1	1
PO49	1	1	1	1	1	1	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1	1	1	1

6 Risk assessment for cockles, razors and surf clams

Due to the limited data for toxin prevalence in cockles, razors and surf clams, the focus has been on data summaries. Weekly monitoring is recommended where the proportion of samples with exceeding 0.5 MPL is greater than 2% and fortnightly when it is between 1.33% and 2%. A smooth model similar to those for mussels and Pacific oysters but without the group variable was fitted for PST exceeding 0.5 MPL and LT exceeding the MPL and used to calculate the recommended sampling frequencies.

The proportion of samples exceeding various thresholds for the three toxin groups together with suggested monitoring frequencies are presented in Appendix C. These suggest that monitoring frequencies for the minor species should be increased. For example, cockles and razors should be monitored weekly for DA in June. Cockles and razors should be monitored for weekly for PST in May and June with razors also being monitored fortnightly for PST in July. Razors should be monitored fortnightly for LTs in June and the weekly monitoring of surf clams for LTs between May and October should continue.

7 Discussion

7.1 Reasons for changes since the last risk assessment

There are several reasons why the suggested monitoring frequencies differ from those in Holtrop *et al*. (2016). Firstly, more recent data have been included. In particular, there has been an increase in PST exceedances in Pacific oysters in the last few years. Secondly, some pod groupings have been split because there are now sufficient data to allow three individual pods which were previously part of a grouping to be analysed separately. For example, analysing Pod 31 separately has resulted in an increase in the estimated risk of LTs in mussels for the remainder of Group 34. Thirdly, some changes result from the use of smoothed models in place of ones with a separate effect for each month.

7.2 Assumptions regarding data, model and risk assessment

Many assumptions regarding the data, statistical model and risk assessment had to be made. Here we list and discuss the various assumptions and their implications.

Data assumptions

1. It is assumed that the test result gives a true representation of the biotoxin levels in the shellfish sample.

2. It is assumed that the biotoxin levels observed in the (small) sample tested are representative of biotoxin levels in shellfish across the entire harvesting site.

Experiments could be run to investigate this by testing a larger sample of shellfish and smaller subsamples for comparison.

3. It is assumed that harvesting sites within the same pod all follow the same pattern of biotoxin prevalence.

This assumption could be tested by collecting samples from individual sites within a pod at the same time and comparing the results.

From these three assumptions it follows that

4. It is assumed that the test result from the sample is representative of the biotoxin status of the entire pod.

If biotoxin levels anywhere in the pod exceed the MPL then it is assumed that the test result reflects this. Likewise, if the test result falls below the MPL then it is assumed that this is a reflection of biotoxin levels being 'safe' across the entire pod. It is obvious that the above assumptions are extremely severe and that, as a consequence, all model outcomes and risk assessment findings should never be seen in isolation. They should always be combined with other available information such as phytoplankton abundance, development of toxin patterns over the previous weeks at the same pod or neighbouring pods, etc.

Model assumptions

5. It is assumed that biotoxin patterns are similar for pods that have been grouped together

To allow for statistical modelling, several of the individual pods had to be grouped due to limited data. Care has been taken, however, to ensure that groupings take into account similarities in location and the abundance of the phytoplankton genera responsible for biotoxins in shellfish (but note that phytoplankton is not monitored at all pods). There are other pods which are also similar to each other, but we aimed to analyse pods individually where we considered that there were sufficient data to allow this.

6. Models are restricted to modelling the likelihood of exceeding a given limit of interest.

The models do not describe the development of actual toxin levels over time. Instead, the data have been simplified into below/above a given level. Modelling of actual levels (e.g. PST in µg/kg) is more informative but does require data to be collected regularly. Such a model might consist of two components, namely modelling the probability of toxin being absent (e.g. PST = 0 µg/kg, i.e. below the limit of detection) or present (e.g. PST > 0 µg/kg), and then, when the latter holds, to model what the actual toxin level would be. Again, such models are rather more complex than the ones used here and would require considerable effort to develop. Alternatively, it might be possible to use a Tweedie probability distribution to model these zero-inflated data.

Risk assessment assumptions

Based on the predicted prevalence per pod group for each month of the year, the current monitoring scheme was assessed for the risk of not detecting a toxic event (i.e. biotoxin levels exceed a given limit of interest). Alternative monitoring frequencies have been proposed such that the risk of non-detection is kept below 1%. The following assumptions were made:

7. It is assumed that the test result is valid for one week, i.e. if the test result indicates that the toxin level falls below a given cut-off then it is assumed that this will remain so for one week.

The implication of this assumption is that weekly monitoring is safe, i.e. with weekly monitoring we would always detect biotoxin levels exceeding the MPL.

8. Monitoring schemes have been formulated based on keeping the risk of non-detection below 1%

Modifications to the monitoring programme have been suggested based on keeping the risk of non-detection below 1%. This is a nominal figure as it assumes that the small sample sent off for testing is representative of the entire harvesting area, that test results are valid for one week, and that all other assumptions listed above hold. It does however give an indication of how (groups of) pod(s) compare and how biotoxin prevalence varies from month to month. As such it is informative in identifying locations and months that require more frequent sampling compared to locations or months that require less frequent sampling. Furthermore, the proposed monitoring programme errs on the safe side as it is based around half the MPL for DA and PST.

7.3 Uncertainty in model predictions

A limitation of the monitoring scheme is that there is high uncertainty in the model predictions. For example, Figure 7 shows the 95% confidence intervals for the predicted percentage of samples in G18 for which PST exceeds 400 µg/kg in an average year. If upper confidence limits were to be used for developing a monitoring scheme this would result in a large increase over current levels of monitoring with weekly sampling being needed in most groups for a large part of the year.

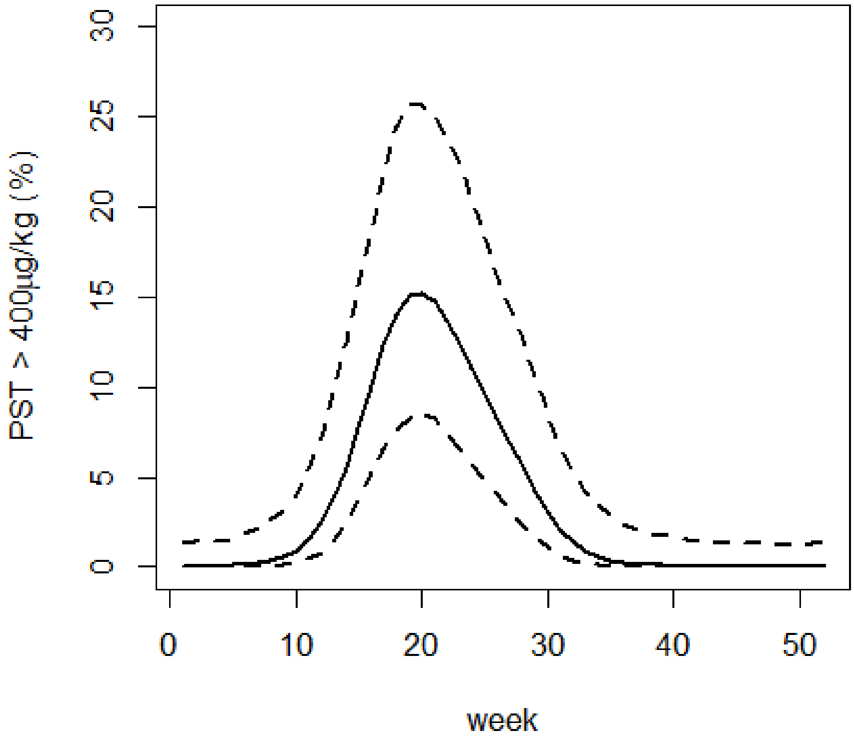


Figure 7: Predicted percentage of samples in G18 for which PST exceeds 400 µg/kg (solid line) in an average year together with the 95% confidence intervals (dashed lines).

7.4 Other aspects

Bias in data summaries

Although biotoxin data summaries are useful, it should also be kept in mind that such summaries may be biased, and therefore somewhat misleading. This may be due to, amongst others, the following:

- Sampling frequencies are irregular, with more frequent sampling during summer for some locations but not others. This may lead to overestimation of average annual toxin levels for the more frequently sampled pods (as it is likely that the samples collected during summer contain higher biotoxin levels) and would make comparisons between locations flawed when based on data aggregated over time.

- When the field is closed based on LT levels say, monitoring of DA and PST stops. If this happens during a period with high DA or PST prevalence, then the mean levels of these biotoxins will be underestimated (as samples that would have had high DA or PST are now missing). In order to reduce this bias FSS should perhaps consider continuing to monitor for all three groups of biotoxins even when a field is closed for harvesting.

Higher toxin levels are rare events

The data were insufficient to formulate statistical models for DA exceeding the MPL or half the MPL. This is due to there being insufficient samples exceeding these limits.

Modelling of individual pods allows for more targeted sampling

Where possible (i.e. when data were sufficient) pods have been treated as stand-alone. This allows for more targeted monitoring frequencies.

Uninterrupted sampling for a new pod

When testing for biotoxin is halted because the MPL has been exceeded, there is the potential for bias in the time series data. This is especially relevant for new pods. To build up a reliable picture of prevalence of biotoxins throughout the year for a new pod, it is especially important that during the first year of monitoring uninterrupted weekly testing takes place for all three groups of biotoxins. This implies that when the MPL is exceeded for one of the biotoxins, monitoring of all three groups of biotoxins should continue nonetheless.

Biotoxin monitoring programme should not be seen in isolation

It is clear from the many issues raised above that the biotoxin monitoring scheme should never be seen in isolation. Where possible, information from other sources (phytoplankton, development of biotoxin patterns over recent weeks for pod of interest and neighbouring pods, etc.) should be incorporated in any decision-making process with regard to increasing the monitoring frequency and/or field closure. The collection of additional climatic and environmental data at the monitoring locations should also be considered.

7.5 Summary of recommendations

- The sampling scheme for PST and LTs in mussels should be updated according to the recommendations in Tables 10 and 13 or 11 and 14 depending on whether it is desired to keep the risk of non-detection below 1% or 2%.
- Testing for DA in mussels is currently monthly in all pods. There are some pod groupings and weeks of the year when weekly or fortnightly sampling should be considered (see Tables 6 and 7).
- The testing frequency for PST in Pacific oysters is currently monthly. This should be increased to weekly or fortnightly in some cases (see Tables 16-19).
- Weekly testing for PST in cockles, razors and surf clams during the early summer should also be considered (see Appendix C for details).

Acknowledgements

FSS is thanked for funding this research. Kasia Kazimierczak (FSS) and Kelly White are thanked for the provision of data and information to support the risk assessment.

References

Holtrop, G. (2018) Exploring improvements to models used in risk assessment of the Scottish monitoring programme for marine biotoxins in shellfish harvested from classified production areas. Report to Food Standards Scotland, FSS/2017/020. May 2018.

Holtrop, G., Swan, S., Duff, B. Wilding, T., Narayanaswamy, B., Davidson, K. (2016) Risk Assessment of the Scottish Monitoring Programme for Marine Biotoxins in Shellfish harvested from Classified Production Areas: Review of the current Sampling Scheme to develop an improved programme based on evidence of risk. Report to Food Standards Scotland, FSS/2015/021. September 2016.

R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Wood SN (2021). mgcv: Mixed GAM Computation Vehicle with Automatic Smoothness Estimation. R package version 1.8-36, URL https://CRAN.R-project.org/package=mgcv.

Appendix A – Additional Figures

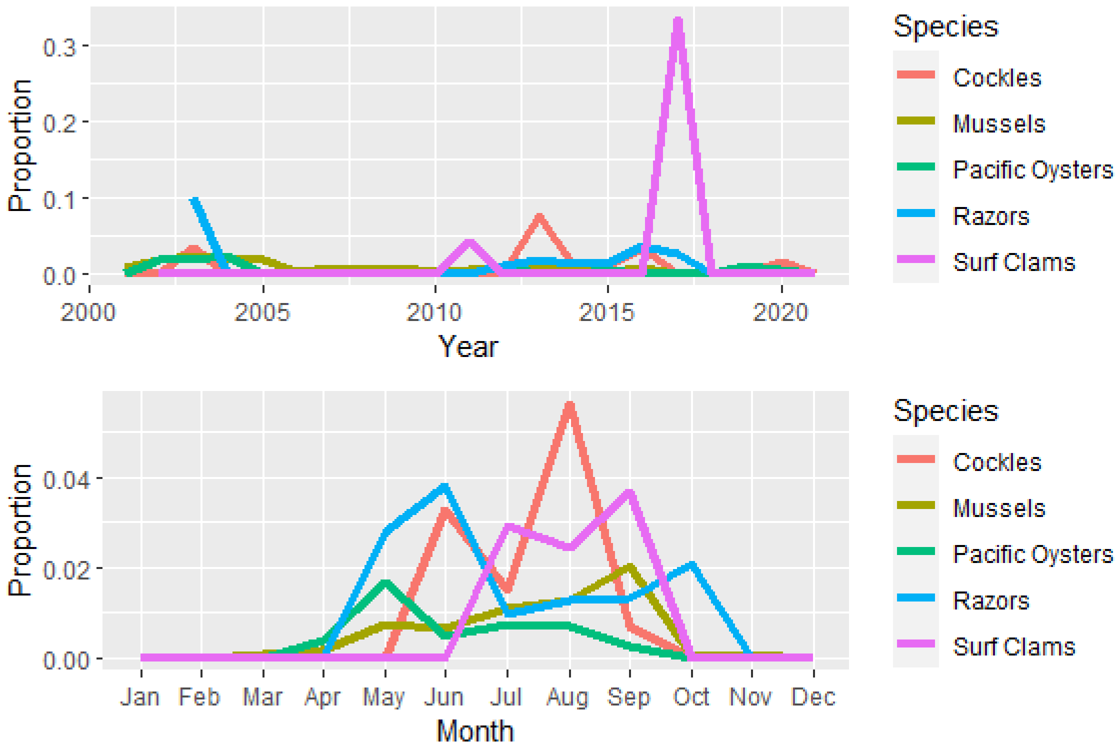


Figure A1: Proportion of samples with DA ≥ 5 mg/kg over years and months for each of five shellfish species.

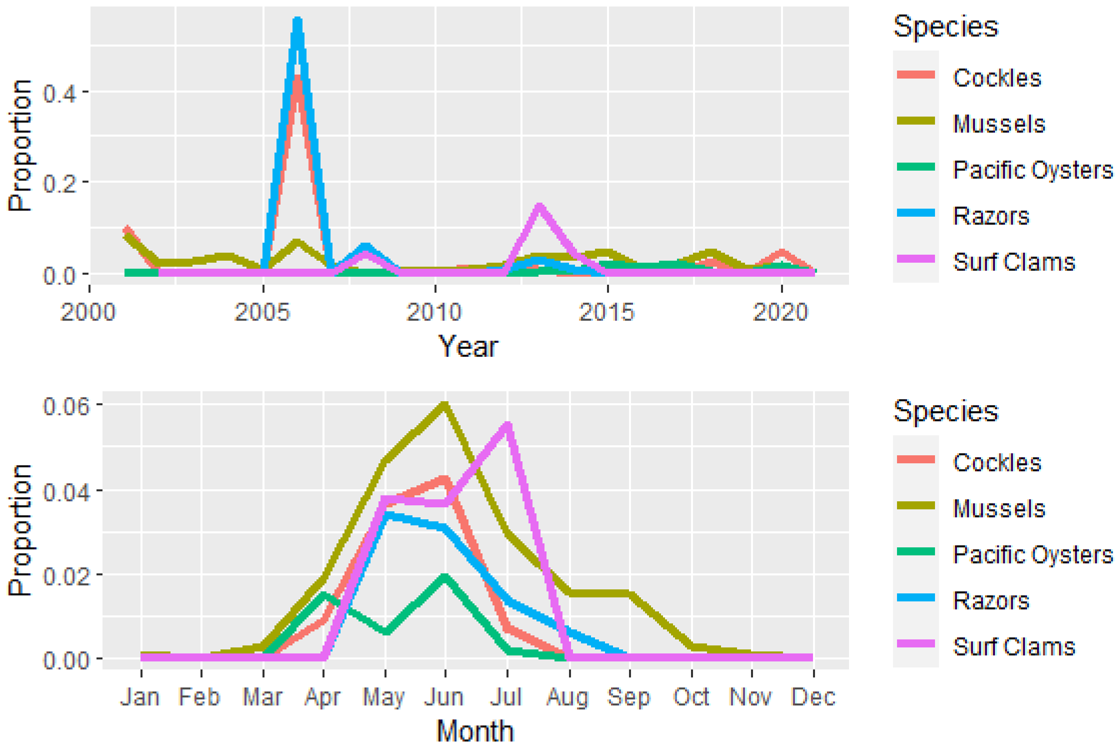


Figure A2: Proportion of samples with PST ≥ 400 µg/kg , over years and months, for each of five shellfish species.

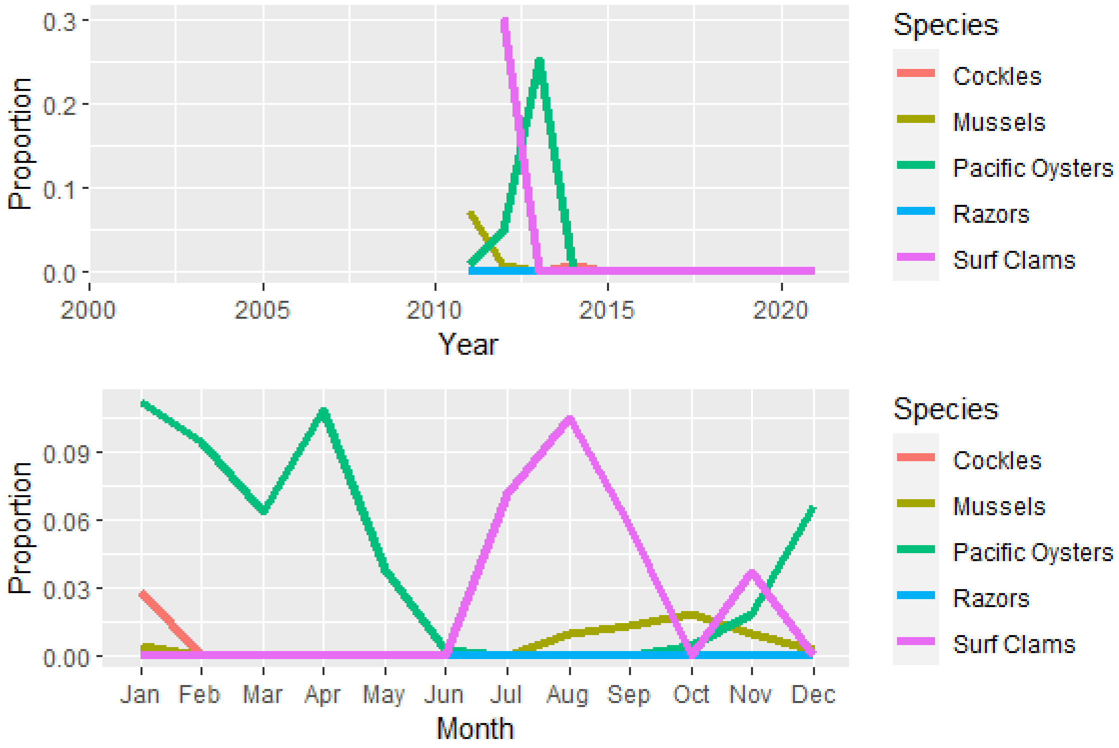


Figure A3: Proportion of samples with AZA ≥ 80 µg/kg over years and months, for each of five species.

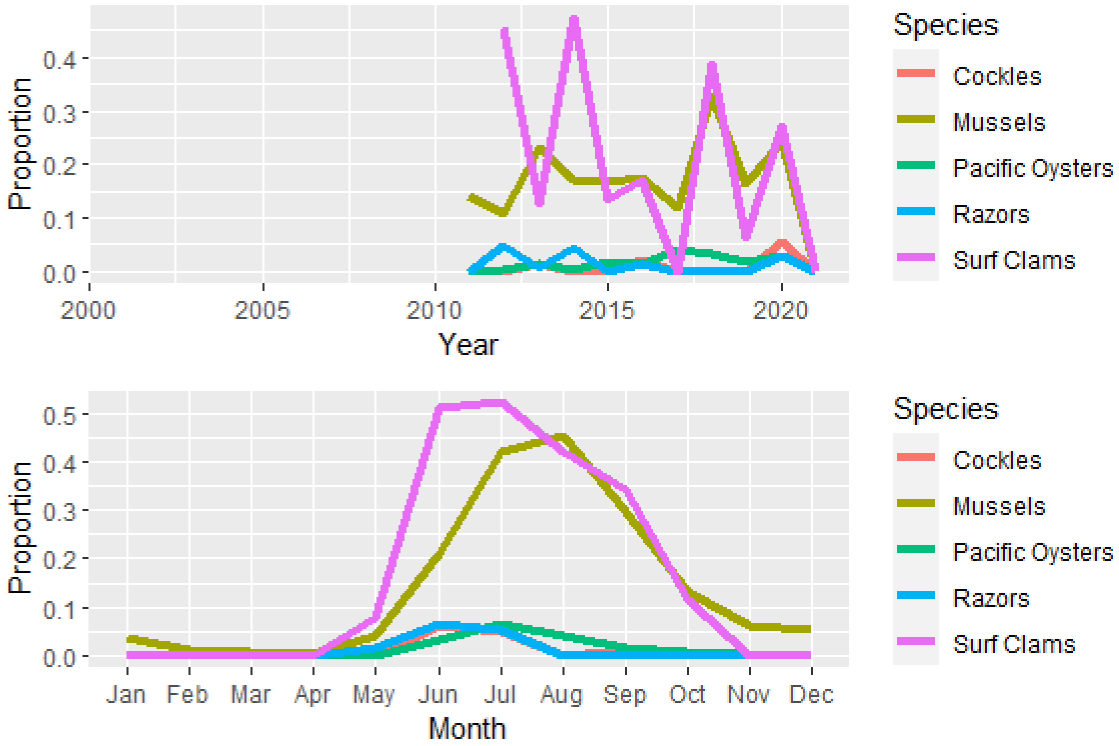


Figure A4: Proportion of samples with OA ≥ 80 µg/kg over years and months, for each of five species.

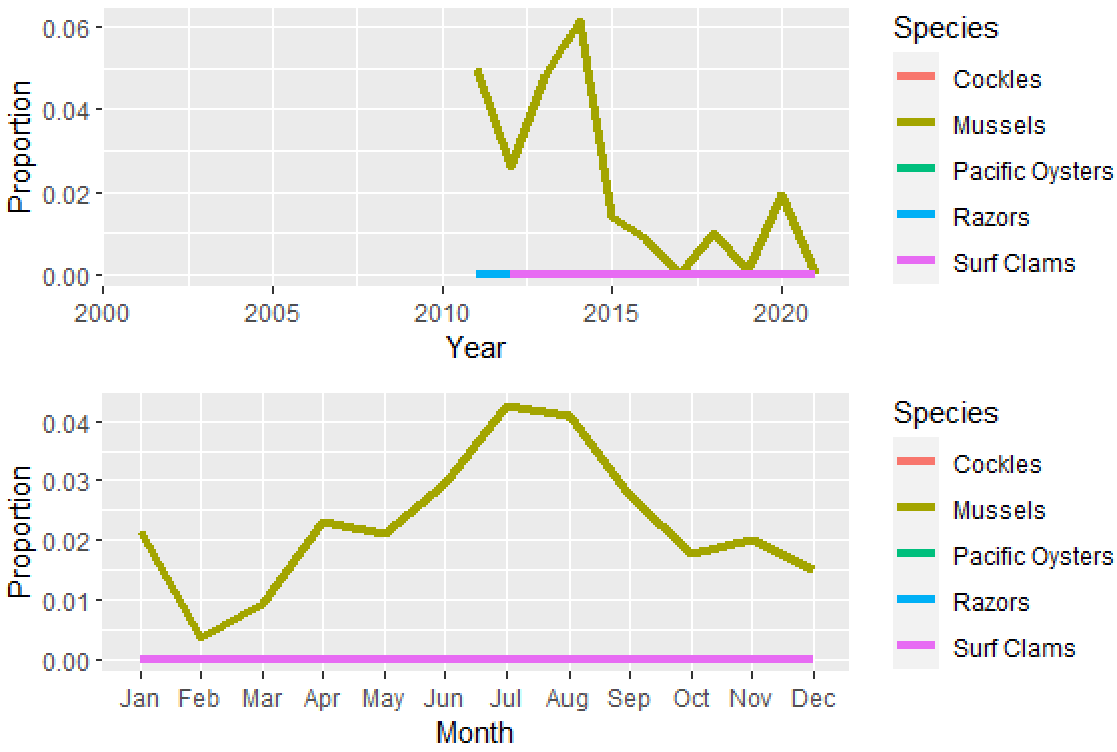


Figure A5: Proportion of samples with YTX present (but below MPL) over years and months, for each of five species.

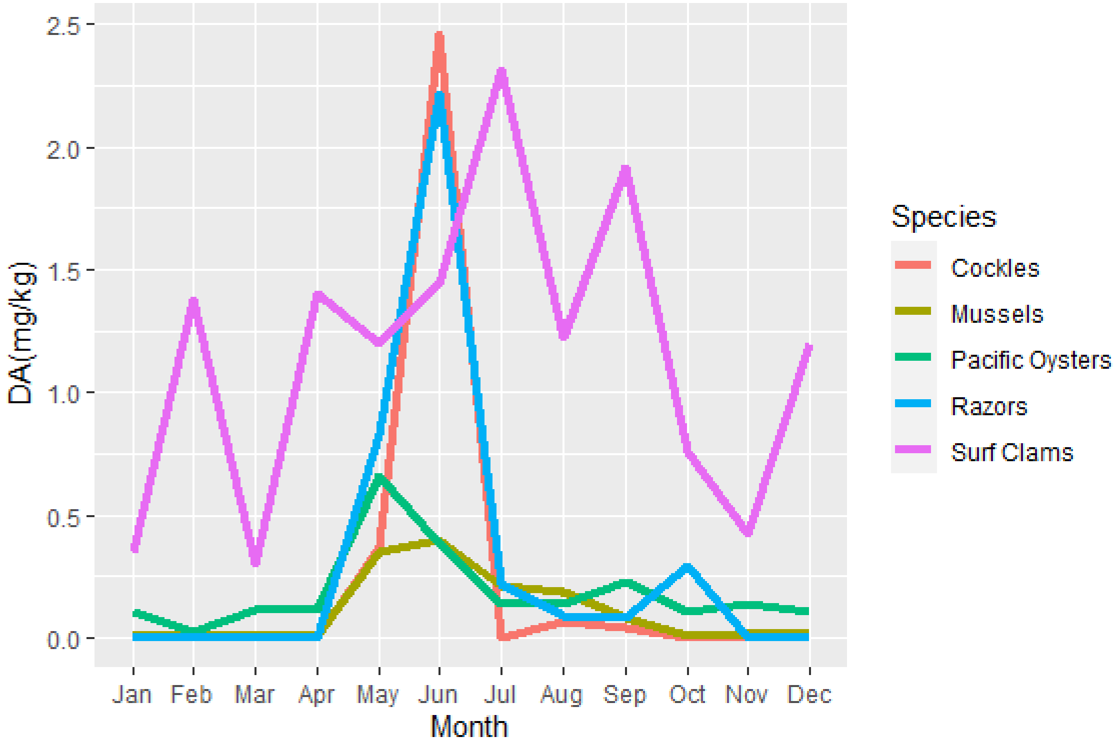


Figure A6: Average DA concentration (mg/kg) over months for each of five shellfish species 2016-2021.

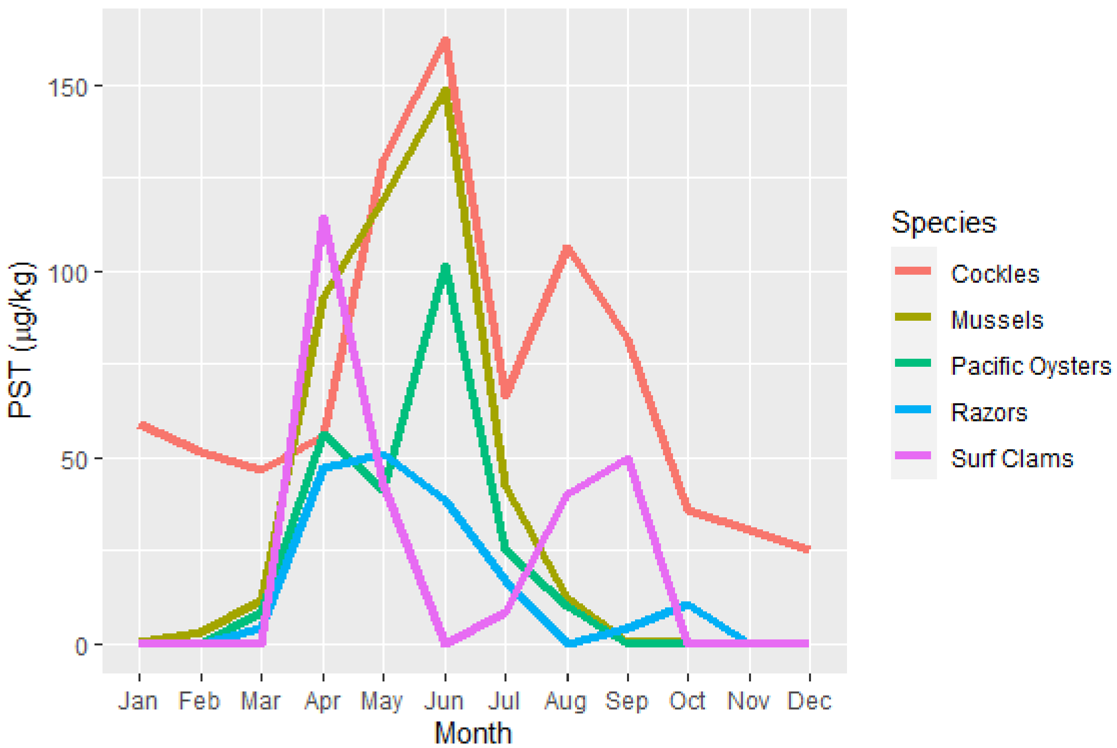


Figure A7: Average PST concentration (µg/kg) over months for each of five shellfish species 2016-2021.

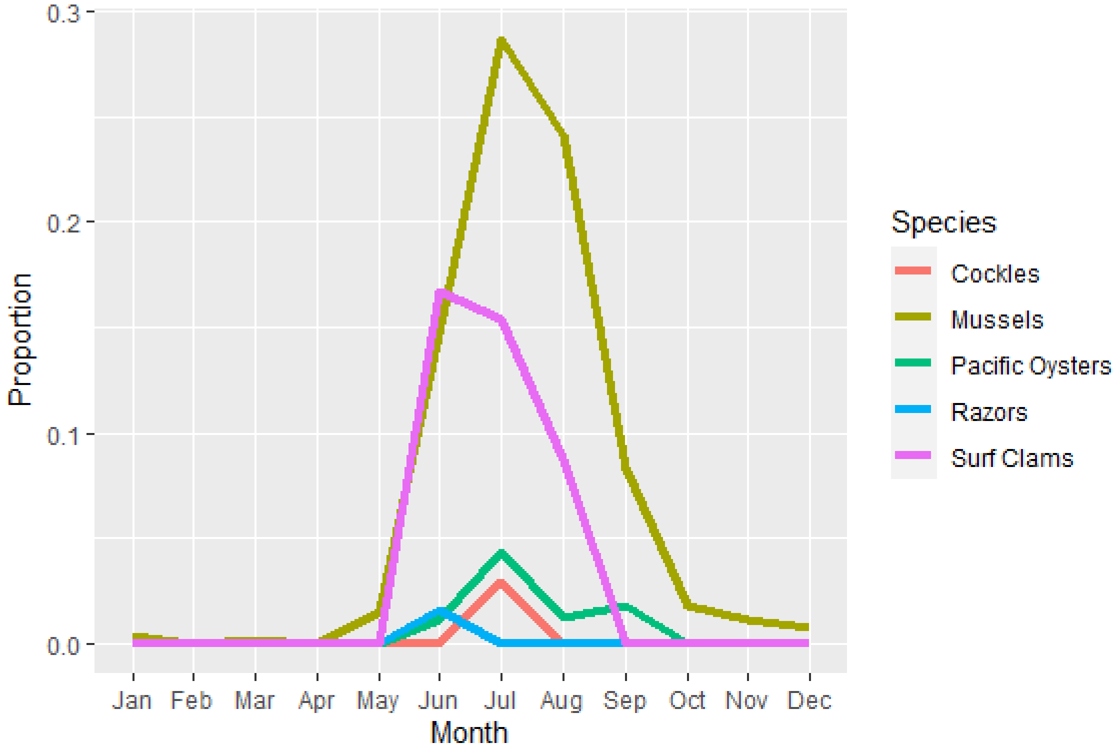


Figure A8: Proportion of samples with LT levels exceeding the MPL over months for each of five shellfish species 2016-2021

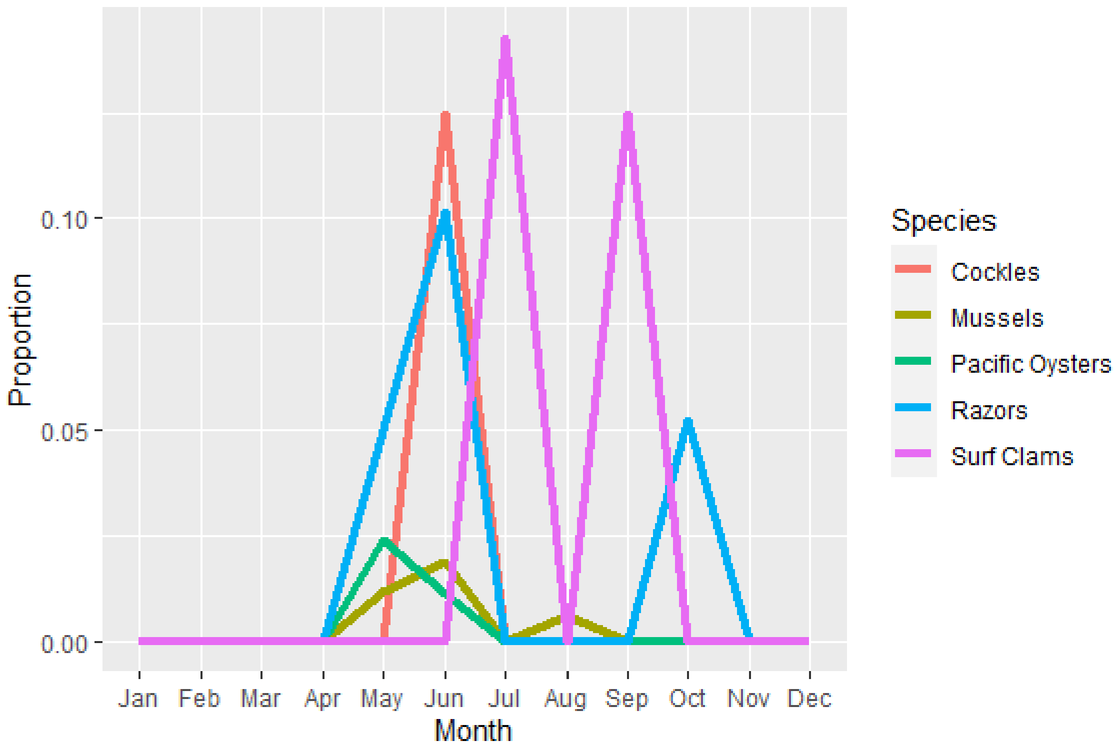


Figure A9: Proportion of samples with DA ≥ 5 mg/kg over years and months for each of five shellfish species 2016-2021

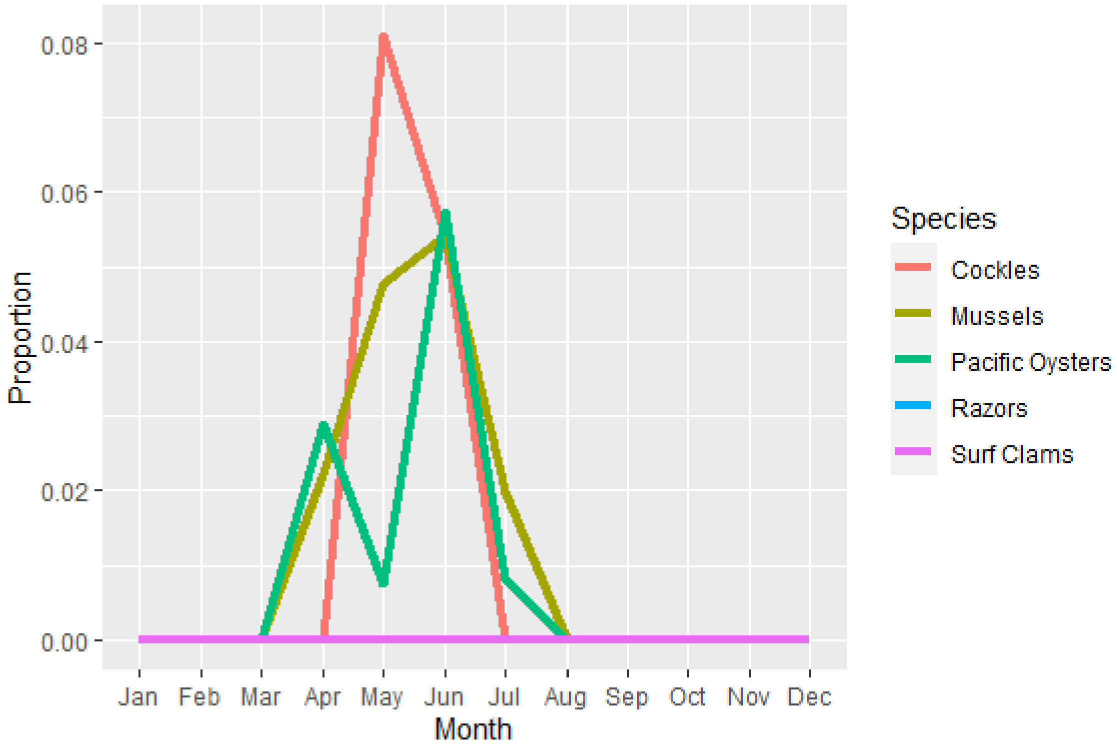


Figure A10: Proportion of samples with PST ≥ 400 µg/kg over months for each of five shellfish species 2016-2021.

