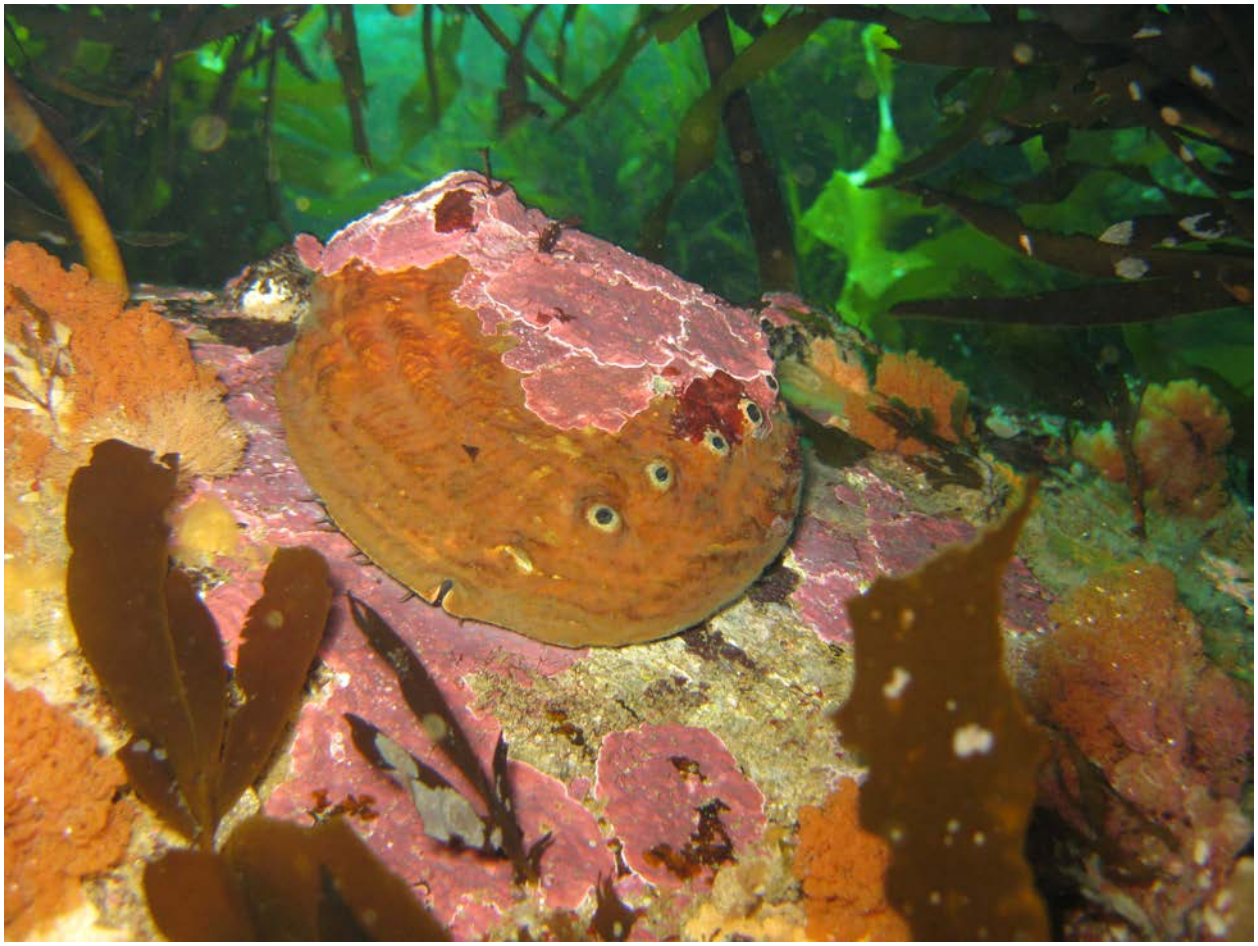
Abalone Biotoxin Management Plan

A Management Plan for Commercially-Caught Abalone in Eastern Tasmania



Prepared for the Tasmanian Abalone Council Ltd

August 2017

Document Acceptance and Release Notice

This document is Version 1.0 of TACL Abalone Bio-toxin Management Plan.
This is a managed document.

Version Control

Version	Date	Author	Reason	Sections
1.0	12/3/17	Dean Lisson	Release following endorsement	Review by DPIPWE Bio-security pending
2.0	25/8/17	Dean Lisson	Review completed	DPIPWE endorsement completed
3.0				
4.0				
5.0				
6.0				

Next Review – March 2018

This **Abalone Bio-toxin Management Plan (ABMP)** has been developed by Dean Lisson on behalf of the Tasmanian Abalone Council Ltd in consultation with Department of Primary Industries, Parks, Water and Environment (DPIPWE) and the Commonwealth Department of Agriculture and Water Resources (DAWR).

This document (August 2017 version) has been adopted for determining management outcomes and/or responses in relation to PST in the abalone fishery going forward. Please note that this "working" document will be subjected to ongoing annual review and may be amended and altered accordingly.

Contents Page

1. Introduction

The Tasmanian abalone fishery is the largest wild abalone resource in the world, and supplies about 25% of the annual wild-caught global abalone harvest. The fishery is divided into 6 geographical harvest zones: one for greenlip abalone and five for blacklip abalone.

Harmful Algal Blooms (HAB's) are known to occur from time to time within sections of the Eastern Abalone fishing zone. The Eastern zone of Tasmania's commercial abalone fishery is bounded in the north by abalone fishing block 31a and in the south by abalone fishing block 13c – please refer to the map on the following page.

For more detailed maps of the Tasmanian Eastern abalone fishing zone, please refer to Appendix 1.

The primary risk to seafood consumers is poisoning from shellfish toxins caused by algal bloom events that occur from time to time in abalone harvest areas along Tasmania's East coast.

Some species of algae produce natural toxins that adversely affect humans. These toxins can be concentrated in the tissues of abalone at levels that may become potentially harmful if ingested.