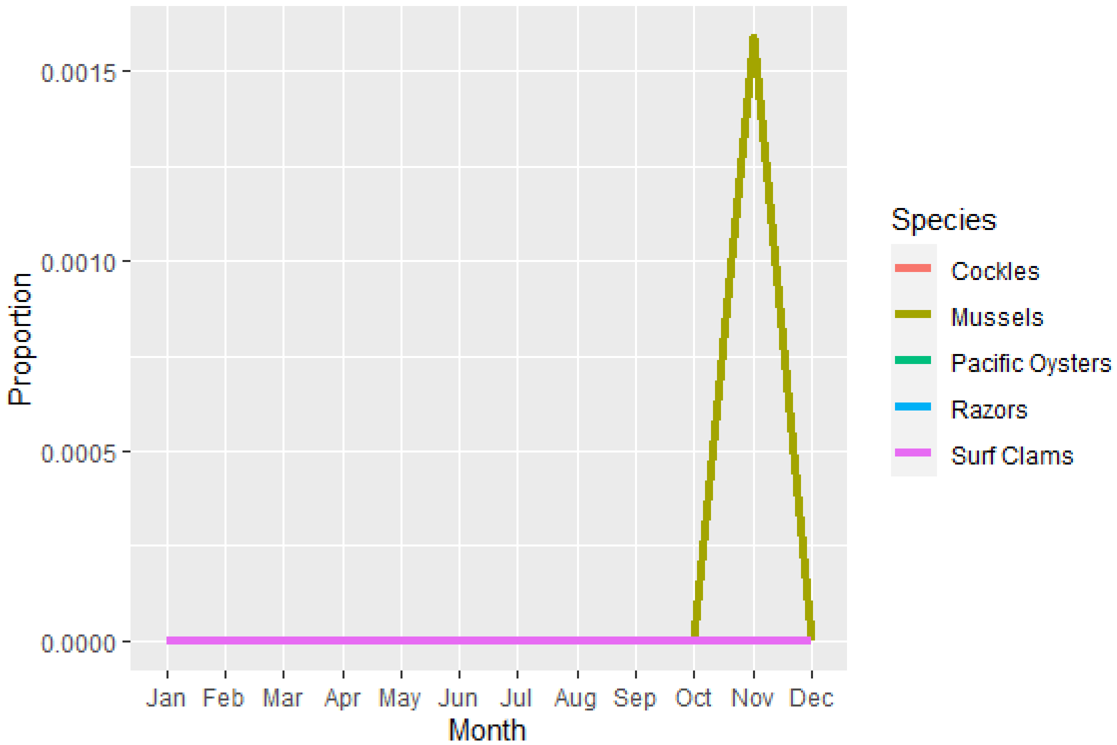


Figure A11: Proportion of samples with AZA ≥ 80 µg/kg over months for each of five species 2016-2021.

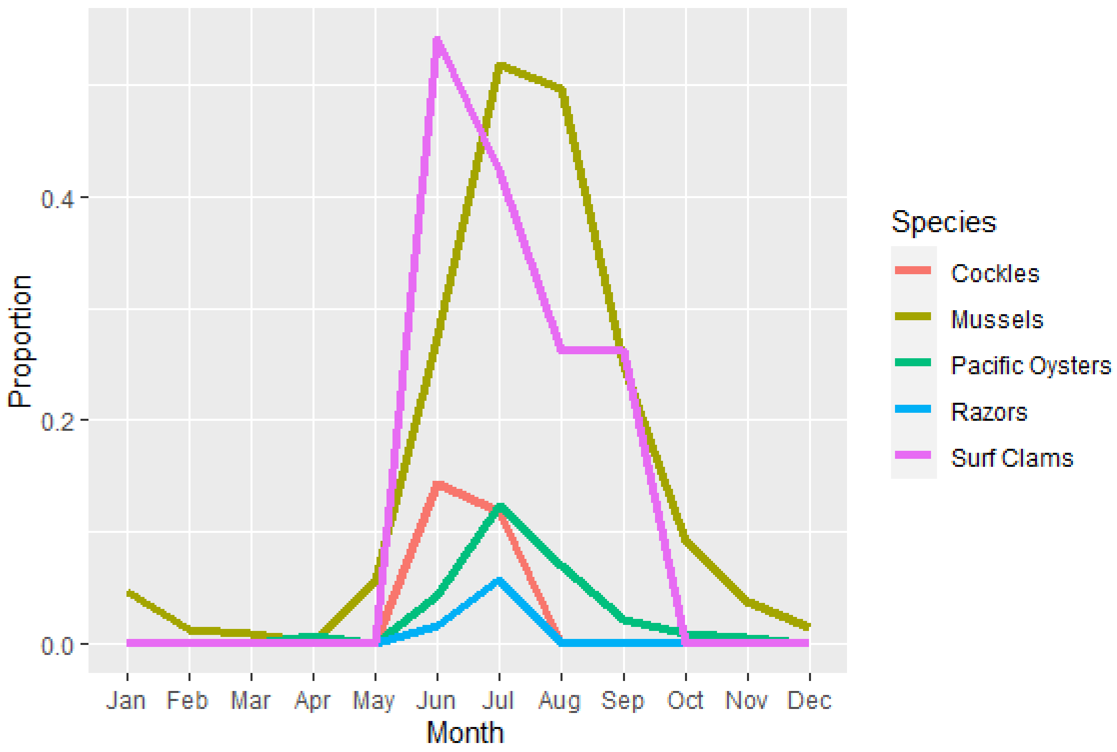


Figure A12: Proportion of samples with OA ≥ 80 µg/kg over month for each of five species 2016-2021.

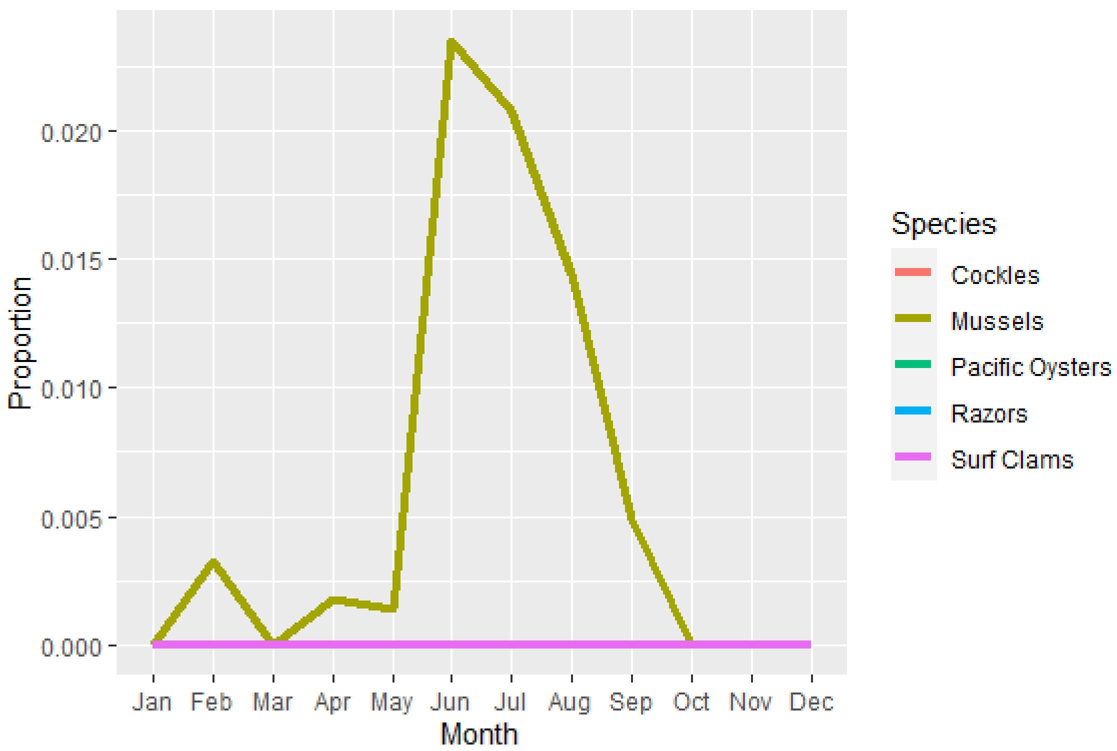


Figure A13: Proportion of samples with YTX present (but below MPL) over months for each of five species 2016-2021.

Appendix B – Additional Tables

Table B1: Percentage of samples with *Alexandrium* spp. equal to or exceeding 40 cells per litre by month, for each group and pod.

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G1	1	-	0.00	12.90	24.39	57.50	54.05	58.97	30.56	8.82	0.00	-	-
G10	10	0.00	0.00	7.14	7.14	3.03	0.00	6.45	3.45	0.00	0.00	0.00	0.00
G10	3	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-
G10	84	-	-	0.00	25.00	0.00	25.00	100.00	44.44	14.29	0.00	-	-
G123	123	-	-	0.00	0.00	0.00	80.00	0.00	12.50	25.00	0.00	-	-
G123	13	0.00	10.00	0.00	13.79	10.00	10.81	12.12	24.24	24.32	3.57	0.00	0.00
G123	15	0.00	0.00	0.00	10.71	25.00	24.19	23.53	21.31	4.76	0.00	0.00	-
G123	19	-	-	0.00	-	-	-	-	-	-	-	-	-
G18	14	0.00	10.00	18.18	28.38	8.97	14.47	7.41	1.30	1.33	0.00	0.00	8.33
G18	18	-	0.00	9.52	9.09	11.11	7.69	14.81	4.00	0.00	0.00	-	-
G18	52	0.00	0.00	50.00	53.33	58.33	46.15	21.43	0.00	7.14	0.00	0.00	0.00
G18	53	0.00	0.00	12.50	7.14	18.75	11.76	17.65	0.00	0.00	0.00	0.00	0.00
G18	74	0.00	0.00	28.57	23.08	18.52	20.00	14.81	4.76	4.55	0.00	0.00	0.00
G21	124	-	0.00	5.88	28.57	39.13	57.14	72.73	52.17	31.82	14.29	-	-
G21	21	-	-	5.26	13.33	37.84	42.50	57.50	41.67	26.83	5.00	0.00	-
G22	136	-	-	0.00	0.00	50.00	75.00	40.00	75.00	0.00	0.00	-	-
G22	22	0.00	0.00	5.13	8.00	25.42	31.03	19.05	23.73	3.51	0.00	0.00	0.00
G22	76	-	0.00	0.00	4.76	18.00	30.00	24.53	25.49	14.29	0.00	-	-
G22	77	0.00	0.00	0.00	0.00	32.26	36.67	34.38	20.00	6.90	0.00	0.00	0.00
G23	23	0.00	0.00	11.54	13.95	15.22	43.75	34.69	38.00	27.91	3.03	0.00	0.00
G23	24	0.00	0.00	2.50	8.70	35.19	55.74	71.67	61.90	40.98	0.00	0.00	0.00
G26	26	0.00	0.00	11.36	25.49	23.64	14.29	6.90	14.55	24.56	0.00	0.00	0.00
G26	27	0.00	0.00	0.00	0.00	22.22	0.00	0.00	14.29	5.88	0.00	0.00	0.00
G26	89	-	0.00	0.00	5.00	4.35	9.09	4.55	0.00	0.00	0.00	-	-
G28	126	-	-	17.14	33.33	40.00	30.23	13.95	18.92	5.56	0.00	-	-
G28	137	-	-	-	-	0.00	60.00	75.00	25.00	0.00	0.00	-	-
G28	28	-	-	33.33	28.57	60.00	14.29	18.18	31.58	0.00	0.00	-	-
G28	30	-	-	-	-	50.00	-	-	-	-	-	-	-
G28	33	-	-	0.00	0.00	50.00	33.33	22.22	0.00	0.00	0.00	-	-
G28	85	0.00	-	50.00	50.00	50.00	0.00	100.00	-	-	0.00	0.00	0.00
G28	88	-	-	20.00	50.00	77.78	62.50	60.00	25.00	11.11	0.00	-	-
G34	34	-	-	0.00	7.14	0.00	12.50	69.23	38.46	15.38	0.00	-	-
G35	35	0.00	0.00	28.57	15.00	27.03	53.85	24.39	2.70	0.00	0.00	0.00	12.50
G35	37	-	-	-	-	-	100.00	-	-	0.00	0.00	-	0.00
G39	144	-	0.00	11.76	18.75	42.11	31.25	0.00	0.00	0.00	0.00	-	-
G39	36	0.00	0.00	12.77	21.21	30.99	36.76	24.32	17.11	0.00	0.00	0.00	0.00
G39	39	0.00	0.00	0.00	0.00	16.67	25.00	0.00	33.33	0.00	0.00	0.00	-
G42	40	-	0.00	17.65	37.50	63.16	31.25	21.05	5.88	0.00	0.00	-	-
G42	42	-	-	5.56	5.88	35.29	35.29	34.78	15.00	0.00	0.00	-	-
G42	43	-	-	-	-	-	-	-	0.00	-	-	-	-
G42	45	-	-	-	-	-	-	-	0.00	-	-	-	-
G48	47	-	0.00	12.50	28.57	55.56	52.94	13.33	14.29	7.14	0.00	-	-
G48	48	0.00	0.00	2.33	16.67	39.44	40.30	29.17	21.54	10.17	0.00	0.00	0.00
G49	49	-	-	16.67	64.71	100.00	70.59	44.44	17.65	6.25	0.00	-	-
G49	50	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
G49	51	-	0.00	6.25	16.13	35.14	30.00	18.92	2.63	3.03	0.00	-	-
G54	103old	0.00	6.67	31.25	82.93	68.89	44.44	45.10	43.48	16.28	7.14	0.00	0.00
G54	105old	0.00	0.00	0.00	-	50.00	33.33	66.67	0.00	0.00	0.00	-	0.00
G54	130	-	-	0.00	0.00	13.33	0.00	21.43	15.38	0.00	0.00	-	-
G54	130old	0.00	0.00	-	50.00	50.00	60.00	100.00	75.00	0.00	0.00	-	0.00
G54	131	0.00	0.00	50.00	33.33	-	-	-	0.00	20.00	0.00	0.00	0.00
G56	56	-	-	2.78	27.50	61.90	59.09	30.95	11.63	4.76	0.00	-	-
G57	57	0.00	0.00	8.33	40.35	69.49	68.97	47.37	23.73	5.66	0.00	0.00	0.00
G57	59	-	-	-	-	0.00	0.00	50.00	100.00	0.00	0.00	-	-
G57	63	-	-	0.00	5.56	29.41	52.38	17.39	31.82	5.00	10.00	-	-
G58	127	-	-	-	-	0.00	0.00	-	-	-	-	-	-
G58	58	-	0.00	0.00	20.00	32.73	46.55	48.33	40.98	8.93	0.00	-	-
G67	60	-	-	0.00	33.33	100.00	100.00	76.92	33.33	0.00	0.00	-	-
G67	67	0.00	16.67	6.52	21.43	48.28	69.23	62.50	51.56	17.91	15.79	0.00	0.00
G71	71	0.00	0.00	0.00	0.00	0.00	13.33	41.38	45.83	5.88	12.50	0.00	0.00

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G8	8	0.00	0.00	28.57	42.86	28.57	21.28	17.78	2.44	0.00	0.00	0.00	0.00
G80	107	-	-	-	100.00	-	-	-	-	-	-	-	-
G80	112	0.00	20.00	0.00	50.00	63.64	25.00	9.09	20.00	12.50	0.00	0.00	0.00
G80	80	0.00	0.00	0.00	23.33	40.91	24.19	10.45	9.68	1.67	0.00	0.00	0.00
G80	87	0.00	0.00	0.00	0.00	50.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00
G81	128	-	0.00	0.00	0.00	0.00	17.39	13.33	11.76	0.00	7.69	-	-
G81	129	-	-	-	25.00	50.00	0.00	-	-	-	-	-	-
G81	81	-	-	0.00	13.33	8.70	15.38	0.00	21.43	6.25	25.00	-	-
G9	9	7.14	0.00	24.07	36.92	32.35	23.44	48.57	47.46	23.73	5.41	0.00	0.00
P125	125	0.00	0.00	4.17	3.57	36.59	48.65	54.17	63.41	29.55	0.00	0.00	0.00
P16	16	0.00	0.00	22.73	27.12	12.90	9.38	7.58	1.54	1.52	3.70	0.00	-
P31	31	0.00	0.00	20.00	28.57	0.00	23.08	47.37	44.44	10.00	0.00	0.00	0.00
P38	38	0.00	0.00	3.45	35.14	63.27	18.18	21.43	13.51	5.00	0.00	0.00	0.00
P41	41	0.00	5.00	31.67	42.53	32.97	26.37	17.89	11.63	4.94	0.00	0.00	0.00
P5	5	0.00	0.00	0.00	10.00	4.26	21.57	16.36	12.00	4.00	0.00	0.00	0.00
P6	6	0.00	0.00	20.45	16.67	28.81	30.65	48.39	31.15	5.00	0.00	0.00	0.00
P61	61	0.00	-	2.86	35.85	58.18	61.40	55.74	36.21	5.77	0.00	-	-
P64	64	0.00	0.00	5.56	14.52	22.22	26.87	23.94	14.71	10.45	0.00	0.00	0.00
P65	65	0.00	0.00	0.00	10.17	19.30	3.39	19.05	18.75	12.50	7.41	0.00	0.00
P68	68	0.00	4.76	5.17	20.93	42.22	42.27	61.00	55.43	16.09	4.00	0.00	0.00
P69	69	0.00	0.00	0.00	37.50	37.50	42.86	40.00	50.00	25.00	0.00	0.00	-
P7	7	0.00	0.00	14.29	33.80	69.70	43.06	29.58	22.06	1.37	0.00	0.00	0.00
P70	70	0.00	0.00	3.33	4.55	27.08	28.00	25.00	7.14	3.85	0.00	0.00	0.00
P72	72	-	0.00	0.00	5.71	12.20	30.00	24.44	12.50	5.13	0.00	-	-

Table B2: Percentage of samples with *Dinophysis* spp. equal to or exceeding 100 cells per litre by month, for each group and pod.

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G1	1	-	0.00	0.00	0.00	27.50	37.84	43.59	55.56	47.06	0.00	-	-
G10	10	0.00	0.00	0.00	0.00	9.09	9.68	3.23	3.45	3.12	0.00	0.00	0.00
G10	3	-	-	-	12.50	40.00	0.00	0.00	0.00	0.00	-	0.00	-
G10	84	-	-	0.00	0.00	0.00	25.00	16.67	11.11	0.00	0.00	-	-
G123	123	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G123	13	0.00	0.00	0.00	0.00	0.00	2.70	12.12	12.12	2.70	3.57	0.00	0.00
G123	15	0.00	0.00	0.00	0.00	1.79	1.61	1.47	0.00	0.00	0.00	0.00	-
G123	19	-	-	0.00	-	-	-	-	-	-	-	-	-
G18	14	0.00	0.00	5.45	9.46	19.23	32.89	23.46	24.68	13.33	12.20	5.56	0.00
G18	18	-	0.00	0.00	0.00	18.52	23.08	25.93	12.00	17.39	0.00	-	-
G18	52	0.00	0.00	20.00	20.00	50.00	69.23	78.57	91.67	50.00	0.00	0.00	0.00
G18	53	0.00	0.00	0.00	0.00	18.75	17.65	47.06	50.00	55.00	33.33	0.00	0.00
G18	74	0.00	0.00	0.00	3.85	14.81	36.00	25.93	33.33	13.64	0.00	0.00	0.00
G21	124	-	0.00	0.00	0.00	0.00	42.86	50.00	30.43	4.55	0.00	-	-
G21	21	-	-	0.00	0.00	2.70	30.00	35.00	13.89	9.76	5.00	0.00	-
G22	136	-	-	0.00	0.00	0.00	25.00	40.00	25.00	60.00	100.00	-	-
G22	22	0.00	0.00	0.00	0.00	10.17	36.21	39.68	25.42	12.28	0.00	0.00	0.00
G22	76	-	0.00	0.00	0.00	2.00	8.00	3.77	13.73	8.16	0.00	-	-
G22	77	0.00	0.00	0.00	0.00	0.00	6.67	12.50	0.00	0.00	0.00	0.00	0.00
G23	23	0.00	0.00	0.00	0.00	10.87	35.42	40.82	38.00	30.23	0.00	0.00	0.00
G23	24	0.00	0.00	0.00	0.00	16.67	31.15	51.67	34.92	14.75	0.00	0.00	0.00
G26	26	0.00	0.00	0.00	0.00	0.00	7.14	12.07	12.73	3.51	0.00	0.00	0.00
G26	27	0.00	0.00	0.00	10.00	33.33	11.11	0.00	14.29	0.00	0.00	0.00	0.00
G26	89	-	0.00	0.00	0.00	0.00	4.55	4.55	0.00	0.00	0.00	-	-
G28	126	-	-	0.00	2.56	20.00	27.91	30.23	27.03	5.56	0.00	-	-
G28	137	-	-	-	-	0.00	40.00	75.00	25.00	0.00	50.00	-	-
G28	28	-	-	0.00	0.00	40.00	7.14	45.45	63.16	9.09	0.00	-	-
G28	30	-	-	-	-	0.00	-	-	-	-	-	-	-
G28	33	-	-	0.00	0.00	25.00	44.44	22.22	0.00	12.50	0.00	-	-
G28	85	0.00	-	0.00	0.00	0.00	100.00	100.00	-	-	0.00	0.00	0.00
G28	88	-	-	0.00	0.00	22.22	75.00	70.00	25.00	22.22	33.33	-	-
G34	34	-	-	0.00	0.00	0.00	0.00	0.00	15.38	0.00	16.67	-	-
G35	35	0.00	0.00	0.00	0.00	21.62	58.97	60.98	45.95	44.74	0.00	0.00	0.00
G35	37	-	-	-	-	-	100.00	-	-	50.00	0.00	-	0.00
G39	144	-	0.00	0.00	0.00	42.11	31.25	36.84	18.75	20.00	0.00	-	-
G39	36	0.00	0.00	2.13	3.03	26.76	42.65	52.70	56.58	23.08	2.86	0.00	0.00
G39	39	0.00	0.00	0.00	0.00	16.67	50.00	50.00	100.00	0.00	0.00	0.00	-
G42	40	-	0.00	0.00	12.50	52.63	93.75	73.68	52.94	15.00	0.00	-	-
G42	42	-	-	0.00	0.00	0.00	52.94	60.87	55.00	0.00	20.00	-	-
G42	43	-	-	-	-	-	-	-	0.00	-	-	-	-
G42	45	-	-	-	-	-	-	-	0.00	-	-	-	-
G48	47	-	0.00	0.00	0.00	16.67	70.59	86.67	78.57	21.43	0.00	-	-
G48	48	0.00	0.00	0.00	3.03	22.54	49.25	63.89	24.62	6.78	0.00	0.00	0.00
G49	49	-	-	0.00	0.00	27.78	64.71	83.33	17.65	18.75	0.00	-	-
G49	50	-	-	-	0.00	0.00	0.00	25.00	50.00	0.00	-	-	-
G49	51	-	0.00	0.00	3.23	16.22	32.50	27.03	10.53	3.03	0.00	-	-
G54	103old	0.00	0.00	0.00	4.88	33.33	33.33	56.86	36.96	32.56	0.00	0.00	0.00
G54	105old	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
G54	130	-	-	0.00	0.00	0.00	8.33	28.57	0.00	0.00	0.00	-	-
G54	130old	0.00	0.00	-	0.00	0.00	20.00	100.00	50.00	0.00	0.00	-	0.00
G54	131	0.00	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00
G56	56	-	-	0.00	0.00	11.90	34.09	64.29	34.88	2.38	0.00	-	-
G57	57	0.00	0.00	0.00	0.00	0.00	22.41	61.40	47.46	1.89	0.00	0.00	0.00
G57	59	-	-	-	-	0.00	100.00	50.00	50.00	0.00	0.00	-	-
G57	63	-	-	0.00	0.00	5.88	42.86	52.17	31.82	5.00	10.00	-	-
G58	127	-	-	-	-	0.00	0.00	-	-	-	-	-	-
G58	58	-	0.00	0.00	0.00	1.82	13.79	56.67	32.79	0.00	0.00	-	-

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G67	60	-	-	0.00	0.00	0.00	0.00	23.08	16.67	0.00	0.00	-	-
G67	67	0.00	0.00	0.00	0.00	1.72	34.62	62.50	53.12	7.46	0.00	0.00	0.00
G71	71	0.00	0.00	0.00	0.00	4.35	40.00	48.28	41.67	11.76	0.00	0.00	0.00
G8	8	0.00	0.00	0.00	4.08	32.14	55.32	53.33	39.02	25.53	9.52	0.00	0.00
G80	107	-	-	-	0.00	-	-	-	-	-	-	-	-
G80	112	0.00	0.00	0.00	0.00	0.00	58.33	36.36	90.00	37.50	12.50	0.00	0.00
G80	80	0.00	0.00	0.00	1.67	3.03	20.97	19.40	11.29	5.00	0.00	0.00	0.00
G80	87	0.00	0.00	0.00	0.00	0.00	28.57	0.00	0.00	0.00	0.00	0.00	0.00
G81	128	-	0.00	0.00	0.00	4.35	13.04	46.67	26.47	2.94	0.00	-	-
G81	129	-	-	-	0.00	0.00	0.00	-	-	-	-	-	-
G81	81	-	-	0.00	0.00	0.00	15.38	8.33	0.00	0.00	0.00	-	-
G9	9	0.00	0.00	1.85	10.77	10.29	17.19	18.57	37.29	20.34	2.70	0.00	0.00
P125	125	0.00	0.00	0.00	0.00	2.44	40.54	60.42	39.02	9.09	0.00	0.00	0.00
P16	16	0.00	0.00	6.82	22.03	38.71	48.44	43.94	33.85	36.36	22.22	0.00	-
P31	31	0.00	0.00	0.00	0.00	0.00	3.85	36.84	27.78	0.00	0.00	0.00	0.00
P38	38	0.00	0.00	0.00	2.70	16.33	31.82	21.43	8.11	5.00	0.00	0.00	0.00
P41	41	0.00	0.00	0.00	9.20	40.66	56.04	58.95	48.84	16.05	0.00	0.00	0.00
P5	5	0.00	0.00	0.00	0.00	4.26	13.73	9.09	12.00	2.00	0.00	0.00	0.00
P6	6	0.00	0.00	0.00	11.67	32.20	41.94	54.84	67.21	40.00	10.71	0.00	0.00
P61	61	0.00	-	0.00	0.00	3.64	28.07	75.41	44.83	5.77	0.00	-	-
P64	64	0.00	0.00	0.00	0.00	6.35	23.88	47.89	22.06	5.97	0.00	0.00	0.00
P65	65	0.00	0.00	0.00	0.00	1.75	10.17	31.75	17.19	0.00	0.00	0.00	0.00
P68	68	0.00	0.00	0.00	0.00	2.22	22.68	67.00	39.13	1.15	0.00	0.00	0.00
P69	69	0.00	0.00	0.00	0.00	0.00	14.29	40.00	0.00	0.00	0.00	0.00	-
P7	7	0.00	0.00	2.04	7.04	36.36	47.22	57.75	44.12	23.29	0.00	0.00	0.00
P70	70	0.00	0.00	0.00	0.00	10.42	18.00	34.62	23.21	3.85	0.00	0.00	0.00
P72	72	-	0.00	0.00	0.00	7.32	35.00	55.56	45.83	0.00	0.00	-	-

Table B3: Percentage of samples with *Pseudo-nitzschia* spp. equal to or exceeding 50,000 cells per litre by month, for each group and pod.

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G1	1	-	0.00	0.00	7.32	5.00	0.00	2.56	5.56	14.71	23.08	-	-
G10	10	0.00	0.00	0.00	0.00	0.00	0.00	3.23	0.00	0.00	0.00	0.00	0.00
G10	3	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-
G10	84	-	-	0.00	0.00	0.00	0.00	16.67	11.11	0.00	0.00	-	-
G123	123	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G123	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	15	0.00	0.00	0.00	0.00	1.79	0.00	4.41	3.28	3.17	0.00	0.00	-
G123	19	-	-	0.00	-	-	-	-	-	-	-	-	-
G18	14	0.00	0.00	0.00	0.00	5.13	7.89	6.17	2.60	4.00	0.00	0.00	0.00
G18	18	-	0.00	0.00	0.00	0.00	7.69	7.41	4.00	0.00	0.00	-	-
G18	52	0.00	0.00	10.00	6.67	25.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00
G18	53	0.00	0.00	0.00	0.00	0.00	0.00	17.65	15.00	0.00	0.00	0.00	0.00
G18	74	0.00	0.00	4.76	0.00	3.70	0.00	14.81	4.76	9.09	0.00	0.00	0.00
G21	124	-	0.00	0.00	9.52	4.35	9.52	18.18	0.00	18.18	0.00	-	-
G21	21	-	-	0.00	16.67	2.70	15.00	10.00	0.00	2.44	0.00	0.00	-
G22	136	-	-	0.00	20.00	25.00	25.00	0.00	0.00	20.00	0.00	-	-
G22	22	0.00	0.00	0.00	8.00	8.47	31.03	12.70	5.08	0.00	0.00	0.00	0.00
G22	76	-	0.00	3.85	7.14	0.00	14.00	0.00	5.88	10.20	0.00	-	-
G22	77	0.00	0.00	0.00	0.00	0.00	3.33	0.00	3.33	0.00	0.00	0.00	0.00
G23	23	0.00	0.00	0.00	2.33	8.70	20.83	6.12	18.00	16.28	15.15	0.00	0.00
G23	24	0.00	0.00	0.00	0.00	9.26	24.59	3.33	6.35	9.84	4.17	0.00	0.00
G26	26	0.00	0.00	0.00	0.00	0.00	0.00	1.72	1.82	0.00	0.00	0.00	0.00
G26	27	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G26	89	-	0.00	16.67	15.00	0.00	0.00	0.00	9.52	0.00	0.00	-	-
G28	126	-	-	8.57	12.82	2.22	6.98	9.30	2.70	19.44	5.88	-	-
G28	137	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G28	28	-	-	0.00	0.00	0.00	7.14	9.09	21.05	9.09	0.00	-	-
G28	30	-	-	-	-	0.00	-	-	-	-	-	-	-
G28	33	-	-	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	-	-
G28	85	0.00	-	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00
G28	88	-	-	0.00	12.50	22.22	25.00	0.00	0.00	33.33	0.00	-	-
G34	34	-	-	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G35	35	0.00	0.00	2.86	5.00	10.81	10.26	7.32	0.00	2.63	0.00	0.00	0.00
G35	37	-	-	-	-	-	0.00	-	-	0.00	0.00	-	0.00
G39	144	-	0.00	17.65	6.25	0.00	6.25	0.00	0.00	0.00	0.00	-	-
G39	36	0.00	0.00	17.02	13.64	8.45	8.82	1.35	11.84	26.15	0.00	0.00	0.00
G39	39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
G42	40	-	0.00	0.00	12.50	10.53	43.75	26.32	0.00	10.00	20.00	-	-
G42	42	-	-	5.56	35.29	23.53	5.88	21.74	10.00	0.00	20.00	-	-
G42	43	-	-	-	-	-	-	-	0.00	-	-	-	-
G42	45	-	-	-	-	-	-	-	0.00	-	-	-	-
G48	47	-	0.00	0.00	0.00	0.00	17.65	6.67	0.00	7.14	25.00	-	-
G48	48	0.00	0.00	0.00	4.55	5.63	17.91	4.17	3.08	5.08	3.57	0.00	0.00
G49	49	-	-	8.33	0.00	5.56	23.53	11.11	17.65	6.25	0.00	-	-
G49	50	-	-	-	25.00	0.00	0.00	0.00	0.00	0.00	-	-	-
G49	51	-	0.00	0.00	0.00	0.00	7.50	2.70	2.63	0.00	0.00	-	-
G54	103old	0.00	0.00	21.88	24.39	20.00	22.22	21.57	10.87	23.26	3.57	0.00	0.00
G54	105old	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	50.00	0.00	-	0.00
G54	130	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G54	130old	0.00	0.00	-	0.00	0.00	40.00	25.00	25.00	20.00	0.00	-	0.00
G54	131	0.00	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00
G56	56	-	-	2.78	7.50	0.00	13.64	21.43	30.23	14.29	0.00	-	-
G57	57	0.00	0.00	16.67	8.77	0.00	15.52	38.60	25.42	22.64	0.00	0.00	0.00
G57	59	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-
G57	63	-	-	5.56	0.00	0.00	4.76	34.78	9.09	15.00	0.00	-	-
G58	127	-	-	-	-	0.00	33.33	-	-	-	-	-	-
G58	58	-	0.00	0.00	0.00	5.45	15.52	33.33	24.59	19.64	0.00	-	-
G67	60	-	-	0.00	0.00	0.00	37.50	30.77	16.67	0.00	0.00	-	-
G67	67	0.00	0.00	4.35	0.00	0.00	21.15	54.69	51.56	50.75	5.26	0.00	0.00
G71	71	0.00	0.00	0.00	28.57	13.04	46.67	41.38	45.83	17.65	0.00	0.00	0.00
G8	8	0.00	0.00	0.00	0.00	1.79	4.26	2.22	2.44	6.38	4.76	0.00	0.00

Group	Pod	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
G80	107	-	-	-	0.00	-	-	-	-	-	-	-	-
G80	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G80	80	0.00	0.00	0.00	5.00	3.03	0.00	1.49	3.23	1.67	0.00	0.00	0.00
G80	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G81	128	-	0.00	0.00	0.00	0.00	8.70	33.33	20.59	2.94	0.00	-	-
G81	129	-	-	-	0.00	0.00	0.00	-	-	-	-	-	-
G81	81	-	-	0.00	0.00	13.04	23.08	8.33	7.14	0.00	0.00	-	-
G9	9	0.00	0.00	7.41	10.77	2.94	4.69	24.29	20.34	8.47	2.70	0.00	0.00
P125	125	0.00	0.00	0.00	0.00	9.76	43.24	10.42	17.07	11.36	0.00	0.00	0.00
P16	16	0.00	0.00	0.00	0.00	3.23	3.12	7.58	3.08	4.55	0.00	0.00	-
P31	31	0.00	0.00	6.67	9.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	38	0.00	0.00	48.28	8.11	2.04	4.55	7.14	8.11	7.50	4.17	11.11	0.00
P41	41	0.00	0.00	3.33	5.75	6.59	15.38	11.58	5.81	12.35	9.38	0.00	0.00
P5	5	0.00	0.00	4.55	25.00	2.13	1.96	25.45	36.00	26.00	13.64	0.00	0.00
P6	6	0.00	0.00	9.09	13.33	0.00	14.52	22.58	22.95	35.00	7.14	0.00	0.00
P61	61	0.00	-	8.57	11.32	0.00	14.04	42.62	37.93	25.00	4.76	-	-
P64	64	0.00	0.00	16.67	12.90	0.00	17.91	39.44	20.59	22.39	13.16	0.00	0.00
P65	65	0.00	0.00	0.00	1.69	5.26	20.34	26.98	26.56	1.56	0.00	0.00	0.00
P68	68	0.00	0.00	0.00	6.98	0.00	12.37	38.00	26.09	26.44	6.00	0.00	0.00
P69	69	0.00	0.00	0.00	12.50	0.00	42.86	10.00	0.00	0.00	0.00	0.00	-
P7	7	0.00	0.00	4.08	1.41	4.55	4.17	5.63	13.24	24.66	15.00	0.00	0.00
P70	70	0.00	0.00	10.00	20.45	0.00	8.00	38.46	32.14	28.85	9.09	0.00	0.00
P72	72	-	0.00	0.00	5.71	0.00	12.50	35.56	31.25	20.51	0.00	-	-

Table B4: Percentage of mussel samples for which DA equals or exceeds 5 mg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 5 mg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/15)	0 (0/17)	0 (0/17)	0 (0/23)	0 (0/33)	0 (0/34)	2.5 (1/40)	0 (0/43)	0 (0/39)	0 (0/36)	0 (0/37)	0 (0/33)	0 (0/17)	0.3 (1/384)
G10	0 (0/28)	0 (0/30)	2.8 (1/36)	0 (0/49)	0 (0/54)	0 (0/58)	0 (0/56)	0 (0/66)	0 (0/78)	0 (0/72)	0 (0/53)	0 (0/43)	0 (0/28)	0.2 (1/651)
G123	0 (0/22)	0 (0/21)	0 (0/23)	0 (0/26)	0 (0/28)	0 (0/29)	0 (0/28)	0 (0/33)	0 (0/28)	0 (0/32)	0 (0/32)	0 (0/26)	0 (0/16)	0 (0/344)
G18	0 (0/39)	0 (0/47)	0 (0/50)	0 (0/49)	1.7 (1/60)	1.9 (1/54)	0 (0/54)	3 (2/66)	0 (0/72)	0 (0/72)	0 (0/82)	0 (0/61)	0 (0/32)	0.5 (4/738)
G21	0 (0/30)	0 (0/34)	0 (0/35)	0 (0/27)	0 (0/47)	0 (0/47)	0 (0/57)	0 (0/56)	2.6 (2/77)	1.6 (1/63)	0 (0/56)	0 (0/40)	0 (0/26)	0.5 (3/595)
G22	0 (0/44)	0 (0/51)	0 (0/58)	0 (0/48)	0 (0/67)	1.3 (1/78)	0 (0/72)	1.2 (1/82)	3.1 (3/98)	1.2 (1/83)	0 (0/67)	0 (0/52)	0 (0/40)	0.7 (6/840)
G23	0 (0/31)	0 (0/29)	0 (0/32)	0 (0/32)	0 (0/38)	0 (0/51)	3.1 (2/65)	3 (2/67)	5.4 (4/74)	9 (7/78)	0 (0/62)	0 (0/36)	0 (0/26)	2.4 (15/621)
G26	0 (0/17)	0 (0/25)	0 (0/19)	0 (0/22)	0 (0/24)	0 (0/25)	0 (0/35)	0 (0/29)	0 (0/26)	0 (0/25)	0 (0/26)	0 (0/20)	0 (0/17)	0 (0/310)
G28	0 (0/32)	0 (0/39)	0 (0/40)	0 (0/45)	4.8 (3/62)	0 (0/73)	1.2 (1/85)	0 (0/77)	1.1 (1/93)	1.1 (1/89)	0 (0/60)	0 (0/57)	0 (0/35)	0.8 (6/787)
G34	0 (0/12)	0 (0/17)	0 (0/18)	0 (0/14)	0 (0/16)	0 (0/19)	0 (0/21)	0 (0/32)	0 (0/27)	0 (0/30)	0 (0/22)	0 (0/19)	0 (0/13)	0 (0/260)
G35	0 (0/24)	0 (0/29)	0 (0/26)	0 (0/31)	0 (0/38)	0 (0/53)	0 (0/50)	0 (0/65)	0 (0/68)	0 (0/61)	0 (0/57)	0 (0/40)	0 (0/22)	0 (0/564)
G39	0 (0/18)	0 (0/20)	0 (0/20)	0 (0/31)	4.4 (2/45)	0 (0/42)	0 (0/46)	0 (0/51)	0 (0/51)	1.9 (1/54)	0 (0/53)	0 (0/36)	0 (0/19)	0.6 (3/486)
G42	0 (0/23)	0 (0/19)	0 (0/24)	0 (0/28)	2.2 (1/45)	3.6 (2/55)	0 (0/61)	4.9 (4/82)	4.3 (3/70)	0 (0/66)	0 (0/70)	0 (0/41)	0 (0/19)	1.7 (10/603)
G48	0 (0/27)	0 (0/29)	0 (0/29)	0 (0/27)	0 (0/39)	0 (0/42)	1.8 (1/56)	2 (1/50)	3.3 (2/60)	3.3 (2/60)	0 (0/53)	0 (0/37)	0 (0/25)	1.1 (6/534)
G49	0 (0/22)	0 (0/29)	0 (0/25)	0 (0/26)	0 (0/35)	0 (0/38)	1.9 (1/54)	0 (0/59)	0 (0/56)	0 (0/59)	0 (0/41)	0 (0/37)	0 (0/22)	0.2 (1/503)
G54	0 (0/3)	0 (0/2)	0 (0/4)	0 (0/5)	0 (0/10)	0 (0/9)	0 (0/8)	0 (0/12)	0 (0/15)	0 (0/8)	0 (0/12)	0 (0/8)	0 (0/3)	0 (0/99)
G56	0 (0/18)	0 (0/18)	0 (0/22)	0 (0/27)	0 (0/30)	0 (0/36)	1.8 (1/56)	3.6 (2/56)	1.6 (1/62)	7.4 (4/54)	0 (0/37)	0 (0/23)	0 (0/15)	1.8 (8/454)
G57	0 (0/36)	0 (0/43)	0 (0/38)	0 (0/48)	0 (0/51)	0 (0/44)	0 (0/57)	1.4 (1/72)	5.4 (5/92)	1.1 (1/89)	0 (0/88)	0 (0/55)	0 (0/33)	0.9 (7/746)
G58	0 (0/28)	0 (0/31)	0 (0/30)	0 (0/25)	0 (0/32)	0 (0/41)	0 (0/42)	0 (0/51)	0 (0/60)	0 (0/58)	0 (0/48)	0 (0/36)	0 (0/23)	0 (0/505)
G67	0 (0/28)	0 (0/28)	0 (0/29)	0 (0/35)	0 (0/43)	0 (0/35)	0 (0/56)	1.7 (1/59)	3 (2/67)	0 (0/79)	0 (0/58)	0 (0/38)	0 (0/24)	0.5 (3/579)
G71	0 (0/9)	0 (0/9)	0 (0/18)	0 (0/9)	0 (0/20)	0 (0/31)	0 (0/30)	0 (0/32)	0 (0/19)	0 (0/19)	0 (0/19)	0 (0/19)	0 (0/6)	0 (0/240)
G8	0 (0/21)	0 (0/31)	0 (0/31)	0 (0/36)	0 (0/31)	3.4 (1/29)	0 (0/30)	0 (0/30)	0 (0/36)	0 (0/35)	0 (0/39)	0 (0/38)	0 (0/22)	0.2 (1/409)
G80	0 (0/12)	0 (0/16)	0 (0/10)	0 (0/14)	0 (0/19)	0 (0/22)	0 (0/15)	0 (0/22)	0 (0/17)	0 (0/18)	0 (0/21)	0 (0/11)	0 (0/9)	0 (0/206)
G81	0 (0/32)	0 (0/40)	0 (0/43)	0 (0/38)	0 (0/39)	0 (0/39)	0 (0/39)	0 (0/51)	1.4 (1/72)	0 (0/73)	0 (0/61)	0 (0/43)	0 (0/28)	0.2 (1/598)
G9	0 (0/24)	0 (0/24)	0 (0/27)	0 (0/33)	0 (0/50)	0 (0/58)	0 (0/56)	1.8 (1/57)	1.6 (1/61)	0 (0/57)	0 (0/54)	0 (0/45)	0 (0/19)	0.4 (2/565)
P125	0 (0/19)	0 (0/22)	0 (0/25)	0 (0/26)	0 (0/32)	2.4 (1/41)	5.7 (3/53)	3.8 (2/53)	3.5 (2/57)	3.4 (2/58)	0 (0/39)	0 (0/25)	0 (0/18)	2.1 (10/468)
P16	0 (0/15)	0 (0/15)	0 (0/15)	0 (0/18)	0 (0/18)	0 (0/20)	0 (0/21)	0 (0/28)	0 (0/31)	2.6 (1/39)	0 (0/30)	0 (0/21)	0 (0/14)	0.4 (1/285)
P31	0 (0/17)	0 (0/18)	0 (0/22)	0 (0/19)	0 (0/33)	0 (0/39)	0 (0/37)	0 (0/38)	0 (0/37)	0 (0/37)	0 (0/36)	0 (0/32)	0 (0/20)	0 (0/385)
P38	0 (0/9)	0 (0/13)	0 (0/12)	0 (0/25)	0 (0/19)	0 (0/21)	0 (0/29)	0 (0/30)	0 (0/27)	0 (0/29)	0 (0/29)	0 (0/15)	0 (0/9)	0 (0/267)
P41	0 (0/18)	0 (0/20)	0 (0/22)	0 (0/24)	2.9 (1/35)	0 (0/39)	0 (0/36)	0 (0/41)	0 (0/42)	0 (0/42)	0 (0/39)	0 (0/22)	0 (0/21)	0.2 (1/401)
P5	0 (0/15)	0 (0/17)	0 (0/21)	0 (0/33)	0 (0/32)	0 (0/34)	0 (0/35)	2.6 (1/39)	5.9 (3/51)	2.1 (1/48)	0 (0/37)	0 (0/21)	0 (0/15)	1.3 (5/398)
P6	0 (0/17)	0 (0/15)	0 (0/17)	3.6 (1/28)	3.7 (1/27)	0 (0/24)	0 (0/29)	6.5 (2/31)	0 (0/31)	2.8 (1/36)	0 (0/34)	0 (0/21)	0 (0/12)	1.6 (5/322)
P61	0 (0/19)	0 (0/21)	0 (0/20)	0 (0/30)	0 (0/31)	0 (0/38)	0 (0/45)	2.2 (1/45)	6 (3/50)	6 (3/50)	0 (0/37)	0 (0/28)	0 (0/17)	1.6 (7/431)
P64	0 (0/16)	0 (0/19)	0 (0/26)	0 (0/25)	0 (0/31)	0 (0/31)	2.8 (1/36)	0 (0/44)	0 (0/38)	4.4 (2/45)	0 (0/35)	0 (0/28)	0 (0/17)	0.8 (3/391)
P65	0 (0/15)	0 (0/16)	0 (0/17)	0 (0/20)	0 (0/23)	0 (0/27)	0 (0/31)	0 (0/31)	0 (0/37)	2.4 (1/41)	0 (0/25)	0 (0/26)	0 (0/17)	0.3 (1/326)
P68	0 (0/17)	0 (0/25)	0 (0/22)	0 (0/26)	0 (0/31)	0 (0/31)	4.8 (2/42)	0 (0/53)	0 (0/54)	3.7 (2/54)	0 (0/40)	0 (0/29)	0 (0/17)	0.9 (4/441)
P69	0 (0/10)	0 (0/13)	0 (0/13)	0 (0/16)	0 (0/13)	0 (0/10)	0 (0/12)	0 (0/16)	0 (0/27)	0 (0/15)	0 (0/17)	0 (0/16)	0 (0/9)	0 (0/187)
P7	0 (0/18)	0 (0/17)	0 (0/22)	0 (0/24)	2.9 (1/34)	2.4 (1/41)	0 (0/37)	0 (0/37)	2.9 (1/35)	2.2 (1/46)	0 (0/46)	0 (0/23)	0 (0/16)	1 (4/396)
P70	0 (0/17)	0 (0/17)	0 (0/20)	0 (0/21)	0 (0/27)	0 (0/23)	0 (0/34)	2.4 (1/42)	2.3 (1/43)	0 (0/37)	0 (0/34)	0 (0/28)	0 (0/15)	0.6 (2/358)
P72	0 (0/19)	0 (0/21)	0 (0/18)	0 (0/23)	0 (0/25)	0 (0/22)	0 (0/28)	0 (0/32)	0 (0/36)	0 (0/34)	0 (0/29)	3.3 (1/30)	0 (0/16)	0.3 (1/333)

Table B5: Percentage of Pacific oyster samples for which DA equals or exceeds 5 mg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 5 mg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	0 (0/31)	0 (0/35)	0 (0/37)	3 (1/33)	2.1 (1/48)	0 (0/49)	0 (0/61)	0 (0/63)	0 (0/62)	0 (0/60)	0 (0/45)	0 (0/39)	0 (0/30)	0.3 (2/593)
PO10	0 (0/20)	0 (0/23)	0 (0/22)	0 (0/28)	0 (0/30)	5.9 (2/34)	2.6 (1/38)	0 (0/44)	4.7 (2/43)	0 (0/45)	0 (0/37)	0 (0/29)	0 (0/22)	1.2 (5/415)
PO123	0 (0/28)	0 (0/31)	0 (0/33)	0 (0/32)	0 (0/50)	0 (0/61)	0 (0/65)	0 (0/71)	0 (0/70)	0 (0/81)	0 (0/65)	0 (0/39)	0 (0/24)	0 (0/650)
PO18	0 (0/29)	0 (0/31)	0 (0/35)	0 (0/29)	5.4 (2/37)	1.9 (1/52)	0 (0/49)	0 (0/46)	0 (0/57)	0 (0/44)	0 (0/25)	0 (0/31)	0 (0/25)	0.6 (3/490)
PO28	0 (0/26)	0 (0/31)	0 (0/28)	0 (0/29)	0 (0/33)	0 (0/33)	0 (0/41)	2.5 (1/40)	4.7 (2/43)	0 (0/35)	0 (0/32)	0 (0/27)	0 (0/17)	0.7 (3/415)
PO42	0 (0/23)	0 (0/19)	0 (0/23)	0 (0/20)	0 (0/30)	2.9 (1/35)	0 (0/41)	0 (0/41)	0 (0/36)	0 (0/30)	0 (0/26)	0 (0/22)	0 (0/18)	0.3 (1/364)
PO49	0 (0/23)	0 (0/28)	0 (0/35)	0 (0/33)	0 (0/32)	0 (0/38)	0 (0/48)	0 (0/39)	0 (0/46)	0 (0/40)	0 (0/38)	0 (0/30)	0 (0/25)	0 (0/455)
PO9	0 (0/11)	0 (0/18)	0 (0/22)	0 (0/26)	0 (0/26)	0 (0/23)	0 (0/30)	3.1 (1/32)	0 (0/34)	0 (0/30)	0 (0/18)	0 (0/20)	0 (0/13)	0.3 (1/303)

Table B6: Percentage of mussel samples for which PST equals or exceeds 800 µg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 800 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/29)	0 (0/41)	0 (0/36)	0 (0/39)	0 (0/45)	0 (0/44)	0 (0/42)	0 (0/41)	0 (0/35)	0 (0/35)	0 (0/38)	0 (0/32)	0 (0/26)	0 (0/483)
G10	0 (0/40)	0 (0/49)	0 (0/57)	0 (0/61)	0 (0/69)	0 (0/69)	0 (0/62)	0 (0/63)	0 (0/70)	0 (0/67)	0 (0/41)	0 (0/44)	0 (0/40)	0 (0/732)
G123	0 (0/34)	0 (0/36)	0 (0/41)	0 (0/41)	0 (0/49)	3.4 (2/59)	3.8 (2/53)	0 (0/57)	0 (0/29)	0 (0/32)	0 (0/32)	0 (0/29)	0 (0/22)	0.8 (4/514)
G18	0 (0/60)	0 (0/75)	0 (0/86)	2.9 (3/103)	9.1 (11/121)	9.1 (9/99)	7.3 (6/82)	0 (0/85)	0 (0/79)	0 (0/74)	0 (0/81)	0 (0/69)	0 (0/51)	2.7 (29/1065)
G21	0 (0/39)	0 (0/49)	0 (0/47)	0 (0/42)	0 (0/69)	0 (0/81)	0 (0/75)	0 (0/71)	0 (0/73)	0 (0/60)	0 (0/42)	0 (0/47)	0 (0/34)	0 (0/729)
G22	0 (0/59)	0 (0/72)	0 (0/76)	0 (0/67)	0 (0/88)	3 (3/100)	6 (6/100)	0 (0/87)	0 (0/94)	0 (0/77)	0 (0/54)	0 (0/56)	0 (0/48)	0.9 (9/978)
G23	0 (0/39)	0 (0/42)	0 (0/42)	0 (0/52)	0 (0/70)	3.4 (3/89)	1.9 (2/106)	0 (0/86)	0 (0/78)	0 (0/68)	0 (0/44)	0 (0/41)	0 (0/32)	0.6 (5/789)
G26	0 (0/18)	0 (0/21)	0 (0/28)	0 (0/27)	0 (0/37)	0 (0/37)	0 (0/37)	0 (0/31)	0 (0/25)	0 (0/30)	0 (0/24)	0 (0/22)	0 (0/15)	0 (0/352)
G28	0 (0/36)	0 (0/52)	0 (0/76)	0 (0/87)	3.1 (3/98)	10.4 (13/125)	4 (5/124)	0 (0/103)	0 (0/96)	0 (0/105)	0 (0/66)	0 (0/60)	0 (0/37)	2 (21/1065)
G34	0 (0/14)	0 (0/19)	0 (0/24)	0 (0/16)	0 (0/14)	0 (0/16)	0 (0/22)	0 (0/35)	0 (0/29)	0 (0/29)	0 (0/22)	0 (0/20)	0 (0/17)	0 (0/277)
G35	0 (0/35)	0 (0/47)	0 (0/44)	0 (0/64)	0 (0/73)	9.3 (9/97)	12.7 (10/79)	0 (0/71)	0 (0/79)	0 (0/65)	0 (0/55)	0 (0/46)	0 (0/30)	2.4 (19/785)
G39	0 (0/34)	0 (0/45)	0 (0/40)	0 (0/53)	0 (0/62)	1.6 (1/63)	0 (0/58)	0 (0/58)	0 (0/57)	0 (0/57)	0 (0/53)	0 (0/40)	0 (0/27)	0.2 (1/647)
G42	0 (0/38)	0 (0/45)	0 (0/47)	0 (0/64)	0 (0/78)	2.3 (2/88)	3.6 (3/84)	0 (0/84)	0 (0/76)	0 (0/73)	0 (0/66)	0 (0/49)	0 (0/35)	0.6 (5/827)
G48	0 (0/38)	0 (0/44)	0 (0/45)	0 (0/71)	5.5 (5/91)	11.9 (10/84)	8.4 (7/83)	3.5 (2/57)	0 (0/64)	0 (0/69)	0 (0/61)	0 (0/42)	0 (0/33)	3.1 (24/782)
G49	0 (0/28)	0 (0/38)	0 (0/40)	0 (0/63)	0 (0/77)	0 (0/75)	6.3 (5/79)	0 (0/72)	0 (0/63)	0 (0/68)	0 (0/49)	0 (0/38)	0 (0/28)	0.7 (5/718)
G54	0 (0/5)	0 (0/3)	0 (0/6)	0 (0/10)	0 (0/11)	36.4 (4/11)	15.4 (2/13)	0 (0/14)	0 (0/18)	0 (0/10)	0 (0/11)	0 (0/11)	0 (0/3)	4.8 (6/126)
G56	0 (0/24)	0 (0/24)	0 (0/29)	0 (0/40)	0 (0/52)	0 (0/68)	0 (0/61)	0 (0/50)	0 (0/53)	0 (0/41)	0 (0/29)	0 (0/25)	0 (0/18)	0 (0/514)
G57	0 (0/60)	0 (0/65)	0 (0/64)	0 (0/72)	1.1 (1/93)	0 (0/95)	0 (0/90)	1.1 (1/94)	1 (1/101)	0 (0/95)	0 (0/65)	0 (0/58)	0 (0/41)	0.3 (3/993)
G58	0 (0/34)	0 (0/44)	0 (0/49)	0 (0/53)	1.4 (1/72)	1.2 (1/84)	0 (0/71)	0 (0/63)	0 (0/92)	3.1 (3/97)	0 (0/91)	0 (0/46)	0 (0/26)	0.6 (5/822)
G67	0 (0/50)	0 (0/52)	0 (0/47)	0 (0/64)	0 (0/66)	0 (0/72)	0 (0/79)	0 (0/77)	3.8 (3/78)	0 (0/71)	0 (0/43)	0 (0/41)	0 (0/32)	0.4 (3/772)
G71	0 (0/14)	0 (0/18)	0 (0/26)	0 (0/14)	0 (0/25)	2.3 (1/43)	0 (0/40)	2.8 (1/36)	3.6 (1/28)	0 (0/25)	0 (0/22)	0 (0/21)	0 (0/10)	0.9 (3/322)
G8	0 (0/26)	0 (0/40)	0 (0/44)	4.9 (3/61)	10.8 (7/65)	11.1 (6/54)	8.7 (4/46)	11.6 (5/43)	0 (0/34)	0 (0/33)	0 (0/37)	0 (0/38)	0 (0/27)	4.6 (25/548)
G80	0 (0/16)	0 (0/17)	0 (0/16)	0 (0/18)	0 (0/23)	4.8 (1/21)	0 (0/18)	0 (0/20)	0 (0/16)	0 (0/16)	0 (0/19)	0 (0/10)	0 (0/10)	0.5 (1/220)
G81	0 (0/34)	0 (0/46)	0 (0/59)	0 (0/79)	0 (0/76)	1.4 (1/69)	0 (0/59)	1.9 (1/53)	1.8 (2/110)	0 (0/109)	0 (0/73)	0 (0/45)	0 (0/31)	0.5 (4/843)
G9	0 (0/41)	0 (0/45)	0 (0/51)	0 (0/56)	0 (0/63)	0 (0/69)	0 (0/56)	0 (0/55)	0 (0/61)	0 (0/53)	0 (0/52)	0 (0/50)	0 (0/34)	0 (0/686)
P125	0 (0/27)	0 (0/35)	0 (0/36)	0 (0/35)	0 (0/50)	1.5 (1/67)	4.8 (3/63)	1.5 (1/65)	0 (0/56)	0 (0/53)	0 (0/31)	0 (0/28)	0 (0/24)	0.9 (5/570)
P16	0 (0/22)	0 (0/26)	0 (0/27)	2.5 (1/40)	2.9 (1/35)	6.9 (2/29)	0 (0/24)	0 (0/28)	0 (0/31)	0 (0/36)	0 (0/28)	0 (0/22)	0 (0/19)	1.1 (4/367)
P31	0 (0/26)	0 (0/31)	0 (0/32)	0 (0/32)	0 (0/39)	0 (0/44)	0 (0/40)	0 (0/44)	0 (0/44)	0 (0/37)	0 (0/35)	0 (0/35)	0 (0/26)	0 (0/465)
P38	0 (0/16)	0 (0/21)	0 (0/20)	0 (0/36)	5.9 (2/34)	10.5 (4/38)	0 (0/39)	0 (0/38)	0 (0/33)	0 (0/37)	0 (0/33)	0 (0/19)	0 (0/14)	1.6 (6/378)
P41	0 (0/27)	0 (0/31)	0 (0/40)	0 (0/55)	8.7 (6/69)	15.1 (11/73)	3.6 (2/56)	0 (0/45)	0 (0/46)	0 (0/51)	0 (0/39)	0 (0/25)	0 (0/23)	3.3 (19/580)
P5	0 (0/18)	0 (0/23)	0 (0/31)	0 (0/35)	0 (0/36)	0 (0/40)	0 (0/39)	0 (0/42)	0 (0/46)	0 (0/40)	0 (0/29)	0 (0/21)	0 (0/19)	0 (0/419)
P6	0 (0/25)	0 (0/25)	0 (0/33)	0 (0/37)	0 (0/37)	0 (0/41)	4.8 (2/42)	0 (0/42)	0 (0/32)	0 (0/35)	0 (0/28)	0 (0/23)	0 (0/19)	0.5 (2/419)
P61	0 (0/26)	0 (0/31)	0 (0/31)	0 (0/38)	0 (0/51)	0 (0/53)	0 (0/60)	0 (0/49)	0 (0/54)	0 (0/46)	0 (0/26)	0 (0/26)	0 (0/21)	0 (0/512)
P64	0 (0/27)	0 (0/32)	0 (0/41)	0 (0/41)	0 (0/59)	1.6 (1/61)	1.9 (1/53)	0 (0/55)	3.4 (2/58)	4.5 (3/67)	0 (0/65)	0 (0/39)	0 (0/22)	1.1 (7/620)
P65	0 (0/26)	0 (0/31)	0 (0/36)	0 (0/38)	0 (0/49)	0 (0/51)	0 (0/50)	0 (0/39)	0 (0/44)	0 (0/62)	0 (0/29)	0 (0/27)	0 (0/20)	0 (0/502)
P68	0 (0/24)	0 (0/34)	0 (0/40)	0 (0/46)	0 (0/51)	0 (0/57)	0 (0/59)	4.7 (3/64)	3 (2/66)	0 (0/62)	0 (0/39)	0 (0/30)	0 (0/22)	0.8 (5/594)
P69	0 (0/10)	0 (0/17)	0 (0/20)	0 (0/23)	0 (0/25)	0 (0/14)	0 (0/11)	6.7 (1/15)	2.9 (1/34)	0 (0/24)	0 (0/20)	0 (0/14)	0 (0/8)	0.9 (2/235)
P7	0 (0/25)	0 (0/28)	0 (0/39)	0 (0/47)	1.8 (1/57)	9 (6/67)	0 (0/54)	0 (0/46)	0 (0/39)	0 (0/45)	0 (0/50)	0 (0/32)	0 (0/21)	1.3 (7/550)
P70	0 (0/20)	0 (0/26)	0 (0/34)	0 (0/41)	0 (0/50)	0 (0/49)	2 (1/51)	0 (0/46)	0 (0/48)	1.6 (1/61)	0 (0/47)	0 (0/38)	0 (0/21)	0.4 (2/532)
P72	0 (0/24)	0 (0/27)	0 (0/27)	0 (0/42)	1.9 (1/54)	0 (0/53)	0 (0/48)	2.1 (1/48)	0 (0/50)	0 (0/55)	0 (0/48)	0 (0/35)	0 (0/19)	0.4 (2/530)

Table B7: Percentage of Pacific oyster samples for which PST equals or exceeds 800 µg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 800 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	0 (0/40)	0 (0/51)	0 (0/55)	0 (0/60)	0 (0/74)	0 (0/77)	0 (0/76)	0 (0/74)	0 (0/71)	0 (0/57)	0 (0/45)	0 (0/42)	0 (0/39)	0 (0/761)
PO10	0 (0/30)	0 (0/39)	0 (0/37)	0 (0/41)	0 (0/45)	0 (0/45)	0 (0/39)	0 (0/44)	0 (0/40)	0 (0/40)	0 (0/32)	0 (0/31)	0 (0/27)	0 (0/490)
PO123	0 (0/44)	0 (0/49)	0 (0/59)	0 (0/62)	0 (0/70)	0 (0/77)	0 (0/73)	0 (0/77)	0 (0/74)	0 (0/77)	0 (0/64)	0 (0/45)	0 (0/35)	0 (0/806)
PO18	0 (0/29)	0 (0/33)	0 (0/36)	1.9 (1/52)	7.8 (4/51)	0 (0/61)	0 (0/69)	0 (0/61)	0 (0/65)	0 (0/40)	0 (0/24)	0 (0/27)	0 (0/24)	0.9 (5/572)
PO28	0 (0/30)	0 (0/43)	0 (0/51)	0 (0/56)	0 (0/54)	3.4 (2/58)	1.5 (1/65)	0 (0/61)	0 (0/49)	0 (0/46)	0 (0/44)	0 (0/28)	0 (0/22)	0.5 (3/607)
PO42	0 (0/30)	0 (0/25)	0 (0/32)	0 (0/29)	0 (0/39)	0 (0/49)	0 (0/47)	0 (0/43)	0 (0/38)	0 (0/31)	0 (0/26)	0 (0/26)	0 (0/20)	0 (0/435)
PO49	0 (0/25)	0 (0/34)	0 (0/37)	0 (0/49)	0 (0/56)	3 (2/67)	0 (0/68)	0 (0/56)	0 (0/53)	0 (0/46)	0 (0/42)	0 (0/32)	0 (0/25)	0.3 (2/590)
PO9	0 (0/11)	0 (0/25)	0 (0/28)	0 (0/28)	0 (0/35)	0 (0/32)	0 (0/38)	0 (0/52)	0 (0/46)	0 (0/41)	0 (0/21)	0 (0/18)	0 (0/13)	0 (0/388)

Table B8: Percentage of mussel samples for which PST equals or exceeds 400 µg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 400 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/29)	0 (0/41)	0 (0/36)	0 (0/39)	0 (0/45)	4.5 (2/44)	0 (0/42)	0 (0/41)	0 (0/35)	0 (0/35)	0 (0/38)	0 (0/32)	0 (0/26)	0.4 (2/483)
G10	0 (0/40)	0 (0/49)	0 (0/57)	0 (0/61)	0 (0/69)	0 (0/69)	0 (0/62)	0 (0/63)	0 (0/70)	0 (0/67)	0 (0/41)	0 (0/44)	0 (0/40)	0 (0/732)
G123	0 (0/34)	0 (0/36)	0 (0/41)	0 (0/41)	0 (0/49)	6.8 (4/59)	5.7 (3/53)	1.8 (1/57)	0 (0/29)	0 (0/32)	0 (0/32)	0 (0/29)	0 (0/22)	1.6 (8/514)
G18	0 (0/60)	0 (0/75)	0 (0/86)	6.8 (7/103)	14.9 (18/121)	12.1 (12/99)	9.8 (8/82)	2.4 (2/85)	0 (0/79)	0 (0/74)	0 (0/81)	0 (0/69)	0 (0/51)	4.4 (47/1065)
G21	0 (0/39)	0 (0/49)	0 (0/47)	0 (0/42)	2.9 (2/69)	1.2 (1/81)	0 (0/75)	0 (0/71)	0 (0/73)	0 (0/60)	0 (0/42)	0 (0/47)	0 (0/34)	0.4 (3/729)
G22	0 (0/59)	0 (0/72)	0 (0/76)	0 (0/67)	0 (0/88)	3 (3/100)	7 (7/100)	3.4 (3/87)	0 (0/94)	0 (0/77)	0 (0/54)	0 (0/56)	0 (0/48)	1.3 (13/978)
G23	0 (0/39)	0 (0/42)	0 (0/42)	0 (0/52)	0 (0/70)	3.4 (3/89)	2.8 (3/106)	0 (0/86)	0 (0/78)	0 (0/68)	0 (0/44)	0 (0/41)	0 (0/32)	0.8 (6/789)
G26	0 (0/18)	0 (0/21)	0 (0/28)	0 (0/27)	0 (0/37)	0 (0/37)	0 (0/37)	0 (0/31)	0 (0/25)	0 (0/30)	0 (0/24)	0 (0/22)	0 (0/15)	0 (0/352)
G28	0 (0/36)	0 (0/52)	2.6 (2/76)	1.1 (1/87)	6.1 (6/98)	12.8 (16/125)	7.3 (9/124)	1 (1/103)	0 (0/96)	0 (0/105)	0 (0/66)	0 (0/60)	0 (0/37)	3.3 (35/1065)
G34	0 (0/14)	0 (0/19)	0 (0/24)	0 (0/16)	0 (0/14)	0 (0/16)	0 (0/22)	0 (0/35)	0 (0/29)	0 (0/29)	0 (0/22)	0 (0/20)	0 (0/17)	0 (0/277)
G35	0 (0/35)	0 (0/47)	0 (0/44)	0 (0/64)	1.4 (1/73)	15.5 (15/97)	20.3 (16/79)	0 (0/71)	0 (0/79)	0 (0/65)	0 (0/55)	0 (0/46)	0 (0/30)	4.1 (32/785)
G39	0 (0/34)	0 (0/45)	0 (0/40)	0 (0/53)	0 (0/62)	4.8 (3/63)	1.7 (1/58)	0 (0/58)	0 (0/57)	0 (0/57)	0 (0/53)	0 (0/40)	0 (0/27)	0.6 (4/647)
G42	0 (0/38)	0 (0/45)	0 (0/47)	0 (0/64)	3.8 (3/78)	10.2 (9/88)	7.1 (6/84)	1.2 (1/84)	0 (0/76)	0 (0/73)	0 (0/66)	0 (0/49)	0 (0/35)	2.3 (19/827)
G48	0 (0/38)	0 (0/44)	0 (0/45)	4.2 (3/71)	8.8 (8/91)	20.2 (17/84)	13.3 (11/83)	5.3 (3/57)	0 (0/64)	0 (0/69)	0 (0/61)	0 (0/42)	0 (0/33)	5.4 (42/782)
G49	0 (0/28)	0 (0/38)	0 (0/40)	0 (0/63)	2.6 (2/77)	2.7 (2/75)	8.9 (7/79)	2.8 (2/72)	0 (0/63)	0 (0/68)	0 (0/49)	0 (0/38)	0 (0/28)	1.8 (13/718)
G54	0 (0/5)	0 (0/3)	0 (0/6)	0 (0/10)	0 (0/11)	54.5 (6/11)	23.1 (3/13)	0 (0/14)	0 (0/18)	0 (0/10)	0 (0/11)	0 (0/11)	0 (0/3)	7.1 (9/126)
G56	0 (0/24)	0 (0/24)	0 (0/29)	0 (0/40)	0 (0/52)	0 (0/68)	0 (0/61)	0 (0/50)	0 (0/53)	0 (0/41)	0 (0/29)	0 (0/25)	0 (0/18)	0 (0/514)
G57	0 (0/60)	0 (0/65)	0 (0/64)	0 (0/72)	1.1 (1/93)	1.1 (1/95)	0 (0/90)	3.2 (3/94)	3 (3/101)	0 (0/95)	0 (0/65)	0 (0/58)	0 (0/41)	0.8 (8/993)
G58	0 (0/34)	0 (0/44)	0 (0/49)	0 (0/53)	2.8 (2/72)	2.4 (2/84)	0 (0/71)	0 (0/63)	3.3 (3/92)	7.2 (7/97)	1.1 (1/91)	0 (0/46)	0 (0/26)	1.8 (15/822)
G67	2 (1/50)	0 (0/52)	0 (0/47)	0 (0/64)	0 (0/66)	0 (0/72)	0 (0/79)	1.3 (1/77)	5.1 (4/78)	0 (0/71)	0 (0/43)	0 (0/41)	0 (0/32)	0.8 (6/772)
G71	0 (0/14)	0 (0/18)	0 (0/26)	0 (0/14)	0 (0/25)	2.3 (1/43)	0 (0/40)	5.6 (2/36)	10.7 (3/28)	4 (1/25)	0 (0/22)	0 (0/21)	0 (0/10)	2.2 (7/322)
G8	0 (0/26)	0 (0/40)	0 (0/44)	8.2 (5/61)	13.8 (9/65)	11.1 (6/54)	10.9 (5/46)	14 (6/43)	0 (0/34)	0 (0/33)	0 (0/37)	0 (0/38)	0 (0/27)	5.7 (31/548)
G80	0 (0/16)	0 (0/17)	0 (0/16)	0 (0/18)	0 (0/23)	9.5 (2/21)	11.1 (2/18)	0 (0/20)	0 (0/16)	0 (0/16)	0 (0/19)	0 (0/10)	0 (0/10)	1.8 (4/220)
G81	0 (0/34)	0 (0/46)	0 (0/59)	0 (0/79)	0 (0/76)	2.9 (2/69)	1.7 (1/59)	1.9 (1/53)	8.2 (9/110)	0 (0/109)	0 (0/73)	0 (0/45)	0 (0/31)	1.5 (13/843)
G9	0 (0/41)	0 (0/45)	0 (0/51)	0 (0/56)	0 (0/63)	0 (0/69)	0 (0/56)	0 (0/55)	0 (0/61)	0 (0/53)	0 (0/52)	0 (0/50)	0 (0/34)	0 (0/686)
P125	0 (0/27)	0 (0/35)	0 (0/36)	0 (0/35)	0 (0/50)	3 (2/67)	6.3 (4/63)	3.1 (2/65)	0 (0/56)	0 (0/53)	0 (0/31)	0 (0/28)	0 (0/24)	1.4 (8/570)
P16	0 (0/22)	0 (0/26)	0 (0/27)	2.5 (1/40)	5.7 (2/35)	6.9 (2/29)	0 (0/24)	0 (0/28)	0 (0/31)	0 (0/36)	0 (0/28)	0 (0/22)	0 (0/19)	1.4 (5/367)
P31	0 (0/26)	0 (0/31)	0 (0/32)	0 (0/32)	0 (0/39)	0 (0/44)	0 (0/40)	0 (0/44)	0 (0/44)	0 (0/37)	0 (0/35)	0 (0/35)	0 (0/26)	0 (0/465)
P38	0 (0/16)	0 (0/21)	0 (0/20)	2.8 (1/36)	17.6 (6/34)	15.8 (6/38)	0 (0/39)	0 (0/38)	0 (0/33)	0 (0/37)	0 (0/33)	0 (0/19)	0 (0/14)	3.4 (13/378)
P41	0 (0/27)	0 (0/31)	0 (0/40)	7.3 (4/55)	14.5 (10/69)	20.5 (15/73)	10.7 (6/56)	0 (0/45)	0 (0/46)	0 (0/51)	0 (0/39)	0 (0/25)	0 (0/23)	6 (35/580)
P5	0 (0/18)	0 (0/23)	0 (0/31)	0 (0/35)	0 (0/36)	0 (0/40)	0 (0/39)	0 (0/42)	0 (0/46)	0 (0/40)	0 (0/29)	0 (0/21)	0 (0/19)	0 (0/419)
P6	0 (0/25)	0 (0/25)	0 (0/33)	0 (0/37)	0 (0/37)	0 (0/41)	4.8 (2/42)	0 (0/42)	0 (0/32)	0 (0/35)	0 (0/28)	0 (0/23)	0 (0/19)	0.5 (2/419)
P61	0 (0/26)	0 (0/31)	0 (0/31)	0 (0/38)	0 (0/51)	0 (0/53)	0 (0/60)	2 (1/49)	3.7 (2/54)	4.3 (2/46)	0 (0/26)	0 (0/26)	0 (0/21)	1 (5/512)
P64	0 (0/27)	0 (0/32)	0 (0/41)	0 (0/41)	0 (0/59)	3.3 (2/61)	3.8 (2/53)	3.6 (2/55)	8.6 (5/58)	6 (4/67)	1.5 (1/65)	0 (0/39)	0 (0/22)	2.6 (16/620)
P65	0 (0/26)	0 (0/31)	0 (0/36)	0 (0/38)	0 (0/49)	2 (1/51)	2 (1/50)	0 (0/39)	0 (0/44)	3.2 (2/62)	0 (0/29)	0 (0/27)	0 (0/20)	0.8 (4/502)
P68	0 (0/24)	0 (0/34)	0 (0/40)	0 (0/46)	0 (0/51)	0 (0/57)	3.4 (2/59)	7.8 (5/64)	15.2 (10/66)	6.5 (4/62)	0 (0/39)	0 (0/30)	0 (0/22)	3.5 (21/594)
P69	0 (0/10)	0 (0/17)	0 (0/20)	0 (0/23)	0 (0/25)	0 (0/14)	0 (0/11)	13.3 (2/15)	14.7 (5/34)	0 (0/24)	0 (0/20)	0 (0/14)	0 (0/8)	3 (7/235)
P7	0 (0/25)	0 (0/28)	0 (0/39)	0 (0/47)	7 (4/57)	28.4 (19/67)	9.3 (5/54)	2.2 (1/46)	0 (0/39)	0 (0/45)	0 (0/50)	0 (0/32)	0 (0/21)	5.3 (29/550)
P70	0 (0/20)	0 (0/26)	0 (0/34)	0 (0/41)	0 (0/50)	0 (0/49)	3.9 (2/51)	0 (0/46)	0 (0/48)	4.9 (3/61)	0 (0/47)	0 (0/38)	0 (0/21)	0.9 (5/532)
P72	0 (0/24)	0 (0/27)	0 (0/27)	0 (0/42)	3.7 (2/54)	1.9 (1/53)	0 (0/48)	8.3 (4/48)	4 (2/50)	1.8 (1/55)	2.1 (1/48)	2.9 (1/35)	0 (0/19)	2.3 (12/530)

Table B9: Percentage of Pacific oyster samples for which PST equals or exceeds 400 µg/kg, per group and period, based on data from 2001-21. In brackets: number of samples exceeding 400 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	0 (0/40)	0 (0/51)	0 (0/55)	0 (0/60)	0 (0/74)	1.3 (1/77)	0 (0/76)	0 (0/74)	0 (0/71)	0 (0/57)	0 (0/45)	0 (0/42)	0 (0/39)	0.1 (1/761)
PO10	0 (0/30)	0 (0/39)	0 (0/37)	0 (0/41)	0 (0/45)	0 (0/45)	0 (0/39)	0 (0/44)	0 (0/40)	0 (0/40)	0 (0/32)	0 (0/31)	0 (0/27)	0 (0/490)
PO123	0 (0/44)	0 (0/49)	0 (0/59)	0 (0/62)	0 (0/70)	0 (0/77)	0 (0/73)	0 (0/77)	0 (0/74)	0 (0/77)	0 (0/64)	0 (0/45)	0 (0/35)	0 (0/806)
PO18	0 (0/29)	0 (0/33)	0 (0/36)	5.8 (3/52)	9.8 (5/51)	0 (0/61)	1.4 (1/69)	0 (0/61)	0 (0/65)	0 (0/40)	0 (0/24)	0 (0/27)	0 (0/24)	1.6 (9/572)
PO28	0 (0/30)	0 (0/43)	0 (0/51)	0 (0/56)	0 (0/54)	3.4 (2/58)	1.5 (1/65)	0 (0/61)	0 (0/49)	0 (0/46)	0 (0/44)	0 (0/28)	0 (0/22)	0.5 (3/607)
PO42	0 (0/30)	0 (0/25)	0 (0/32)	0 (0/29)	0 (0/39)	0 (0/49)	0 (0/47)	0 (0/43)	0 (0/38)	0 (0/31)	0 (0/26)	0 (0/26)	0 (0/20)	0 (0/435)
PO49	0 (0/25)	0 (0/34)	0 (0/37)	0 (0/49)	1.8 (1/56)	4.5 (3/67)	4.4 (3/68)	0 (0/56)	0 (0/53)	0 (0/46)	0 (0/42)	0 (0/32)	0 (0/25)	1.2 (7/590)
PO9	0 (0/11)	0 (0/25)	0 (0/28)	0 (0/28)	0 (0/35)	0 (0/32)	0 (0/38)	0 (0/52)	0 (0/46)	0 (0/41)	0 (0/21)	0 (0/18)	0 (0/13)	0 (0/388)

Table B10: Percentage of mussel samples for which LT exceeds the MPL, per group and period, based on data from 2001-21. In brackets: number of samples exceeding the MPL over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/14)	0 (0/17)	0 (0/22)	0 (0/36)	0 (0/48)	6.1 (3/49)	0 (0/48)	2.2 (1/46)	7 (3/43)	2.3 (1/43)	0 (0/44)	2.5 (1/40)	0 (0/28)	1.9 (9/478)
G10	0 (0/28)	0 (0/34)	0 (0/58)	0 (0/74)	0 (0/88)	1.1 (1/88)	2.4 (2/82)	0 (0/85)	0 (0/92)	0 (0/86)	0 (0/67)	0 (0/70)	0 (0/49)	0.3 (3/901)
G123	0 (0/22)	0 (0/22)	0 (0/46)	0 (0/54)	0 (0/54)	5.6 (3/54)	3.4 (2/59)	1.5 (1/67)	9.7 (7/72)	6.8 (5/73)	0 (0/52)	0 (0/58)	0 (0/31)	2.7 (18/664)
G18	0 (0/44)	0 (0/48)	0 (0/80)	3.8 (4/104)	8.8 (11/125)	26.2 (32/122)	32.5 (40/123)	27.1 (35/129)	31.3 (41/131)	31.2 (40/128)	20.6 (28/136)	11 (15/136)	9.8 (8/82)	18.3 (254/1388)
G21	0 (0/31)	0 (0/33)	0 (0/65)	0 (0/67)	1.2 (1/84)	3 (3/100)	9.8 (11/112)	14.2 (16/113)	5.3 (6/113)	2.7 (3/113)	0 (0/83)	1.1 (1/88)	0 (0/55)	3.9 (41/1057)
G22	0 (0/44)	0 (0/52)	0 (0/88)	0 (0/87)	0 (0/111)	0.9 (1/113)	3.7 (4/108)	12.7 (17/134)	1.5 (2/132)	1.8 (2/114)	0 (0/88)	0 (0/101)	0 (0/70)	2.1 (26/1242)
G23	0 (0/30)	0 (0/30)	0 (0/58)	0 (0/70)	2.3 (2/87)	5.8 (6/103)	15.1 (16/106)	28 (30/107)	12.4 (14/113)	10 (11/110)	0 (0/109)	0 (0/89)	0 (0/56)	7.4 (79/1068)
G26	0 (0/18)	0 (0/19)	0 (0/41)	0 (0/35)	0 (0/40)	2.3 (1/44)	0 (0/45)	0 (0/43)	0 (0/45)	0 (0/42)	2.4 (1/41)	0 (0/41)	0 (0/27)	0.4 (2/481)
G28	0 (0/28)	0 (0/42)	0 (0/62)	0 (0/80)	2.8 (3/106)	4.2 (5/118)	19.8 (26/131)	24.4 (33/135)	24.5 (35/143)	9.7 (14/144)	3.2 (3/93)	3.7 (4/107)	0 (0/49)	9.9 (123/1238)
G34	0 (0/11)	0 (0/16)	0 (0/30)	0 (0/23)	0 (0/18)	9.5 (2/21)	0 (0/32)	0 (0/43)	0 (0/47)	0 (0/43)	0 (0/36)	0 (0/36)	0 (0/24)	0.5 (2/380)
G35	0 (0/24)	0 (0/30)	0 (0/46)	0 (0/66)	1.3 (1/79)	7.4 (7/94)	19.5 (16/82)	16 (15/94)	23.7 (23/97)	18.7 (17/91)	7.9 (7/89)	2.4 (2/83)	0 (0/43)	9.6 (88/918)
G39	0 (0/17)	0 (0/20)	0 (0/37)	0 (0/58)	1.4 (1/72)	12.2 (9/74)	19.7 (14/71)	14.9 (11/74)	21.9 (16/73)	16 (12/75)	8.6 (6/70)	0 (0/65)	0 (0/36)	9.3 (69/742)
G42	0 (0/25)	0 (0/21)	0 (0/40)	0 (0/63)	1.2 (1/82)	1.2 (1/86)	7.3 (6/82)	14.4 (13/90)	8.8 (7/80)	3.9 (3/76)	3.8 (3/79)	2.8 (2/72)	2.2 (1/45)	4.4 (37/841)
G48	0 (0/28)	0 (0/29)	0 (0/50)	0 (0/73)	1.1 (1/88)	12 (10/83)	29.9 (26/87)	55.7 (54/97)	44.6 (50/112)	26.4 (28/106)	14.2 (15/106)	8.2 (8/98)	1.7 (1/59)	19 (193/1016)
G49	0 (0/21)	0 (0/26)	2.8 (1/36)	0 (0/53)	0 (0/71)	7.6 (6/79)	16.7 (14/84)	31.2 (29/93)	28.1 (25/89)	9.1 (8/88)	2.7 (2/73)	0 (0/63)	0 (0/31)	10.5 (85/807)
G54	0 (0/3)	0 (0/2)	0 (0/8)	0 (0/11)	0 (0/9)	18.2 (2/11)	7.7 (1/13)	0 (0/14)	17.6 (3/17)	30 (3/10)	14.3 (2/14)	6.7 (1/15)	16.7 (1/6)	9.8 (13/133)
G56	0 (0/18)	0 (0/18)	0 (0/38)	5 (3/60)	5.8 (4/69)	5 (4/80)	5.9 (5/85)	25.7 (19/74)	19 (16/84)	5.7 (4/70)	1.6 (1/64)	1.7 (1/59)	0 (0/30)	7.6 (57/749)
G57	0 (0/37)	0 (0/46)	0 (0/67)	3.1 (3/98)	3.3 (4/120)	5.8 (6/103)	15.9 (18/113)	25.8 (31/120)	23.9 (33/138)	10.4 (14/134)	3 (4/132)	0 (0/108)	0 (0/60)	8.9 (113/1276)
G58	0 (0/30)	0 (0/34)	0 (0/57)	0 (0/62)	1.4 (1/74)	3.3 (3/90)	11.2 (10/89)	22.9 (22/96)	12.9 (13/101)	6.3 (6/95)	3.1 (3/97)	2.2 (2/90)	0 (0/40)	6.3 (60/955)
G67	0 (0/27)	0 (0/30)	0 (0/50)	3.5 (3/85)	5 (5/101)	8.7 (8/92)	12.4 (12/97)	29 (29/100)	22 (22/100)	3.9 (4/103)	2.2 (2/93)	0 (0/86)	0 (0/44)	8.4 (85/1008)
G71	0 (0/9)	0 (0/9)	0 (0/22)	7.1 (1/14)	11.5 (3/26)	11.1 (5/45)	4.7 (2/43)	20.5 (8/39)	41.2 (14/34)	32.3 (10/31)	17.9 (5/28)	7.4 (2/27)	18.2 (2/11)	15.4 (52/338)
G8	4 (1/25)	0 (0/35)	2.3 (1/44)	0 (0/61)	4.7 (3/64)	20 (12/60)	33.3 (20/60)	36.8 (21/57)	31.2 (20/64)	36.6 (26/71)	24.7 (19/77)	20.3 (16/79)	6.7 (3/45)	19.1 (142/742)
G80	0 (0/14)	0 (0/17)	0 (0/14)	0 (0/26)	0 (0/28)	4.5 (1/22)	5 (1/20)	17.4 (4/23)	36 (9/25)	21.4 (6/28)	12.1 (4/33)	3.8 (1/26)	5 (1/20)	9.1 (27/296)
G81	2.9 (1/34)	0 (0/40)	1.4 (1/74)	1.2 (1/84)	1.2 (1/81)	4.2 (3/72)	0 (0/64)	12.3 (9/73)	7.8 (9/116)	10.1 (13/129)	6.3 (8/127)	1.9 (2/107)	0 (0/49)	4.6 (48/1050)
G9	0 (0/25)	0 (0/28)	0 (0/46)	0 (0/64)	0 (0/83)	0 (0/88)	1.2 (1/82)	3.4 (3/87)	3.3 (3/91)	1.1 (1/88)	0 (0/72)	0 (0/79)	0 (0/44)	0.9 (8/877)
P125	0 (0/21)	0 (0/23)	0 (0/39)	0 (0/46)	0 (0/58)	6.8 (5/74)	22.8 (18/79)	25.9 (21/81)	12.7 (10/79)	7.8 (6/77)	1.6 (1/64)	0 (0/55)	2.9 (1/34)	8.5 (62/730)
P16	0 (0/17)	0 (0/17)	0 (0/28)	2.5 (1/40)	10 (4/40)	15.8 (6/38)	33.3 (14/42)	30.2 (13/43)	14 (6/43)	11.4 (5/44)	2.2 (1/46)	4.8 (2/42)	7.1 (2/28)	11.5 (54/468)
P31	0 (0/17)	0 (0/18)	0 (0/32)	0 (0/37)	0 (0/46)	1.9 (1/54)	0 (0/52)	2 (1/50)	1.9 (1/53)	0 (0/51)	0 (0/51)	0 (0/52)	0 (0/33)	0.5 (3/546)
P38	0 (0/9)	0 (0/12)	0 (0/17)	0 (0/33)	0 (0/35)	0 (0/33)	11.1 (5/45)	7.3 (3/41)	0 (0/35)	4.7 (2/43)	2.6 (1/38)	0 (0/30)	0 (0/19)	2.8 (11/390)
P41	0 (0/19)	0 (0/21)	0 (0/35)	0 (0/55)	4.5 (3/66)	11.8 (8/68)	32.9 (23/70)	40.6 (28/69)	27.8 (20/72)	18.6 (13/70)	4.5 (3/66)	3.3 (2/60)	0 (0/40)	14.1 (100/711)
P5	0 (0/14)	0 (0/17)	0 (0/35)	2.1 (1/47)	0 (0/53)	0 (0/54)	0 (0/54)	1.7 (1/59)	1.5 (1/68)	0 (0/60)	0 (0/47)	0 (0/38)	0 (0/26)	0.5 (3/572)
P6	0 (0/18)	0 (0/15)	0 (0/34)	2.3 (1/44)	0 (0/51)	5.5 (3/55)	11.1 (6/54)	19.3 (11/57)	37.5 (21/56)	26.3 (15/57)	5.3 (3/57)	0 (0/50)	0 (0/29)	10.4 (60/577)
P61	0 (0/19)	0 (0/25)	0 (0/35)	1.9 (1/53)	10.6 (7/66)	9.1 (7/77)	10.5 (8/76)	27.7 (18/65)	24.4 (19/78)	8.2 (5/61)	0 (0/60)	0 (0/55)	0 (0/25)	9.4 (65/695)
P64	0 (0/17)	0 (0/20)	0 (0/38)	0 (0/44)	1.7 (1/58)	9.2 (6/65)	16.1 (10/62)	27.7 (18/65)	16.7 (12/72)	7.1 (5/70)	1.5 (1/65)	1.5 (1/67)	0 (0/30)	8 (54/673)
P65	0 (0/16)	0 (0/19)	0 (0/36)	6.7 (3/45)	7.3 (4/55)	3.8 (2/53)	7 (4/57)	18.5 (10/54)	6.9 (4/58)	7.6 (5/66)	6.6 (4/61)	0 (0/62)	2.7 (1/37)	6 (37/619)
P68	0 (0/18)	0 (0/25)	0 (0/35)	3.9 (2/51)	11.4 (8/70)	7.7 (5/65)	10.3 (7/68)	32 (24/75)	13.3 (10/75)	3.2 (2/63)	1.6 (1/64)	0 (0/60)	0 (0/36)	8.4 (59/705)
P69	0 (0/10)	0 (0/14)	0 (0/23)	0 (0/26)	0 (0/25)	5.9 (1/17)	7.7 (1/13)	4.8 (1/21)	11.1 (4/36)	10 (3/30)	13.5 (5/37)	0 (0/29)	0 (0/14)	5.1 (15/295)
P7	0 (0/19)	0 (0/19)	0 (0/35)	0 (0/55)	1.6 (1/63)	11.3 (7/62)	23.8 (15/63)	35.9 (23/64)	40.3 (27/67)	16.9 (11/65)	2.9 (2/68)	0 (0/60)	0 (0/36)	12.7 (86/676)
P70	0 (0/17)	0 (0/18)	0 (0/33)	0 (0/39)	0 (0/51)	10.3 (6/58)	13.3 (8/60)	19 (12/63)	13.4 (9/67)	6.7 (4/60)	1.6 (1/62)	0 (0/59)	0 (0/29)	6.5 (40/616)
P72	0 (0/19)	0 (0/23)	0 (0/31)	0 (0/49)	1.7 (1/59)	16.1 (9/56)	19 (11/58)	31 (18/58)	21 (13/62)	8.5 (5/59)	1.6 (1/61)	0 (0/64)	0 (0/29)	9.2 (58/628)

Table B11: Percentage of Pacific oyster samples for which LT exceeds MPL, per group and period, based on data from 2001-21. In brackets: number of samples exceeding MPL over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	3.2 (1/31)	0 (0/55)	2.8 (2/71)	0 (0/68)	0 (0/80)	0 (0/81)	0 (0/85)	0 (0/86)	0 (0/96)	2.8 (3/107)	0 (0/85)	0 (0/80)	0 (0/52)	0.6 (6/977)
PO10	0 (0/22)	0 (0/26)	0 (0/38)	4.3 (2/47)	0 (0/48)	0 (0/53)	0 (0/49)	0 (0/55)	0 (0/54)	0 (0/71)	0 (0/52)	1.9 (1/53)	0 (0/36)	0.5 (3/604)
PO123	0 (0/34)	6.2 (3/48)	0 (0/59)	2.7 (2/75)	2.4 (2/85)	1.1 (1/90)	2.6 (2/78)	1.3 (1/77)	4.5 (4/88)	6.7 (7/104)	4.5 (4/88)	3.4 (3/88)	6.1 (3/49)	3.3 (32/963)
PO18	0 (0/26)	0 (0/59)	0 (0/86)	0 (0/70)	3.3 (2/61)	1.1 (1/87)	2.2 (2/92)	5.7 (5/88)	6.4 (7/110)	2.6 (3/116)	0 (0/93)	0 (0/70)	0 (0/57)	2 (20/1015)
PO28	0 (0/27)	7 (3/43)	1.5 (1/65)	0 (0/67)	0 (0/60)	1.4 (1/69)	0 (0/68)	1.5 (1/65)	2.8 (2/71)	6.3 (5/79)	1.3 (1/79)	0 (0/67)	0 (0/48)	1.7 (14/808)
PO42	0 (0/19)	0 (0/35)	0 (0/43)	0 (0/42)	0 (0/41)	1.8 (1/57)	0 (0/61)	1.7 (1/59)	9.5 (6/63)	9.4 (6/64)	0 (0/60)	0 (0/49)	0 (0/35)	2.2 (14/628)
PO49	0 (0/22)	0 (0/30)	0 (0/44)	0 (0/48)	0 (0/54)	1.4 (1/69)	0 (0/81)	4.3 (3/69)	0 (0/78)	2.5 (2/81)	0 (0/78)	0 (0/54)	0 (0/31)	0.8 (6/739)
PO9	0 (0/14)	0 (0/29)	0 (0/35)	0 (0/32)	0 (0/28)	0 (0/34)	0 (0/41)	2.2 (1/45)	1.7 (1/58)	0 (0/56)	2 (1/51)	0 (0/33)	0 (0/21)	0.6 (3/477)

Table B12: Percentage of mussel samples for which AZA equals or exceeds 160 µg/kg, per group and period, based on data from 2011-21. In brackets: number of samples exceeding 160 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/2)	0 (0/2)	0 (0/7)	0 (0/5)	0 (0/4)	0 (0/4)	0 (0/6)	0 (0/8)	0 (0/8)	0 (0/7)	0 (0/8)	0 (0/8)	0 (0/5)	0 (0/74)
G10	0 (0/16	0 (0/15)	0 (0/37)	0 (0/40)	0 (0/39)	0 (0/35)	0 (0/34)	0 (0/37)	0 (0/43)	0 (0/36)	0 (0/33)	0 (0/42)	0 (0/31)	0 (0/438)
G123	0 (0/16)	0 (0/15)	0 (0/36)	0 (0/35)	0 (0/32)	0 (0/33)	0 (0/43)	0 (0/50)	0 (0/57)	0 (0/59)	0 (0/38)	0 (0/40)	0 (0/23)	0 (0/477)
G18	0 (0/25)	0 (0/27)	0 (0/51)	0 (0/56)	0 (0/52)	0 (0/46)	0 (0/50)	0 (0/64)	0 (0/64)	0 (0/61)	0 (0/66)	0 (0/70)	0 (0/46)	0 (0/678)
G21	0 (0/20)	0 (0/20)	0 (0/50)	0 (0/47)	0 (0/53)	0 (0/64)	0 (0/76)	0 (0/80)	5 (4/80)	3.8 (3/80)	0 (0/57)	0 (0/56)	0 (0/40)	1 (7/723)
G22	0 (0/32)	0 (0/36)	0 (0/67)	0 (0/64)	0 (0/65)	0 (0/70)	0 (0/76)	0 (0/95)	0 (0/96)	0 (0/78)	0 (0/61)	0 (0/71)	0 (0/48)	0 (0/859)
G23	0 (0/20)	0 (0/20)	0 (0/46)	0 (0/43)	0 (0/48)	0 (0/63)	0 (0/70)	0 (0/76)	3.9 (3/76)	1.3 (1/76)	0 (0/76)	0 (0/60)	0 (0/38)	0.6 (4/712)
G26	0 (0/6)	0 (0/6)	0 (0/20)	0 (0/20)	0 (0/21)	0 (0/20)	0 (0/24)	0 (0/26)	0 (0/28)	0 (0/24)	0 (0/24)	0 (0/22)	0 (0/15)	0 (0/256)
G28	0 (0/14)	0 (0/18)	0 (0/34)	0 (0/43)	0 (0/50)	0 (0/51)	0 (0/80)	0 (0/90)	0 (0/86)	0 (0/84)	0 (0/60)	0 (0/60)	0 (0/24)	0 (0/694)
G34	0 (0/6)	0 (0/7)	0 (0/20)	0 (0/14)	0 (0/9)	0 (0/10)	0 (0/16)	0 (0/31)	0 (0/29)	0 (0/22)	0 (0/21)	0 (0/24)	0 (0/17)	0 (0/226)
G35	0 (0/11)	0 (0/13)	0 (0/28)	0 (0/34)	0 (0/34)	0 (0/39)	0 (0/33)	0 (0/47)	0 (0/47)	0 (0/43)	0 (0/45)	0 (0/42)	0 (0/23)	0 (0/439)
G39	0 (0/6)	0 (0/7)	0 (0/23)	0 (0/25)	0 (0/27)	0 (0/26)	0 (0/33)	0 (0/35)	0 (0/33)	0 (0/33)	0 (0/28)	0 (0/26)	0 (0/16)	0 (0/318)
G42	0 (0/6)	0 (0/6)	0 (0/21)	0 (0/24)	0 (0/24)	0 (0/23)	0 (0/25)	0 (0/32)	10 (3/30)	3.8 (1/26)	0 (0/23)	0 (0/24)	0 (0/16)	1.4 (4/280)
G48	0 (0/18)	0 (0/18)	0 (0/41)	0 (0/51)	0 (0/53)	0 (0/52)	0 (0/51)	0 (0/60)	0 (0/66)	0 (0/62)	0 (0/64)	0 (0/65)	0 (0/46)	0 (0/647)
G49	0 (0/11)	0 (0/12)	0 (0/25)	0 (0/25)	0 (0/27)	0 (0/45)	0 (0/41)	0 (0/47)	0 (0/50)	0 (0/50)	0 (0/39)	0 (0/31)	0 (0/17)	0 (0/420)
G54	0 (0/2)	0 (0/2)	0 (0/5)	0 (0/6)	0 (0/3)	0 (0/3)	0 (0/6)	0 (0/9)	0 (0/9)	0 (0/6)	0 (0/7)	0 (0/8)	0 (0/2)	0 (0/68)
G56	0 (0/13)	0 (0/12)	0 (0/32)	0 (0/40)	0 (0/42)	0 (0/53)	0 (0/61)	0 (0/53)	0 (0/58)	0 (0/46)	0 (0/44)	0 (0/42)	0 (0/20)	0 (0/516)
G57	0 (0/20)	0 (0/25)	0 (0/46)	0 (0/68)	0 (0/77)	0 (0/70)	0 (0/80)	0 (0/86)	0 (0/95)	0 (0/88)	0 (0/87)	0 (0/65)	0 (0/41)	0 (0/848)
G58	0 (0/19)	0 (0/20)	0 (0/44)	0 (0/45)	0 (0/48)	0 (0/66)	0 (0/70)	0 (0/71)	0 (0/69)	0 (0/65)	0 (0/66)	0 (0/64)	0 (0/29)	0 (0/676)
G67	0 (0/15)	0 (0/17)	0 (0/37)	0 (0/58)	0 (0/64)	0 (0/57)	0 (0/64)	0 (0/71)	0 (0/64)	0 (0/61)	0 (0/54)	0 (0/48)	0 (0/27)	0 (0/637)
G71	0 (0/2)	0 (0/4)	0 (0/13)	0 (0/9)	0 (0/7)	0 (0/19)	0 (0/20)	0 (0/19)	0 (0/19)	0 (0/15)	0 (0/14)	0 (0/11)	0 (0/7)	0 (0/159)
G8	0 (0/16)	0 (0/16)	0 (0/29)	0 (0/35)	0 (0/38)	0 (0/30)	0 (0/33)	0 (0/31)	0 (0/36)	0 (0/41)	0 (0/42)	0 (0/46)	0 (0/26)	0 (0/419)
G80	0 (0/9)	0 (0/5)	0 (0/6)	0 (0/15)	0 (0/16)	0 (0/7)	0 (0/6)	0 (0/5)	0 (0/14)	0 (0/15)	0 (0/23)	0 (0/18)	0 (0/14)	0 (0/153)
G81	4.5 (1/22)	0 (0/25)	0 (0/53)	0 (0/58)	0 (0/47)	0 (0/42)	0 (0/42)	0 (0/50)	0 (0/80)	4 (4/99)	5.4 (5/93)	1.3 (1/79)	0 (0/35)	1.5 (11/725)
G9	0 (0/13)	0 (0/11)	0 (0/28)	0 (0/25)	0 (0/24)	0 (0/24)	0 (0/34)	0 (0/40)	0 (0/40)	0 (0/40)	0 (0/26)	0 (0/32)	0 (0/22)	0 (0/359)
P125	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	0 (0/36)	0 (0/37)	0 (0/39)	5 (2/40)	0 (0/40)	0 (0/40)	0 (0/32)	0 (0/20)	0.5 (2/383)
P16	0 (0/6)	0 (0/5)	0 (0/17)	0 (0/20)	0 (0/18)	0 (0/14)	0 (0/17)	0 (0/16)	0 (0/16)	0 (0/13)	0 (0/20)	0 (0/20)	0 (0/14)	0 (0/196)
P31	0 (0/7)	0 (0/9)	0 (0/17)	0 (0/20)	0 (0/17)	0 (0/22)	0 (0/20)	0 (0/29)	0 (0/23)	0 (0/24)	0 (0/22)	0 (0/24)	0 (0/18)	0 (0/252)
P38	0 (0/4)	0 (0/6)	0 (0/10)	0 (0/16)	0 (0/11)	0 (0/9)	0 (0/16)	0 (0/19)	0 (0/16)	0 (0/15)	0 (0/13)	0 (0/14)	0 (0/11)	0 (0/160)
P41	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/33)	0 (0/35)	0 (0/32)	0 (0/37)	0 (0/40)	0 (0/41)	0 (0/39)	0 (0/40)	0 (0/40)	0 (0/25)	0 (0/406)
P5	0 (0/8)	0 (0/10)	0 (0/24)	0 (0/24)	0 (0/24)	0 (0/24)	0 (0/30)	0 (0/33)	0 (0/39)	0 (0/31)	0 (0/24)	0 (0/21)	0 (0/14)	0 (0/306)
P6	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/29)	0 (0/29)	0 (0/35)	0 (0/36)	0 (0/40)	0 (0/40)	0 (0/40)	0 (0/40)	0 (0/34)	0 (0/19)	0 (0/387)
P61	0 (0/9)	0 (0/11)	0 (0/24)	0 (0/31)	0 (0/35)	0 (0/36)	0 (0/38)	0 (0/40)	0 (0/39)	0 (0/37)	0 (0/37)	0 (0/35)	0 (0/16)	0 (0/388)
P64	0 (0/11)	0 (0/10)	0 (0/25)	0 (0/27)	0 (0/31)	0 (0/36)	0 (0/38)	0 (0/40)	0 (0/40)	0 (0/41)	0 (0/40)	0 (0/39)	0 (0/19)	0 (0/397)
P65	0 (0/11)	0 (0/10)	0 (0/25)	0 (0/29)	0 (0/32)	0 (0/31)	0 (0/37)	0 (0/37)	0 (0/40)	4.9 (2/41)	7.5 (3/40)	0 (0/40)	3.8 (1/26)	1.5 (6/399)
P68	0 (0/9)	0 (0/11)	0 (0/24)	0 (0/31)	0 (0/36)	0 (0/36)	0 (0/38)	0 (0/38)	0 (0/41)	0 (0/40)	0 (0/38)	0 (0/37)	0 (0/22)	0 (0/401)
P69	0 (0/5)	0 (0/5)	0 (0/15)	0 (0/12)	0 (0/13)	0 (0/6)	0 (0/4)	0 (0/6)	0 (0/17)	0 (0/17)	16.7 (4/24)	0 (0/19)	0 (0/8)	2.6 (4/151)
P7	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/32)	0 (0/36)	0 (0/35)	0 (0/35)	0 (0/36)	0 (0/36)	0 (0/36)	0 (0/40)	0 (0/40)	0 (0/24)	0 (0/395)
P70	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	0 (0/36)	0 (0/38)	0 (0/41)	0 (0/40)	0 (0/41)	0 (0/40)	0 (0/32)	0 (0/20)	0 (0/387)
P72	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/32)	0 (0/35)	0 (0/36)	0 (0/37)	0 (0/40)	0 (0/41)	0 (0/41)	0 (0/38)	0 (0/39)	0 (0/19)	0 (0/402)

Table B13: Percentage of Pacific oyster samples for which AZA equals or exceeds 160 µg/kg, per group and period, based on data from 2011-21. In brackets: number of samples exceeding 160 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	4.2 (1/24)	0 (0/47)	3.3 (2/60)	0 (0/48)	0 (0/50)	0 (0/51)	0 (0/54)	0 (0/57)	0 (0/67)	0 (0/80)	0 (0/58)	0 (0/56)	0 (0/36)	0.4 (3/688)
PO10	0 (0/12)	0 (0/16)	0 (0/27)	8 (2/25)	0 (0/24)	0 (0/24)	0 (0/26)	0 (0/30)	0 (0/28)	0 (0/39)	0 (0/26)	0 (0/28)	0 (0/20)	0.6 (2/325)
PO123	0 (0/19)	0 (0/29)	0 (0/42)	0 (0/42)	0 (0/40)	0 (0/38)	0 (0/38)	0 (0/35)	0 (0/52)	0 (0/54)	0 (0/51)	0 (0/47)	0 (0/29)	0 (0/516)
PO18	0 (0/21)	0 (0/50)	0 (0/79)	0 (0/62)	0 (0/48)	0 (0/66)	0 (0/70)	0 (0/70)	0 (0/87)	0 (0/91)	0 (0/81)	0 (0/62)	0 (0/52)	0 (0/839)
PO28	0 (0/20)	0 (0/30)	0 (0/59)	0 (0/52)	0 (0/43)	0 (0/46)	0 (0/50)	0 (0/48)	0 (0/59)	0 (0/63)	0 (0/65)	0 (0/59)	0 (0/38)	0 (0/632)
PO42	0 (0/12)	0 (0/20)	0 (0/32)	0 (0/31)	0 (0/26)	0 (0/39)	0 (0/38)	0 (0/38)	0 (0/40)	0 (0/41)	0 (0/41)	0 (0/34)	0 (0/26)	0 (0/418)
PO49	0 (0/20)	0 (0/26)	0 (0/40)	0 (0/39)	0 (0/43)	0 (0/52)	0 (0/64)	0 (0/63)	0 (0/66)	0 (0/74)	0 (0/68)	0 (0/46)	0 (0/27)	0 (0/628)
PO9	0 (0/9)	0 (0/21)	0 (0/29)	0 (0/26)	0 (0/24)	0 (0/24)	0 (0/28)	0 (0/29)	0 (0/40)	0 (0/40)	0 (0/39)	0 (0/24)	0 (0/18)	0 (0/351)

Table B14: Percentage of mussel samples for which OA equals or exceeds 160 µg/kg, per group and period, based on data from 2011-21. In brackets: number of samples exceeding 160 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/2)	0 (0/2)	0 (0/7)	0 (0/5)	0 (0/4)	0 (0/4)	0 (0/6)	0 (0/8)	25 (2/8)	14.3 (1/7)	0 (0/8)	0 (0/8)	0 (0/5)	4.1 (3/74)
G10	0 (0/16	0 (0/15)	0 (0/37)	0 (0/40)	0 (0/39)	0 (0/35)	2.9 (1/34)	0 (0/37)	0 (0/43)	0 (0/36)	0 (0/33)	0 (0/42)	0 (0/31)	0.2 (1/438)
G123	0 (0/16)	0 (0/15)	0 (0/36)	0 (0/35)	0 (0/32)	3 (1/33)	4.7 (2/43)	0 (0/50)	12.3 (7/57)	8.5 (5/59)	0 (0/38)	0 (0/40)	0 (0/23)	3.1 (15/477)
G18	0 (0/25)	0 (0/27)	0 (0/51)	0 (0/56)	0 (0/52)	15.2 (7/46)	36 (18/50)	26.6 (17/64)	46.9 (30/64)	50.8 (31/61)	34.8 (23/66)	14.3 (10/70)	13 (6/46)	20.9 (142/678)
G21	0 (0/20)	0 (0/20)	0 (0/50)	0 (0/47)	0 (0/53)	0 (0/64)	10.5 (8/76)	17.5 (14/80)	2.5 (2/80)	0 (0/80)	0 (0/57)	0 (0/56)	0 (0/40)	3.3 (24/723)
G22	0 (0/32)	0 (0/36)	0 (0/67)	0 (0/64)	0 (0/65)	1.4 (1/70)	5.3 (4/76)	12.6 (12/95)	1 (1/96)	2.6 (2/78)	0 (0/61)	0 (0/71)	0 (0/48)	2.3 (20/859)
G23	0 (0/20)	0 (0/20)	0 (0/46)	0 (0/43)	0 (0/48)	6.3 (4/63)	22.9 (16/70)	36.8 (28/76)	14.5 (11/76)	10.5 (8/76)	0 (0/76)	0 (0/60)	0 (0/38)	9.4 (67/712)
G26	0 (0/6)	0 (0/6)	0 (0/20)	0 (0/20)	0 (0/21)	0 (0/20)	0 (0/24)	0 (0/26)	0 (0/28)	0 (0/24)	0 (0/24)	0 (0/22)	0 (0/15)	0 (0/256)
G28	0 (0/14)	0 (0/18)	0 (0/34)	0 (0/43)	0 (0/50)	3.9 (2/51)	22.5 (18/80)	32.2 (29/90)	31.4 (27/86)	7.1 (6/84)	0 (0/60)	1.7 (1/60)	0 (0/24)	12 (83/694)
G34	0 (0/6)	0 (0/7)	0 (0/20)	0 (0/14)	0 (0/9)	0 (0/10)	0 (0/16)	0 (0/31)	0 (0/29)	0 (0/22)	0 (0/21)	0 (0/24)	0 (0/17)	0 (0/226)
G35	0 (0/11)	0 (0/13)	0 (0/28)	0 (0/34)	0 (0/34)	12.8 (5/39)	42.4 (14/33)	31.9 (15/47)	40.4 (19/47)	30.2 (13/43)	13.3 (6/45)	4.8 (2/42)	0 (0/23)	16.9 (74/439)
G39	0 (0/6)	0 (0/7)	0 (0/23)	0 (0/25)	3.7 (1/27)	23.1 (6/26)	36.4 (12/33)	31.4 (11/35)	36.4 (12/33)	30.3 (10/33)	10.7 (3/28)	0 (0/26)	0 (0/16)	17.3 (55/318)
G42	0 (0/6)	0 (0/6)	0 (0/21)	0 (0/24)	0 (0/24)	4.3 (1/23)	4 (1/25)	6.2 (2/32)	0 (0/30)	0 (0/26)	0 (0/23)	0 (0/24)	0 (0/16)	1.4 (4/280)
G48	0 (0/18)	0 (0/18)	0 (0/41)	0 (0/51)	1.9 (1/53)	19.2 (10/52)	49 (25/51)	78.3 (47/60)	57.6 (38/66)	32.3 (20/62)	12.5 (8/64)	9.2 (6/65)	2.2 (1/46)	24.1 (156/647)
G49	0 (0/11)	0 (0/12)	0 (0/25)	0 (0/25)	0 (0/27)	13.3 (6/45)	34.1 (14/41)	55.3 (26/47)	42 (21/50)	12 (6/50)	2.6 (1/39)	0 (0/31)	0 (0/17)	17.6 (74/420)
G54	0 (0/2)	0 (0/2)	0 (0/5)	0 (0/6)	0 (0/3)	0 (0/3)	0 (0/6)	0 (0/9)	0 (0/9)	0 (0/6)	0 (0/7)	0 (0/8)	0 (0/2)	0 (0/68)
G56	0 (0/13)	0 (0/12)	0 (0/32)	2.5 (1/40)	0 (0/42)	3.8 (2/53)	3.3 (2/61)	30.2 (16/53)	25.9 (15/58)	8.7 (4/46)	2.3 (1/44)	2.4 (1/42)	0 (0/20)	8.1 (42/516)
G57	0 (0/20)	0 (0/25)	0 (0/46)	0 (0/68)	0 (0/77)	2.9 (2/70)	13.8 (11/80)	36 (31/86)	33.7 (32/95)	14.8 (13/88)	4.6 (4/87)	0 (0/65)	0 (0/41)	11 (93/848)
G58	0 (0/19)	0 (0/20)	0 (0/44)	0 (0/45)	0 (0/48)	3 (2/66)	8.6 (6/70)	29.6 (21/71)	14.5 (10/69)	7.7 (5/65)	4.5 (3/66)	3.1 (2/64)	0 (0/29)	7.2 (49/676)
G67	0 (0/15)	0 (0/17)	0 (0/37)	0 (0/58)	0 (0/64)	0 (0/57)	10.9 (7/64)	35.2 (25/71)	28.1 (18/64)	4.9 (3/61)	0 (0/54)	0 (0/48)	0 (0/27)	8.3 (53/637)
G71	0 (0/2)	0 (0/4)	0 (0/13)	0 (0/9)	0 (0/7)	0 (0/19)	5 (1/20)	26.3 (5/19)	52.6 (10/19)	26.7 (4/15)	21.4 (3/14)	18.2 (2/11)	28.6 (2/7)	17 (27/159)
G8	6.2 (1/16)	0 (0/16)	3.4 (1/29)	0 (0/35)	0 (0/38)	16.7 (5/30)	30.3 (10/33)	35.5 (11/31)	36.1 (13/36)	48.8 (20/41)	33.3 (14/42)	23.9 (11/46)	7.7 (2/26)	21 (88/419)
G80	0 (0/9)	0 (0/5)	0 (0/6)	0 (0/15)	0 (0/16)	0 (0/7)	0 (0/6)	40 (2/5)	42.9 (6/14)	33.3 (5/15)	17.4 (4/23)	5.6 (1/18)	7.1 (1/14)	12.4 (19/153)
G81	0 (0/22)	0 (0/25)	0 (0/53)	0 (0/58)	0 (0/47)	0 (0/42)	0 (0/42)	16 (8/50)	11.2 (9/80)	7.1 (7/99)	1.1 (1/93)	1.3 (1/79)	0 (0/35)	3.6 (26/725)
G9	0 (0/13)	0 (0/11)	0 (0/28)	0 (0/25)	0 (0/24)	0 (0/24)	0 (0/34)	0 (0/40)	0 (0/40)	0 (0/40)	0 (0/26)	0 (0/32)	0 (0/22)	0 (0/359)
P125	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	11.1 (4/36)	21.6 (8/37)	28.2 (11/39)	12.5 (5/40)	10 (4/40)	0 (0/40)	0 (0/32)	0 (0/20)	8.4 (32/383)
P16	0 (0/6)	0 (0/5)	0 (0/17)	5 (1/20)	16.7 (3/18)	0 (0/14)	23.5 (4/17)	25 (4/16)	18.8 (3/16)	23.1 (3/13)	0 (0/20)	5 (1/20)	14.3 (2/14)	10.7 (21/196)
P31	0 (0/7)	0 (0/9)	0 (0/17)	0 (0/20)	0 (0/17)	0 (0/22)	0 (0/20)	3.4 (1/29)	4.3 (1/23)	0 (0/24)	0 (0/22)	0 (0/24)	0 (0/18)	0.8 (2/252)
P38	0 (0/4)	0 (0/6)	0 (0/10)	0 (0/16)	0 (0/11)	0 (0/9)	25 (4/16)	15.8 (3/19)	0 (0/16)	0 (0/15)	0 (0/13)	0 (0/14)	0 (0/11)	4.4 (7/160)
P41	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/33)	5.7 (2/35)	15.6 (5/32)	51.4 (19/37)	60 (24/40)	41.5 (17/41)	28.2 (11/39)	5 (2/40)	0 (0/40)	0 (0/25)	19.7 (80/406)
P5	0 (0/8)	0 (0/10)	0 (0/24)	0 (0/24)	0 (0/24)	0 (0/24)	0 (0/30)	0 (0/33)	0 (0/39)	0 (0/31)	0 (0/24)	0 (0/21)	0 (0/14)	0 (0/306)
P6	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/29)	0 (0/29)	8.6 (3/35)	11.1 (4/36)	25 (10/40)	52.5 (21/40)	37.5 (15/40)	7.5 (3/40)	0 (0/34)	0 (0/19)	14.5 (56/387)
P61	0 (0/9)	0 (0/11)	0 (0/24)	0 (0/31)	0 (0/35)	0 (0/36)	5.3 (2/38)	32.5 (13/40)	38.5 (15/39)	8.1 (3/37)	0 (0/37)	0 (0/35)	0 (0/16)	8.5 (33/388)
P64	0 (0/11)	0 (0/10)	0 (0/25)	0 (0/27)	0 (0/31)	5.6 (2/36)	18.4 (7/38)	30 (12/40)	15 (6/40)	7.3 (3/41)	0 (0/40)	0 (0/39)	0 (0/19)	7.6 (30/397)
P65	0 (0/11)	0 (0/10)	0 (0/25)	0 (0/29)	0 (0/32)	0 (0/31)	5.4 (2/37)	21.6 (8/37)	7.5 (3/40)	2.4 (1/41)	0 (0/40)	0 (0/40)	0 (0/26)	3.5 (14/399)
P68	0 (0/9)	0 (0/11)	0 (0/24)	0 (0/31)	0 (0/36)	0 (0/36)	2.6 (1/38)	26.3 (10/38)	17.1 (7/41)	5 (2/40)	0 (0/38)	0 (0/37)	0 (0/22)	5 (20/401)
P69	0 (0/5)	0 (0/5)	0 (0/15)	0 (0/12)	0 (0/13)	0 (0/6)	0 (0/4)	16.7 (1/6)	23.5 (4/17)	17.6 (3/17)	0 (0/24)	0 (0/19)	0 (0/8)	5.3 (8/151)
P7	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/32)	0 (0/36)	14.3 (5/35)	31.4 (11/35)	55.6 (20/36)	63.9 (23/36)	25 (9/36)	5 (2/40)	0 (0/40)	0 (0/24)	17.7 (70/395)
P70	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	5.6 (2/36)	13.2 (5/38)	24.4 (10/41)	20 (8/40)	7.3 (3/41)	0 (0/40)	0 (0/32)	0 (0/20)	7.2 (28/387)
P72	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/32)	0 (0/35)	5.6 (2/36)	18.9 (7/37)	27.5 (11/40)	19.5 (8/41)	7.3 (3/41)	0 (0/38)	0 (0/39)	0 (0/19)	7.7 (31/402)

Table B15: Percentage of Pacific oyster samples for which OA equals or exceeds 160 µg/kg, per group and period, based on data from 2011-21. In brackets: number of samples exceeding 160 µg/kg over total number of samples.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
PO1	0 (0/24)	0 (0/47)	0 (0/60)	0 (0/48)	0 (0/50)	0 (0/51)	0 (0/54)	0 (0/57)	0 (0/67)	0 (0/80)	0 (0/58)	0 (0/56)	0 (0/36)	0 (0/688)
PO10	0 (0/12)	0 (0/16)	0 (0/27)	0 (0/25)	0 (0/24)	0 (0/24)	0 (0/26)	0 (0/30)	0 (0/28)	0 (0/39)	0 (0/26)	0 (0/28)	0 (0/20)	0 (0/325)
PO123	0 (0/19)	0 (0/29)	0 (0/42)	0 (0/42)	0 (0/40)	0 (0/38)	0 (0/38)	0 (0/35)	0 (0/52)	0 (0/54)	0 (0/51)	0 (0/47)	0 (0/29)	0 (0/516)
PO18	0 (0/21)	0 (0/50)	0 (0/79)	0 (0/62)	0 (0/48)	1.5 (1/66)	2.9 (2/70)	5.7 (4/70)	8 (7/87)	2.2 (2/91)	0 (0/81)	0 (0/62)	0 (0/52)	1.9 (16/839)
PO28	0 (0/20)	0 (0/30)	0 (0/59)	0 (0/52)	0 (0/43)	0 (0/46)	0 (0/50)	0 (0/48)	0 (0/59)	0 (0/63)	0 (0/65)	0 (0/59)	0 (0/38)	0 (0/632)
PO42	0 (0/12)	0 (0/20)	0 (0/32)	0 (0/31)	0 (0/26)	0 (0/39)	0 (0/38)	0 (0/38)	0 (0/40)	0 (0/41)	0 (0/41)	0 (0/34)	0 (0/26)	0 (0/418)
PO49	0 (0/20)	0 (0/26)	0 (0/40)	0 (0/39)	0 (0/43)	1.9 (1/52)	0 (0/64)	4.8 (3/63)	0 (0/66)	2.7 (2/74)	0 (0/68)	0 (0/46)	0 (0/27)	1 (6/628)
PO9	0 (0/9)	0 (0/21)	0 (0/29)	0 (0/26)	0 (0/24)	0 (0/24)	0 (0/28)	0 (0/29)	0 (0/40)	0 (0/40)	0 (0/39)	0 (0/24)	0 (0/18)	0 (0/351)

Table B16: Percentage of mussel samples for which YTX exceeds 0 mg/kg, per group and period, based on data from 2011-21. In brackets: number of samples exceeding 0 mg/kg over total number of samples. Note: no Pacific Oyster samples exceeded 0 mg/kg

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Total
G1	0 (0/2)	0 (0/2)	0 (0/7)	0 (0/5)	0 (0/4)	0 (0/4)	0 (0/6)	0 (0/8)	0 (0/8)	0 (0/7)	0 (0/8)	0 (0/8)	0 (0/5)	0 (0/74)
G10	0 (0/16	0 (0/15)	0 (0/37)	0 (0/40)	0 (0/39)	0 (0/35)	0 (0/34)	0 (0/37)	2.3 (1/43)	13.9 (5/36)	12.1 (4/33)	9.5 (4/42)	6.5 (2/31)	3.7 (16/438)
G123	0 (0/16)	0 (0/15)	0 (0/36)	0 (0/35)	0 (0/32)	3 (1/33)	9.3 (4/43)	6 (3/50)	5.3 (3/57)	0 (0/59)	2.6 (1/38)	0 (0/40)	0 (0/23)	2.5 (12/477)
G18	0 (0/25)	3.7 (1/27)	3.9 (2/51)	21.4 (12/56)	23.1 (12/52)	32.6 (15/46)	48 (24/50)	46.9 (30/64)	14.1 (9/64)	9.8 (6/61)	3 (2/66)	5.7 (4/70)	4.3 (2/46)	17.6 (119/678)
G21	0 (0/20)	0 (0/20)	0 (0/50)	0 (0/47)	0 (0/53)	0 (0/64)	0 (0/76)	0 (0/80)	0 (0/80)	0 (0/80)	0 (0/57)	0 (0/56)	0 (0/40)	0 (0/723)
G22	0 (0/32)	0 (0/36)	0 (0/67)	0 (0/64)	0 (0/65)	0 (0/70)	0 (0/76)	3.2 (3/95)	2.1 (2/96)	0 (0/78)	0 (0/61)	0 (0/71)	0 (0/48)	0.6 (5/859)
G23	0 (0/20)	0 (0/20)	0 (0/46)	0 (0/43)	0 (0/48)	0 (0/63)	0 (0/70)	0 (0/76)	0 (0/76)	1.3 (1/76)	0 (0/76)	0 (0/60)	0 (0/38)	0.1 (1/712)
G26	0 (0/6)	0 (0/6)	0 (0/20)	0 (0/20)	0 (0/21)	0 (0/20)	0 (0/24)	0 (0/26)	0 (0/28)	0 (0/24)	0 (0/24)	0 (0/22)	0 (0/15)	0 (0/256)
G28	0 (0/14)	0 (0/18)	0 (0/34)	0 (0/43)	2 (1/50)	2 (1/51)	0 (0/80)	1.1 (1/90)	0 (0/86)	0 (0/84)	0 (0/60)	0 (0/60)	0 (0/24)	0.4 (3/694)
G34	0 (0/6)	0 (0/7)	0 (0/20)	0 (0/14)	0 (0/9)	0 (0/10)	0 (0/16)	0 (0/31)	0 (0/29)	0 (0/22)	0 (0/21)	0 (0/24)	0 (0/17)	0 (0/226)
G35	0 (0/11)	0 (0/13)	0 (0/28)	0 (0/34)	0 (0/34)	0 (0/39)	3 (1/33)	0 (0/47)	2.1 (1/47)	0 (0/43)	0 (0/45)	0 (0/42)	0 (0/23)	0.5 (2/439)
G39	0 (0/6)	0 (0/7)	0 (0/23)	0 (0/25)	0 (0/27)	0 (0/26)	0 (0/33)	0 (0/35)	0 (0/33)	0 (0/33)	0 (0/28)	0 (0/26)	0 (0/16)	0 (0/318)
G42	0 (0/6)	0 (0/6)	0 (0/21)	0 (0/24)	0 (0/24)	0 (0/23)	4 (1/25)	0 (0/32)	0 (0/30)	0 (0/26)	0 (0/23)	0 (0/24)	0 (0/16)	0.4 (1/280)
G48	0 (0/18)	0 (0/18)	0 (0/41)	0 (0/51)	0 (0/53)	0 (0/52)	2 (1/51)	0 (0/60)	0 (0/66)	0 (0/62)	0 (0/64)	0 (0/65)	0 (0/46)	0.2 (1/647)
G49	0 (0/11)	0 (0/12)	0 (0/25)	0 (0/25)	0 (0/27)	0 (0/45)	0 (0/41)	0 (0/47)	0 (0/50)	0 (0/50)	0 (0/39)	0 (0/31)	0 (0/17)	0 (0/420)
G54	0 (0/2)	0 (0/2)	0 (0/5)	0 (0/6)	0 (0/3)	0 (0/3)	0 (0/6)	0 (0/9)	0 (0/9)	0 (0/6)	0 (0/7)	0 (0/8)	0 (0/2)	0 (0/68)
G56	0 (0/13)	0 (0/12)	0 (0/32)	2.5 (1/40)	0 (0/42)	0 (0/53)	0 (0/61)	0 (0/53)	0 (0/58)	0 (0/46)	0 (0/44)	0 (0/42)	0 (0/20)	0.2 (1/516)
G57	0 (0/20)	0 (0/25)	0 (0/46)	5.9 (4/68)	5.2 (4/77)	0 (0/70)	0 (0/80)	0 (0/86)	0 (0/95)	0 (0/88)	1.1 (1/87)	0 (0/65)	0 (0/41)	1.1 (9/848)
G58	0 (0/19)	0 (0/20)	0 (0/44)	0 (0/45)	0 (0/48)	0 (0/66)	0 (0/70)	5.6 (4/71)	5.8 (4/69)	0 (0/65)	1.5 (1/66)	3.1 (2/64)	0 (0/29)	1.6 (11/676)
G67	0 (0/15)	0 (0/17)	0 (0/37)	0 (0/58)	0 (0/64)	0 (0/57)	0 (0/64)	0 (0/71)	1.6 (1/64)	0 (0/61)	0 (0/54)	0 (0/48)	0 (0/27)	0.2 (1/637)
G71	0 (0/2)	0 (0/4)	0 (0/13)	0 (0/9)	0 (0/7)	0 (0/19)	0 (0/20)	0 (0/19)	0 (0/19)	0 (0/15)	0 (0/14)	0 (0/11)	0 (0/7)	0 (0/159)
G8	6.2 (1/16)	0 (0/16)	6.9 (2/29)	8.6 (3/35)	5.3 (2/38)	13.3 (4/30)	21.2 (7/33)	22.6 (7/31)	8.3 (3/36)	7.3 (3/41)	9.5 (4/42)	6.5 (3/46)	3.8 (1/26)	9.5 (40/419)
G80	0 (0/9)	0 (0/5)	0 (0/6)	0 (0/15)	0 (0/16)	0 (0/7)	0 (0/6)	0 (0/5)	0 (0/14)	0 (0/15)	0 (0/23)	0 (0/18)	0 (0/14)	0 (0/153)
G81	4.5 (1/22)	0 (0/25)	0 (0/53)	0 (0/58)	0 (0/47)	0 (0/42)	0 (0/42)	2 (1/50)	5 (4/80)	5.1 (5/99)	2.2 (2/93)	2.5 (2/79)	0 (0/35)	2.1 (15/725)
G9	30.8 (4/13)	0 (0/11)	7.1 (2/28)	0 (0/25)	8.3 (2/24)	4.2 (1/24)	2.9 (1/34)	5 (2/40)	0 (0/40)	15 (6/40)	23.1 (6/26)	21.9 (7/32)	9.1 (2/22)	9.2 (33/359)
P125	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	2.8 (1/36)	0 (0/37)	0 (0/39)	0 (0/40)	2.5 (1/40)	0 (0/40)	0 (0/32)	0 (0/20)	0.5 (2/383)
P16	0 (0/6)	0 (0/5)	0 (0/17)	5 (1/20)	33.3 (6/18)	35.7 (5/14)	35.3 (6/17)	50 (8/16)	31.2 (5/16)	0 (0/13)	0 (0/20)	0 (0/20)	0 (0/14)	15.8 (31/196)
P31	0 (0/7)	0 (0/9)	0 (0/17)	0 (0/20)	0 (0/17)	0 (0/22)	0 (0/20)	0 (0/29)	0 (0/23)	0 (0/24)	0 (0/22)	0 (0/24)	0 (0/18)	0 (0/252)
P38	0 (0/4)	0 (0/6)	0 (0/10)	0 (0/16)	9.1 (1/11)	0 (0/9)	0 (0/16)	0 (0/19)	0 (0/16)	0 (0/15)	0 (0/13)	0 (0/14)	0 (0/11)	0.6 (1/160)
P41	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/33)	0 (0/35)	0 (0/32)	2.7 (1/37)	10 (4/40)	2.4 (1/41)	0 (0/39)	0 (0/40)	0 (0/40)	0 (0/25)	1.5 (6/406)
P5	0 (0/8)	0 (0/10)	0 (0/24)	0 (0/24)	0 (0/24)	4.2 (1/24)	0 (0/30)	0 (0/33)	0 (0/39)	0 (0/31)	0 (0/24)	0 (0/21)	0 (0/14)	0.3 (1/306)
P6	11.1 (1/9)	18.2 (2/11)	0 (0/25)	0 (0/29)	0 (0/29)	0 (0/35)	11.1 (4/36)	35 (14/40)	50 (20/40)	17.5 (7/40)	5 (2/40)	5.9 (2/34)	15.8 (3/19)	14.2 (55/387)
P61	11.1 (1/9)	0 (0/11)	12.5 (3/24)	3.2 (1/31)	5.7 (2/35)	8.3 (3/36)	5.3 (2/38)	2.5 (1/40)	10.3 (4/39)	10.8 (4/37)	10.8 (4/37)	11.4 (4/35)	12.5 (2/16)	8 (31/388)
P64	0 (0/11)	0 (0/10)	0 (0/25)	0 (0/27)	0 (0/31)	0 (0/36)	0 (0/38)	0 (0/40)	0 (0/40)	0 (0/41)	0 (0/40)	0 (0/39)	0 (0/19)	0 (0/397)
P65	9.1 (1/11)	0 (0/10)	0 (0/25)	0 (0/29)	0 (0/32)	3.2 (1/31)	0 (0/37)	0 (0/37)	0 (0/40)	7.3 (3/41)	2.5 (1/40)	0 (0/40)	0 (0/26)	1.5 (6/399)
P68	0 (0/9)	0 (0/11)	0 (0/24)	0 (0/31)	0 (0/36)	0 (0/36)	0 (0/38)	0 (0/38)	0 (0/41)	7.5 (3/40)	2.6 (1/38)	5.4 (2/37)	0 (0/22)	1.5 (6/401)
P69	20 (1/5)	0 (0/5)	0 (0/15)	0 (0/12)	0 (0/13)	0 (0/6)	0 (0/4)	0 (0/6)	17.6 (3/17)	17.6 (3/17)	0 (0/24)	0 (0/19)	0 (0/8)	4.6 (7/151)
P7	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/32)	5.6 (2/36)	5.7 (2/35)	0 (0/35)	0 (0/36)	0 (0/36)	0 (0/36)	0 (0/40)	0 (0/40)	0 (0/24)	1 (4/395)
P70	0 (0/10)	0 (0/10)	0 (0/25)	0 (0/24)	0 (0/30)	0 (0/36)	0 (0/38)	0 (0/41)	0 (0/40)	0 (0/41)	0 (0/40)	0 (0/32)	5 (1/20)	0.3 (1/387)
P72	0 (0/10)	0 (0/10)	0 (0/24)	0 (0/32)	0 (0/35)	0 (0/36)	0 (0/37)	0 (0/40)	0 (0/41)	0 (0/41)	0 (0/38)	0 (0/39)	0 (0/19)	0 (0/402)

Table B17: Estimated probability (%) of DA in mussels equalling or exceeding 5 mg/kg, for an average year

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
G1	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
G10	0.74	0.91	0.99	0.89	0.69	0.51	0.39	0.32	0.29	0.30	0.34	0.42	0.56	0.56
G123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G18	0.35	0.51	0.92	1.84	3.39	4.68	4.70	3.36	1.76	0.86	0.48	0.33	0.30	1.80
G21	0.08	0.06	0.05	0.07	0.12	0.31	0.97	3.14	6.21	4.41	1.46	0.45	0.17	1.35
G22	0.33	0.30	0.36	0.54	1.00	1.99	3.59	5.21	5.57	3.75	1.82	0.86	0.48	1.98
G23	0.16	0.11	0.12	0.20	0.49	1.64	5.31	13.80	23.35	17.77	5.93	1.30	0.36	5.43
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	1.60	1.85	2.25	2.75	3.17	3.22	2.97	2.59	2.23	1.90	1.65	1.51	1.49	2.24
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G39	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
G42	0.66	0.79	1.21	2.21	4.22	7.09	10.06	11.22	8.80	4.62	2.04	1.06	0.72	4.21
G48	0.34	0.28	0.31	0.45	0.83	1.85	4.18	7.69	9.24	6.15	2.68	1.11	0.54	2.74
G49	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.75
G54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G56	0.70	0.54	0.55	0.75	1.31	2.68	5.44	10.08	14.70	12.34	6.21	2.57	1.19	4.54
G57	0.02	0.01	0.02	0.03	0.09	0.39	1.75	7.46	16.31	7.30	0.91	0.14	0.04	2.65
G58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G67	0.53	0.49	0.54	0.71	1.07	1.77	2.91	4.04	4.08	2.91	1.71	1.02	0.68	1.73
G71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G8	0.57	0.61	0.68	0.75	0.82	0.85	0.82	0.75	0.68	0.61	0.57	0.55	0.55	0.68
G80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G81	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
G9	1.02	1.01	1.02	1.02	1.03	1.03	1.04	1.05	1.05	1.04	1.04	1.03	1.02	1.03
P125	0.87	0.86	1.11	1.84	3.66	7.45	11.18	11.66	9.38	6.07	3.39	1.84	1.14	4.65
P16	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P41	0.73	0.74	0.75	0.76	0.76	0.75	0.75	0.74	0.73	0.72	0.72	0.72	0.73	0.74
P5	0.02	0.02	0.02	0.03	0.06	0.22	1.22	6.38	14.55	7.28	1.17	0.22	0.06	2.40
P6	5.47	5.72	6.08	6.48	6.80	6.96	6.95	6.76	6.41	6.00	5.65	5.43	5.37	6.16
P61	0.03	0.02	0.01	0.02	0.03	0.11	0.53	3.75	16.87	16.16	3.91	0.57	0.11	3.24
P64	1.66	1.53	1.53	1.66	1.95	2.39	2.91	3.38	3.61	3.41	2.89	2.34	1.92	2.40
P65	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
P68	1.25	1.18	1.27	1.54	2.05	2.85	3.77	4.40	4.36	3.65	2.72	1.96	1.49	2.50
P69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17
P70	1.88	1.87	1.88	1.92	1.98	2.06	2.14	2.20	2.20	2.16	2.08	2.00	1.93	2.02
P72	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.93
Month-Av	0.74	0.75	0.80	0.92	1.15	1.53	2.10	3.01	4.07	3.00	1.50	0.95	0.78	1.64

Table B18: Proposed sampling frequency in four week period (1,2 or 4 times) to keep the risk of non-detection of PST in mussels exceeding 800 µg/kg below 1%.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	1	1	1	1	1	1	1	1	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	1	1	1	1	1	1	1	1	1
G18	1	1	1	4	4	4	4	1	1	1	1	1	1
G21	1	1	1	1	1	1	1	1	1	1	1	1	1
G22	1	1	1	1	1	4	4	1	1	1	1	1	1
G23	1	1	1	1	1	1	1	1	1	1	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	1	4	4	4	1	1	1	1	1	1
G34	1	1	1	1	1	1	1	1	1	1	1	1	1
G35	1	1	1	1	1	4	4	1	1	1	1	1	1
G39	1	1	1	1	1	1	1	1	1	1	1	1	1
G42	1	1	1	1	1	4	4	1	1	1	1	1	1
G48	1	1	1	1	4	4	4	4	1	1	1	1	1
G49	1	1	1	1	1	4	4	2	1	1	1	1	1
G54	1	1	1	1	1	4	4	1	1	1	1	1	1
G56	1	1	1	1	1	1	1	1	1	1	1	1	1
G57	1	1	1	1	1	1	1	1	1	1	1	1	1
G58	1	1	1	1	1	1	1	1	1	1	1	1	1
G67	1	1	1	1	1	1	1	1	1	1	1	1	1
G71	1	1	1	1	1	1	1	1	1	1	1	1	1
G8	1	1	1	4	4	4	4	4	1	1	1	1	1
G80	1	1	1	1	1	1	1	1	1	1	1	1	1
G81	1	1	1	1	1	1	1	1	1	1	1	1	1
G9	1	1	1	1	1	1	1	1	1	1	1	1	1
P125	1	1	1	1	1	1	4	4	1	1	1	1	1
P16	1	1	1	2	4	4	1	1	1	1	1	1	1
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	4	4	4	4	1	1	1	1	1	1
P41	1	1	1	1	4	4	4	1	1	1	1	1	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	1	1	1	1	1	1	1	1	1
P61	1	1	1	1	1	1	1	1	1	1	1	1	1
P64	1	1	1	1	1	1	1	1	2	1	1	1	1
P65	1	1	1	1	1	1	1	1	1	1	1	1	1
P68	1	1	1	1	1	1	1	2	1	1	1	1	1
P69	1	1	1	1	1	1	1	4	2	1	1	1	1
P7	1	1	1	1	1	4	1	1	1	1	1	1	1
P70	1	1	1	1	1	1	1	1	1	1	1	1	1
P72	1	1	1	1	1	1	1	1	1	1	1	1	1

Table B19: Proposed sampling frequency in four week period (1,2 or 4 times) to keep the risk of non-detection of PST in mussels exceeding 800 µg/kg below 2%.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52
G1	1	1	1	1	1	1	1	1	1	1	1	1	1
G10	1	1	1	1	1	1	1	1	1	1	1	1	1
G123	1	1	1	1	1	1	1	1	1	1	1	1	1
G18	1	1	1	1	4	4	4	1	1	1	1	1	1
G21	1	1	1	1	1	1	1	1	1	1	1	1	1
G22	1	1	1	1	1	1	2	1	1	1	1	1	1
G23	1	1	1	1	1	1	1	1	1	1	1	1	1
G26	1	1	1	1	1	1	1	1	1	1	1	1	1
G28	1	1	1	1	1	4	2	1	1	1	1	1	1
G34	1	1	1	1	1	1	1	1	1	1	1	1	1
G35	1	1	1	1	1	4	4	1	1	1	1	1	1
G39	1	1	1	1	1	1	1	1	1	1	1	1	1
G42	1	1	1	1	1	2	4	1	1	1	1	1	1
G48	1	1	1	1	2	4	4	2	1	1	1	1	1
G49	1	1	1	1	1	1	1	1	1	1	1	1	1
G54	1	1	1	1	1	4	4	1	1	1	1	1	1
G56	1	1	1	1	1	1	1	1	1	1	1	1	1
G57	1	1	1	1	1	1	1	1	1	1	1	1	1
G58	1	1	1	1	1	1	1	1	1	1	1	1	1
G67	1	1	1	1	1	1	1	1	1	1	1	1	1
G71	1	1	1	1	1	1	1	1	1	1	1	1	1
G8	1	1	1	2	4	4	4	2	1	1	1	1	1
G80	1	1	1	1	1	1	1	1	1	1	1	1	1
G81	1	1	1	1	1	1	1	1	1	1	1	1	1
G9	1	1	1	1	1	1	1	1	1	1	1	1	1
P125	1	1	1	1	1	1	1	1	1	1	1	1	1
P16	1	1	1	1	1	1	1	1	1	1	1	1	1
P31	1	1	1	1	1	1	1	1	1	1	1	1	1
P38	1	1	1	1	2	2	1	1	1	1	1	1	1
P41	1	1	1	1	4	4	4	1	1	1	1	1	1
P5	1	1	1	1	1	1	1	1	1	1	1	1	1
P6	1	1	1	1	1	1	1	1	1	1	1	1	1
P61	1	1	1	1	1	1	1	1	1	1	1	1	1
P64	1	1	1	1	1	1	1	1	1	1	1	1	1
P65	1	1	1	1	1	1	1	1	1	1	1	1	1
P68	1	1	1	1	1	1	1	1	1	1	1	1	1
P69	1	1	1	1	1	1	1	1	1	1	1	1	1
P7	1	1	1	1	1	4	1	1	1	1	1	1	1
P70	1	1	1	1	1	1	1	1	1	1	1	1	1
P72	1	1	1	1	1	1	1	1	1	1	1	1	1

Table B20: Estimated probability (%) of PST in mussels exceeding 800 µg/kg, for an average year.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
G1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.18	0.25	0.45	0.99	2.47	5.27	6.23	3.91	1.67	0.70	0.34	0.21	0.17	1.76
G18	0.10	0.37	1.94	9.10	23.72	28.67	14.53	3.18	0.51	0.12	0.05	0.04	0.05	6.34
G21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G22	0.00	0.00	0.00	0.00	0.14	6.70	11.57	1.18	0.03	0.00	0.00	0.00	0.00	1.51
G23	0.07	0.12	0.26	0.69	1.95	3.94	3.53	1.51	0.48	0.17	0.08	0.06	0.05	0.99
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.00	0.00	0.03	0.60	8.48	22.87	9.89	0.99	0.09	0.01	0.00	0.00	0.00	3.31
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.01	0.59	25.74	31.50	1.85	0.02	0.00	0.00	0.00	0.00	4.59
G39	0.52	0.52	0.52	0.53	0.53	0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52
G42	0.00	0.00	0.00	0.00	0.15	8.54	11.23	0.65	0.01	0.00	0.00	0.00	0.00	1.58
G48	0.04	0.10	0.36	1.74	8.69	24.96	24.95	8.69	1.48	0.27	0.08	0.04	0.03	5.49
G49	0.00	0.00	0.00	0.00	0.01	2.23	16.93	3.51	0.01	0.00	0.00	0.00	0.00	1.75
G54	0.00	0.00	0.00	0.04	3.49	45.34	18.82	0.22	0.00	0.00	0.00	0.00	0.00	5.23
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G57	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
G58	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
G67	0.00	0.00	0.00	0.00	0.01	0.03	0.26	2.31	6.55	2.03	0.18	0.03	0.01	0.88
G71	2.21	2.21	2.21	2.22	2.23	2.24	2.24	2.24	2.24	2.23	2.22	2.21	2.21	2.22
G8	0.35	0.87	3.03	10.36	21.74	25.36	22.74	13.27	4.05	1.10	0.40	0.23	0.22	7.98
G80	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.73	0.74	0.74
G81	0.16	0.17	0.23	0.39	0.74	1.39	2.29	2.80	2.23	1.16	0.53	0.29	0.19	0.97
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.00	0.01	0.01	0.05	0.32	2.53	8.71	6.28	0.90	0.11	0.02	0.01	0.00	1.46
P16	0.58	1.26	3.02	6.48	9.03	6.67	3.05	1.19	0.53	0.30	0.23	0.23	0.32	2.53
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	1.84	2.62	4.26	7.91	12.49	12.10	7.18	3.57	2.14	1.58	1.36	1.34	1.48	4.60
P41	0.00	0.01	0.09	1.76	18.95	32.60	11.18	1.16	0.13	0.02	0.01	0.00	0.00	5.07
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6	0.33	0.41	0.58	0.94	1.62	2.57	2.89	2.22	1.36	0.81	0.52	0.38	0.33	1.15
P61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P64	0.68	0.60	0.65	0.87	1.34	2.18	3.24	4.50	5.53	4.81	2.97	1.59	0.95	2.30
P65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P68	0.01	0.01	0.01	0.02	0.05	0.26	1.95	7.08	6.28	1.51	0.22	0.05	0.02	1.34
P69	0.21	0.20	0.25	0.40	0.82	1.95	4.54	7.16	5.96	2.80	1.09	0.50	0.29	2.01
P7	0.00	0.00	0.00	0.11	3.32	17.75	3.71	0.04	0.00	0.00	0.00	0.00	0.00	1.92
P70	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P72	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.98
Month-Av	0.30	0.36	0.57	1.25	3.19	7.18	5.71	2.12	1.19	0.63	0.39	0.31	0.29	1.81

Table B21: Estimated probability (%) of LT in mussels exceeding MPL, for an average year.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
G1	3.29	2.97	3.22	4.19	6.22	9.48	12.86	15.33	15.81	12.92	9.03	6.10	4.26	8.13
G10	0.10	0.15	0.27	0.61	1.48	2.98	3.44	2.12	0.86	0.35	0.17	0.11	0.09	0.98
G123	0.03	0.04	0.11	0.57	3.75	12.06	9.48	9.41	25.30	17.26	2.67	0.28	0.06	6.23
G18	8.03	4.19	4.86	11.36	33.71	68.44	79.92	78.90	79.49	76.22	61.04	36.36	18.12	43.13
G21	0.32	0.30	0.43	1.00	3.12	10.06	26.76	34.13	18.87	7.37	2.83	1.14	0.53	8.22
G22	0.04	0.03	0.04	0.09	0.37	2.25	12.82	23.05	11.45	3.57	0.98	0.24	0.08	4.23
G23	0.08	0.10	0.23	0.93	4.05	15.00	46.39	64.91	44.23	18.23	3.77	0.46	0.12	15.27
G26	1.26	1.26	1.26	1.26	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
G28	1.61	1.07	1.15	2.08	5.78	18.97	46.61	65.05	56.60	29.43	12.46	6.35	3.14	19.25
G34	0.04	0.13	0.53	3.13	11.31	11.97	3.58	0.55	0.12	0.04	0.02	0.02	0.02	2.42
G35	0.71	0.48	0.62	1.37	5.52	25.33	49.35	58.96	62.52	52.48	26.81	7.56	1.93	22.59
G39	0.38	0.27	0.41	1.35	7.74	34.24	54.68	57.21	59.19	48.98	22.48	5.07	1.09	22.55
G42	2.48	1.59	1.43	1.98	4.15	11.02	25.84	38.29	34.74	22.32	13.08	7.99	4.49	13.03
G48	1.44	0.54	0.43	0.87	4.22	27.14	79.70	95.06	89.93	65.83	38.31	19.17	5.76	32.96
G49	0.89	1.08	1.52	2.25	4.88	18.90	58.19	80.83	68.14	29.42	7.44	2.24	1.09	21.30
G54	14.93	11.96	10.53	10.54	12.06	15.17	19.14	23.99	29.23	31.68	29.71	24.72	19.35	19.46
G56	1.04	1.48	3.63	9.68	14.97	14.08	28.04	55.27	52.66	22.57	6.46	2.60	1.34	16.45
G57	0.51	0.70	1.58	4.21	10.94	25.11	45.41	62.44	61.38	31.28	7.63	1.80	0.69	19.51
G58	1.09	0.70	0.67	1.10	2.94	10.58	32.97	50.17	38.21	18.64	8.21	4.02	2.04	13.18
G67	0.31	0.52	1.65	6.88	17.35	23.19	42.26	66.36	56.89	17.59	2.91	0.83	0.37	18.24
G71	12.23	9.49	10.12	14.03	20.58	28.13	39.95	60.01	76.20	71.61	51.48	31.33	18.84	34.15
G8	9.91	5.39	4.81	7.73	19.96	50.08	74.19	80.86	80.11	77.28	68.12	47.20	23.13	42.21
G80	4.16	2.36	1.79	2.05	3.68	9.36	25.03	48.53	59.70	48.59	28.63	15.00	7.88	19.75
G81	4.16	3.49	3.39	3.98	5.56	8.66	14.47	21.79	25.56	22.87	15.65	9.16	5.74	11.11
G9	0.04	0.03	0.03	0.06	0.19	0.79	4.08	11.47	11.23	4.09	0.89	0.21	0.07	2.55
P125	1.16	0.65	0.52	0.78	2.98	19.35	56.40	66.65	43.22	17.36	6.23	2.82	1.82	16.92
P16	6.17	4.88	5.76	10.98	26.30	53.18	74.24	74.76	54.23	30.65	17.79	12.03	8.65	29.20
P31	1.32	1.38	1.50	1.67	1.87	2.04	2.13	2.10	1.95	1.74	1.54	1.40	1.33	1.69
P38	1.00	0.88	1.08	1.83	4.27	10.90	19.03	20.25	14.96	9.68	5.48	2.75	1.50	7.20
P41	1.17	0.86	1.12	2.82	11.13	39.89	75.58	85.27	73.04	43.92	17.73	5.96	2.31	27.76
P5	1.67	1.67	1.68	1.68	1.68	1.69	1.69	1.69	1.69	1.68	1.68	1.67	1.67	1.68
P6	0.24	0.30	0.68	1.83	5.45	16.08	31.09	58.33	83.31	64.88	15.35	1.69	0.39	21.51
P61	0.06	0.15	0.75	6.48	25.82	32.42	40.25	64.36	68.12	18.94	1.23	0.16	0.06	19.91
P64	0.52	0.46	0.68	1.73	6.50	23.52	51.26	63.41	49.49	21.59	6.76	2.37	0.95	17.63
P65	4.89	5.41	7.39	10.98	15.61	20.80	28.24	33.13	29.61	21.88	13.85	8.28	5.68	15.83
P68	0.31	0.62	2.49	12.77	28.30	25.21	41.86	64.70	46.25	12.23	2.24	0.69	0.34	18.31
P69	2.20	1.60	1.65	2.41	4.62	9.81	17.75	26.62	33.50	32.31	21.35	9.83	4.23	12.91
P7	0.08	0.08	0.15	0.59	4.27	28.09	63.80	82.22	84.27	48.63	8.41	1.00	0.20	24.75
P70	0.36	0.37	0.63	1.77	6.67	21.79	40.83	48.69	40.19	18.33	5.21	1.50	0.59	14.38
P72	0.23	0.22	0.41	1.42	7.44	31.78	62.30	71.37	57.70	24.86	5.83	1.31	0.42	20.41
Month-Av	2.26	1.75	2.03	3.83	8.97	19.77	36.07	46.74	43.53	27.51	13.82	7.12	3.79	16.71

Table B22: Estimated probability (%) of AZA in mussels exceeding 160 µg/kg.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
G1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	1.53	1.42	0.03	0.00	0.00	0.23
G22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	1.08	0.36	0.00	0.00	0.00	0.11
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.82	0.37	0.02	0.00	0.00	0.10
G48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G81	0.52	0.37	0.16	0.06	0.03	0.02	0.02	0.03	0.13	0.62	0.94	0.54	0.49	0.30
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
P16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P65	0.11	0.04	0.02	0.01	0.01	0.01	0.01	0.04	0.22	1.20	1.84	0.78	0.29	0.35
P68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P69	0.02	0.01	0.01	0.02	0.05	0.16	0.63	2.24	6.20	10.12	4.97	0.68	0.08	1.94
P7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month-Av	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.06	0.25	0.36	0.20	0.05	0.03	0.08

Table B23: Estimated probability (%) of OA in mussels exceeding 160 µg/kg.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
G1	0.80	0.45	0.38	0.51	1.02	2.92	10.63	38.41	71.74	65.28	29.44	7.59	2.10	17.79
G10	0.57	0.57	0.57	0.57	0.57	0.57	0.58	0.58	0.57	0.57	0.57	0.57	0.57	0.57
G123	0.02	0.02	0.05	0.17	1.17	6.79	7.67	9.04	27.28	20.43	3.19	0.27	0.05	5.86
G18	6.26	0.78	0.23	0.30	2.54	36.46	70.76	76.94	91.15	93.56	78.64	42.26	21.76	40.13
G21	0.00	0.00	0.00	0.00	0.05	1.36	26.32	45.75	7.37	0.26	0.01	0.00	0.00	6.24
G22	0.06	0.04	0.06	0.14	0.55	3.17	14.48	20.99	9.26	3.33	1.15	0.32	0.11	4.13
G23	0.01	0.01	0.02	0.07	0.69	10.22	60.86	80.53	48.47	18.51	3.19	0.19	0.02	17.14
G26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G28	0.38	0.20	0.17	0.27	1.19	10.35	48.73	76.93	64.30	21.03	4.23	1.56	0.76	17.70
G34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G35	0.26	0.09	0.08	0.19	2.35	41.38	83.05	86.27	86.04	73.97	42.04	11.79	1.71	33.02
G39	0.71	0.55	0.86	2.76	13.85	49.70	76.01	83.61	84.81	70.64	32.96	7.52	1.79	32.75
G42	0.13	0.18	0.33	0.82	2.48	7.19	13.34	11.30	4.25	1.27	0.45	0.22	0.14	3.24
G48	1.28	0.43	0.33	0.78	5.00	40.05	95.39	99.64	97.56	70.22	35.89	20.44	6.06	36.39
G49	0.06	0.06	0.10	0.41	2.92	25.39	84.97	97.13	85.53	33.29	4.73	0.59	0.13	25.79
G54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G56	0.95	0.87	1.14	1.82	3.00	6.02	23.73	60.62	65.42	31.71	8.95	3.44	1.58	16.10
G57	0.10	0.06	0.07	0.18	0.89	7.29	39.28	75.38	75.72	40.13	8.93	1.56	0.32	19.22
G58	1.16	0.57	0.41	0.54	1.37	6.10	29.54	55.10	43.17	21.93	10.44	5.30	2.58	13.71
G67	0.00	0.00	0.00	0.01	0.07	1.29	26.40	77.88	64.38	11.35	0.54	0.03	0.00	14.00
G71	13.43	4.59	1.85	1.22	1.55	4.17	19.80	59.78	79.02	67.51	51.15	44.54	30.13	29.13
G8	12.03	6.19	4.57	5.40	11.43	32.98	62.17	78.37	84.47	85.59	77.66	54.45	27.39	41.75
G80	5.32	2.70	1.82	1.93	3.45	10.05	33.71	67.14	78.05	67.40	42.53	21.50	10.76	26.64
G81	0.33	0.16	0.11	0.13	0.30	1.28	8.98	31.05	34.75	16.54	5.66	2.28	0.87	7.88
G9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P125	0.08	0.08	0.13	0.43	2.65	19.32	56.38	67.38	44.63	15.45	3.16	0.57	0.16	16.19
P16	9.79	8.51	9.37	13.28	20.99	32.40	48.31	59.85	57.04	41.22	25.34	16.57	12.31	27.31
P31	0.90	0.88	0.96	1.17	1.55	2.14	2.87	3.34	3.14	2.46	1.78	1.31	1.04	1.81
P38	0.08	0.10	0.21	0.68	3.42	17.35	36.86	30.40	10.13	2.09	0.49	0.17	0.09	7.85
P41	0.21	0.20	0.41	1.76	11.06	51.66	92.12	97.38	90.32	59.23	16.74	2.29	0.47	32.61
P5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6	0.05	0.04	0.09	0.37	2.66	15.34	32.18	65.68	94.98	82.60	17.34	1.05	0.13	24.04
P61	0.00	0.00	0.00	0.00	0.02	0.36	13.81	77.53	82.32	20.16	0.65	0.03	0.00	14.99
P64	0.07	0.07	0.12	0.36	1.88	12.28	45.00	65.56	48.74	16.13	2.82	0.49	0.14	14.90
P65	0.01	0.01	0.01	0.02	0.09	1.00	15.76	46.64	26.41	5.06	0.66	0.10	0.02	7.37
P68	0.00	0.00	0.00	0.01	0.03	0.43	11.82	56.81	49.71	11.88	1.12	0.11	0.02	10.15
P69	0.04	0.03	0.03	0.07	0.23	1.12	6.75	32.17	59.07	35.49	5.79	0.59	0.11	10.88
P7	0.04	0.03	0.05	0.22	2.32	28.46	78.16	95.46	97.06	70.07	11.28	0.97	0.14	29.56
P70	0.10	0.10	0.16	0.46	2.11	11.27	36.38	56.96	48.91	18.31	3.29	0.61	0.19	13.76
P72	0.07	0.06	0.11	0.34	1.82	12.05	43.92	66.22	52.73	17.23	2.67	0.45	0.13	15.22
Month-Av	1.38	0.72	0.62	0.93	2.68	12.75	33.92	51.34	49.21	30.30	13.39	6.29	3.09	15.89

Table B24: Estimated probability (%) of LT exceedance of MPL in Pacific oysters.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
PO1	2.94	3.03	2.33	1.41	0.82	0.57	0.52	0.63	0.93	1.42	1.83	2.05	2.44	1.61
PO10	1.75	2.11	2.25	1.87	1.24	0.77	0.51	0.40	0.39	0.46	0.63	0.93	1.32	1.13
PO123	6.31	5.55	4.86	4.37	4.14	4.17	4.56	5.38	6.51	7.48	7.87	7.63	7.04	5.83
PO18	0.76	0.84	1.23	2.23	4.12	6.95	12.15	17.35	15.65	8.85	3.79	1.66	0.95	5.89
PO28	4.55	8.97	5.82	2.38	1.33	1.09	1.33	3.13	9.49	12.56	5.63	1.69	1.71	4.59
PO42	0.04	0.03	0.05	0.10	0.27	0.74	1.50	5.29	20.04	16.10	3.12	0.38	0.08	3.67
PO49	0.52	0.48	0.55	0.79	1.36	2.61	4.69	6.24	5.55	3.70	2.06	1.11	0.69	2.33
PO9	2.19	2.10	2.06	2.06	2.12	2.22	2.34	2.47	2.56	2.59	2.54	2.43	2.30	2.31
Month-Av	2.38	2.89	2.39	1.90	1.93	2.39	3.45	5.11	7.64	6.64	3.43	2.23	2.07	3.42

Table B25: Estimated probability (%) of AZA in Pacific oysters exceeding 80 µg/kg.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
PO1	6.02	6.31	4.59	3.88	2.64	0.68	0.09	0.01	0.01	0.01	0.06	0.49	2.63	2.11
PO10	5.51	5.41	3.83	2.91	1.69	0.40	0.07	0.02	0.02	0.03	0.14	0.87	3.08	1.84
PO123	1.79	3.28	3.73	2.61	1.04	0.23	0.05	0.02	0.01	0.01	0.04	0.14	0.60	1.04
PO18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO28	1.72	2.35	2.27	1.56	0.62	0.13	0.03	0.01	0.01	0.01	0.03	0.15	0.68	0.74
PO42	0.33	0.84	2.06	2.30	0.81	0.12	0.02	0.01	0.00	0.01	0.01	0.04	0.13	0.51
PO49	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
PO9	1.35	3.76	4.49	2.45	0.65	0.10	0.02	0.01	0.00	0.01	0.02	0.06	0.30	1.02
Month-Av	2.10	2.75	2.63	1.97	0.94	0.22	0.04	0.02	0.02	0.02	0.05	0.23	0.94	0.92

Table B26: Estimated probability (%) of OA in Pacific oysters exceeding 80 µg/kg.

Group	Wk1-4	Wk5-8	Wk9-12	Wk13-16	Wk17-20	Wk21-24	Wk25-28	Wk29-32	Wk33-36	Wk37-40	Wk41-44	Wk45-48	Wk49-52	Group Average
PO1	0.06	0.08	0.15	0.41	1.36	4.48	9.32	8.39	3.12	0.82	0.25	0.11	0.07	2.20
PO10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO123	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PO18	0.42	0.41	0.65	1.44	4.08	13.22	35.80	51.62	39.28	17.56	5.65	1.79	0.71	13.28
PO28	0.09	0.12	0.21	0.46	1.18	2.82	4.14	3.03	1.23	0.46	0.20	0.11	0.09	1.09
PO42	0.10	0.13	0.23	0.59	2.00	6.91	14.56	13.42	5.34	1.49	0.46	0.19	0.11	3.50
PO49	0.21	0.17	0.22	0.45	1.44	5.94	19.51	27.09	15.76	7.24	2.88	0.95	0.38	6.33
PO9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Month-Av	0.11	0.11	0.18	0.42	1.26	4.17	10.42	12.94	8.09	3.45	1.18	0.39	0.17	3.30

Appendix C – Tables for Cockles, Razors and Surf Clams

Table C1: Number and percentage of cockle samples that were equal to or exceeded a given limit for DA (mg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DA>0 (counts)	0	0	0	3	8	19	19	20	14	0	0	0	83
DA>=5 (counts)	0	0	0	0	0	4	2	8	1	0	0	0	15
DA>=10 (counts)	0	0	0	0	0	3	0	1	1	0	0	0	5
DA>=20 (counts)	0	0	0	0	0	1	0	1	0	0	0	0	2
Total samples tested	45	65	51	44	80	122	134	142	144	134	70	42	1073
DA>0 (%)	0	0	0	6.82	10	15.57	14.18	14.08	9.72	0	0	0	7.74
DA>=5 (%)	0	0	0	0	0	3.28	1.49	5.63	0.69	0	0	0	1.4
DA>=10 (%)	0	0	0	0	0	2.46	0	0.7	0.69	0	0	0	0.47
DA>=20 (%)	0	0	0	0	0	0.82	0	0.7	0	0	0	0	0.19
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	1	4	1	1	1	1	1	1	

Table C2: Number and percentage of cockle samples that were equal to or exceeded a given limit for PST (µg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PST>0 (counts)	8	9	7	10	23	30	18	19	11	6	12	6	159
PST>=400 (counts)	0	0	0	1	5	6	1	0	0	0	0	0	13
PST>=800 (counts)	0	0	0	1	1	4	0	0	0	0	0	0	6
Total samples tested	74	97	95	111	138	141	146	141	143	132	95	59	1372
PST>0 (%)	10.81	9.28	7.37	9.01	16.67	21.28	12.33	13.48	7.69	4.55	12.63	10.17	11.59
PST>=400 (%)	0	0	0	0.9	3.62	4.26	0.68	0	0	0	0	0	0.95
PST>=800 (%)	0	0	0	0.9	0.72	2.84	0	0	0	0	0	0	0.44
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	4	4	1	1	1	1	1	1	

Table C3: Number and percentage of cockle samples that were equal to or exceeded the MPL for LT based on data from 2001-21. Cockle samples that were equal to or exceeded a given limit for AZA (µg/kg) or OA (µg/kg) are based on data from 2011-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LT>=MPL (counts)	0	0	0	1	0	0	1	0	0	0	0	0	2
Total samples tested	44	64	119	108	123	133	141	139	144	139	136	72	1362
AZA>0 (counts)	2	1	4	1	0	0	1	8	8	1	1	3	30
AZA>=80 (counts)	1	0	0	0	0	0	0	0	0	0	0	0	1
AZA>=160 (counts)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total samples tested	36	48	101	78	81	83	101	103	105	102	98	54	990
OA>0 (counts)	0	0	0	0	1	13	14	0	3	0	0	0	31
OA>=80 (counts)	0	0	0	0	0	5	5	0	1	0	0	0	11
OA>=160 (counts)	0	0	0	0	0	0	1	0	0	0	0	0	1
Total samples tested	36	48	101	78	81	83	101	103	105	102	98	54	990
LT>=MPL (%)	0	0	0	0.93	0	0	0.71	0	0	0	0	0	0.15
AZA>0 (%)	5.56	2.08	3.96	1.28	0	0	0.99	7.77	7.62	0.98	1.02	5.56	3.03
AZA>=80 (%)	2.78	0	0	0	0	0	0	0	0	0	0	0	0.1
AZA>=160 (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
OA>0 (%)	0	0	0	0	1.23	15.66	13.86	0	2.86	0	0	0	3.13
OA>=80 (%)	0	0	0	0	0	6.02	4.95	0	0.95	0	0	0	1.11
OA>=160 (%)	0	0	0	0	0	0	0.99	0	0	0	0	0	0.1
Current mon.	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed mon.	1	1	1	1	1	1	1	1	1	1	1	1	

Table C4: Number and percentage of razor samples that were equal to or exceeded a given limit for DA (mg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DA>0 (counts)	0	0	0	0	17	25	18	12	15	4	0	0	91
DA>=5 (counts)	0	0	0	0	3	7	2	2	2	3	0	0	19
DA>=10 (counts)	0	0	0	0	0	4	0	0	0	0	0	0	4
DA>=20 (counts)	0	0	0	0	0	3	0	0	0	0	0	0	3
Total samples tested	87	76	87	85	107	183	203	154	153	144	110	81	1470
DA>0 (%)	0	0	0	0	15.89	13.66	8.87	7.79	9.8	2.78	0	0	6.19
DA>=5 (%)	0	0	0	0	2.8	3.83	0.99	1.3	1.31	2.08	0	0	1.29
DA>=10 (%)	0	0	0	0	0	2.19	0	0	0	0	0	0	0.27
DA>=20 (%)	0	0	0	0	0	1.64	0	0	0	0	0	0	0.2
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	1	4	1	1	1	1	1	1	

Table C5: Number and percentage of razor samples that were equal to or exceeded a given limit for PST (µg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PST>0 (counts)	0	0	1	11	26	23	18	6	1	3	0	0	89
PST>=400 (counts)	0	0	0	0	5	6	3	1	0	0	0	0	15
PST>=800 (counts)	0	0	0	0	2	2	1	0	0	0	0	0	5
Total samples tested	96	92	114	119	146	196	216	160	153	147	130	91	1660
PST>0 (%)	0	0	0.88	9.24	17.81	11.73	8.33	3.75	0.65	2.04	0	0	5.36
PST>=400 (%)	0	0	0	0	3.42	3.06	1.39	0.62	0	0	0	0	0.9
PST>=800 (%)	0	0	0	0	1.37	1.02	0.46	0	0	0	0	0	0.3
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	4	4	2	1	1	1	1	1	

Table C6: Number and percentage of razor samples that were equal to or exceeded the MPL for LT based on data from 2001-21. Razor samples that were equal to or exceeded a given limit for AZA (µg/kg) or OA (µg/kg) are based on data from 2011-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LT>=MPL (counts)	0	0	0	1	1	4	1	0	0	0	0	0	7
Total samples tested	87	78	124	125	153	205	220	170	161	160	153	100	1736
AZA>0 (counts)	0	0	0	0	0	0	1	2	1	0	0	0	4
AZA>=80 (counts)	0	0	0	0	0	0	0	0	0	0	0	0	0
AZA>=160 (counts)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total samples tested	72	60	104	103	123	138	187	144	133	141	127	78	1410
OA>0 (counts)	0	0	0	0	3	21	25	3	2	1	0	0	55
OA>=80 (counts)	0	0	0	0	2	9	10	0	0	0	0	0	21
OA>=160 (counts)	0	0	0	0	0	4	1	0	0	0	0	0	5
Total samples tested	72	60	104	103	123	138	187	144	133	141	127	78	1410
LT>=MPL (%)	0	0	0	0.8	0.65	1.95	0.45	0	0	0	0	0	0.4
AZA>0 (%)	0	0	0	0	0	0	0.53	1.39	0.75	0	0	0	0.28
AZA>=80 (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
AZA>=160 (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
OA>0 (%)	0	0	0	0	2.44	15.22	13.37	2.08	1.5	0.71	0	0	3.9
OA>=80 (%)	0	0	0	0	1.63	6.52	5.35	0	0	0	0	0	1.49
OA>=160 (%)	0	0	0	0	0	2.9	0.53	0	0	0	0	0	0.35
Current mon.	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed mon.	1	1	1	1	1	2	1	1	1	1	1	1	

Table C7: Number and percentage of surf clam samples that were equal to or exceeded a given limit for DA (mg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DA>0 (counts)	1	4	1	3	7	8	11	15	13	5	1	2	71
DA>=5 (counts)	0	0	0	0	0	0	1	1	1	0	0	0	3
DA>=10 (counts)	0	0	0	0	0	0	0	0	0	0	0	0	0
DA>=20 (counts)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total samples tested	13	16	20	16	29	42	34	41	27	24	15	8	285
DA>0 (%)	7.69	25	5	18.75	24.14	19.05	32.35	36.59	48.15	20.83	6.67	25	24.91
DA>=5 (%)	0	0	0	0	0	0	2.94	2.44	3.7	0	0	0	1.05
DA>=10 (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
DA>=20 (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	

Table C8: Number and percentage of surf clam samples that were equal to or exceeded a given limit for PST (µg/kg) based on data from 2001-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PST>0 (counts)	0	0	0	6	9	2	4	2	2	0	0	0	25
PST>=400 (counts)	0	0	0	0	2	2	3	0	0	0	0	0	7
PST>=800 (counts)	0	0	0	0	1	1	2	0	0	0	0	0	4
Total samples tested	18	21	33	33	53	55	54	42	27	22	21	11	390
PST>0 (%)	0	0	0	18.18	16.98	3.64	7.41	4.76	7.41	0	0	0	6.41
PST>=400 (%)	0	0	0	0	3.77	3.64	5.56	0	0	0	0	0	1.79
PST>=800 (%)	0	0	0	0	1.89	1.82	3.7	0	0	0	0	0	1.03
Current monitoring frequency	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed monitoring frequency	1	1	1	1	4	4	4	1	1	1	1	1	

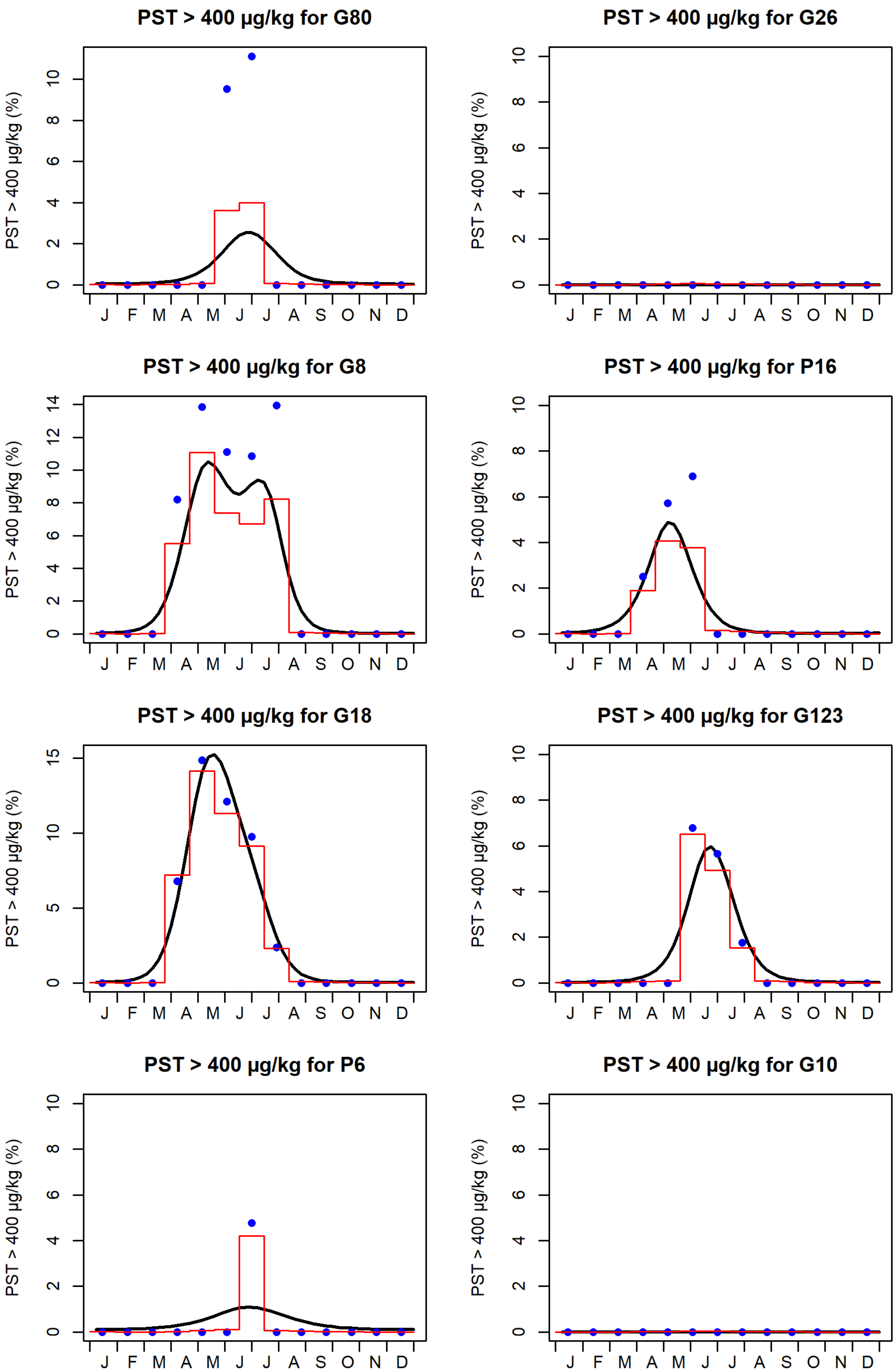
Table C9: Number and percentage of surf clam samples that were equal to or exceeded the MPL for LT based on data from 2001-21. Surf clam samples that were equal to or exceeded a given limit for AZA (µg/kg) or OA (µg/kg) are based on data from 2011-21. Current and proposed monitoring frequency is indicated as 4 (red) = weekly, 2 (yellow) = fortnightly, 1 (white) = monthly.

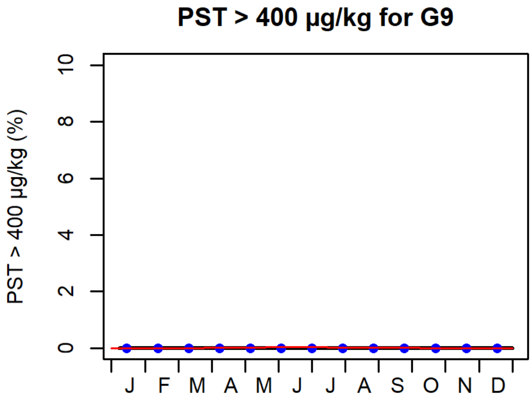
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LT>=MPL (counts)	0	0	0	0	1	10	8	7	3	2	0	0	31
Total samples tested	13	16	34	43	51	58	57	60	45	35	33	18	463
AZA>0 (counts)	1	1	1	4	1	1	5	4	3	5	4	3	33
AZA>=80 (counts)	0	0	0	0	0	0	3	4	2	0	1	0	10
AZA>=160 (counts)	0	0	0	0	0	0	0	2	0	0	0	0	2
Total samples tested	7	7	21	29	38	41	42	38	35	26	27	15	326
OA>0 (counts)	1	1	4	3	14	34	39	33	28	13	11	5	186
OA>=80 (counts)	0	0	0	0	3	21	22	16	12	3	0	0	77
OA>=160 (counts)	0	0	0	0	0	8	8	6	3	2	0	0	27
Total samples tested	7	7	21	29	38	41	42	38	35	26	27	15	326
LT>=MPL (%)	0	0	0	0	1.96	17.24	14.04	11.67	6.67	5.71	0	0	6.7
AZA>0 (%)	14.29	14.29	4.76	13.79	2.63	2.44	11.9	10.53	8.57	19.23	14.81	20	10.12
AZA>=80 (%)	0	0	0	0	0	0	7.14	10.53	5.71	0	3.7	0	3.07
AZA>=160 (%)	0	0	0	0	0	0	0	5.26	0	0	0	0	0.61
OA>0 (%)	14.29	14.29	19.05	10.34	36.84	82.93	92.86	86.84	80	50	40.74	33.33	57.06
OA>=80 (%)	0	0	0	0	7.89	51.22	52.38	42.11	34.29	11.54	0	0	23.62
OA>=160 (%)	0	0	0	0	0	19.51	19.05	15.79	8.57	7.69	0	0	8.28
Current mon.	1	1	1	1	4	4	4	4	4	4	1	1	
Proposed mon.	1	1	1	1	2	4	4	4	4	4	1	1	

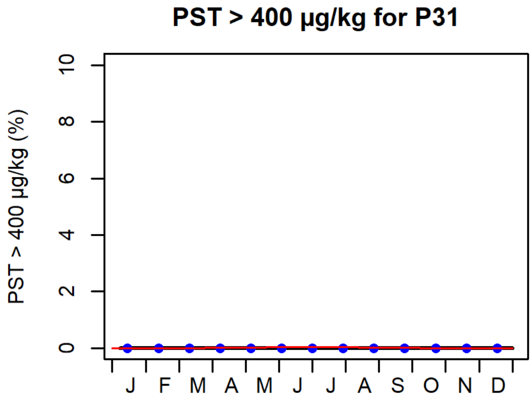
Appendix D – Model fits

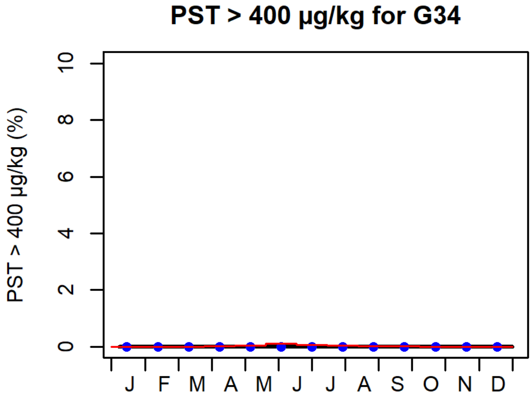
For each (group of) pod(s) the proportion of samples equalling or exceeding a threshold based on data is shown (blue circles) together with predicted proportion from the smooth model (black curve). For mussels a red line showing the predictions from a simple model where predicted proportion is constant for each four week period.

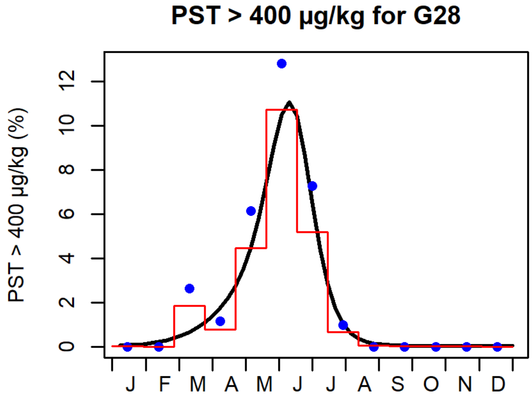
Figure D1: Proportion of mussel samples for which PST equals or exceeds 400 µg/kg.

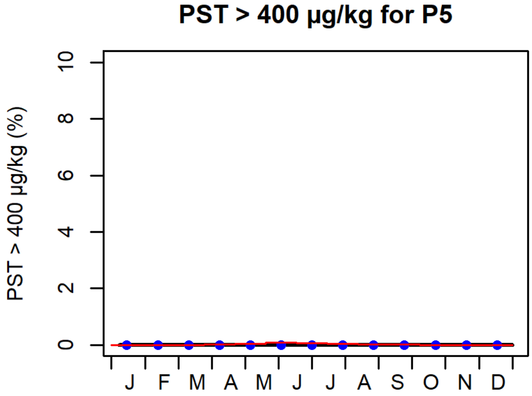


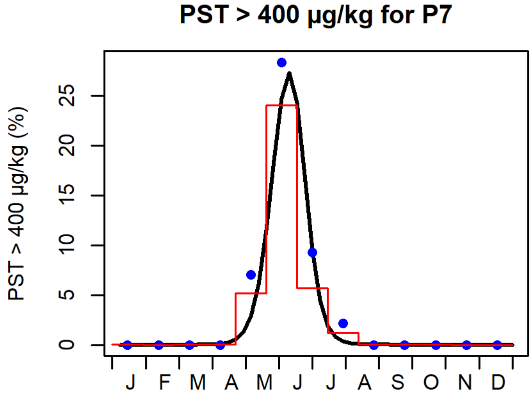

PST > 400 µg/kg for G9
PST > 400 µg/kg (%)
0 2 4 6 8 10
J F M A M J J A S O N D

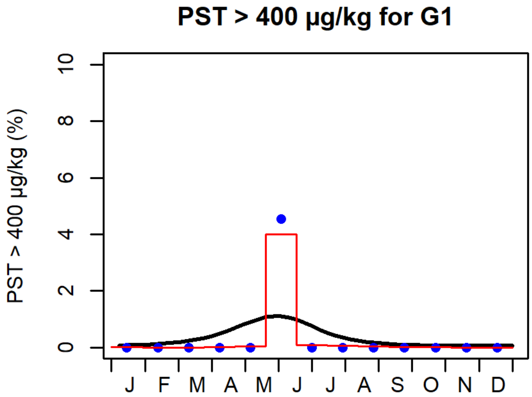

PST > 400 µg/kg for P31
PST > 400 µg/kg (%)
0 2 4 6 8 10
J F M A M J J A S O N D

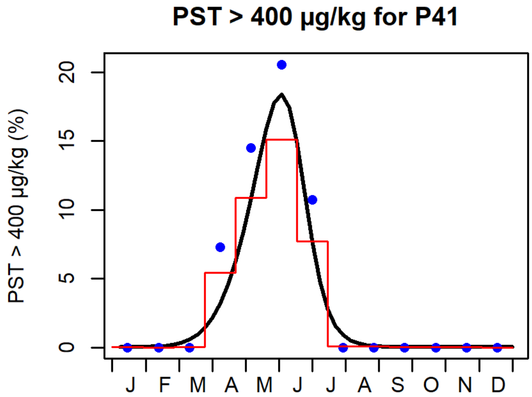

PST > 400 µg/kg for G34
PST > 400 µg/kg (%)
0 2 4 6 8 10
J F M A M J J A S O N D

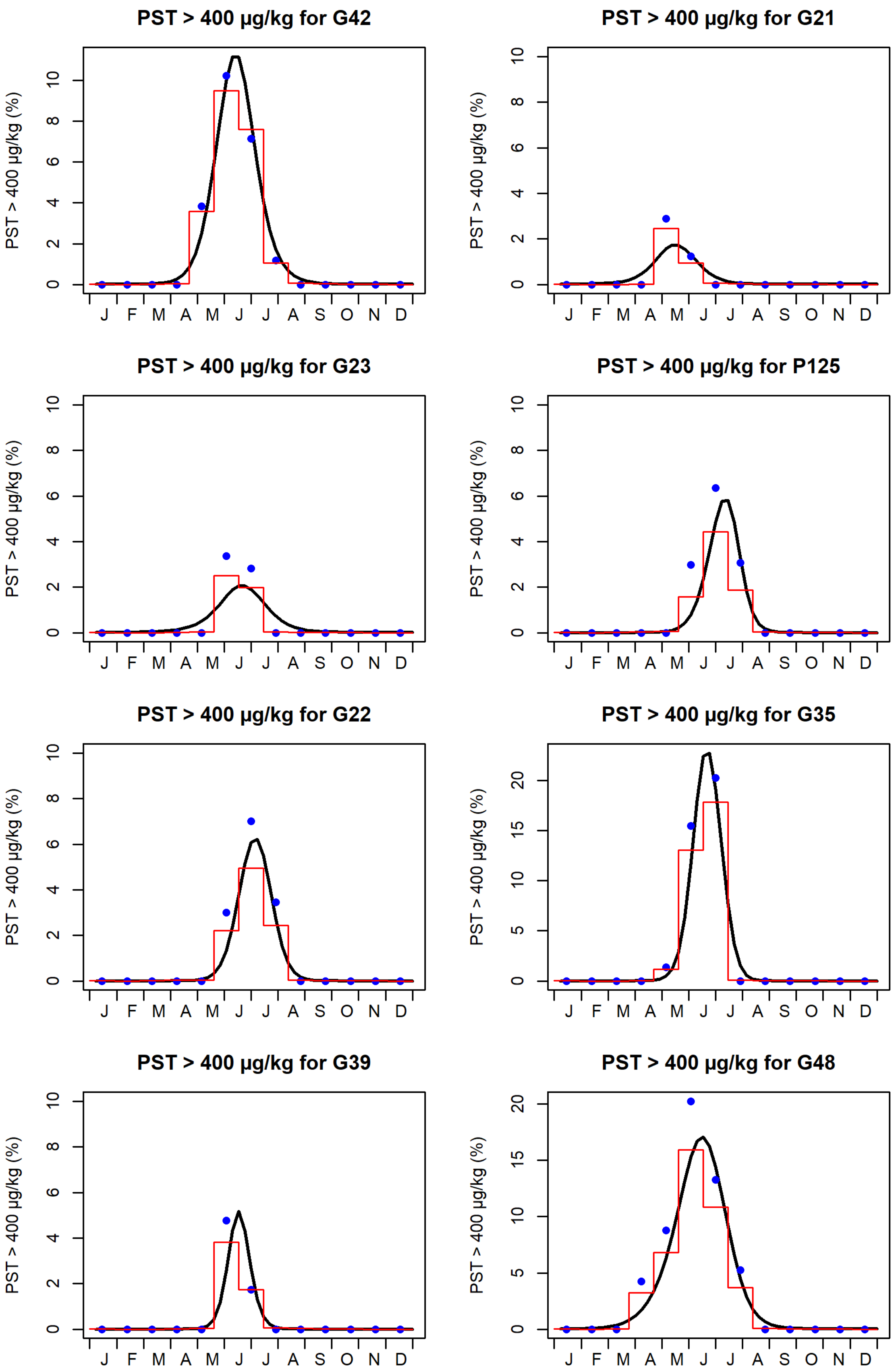

PST > 400 µg/kg for G28
PST > 400 µg/kg (%)
0 2 4 6 8 10 12
J F M A M J J A S O N D


PST > 400 µg/kg for P5
PST > 400 µg/kg (%)
0 2 4 6 8 10
J F M A M J J A S O N D

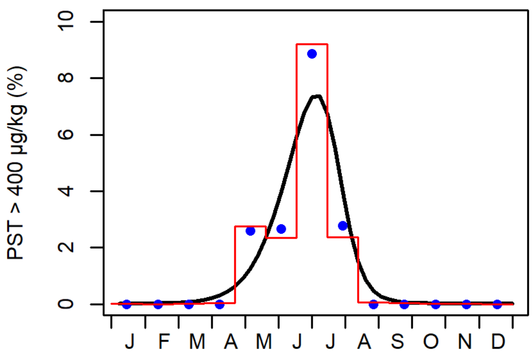

PST > 400 µg/kg for P7
PST > 400 µg/kg (%)
0 5 10 15 20 25
J F M A M J J A S O N D


PST > 400 µg/kg for G1
PST > 400 µg/kg (%)
0 2 4 6 8 10
J F M A M J J A S O N D

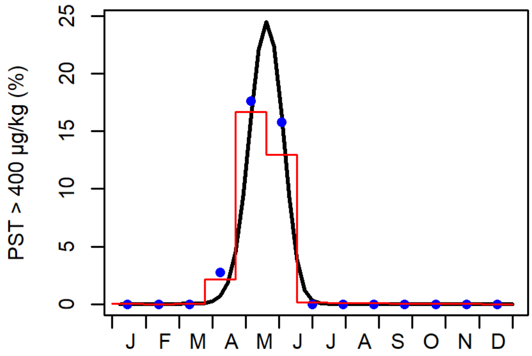

PST > 400 µg/kg for P41
PST > 400 µg/kg (%)
0 5 10 15 20
J F M A M J J A S O N D


PST > 400 µg/kg for G42
PST > 400 µg/kg for G21
PST > 400 µg/kg for G23
PST > 400 µg/kg for P125
PST > 400 µg/kg for G22
PST > 400 µg/kg for G35
PST > 400 µg/kg for G39
PST > 400 µg/kg for G48
PST > 400 µg/kg (%)
J F M A M J J A S O N D

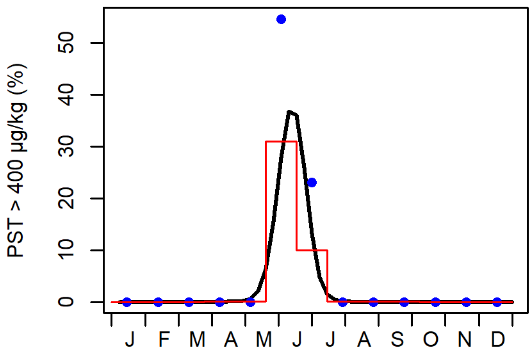
PST > 400 µg/kg for G49



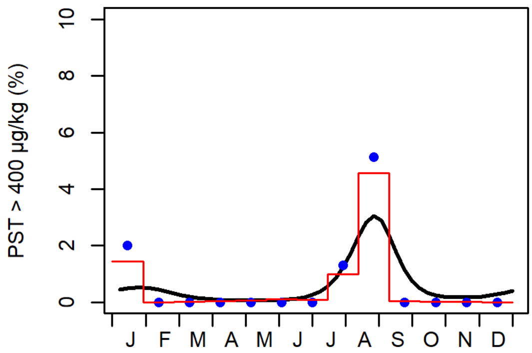
PST > 400 µg/kg for P38



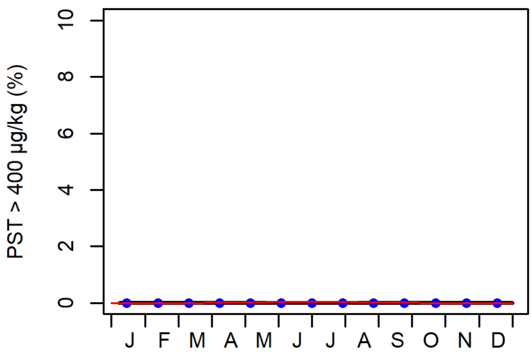
PST > 400 µg/kg for G54



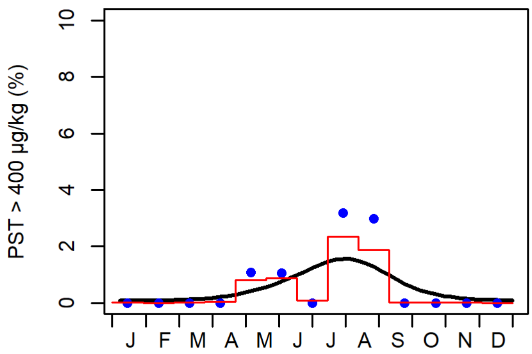
PST > 400 µg/kg for G67



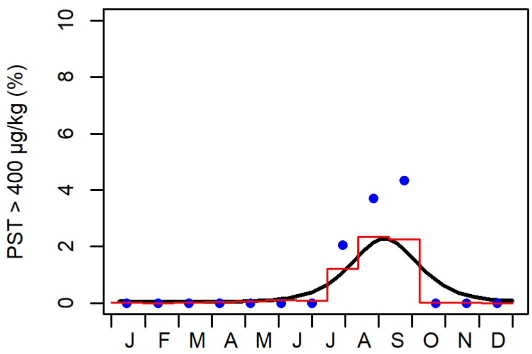
PST > 400 µg/kg for G56



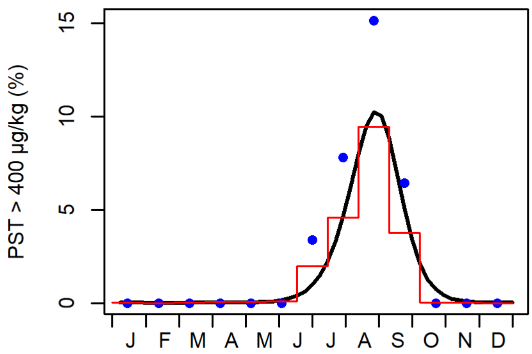
PST > 400 µg/kg for G57



PST > 400 µg/kg for P61



PST > 400 µg/kg for P68



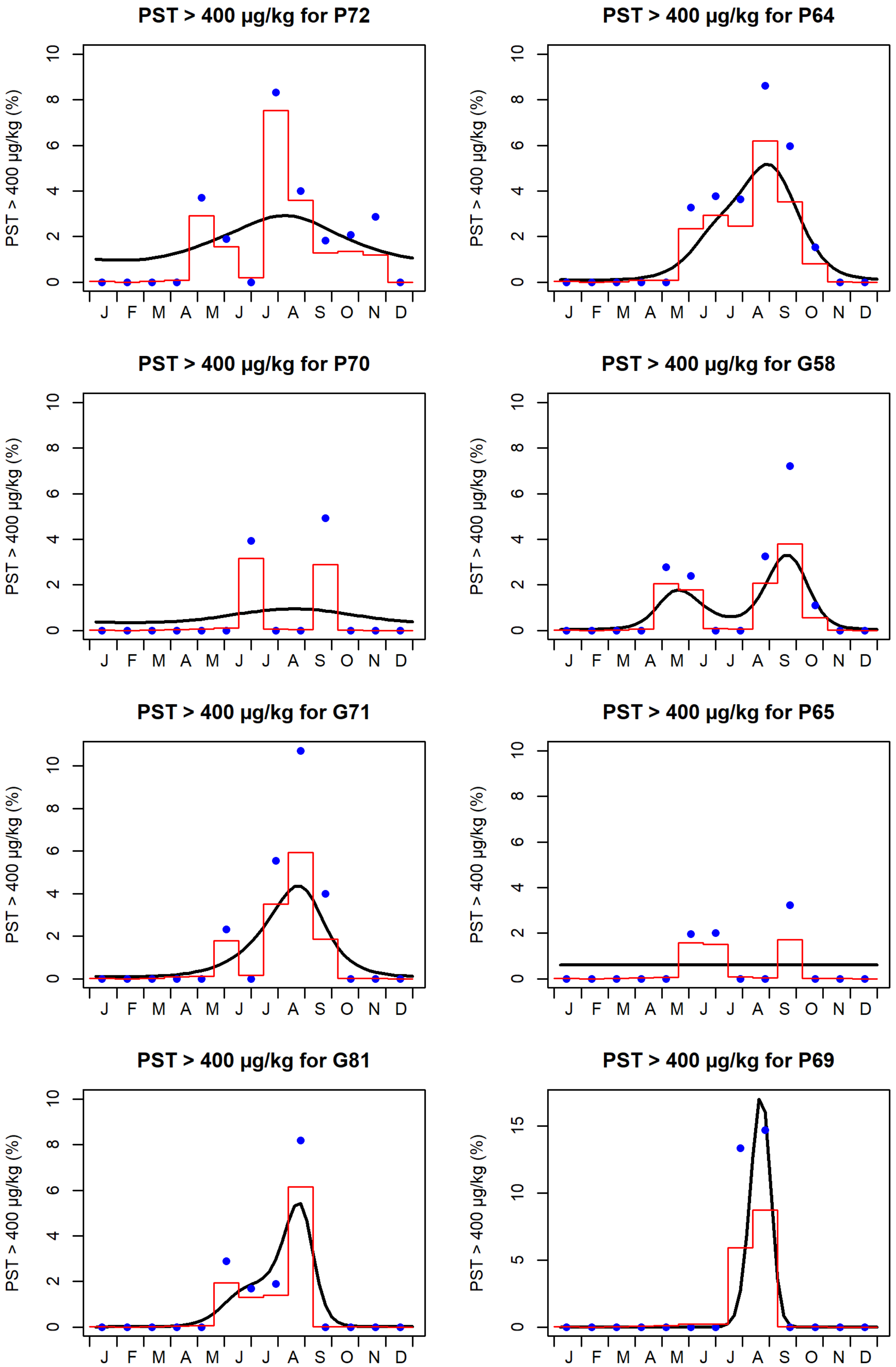
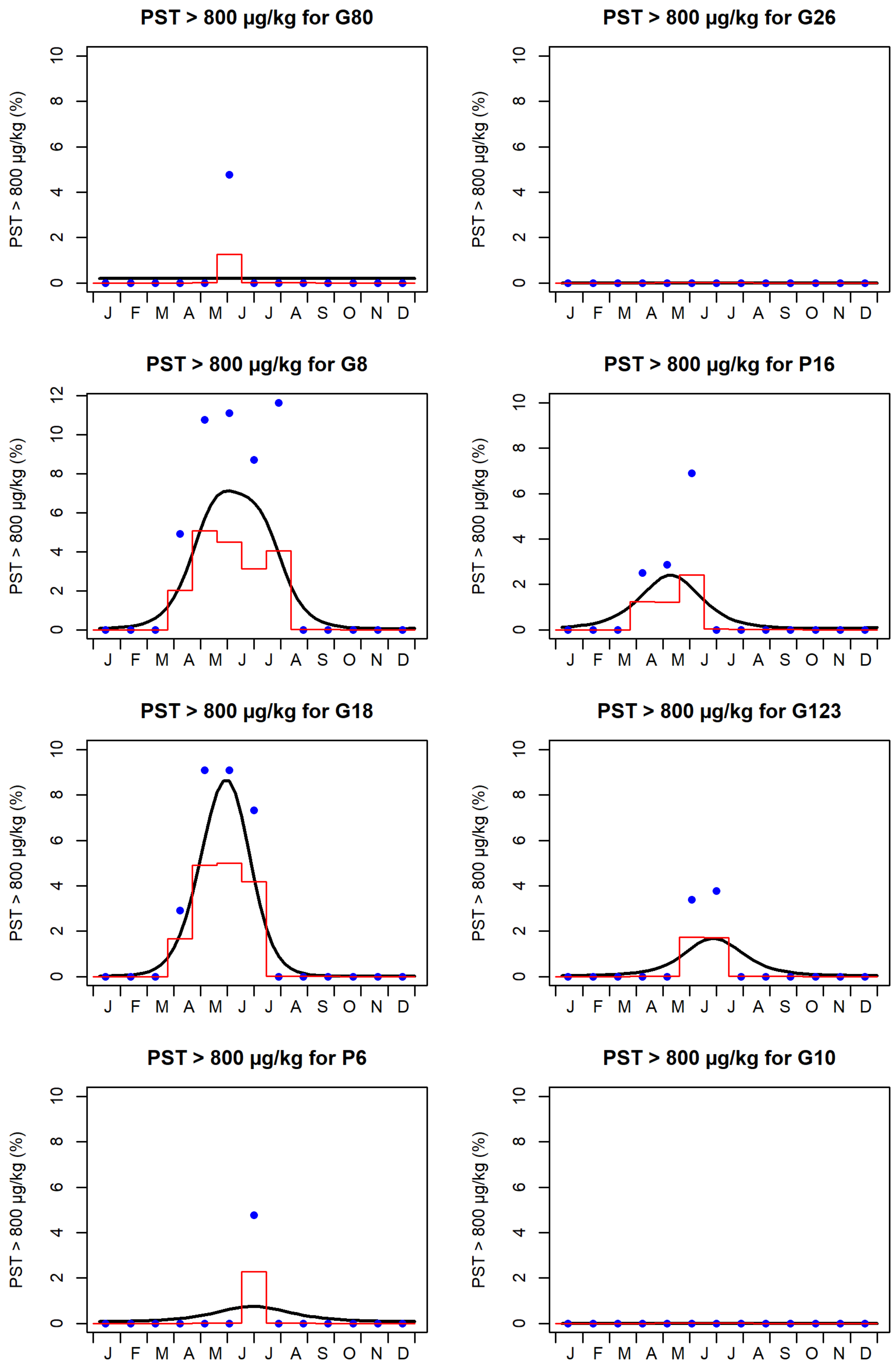
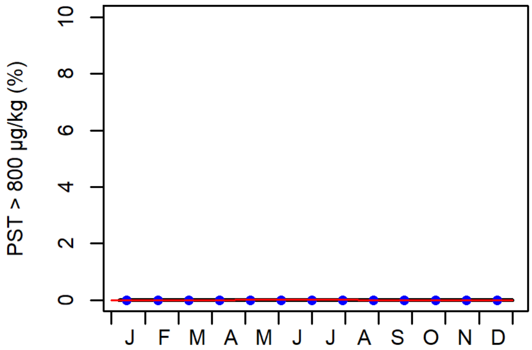

PST > 400 µg/kg for P72
PST > 400 µg/kg for P64
PST > 400 µg/kg for P70
PST > 400 µg/kg for G58
PST > 400 µg/kg for G71
PST > 400 µg/kg for P65
PST > 400 µg/kg for G81
PST > 400 µg/kg for P69
PST > 400 µg/kg (%)
J F M A M J J A S O N D

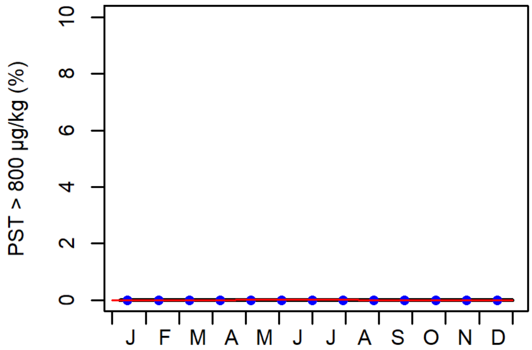
Figure D2: Proportion of mussel samples for which PST equals or exceeds 800 µg/kg.



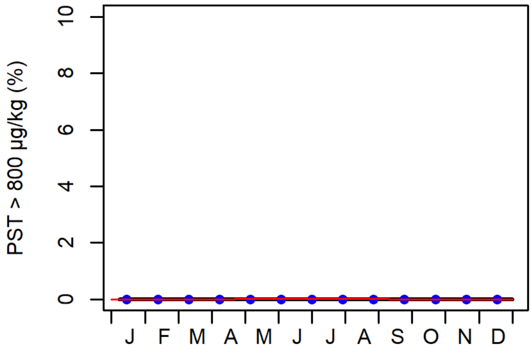
PST > 800 µg/kg for G9



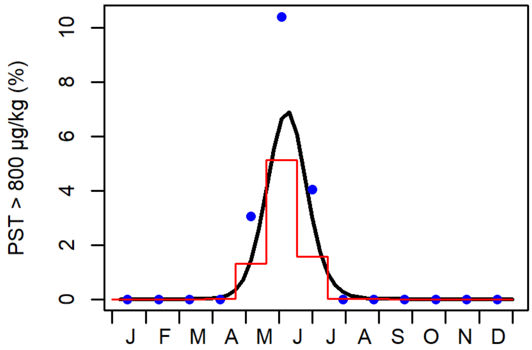
PST > 800 µg/kg for P31



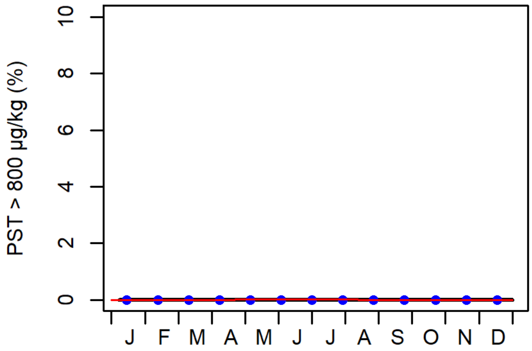
PST > 800 µg/kg for G34



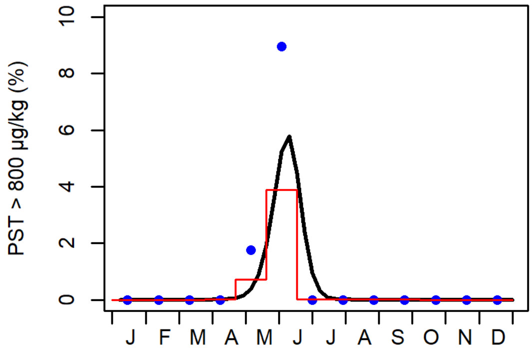
PST > 800 µg/kg for G28



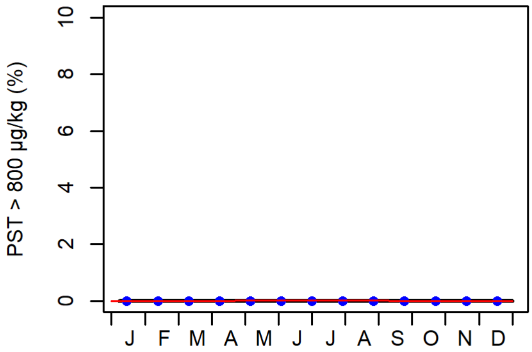
PST > 800 µg/kg for P5



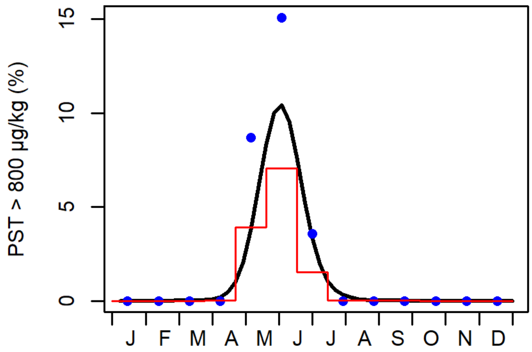
PST > 800 µg/kg for P7



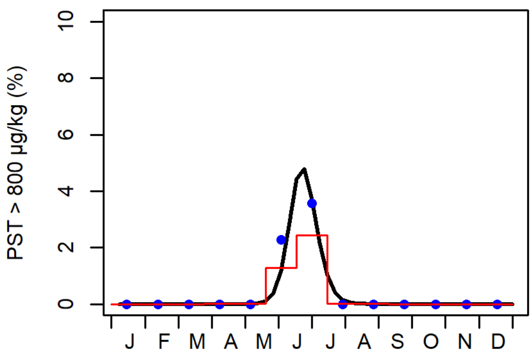
PST > 800 µg/kg for G1



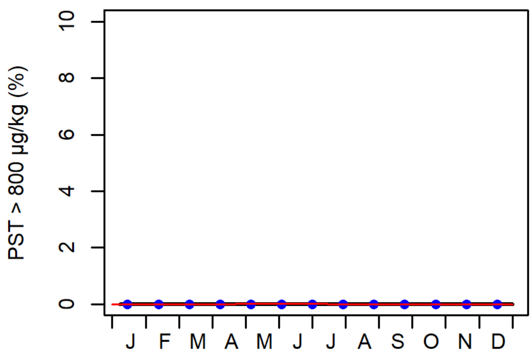
PST > 800 µg/kg for P41



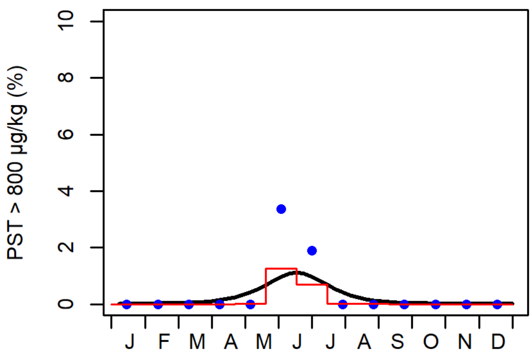
PST > 800 µg/kg for G42



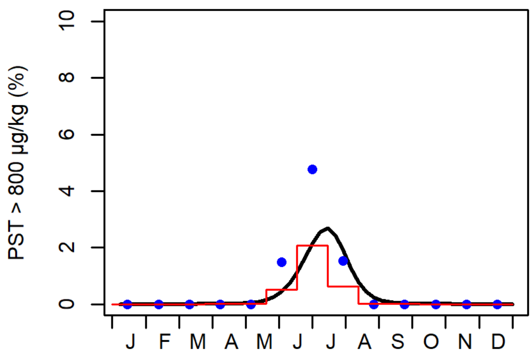
PST > 800 µg/kg for G21



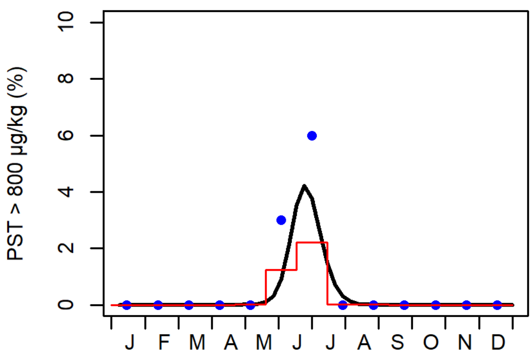
PST > 800 µg/kg for G23



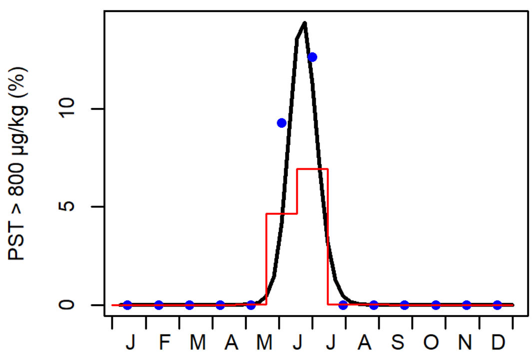
PST > 800 µg/kg for P125



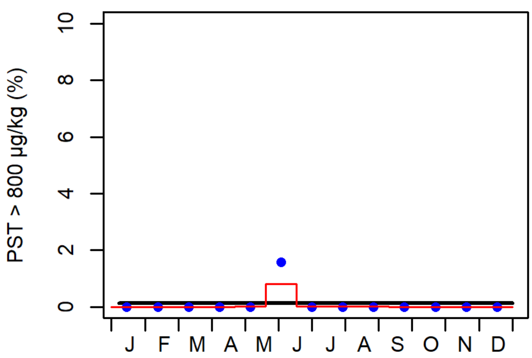
PST > 800 µg/kg for G22



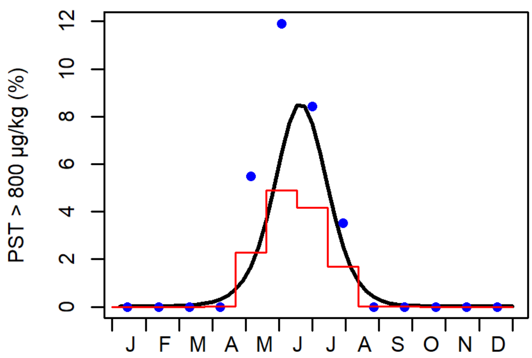
PST > 800 µg/kg for G35

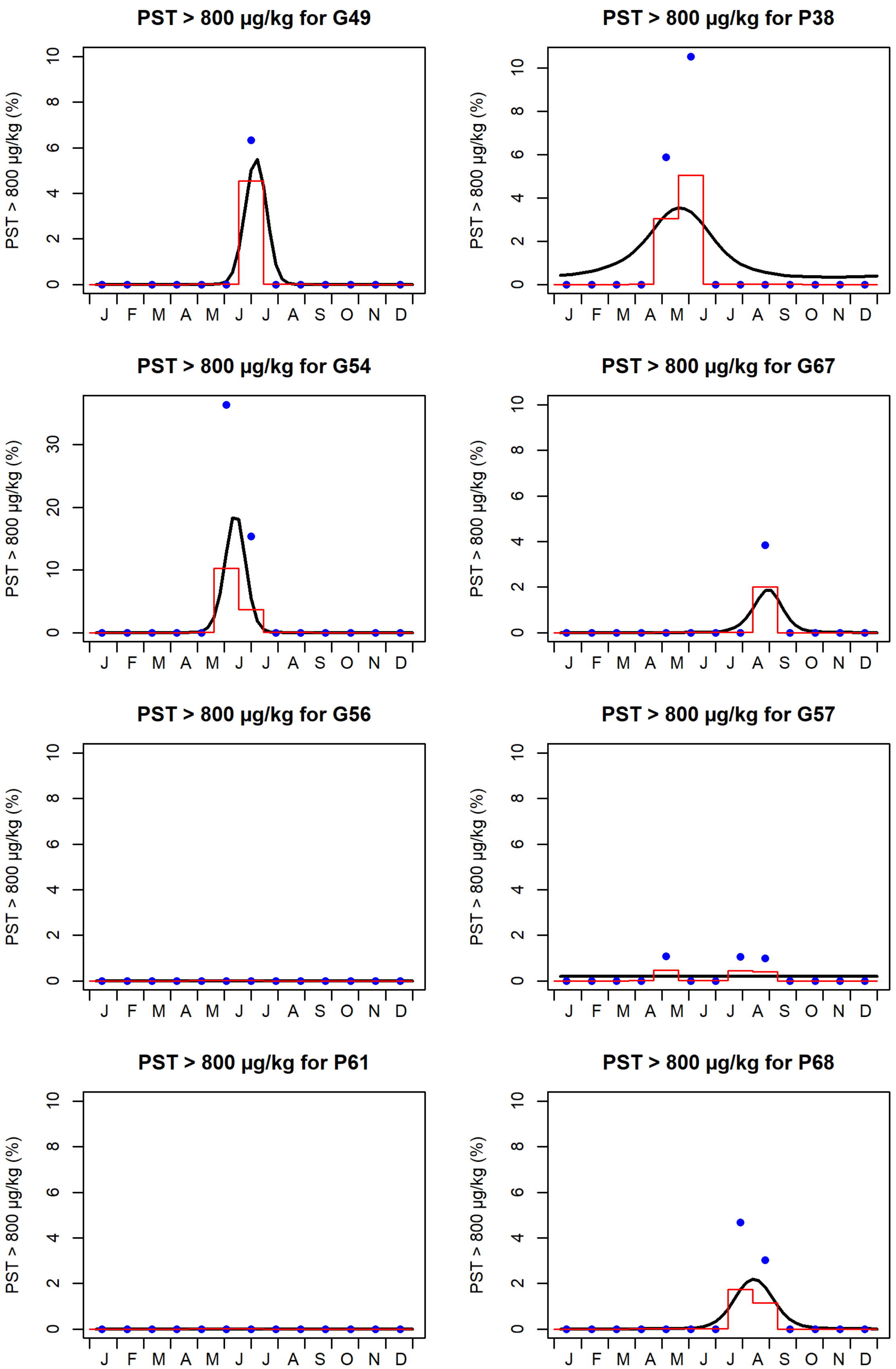


PST > 800 µg/kg for G39

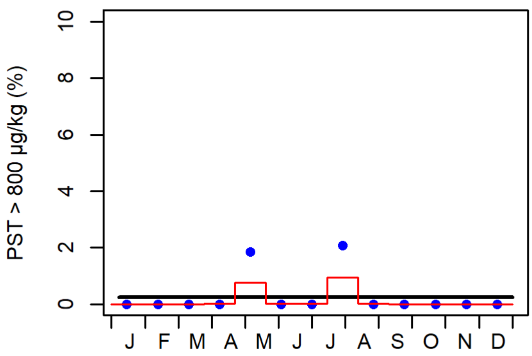


PST > 800 µg/kg for G48

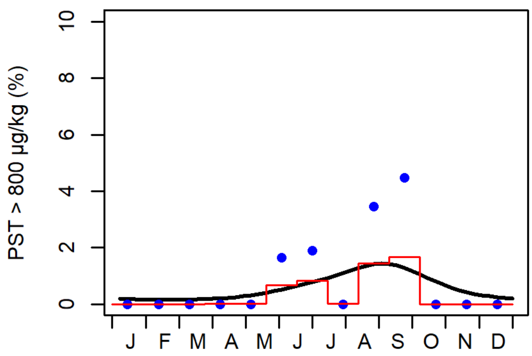



PST > 800 µg/kg for G49
PST > 800 µg/kg for P38
PST > 800 µg/kg for G54
PST > 800 µg/kg for G67
PST > 800 µg/kg for G56
PST > 800 µg/kg for G57
PST > 800 µg/kg for P61
PST > 800 µg/kg for P68
PST > 800 µg/kg (%)
J F M A M J J A S O N D

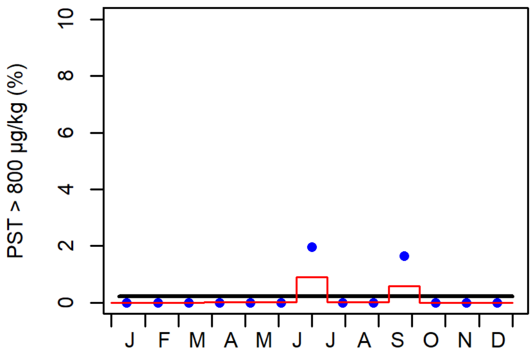
PST > 800 µg/kg for P72



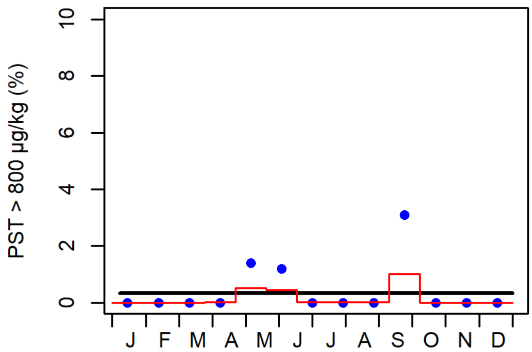
PST > 800 µg/kg for P64



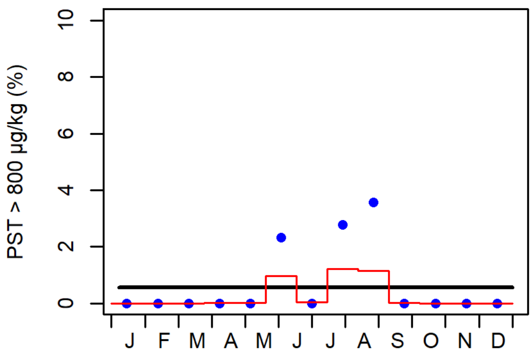
PST > 800 µg/kg for P70



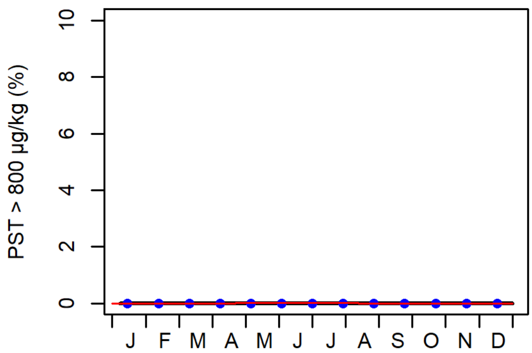
PST > 800 µg/kg for G58



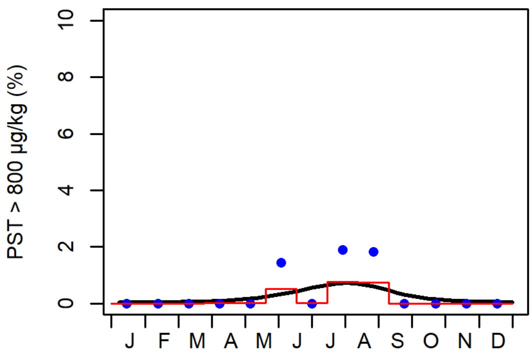
PST > 800 µg/kg for G71



PST > 800 µg/kg for P65



PST > 800 µg/kg for G81



PST > 800 µg/kg for P69

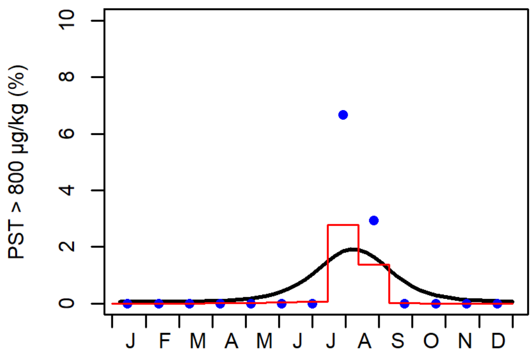
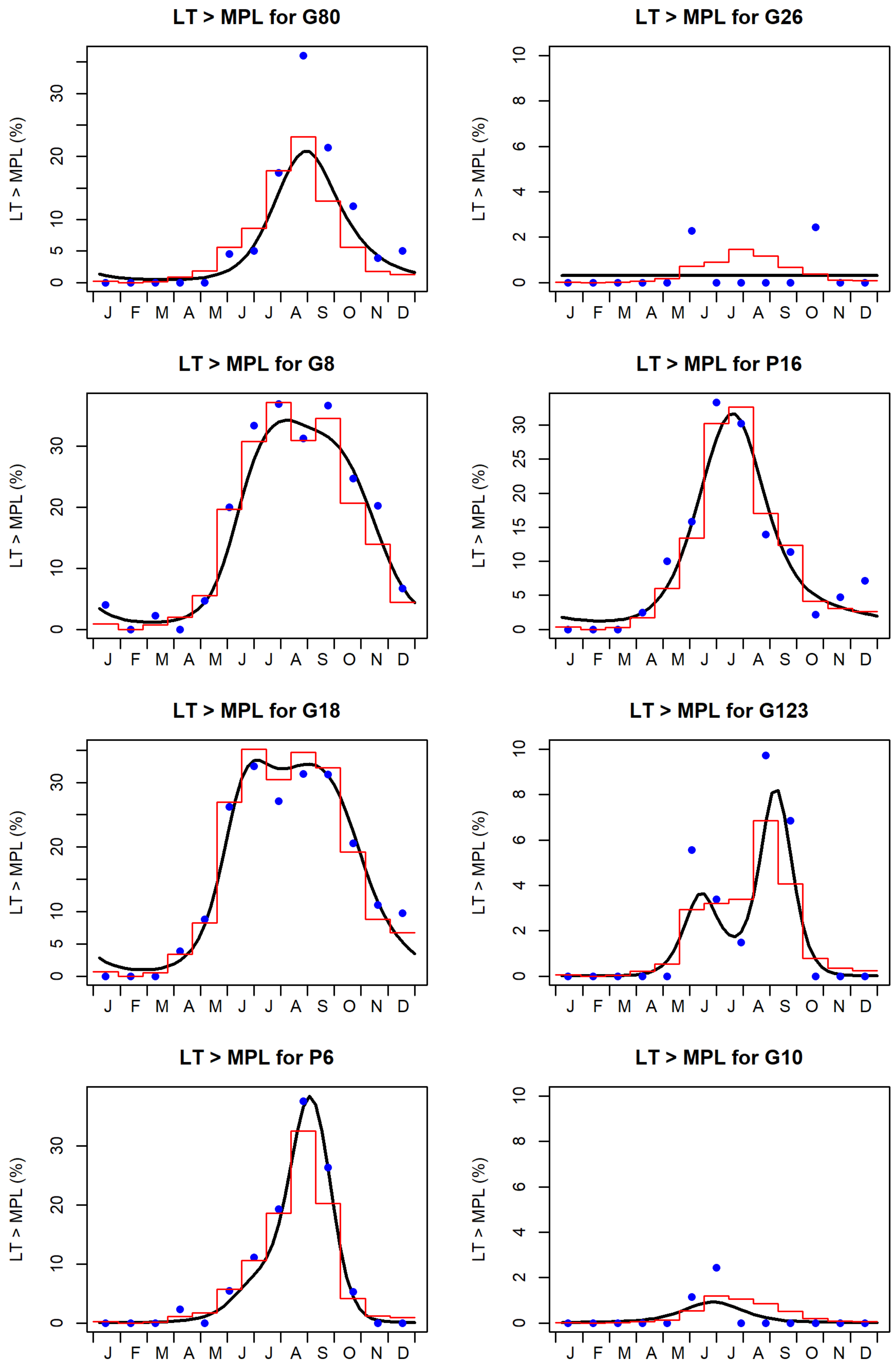
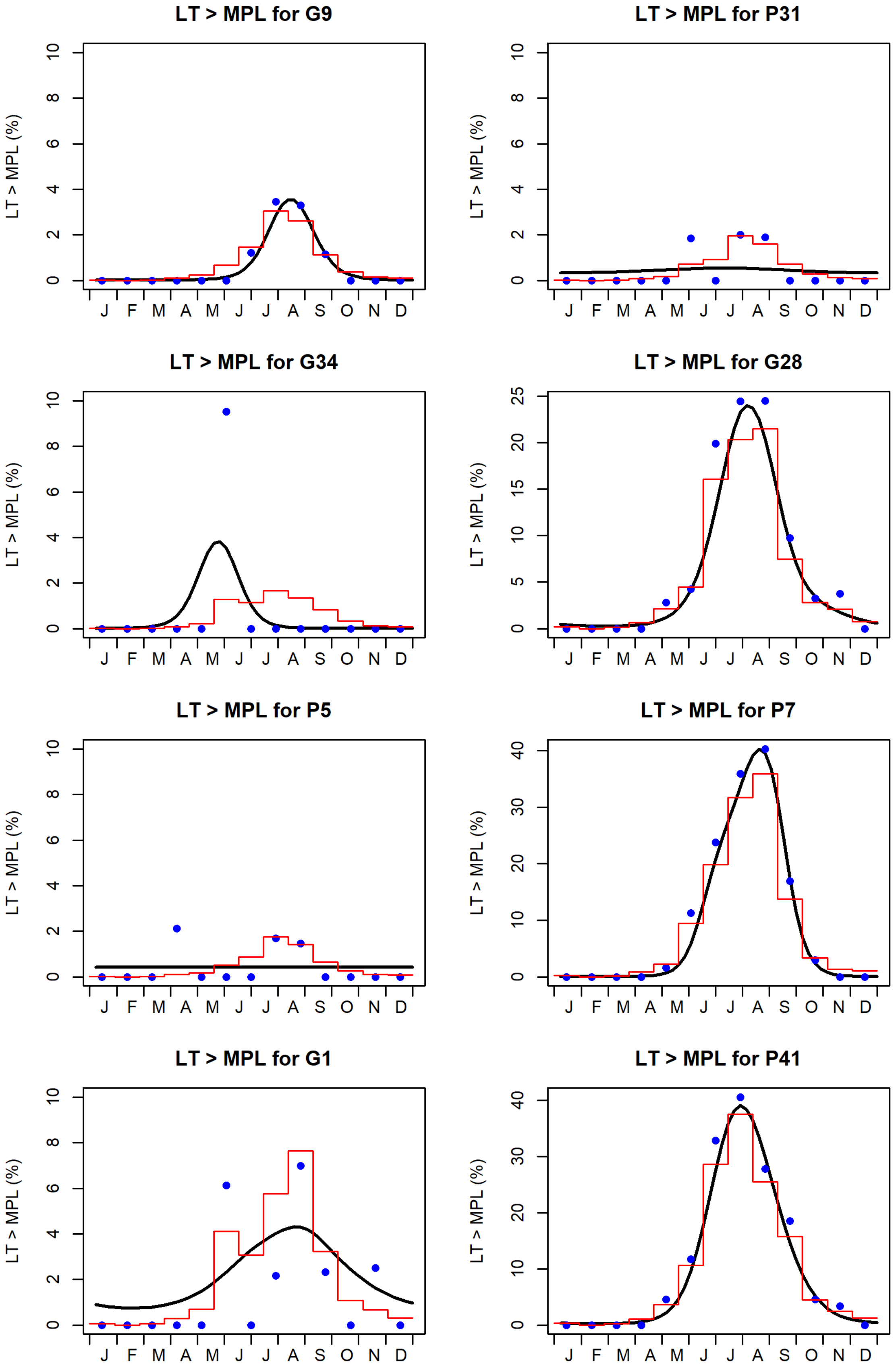
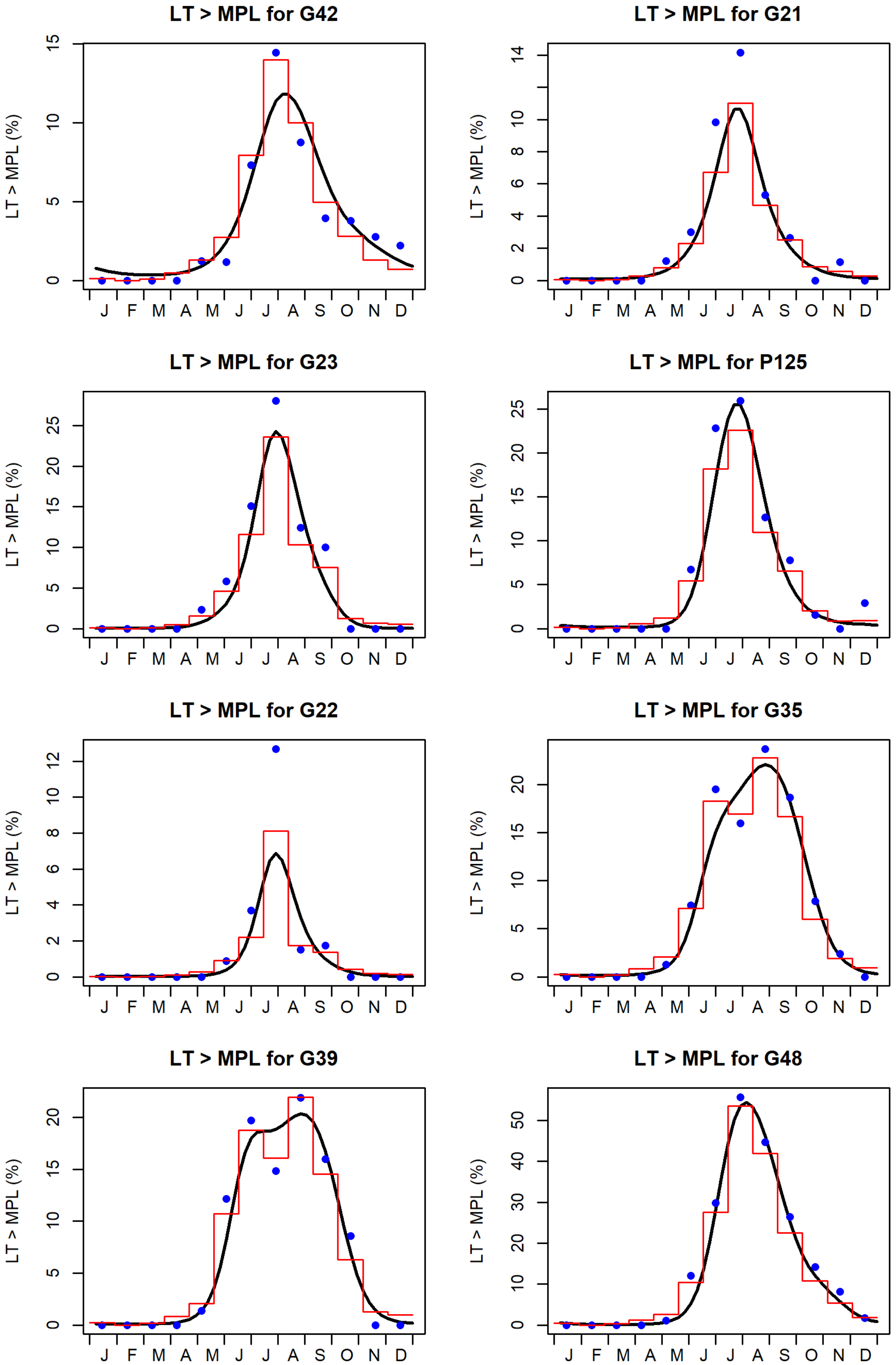
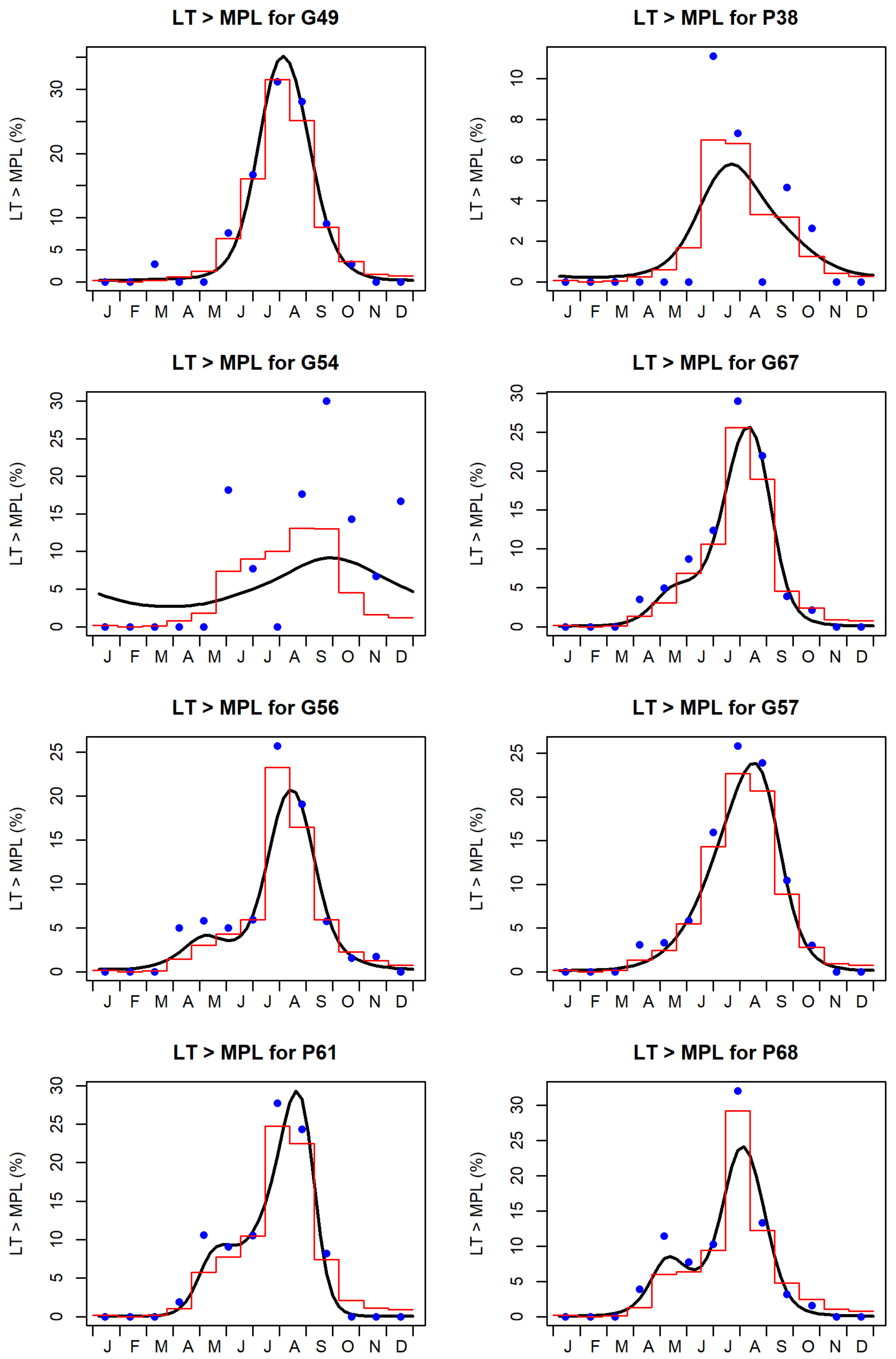


Figure D3: Proportion of mussel samples for which LTs equal or exceed the MPL.




LT > MPL for G9
LT > MPL for P31
LT > MPL for G34
LT > MPL for G28
LT > MPL for P5
LT > MPL for P7
LT > MPL for G1
LT > MPL for P41
LT > MPL (%)
J F M A M J J A S O N D


LT > MPL for G42
LT > MPL for G21
LT > MPL for G23
LT > MPL for P125
LT > MPL for G22
LT > MPL for G35
LT > MPL for G39
LT > MPL for G48
LT > MPL (%)
J F M A M J J A S O N D


LT > MPL for G49
LT > MPL (%)
0 5 10 20 30
J F M A M J J A S O N D
LT > MPL for P38
LT > MPL (%)
0 2 4 6 8 10
J F M A M J J A S O N D
LT > MPL for G54
LT > MPL (%)
0 5 10 15 20 25 30
J F M A M J J A S O N D
LT > MPL for G67
LT > MPL (%)
0 5 10 15 20 25 30
J F M A M J J A S O N D
LT > MPL for G56
LT > MPL (%)
0 5 10 15 20 25
J F M A M J J A S O N D
LT > MPL for G57
LT > MPL (%)
0 5 10 15 20 25
J F M A M J J A S O N D
LT > MPL for P61
LT > MPL (%)
0 5 10 15 20 25 30
J F M A M J J A S O N D
LT > MPL for P68
LT > MPL (%)
0 5 10 15 20 25 30
J F M A M J J A S O N D

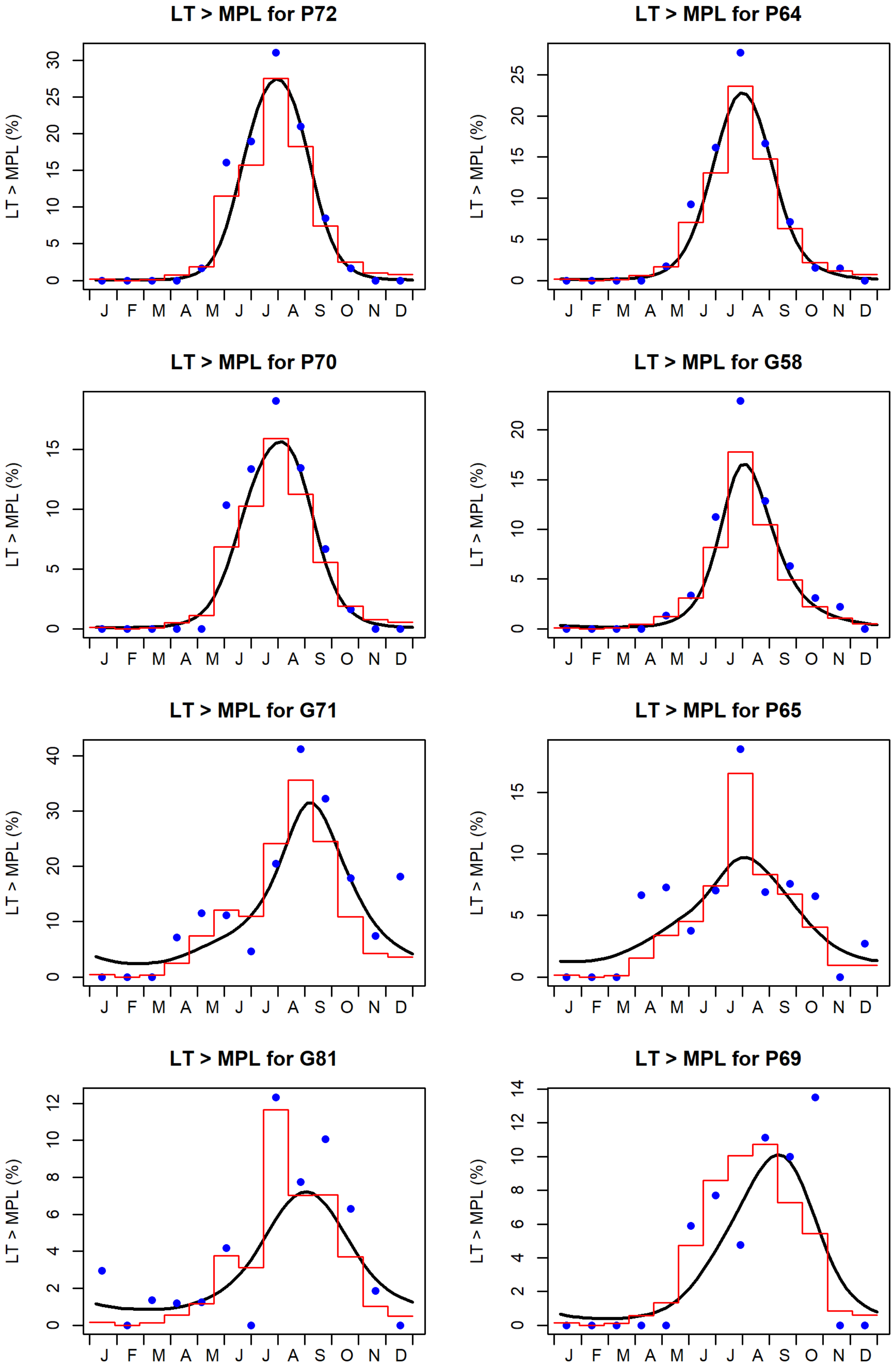

LT > MPL for P72
LT > MPL for P64
LT > MPL for P70
LT > MPL for G58
LT > MPL for G71
LT > MPL for P65
LT > MPL for G81
LT > MPL for P69
LT > MPL (%)
J F M A M J J A S O N D

Figure D4: Proportion of Pacific oyster samples for which PST equals or exceeds 400 µg/kg.

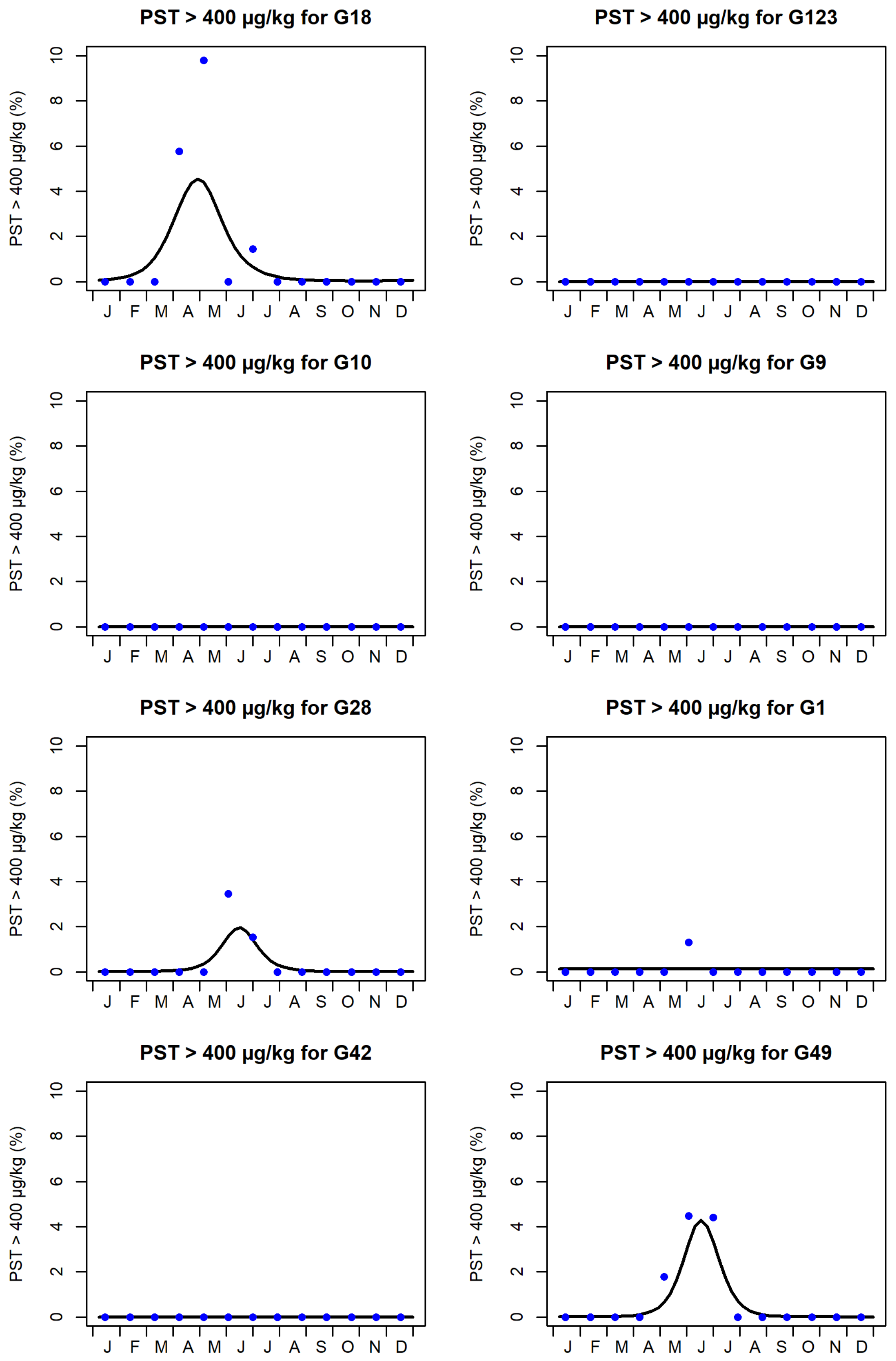


Figure D5: Proportion of Pacific oyster samples for which PST equals or exceeds 800 µg/kg.

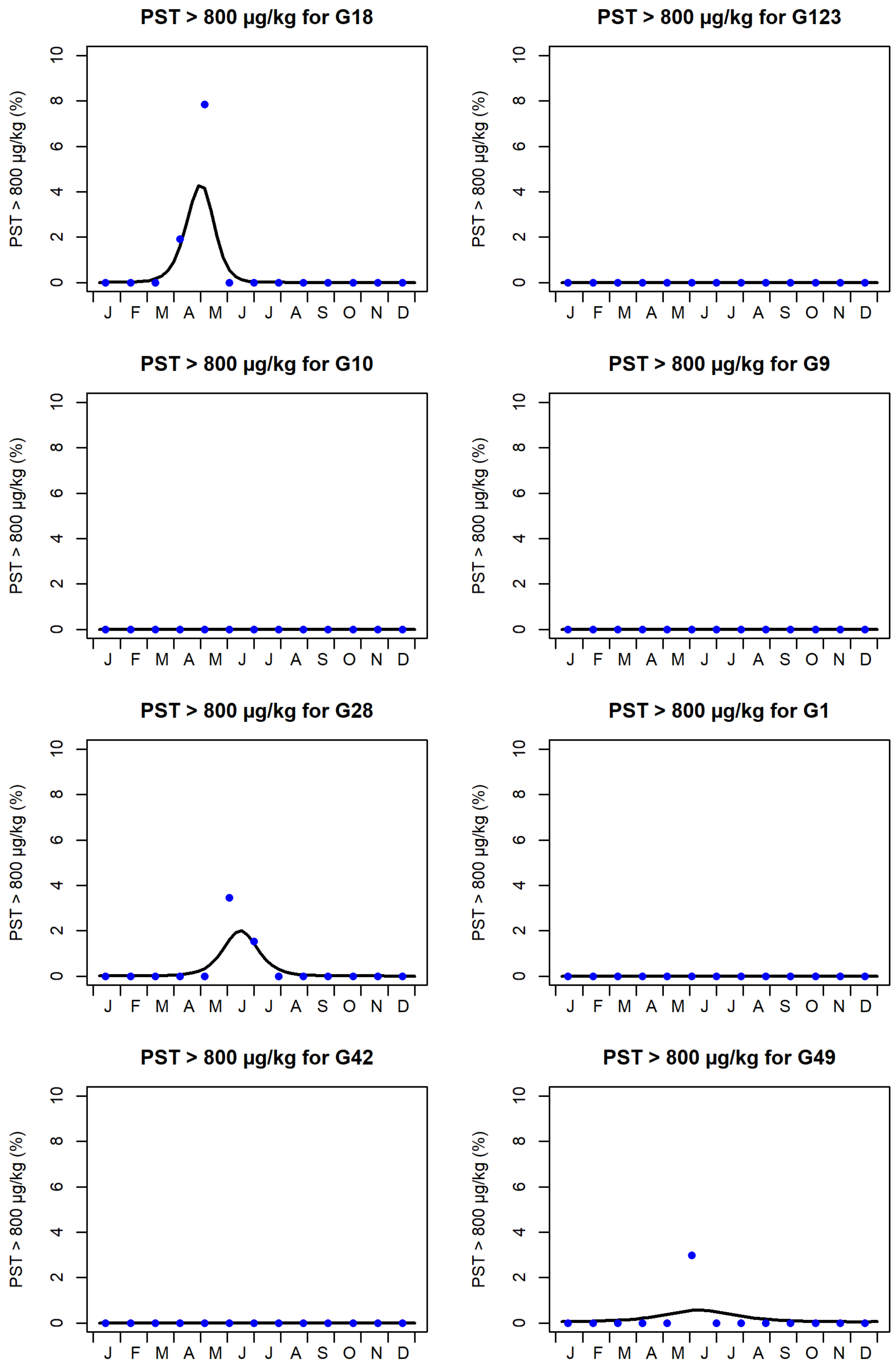


Figure D6: Proportion of Pacific oyster samples for which LTs equal or exceed the MPL.

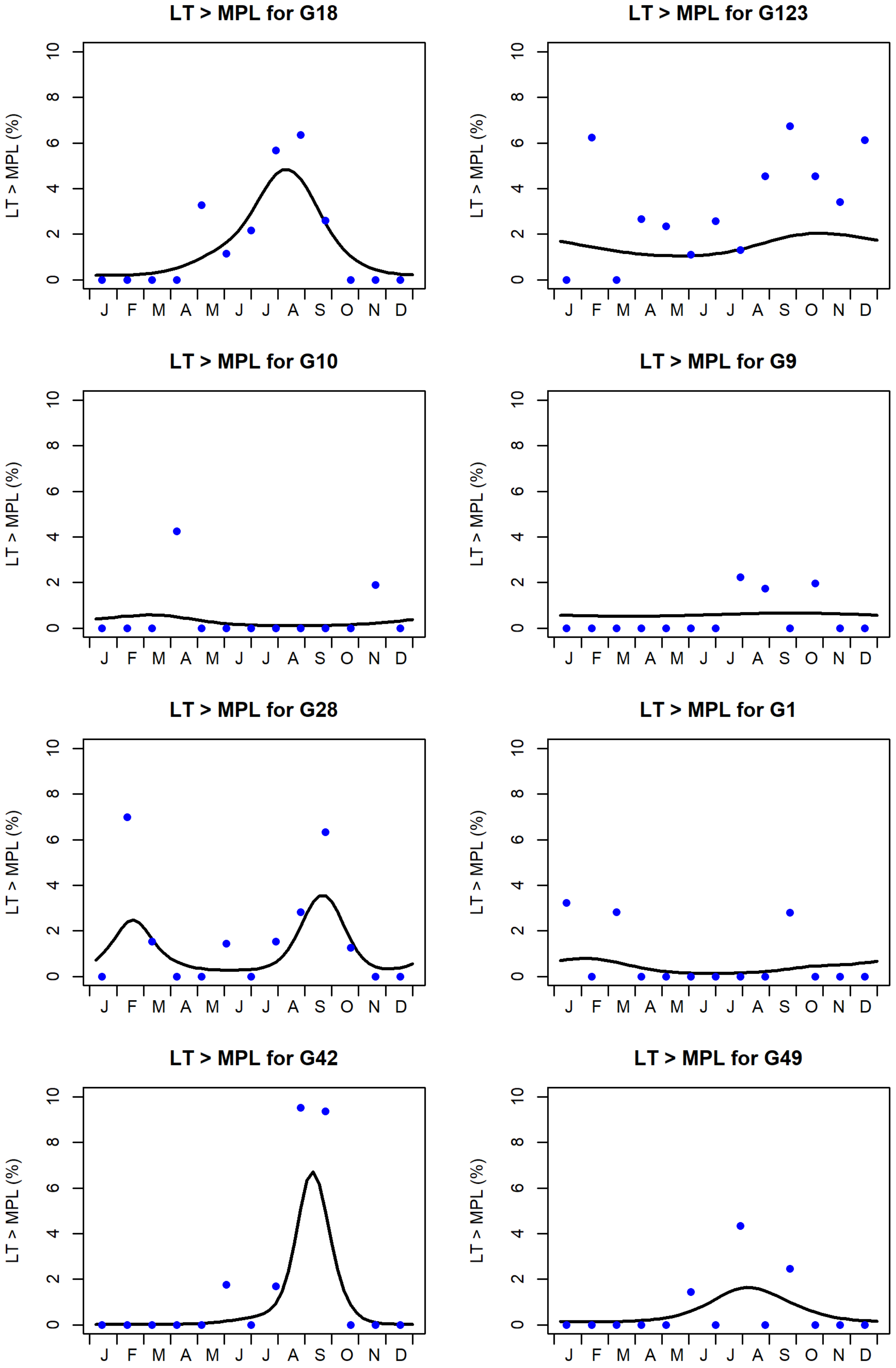


Figure D7: Proportion of cockle samples for which PST equals or exceeds 400 µg/kg.

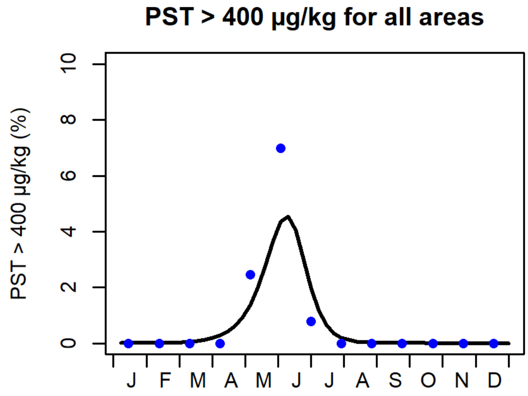


Figure D8: Proportion of razor samples for which PST equals or exceeds 400 µg/kg.

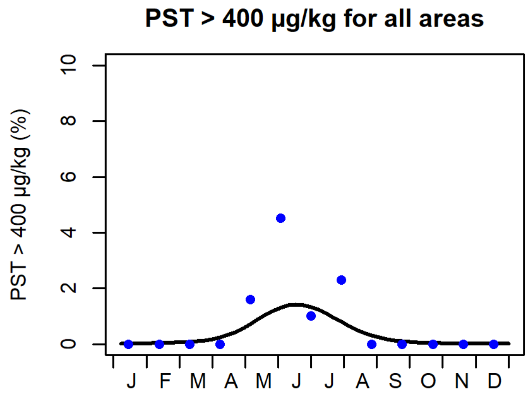


Figure D9: Proportion of razor samples for which LTs equal or exceed the MPL.

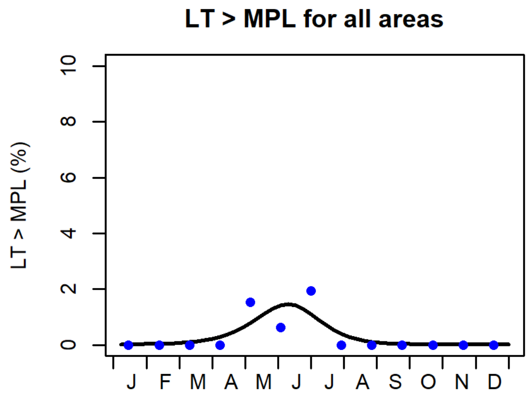


Figure D10: Proportion of surf clam samples for which PST equals or exceeds 400 µg/kg.

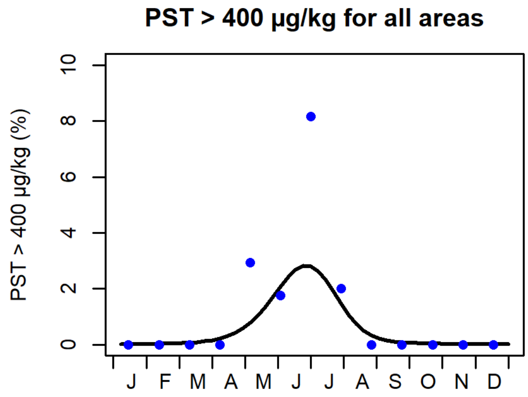


Figure D11: Proportion of surf clam samples for which LTs equal or exceed the MPL.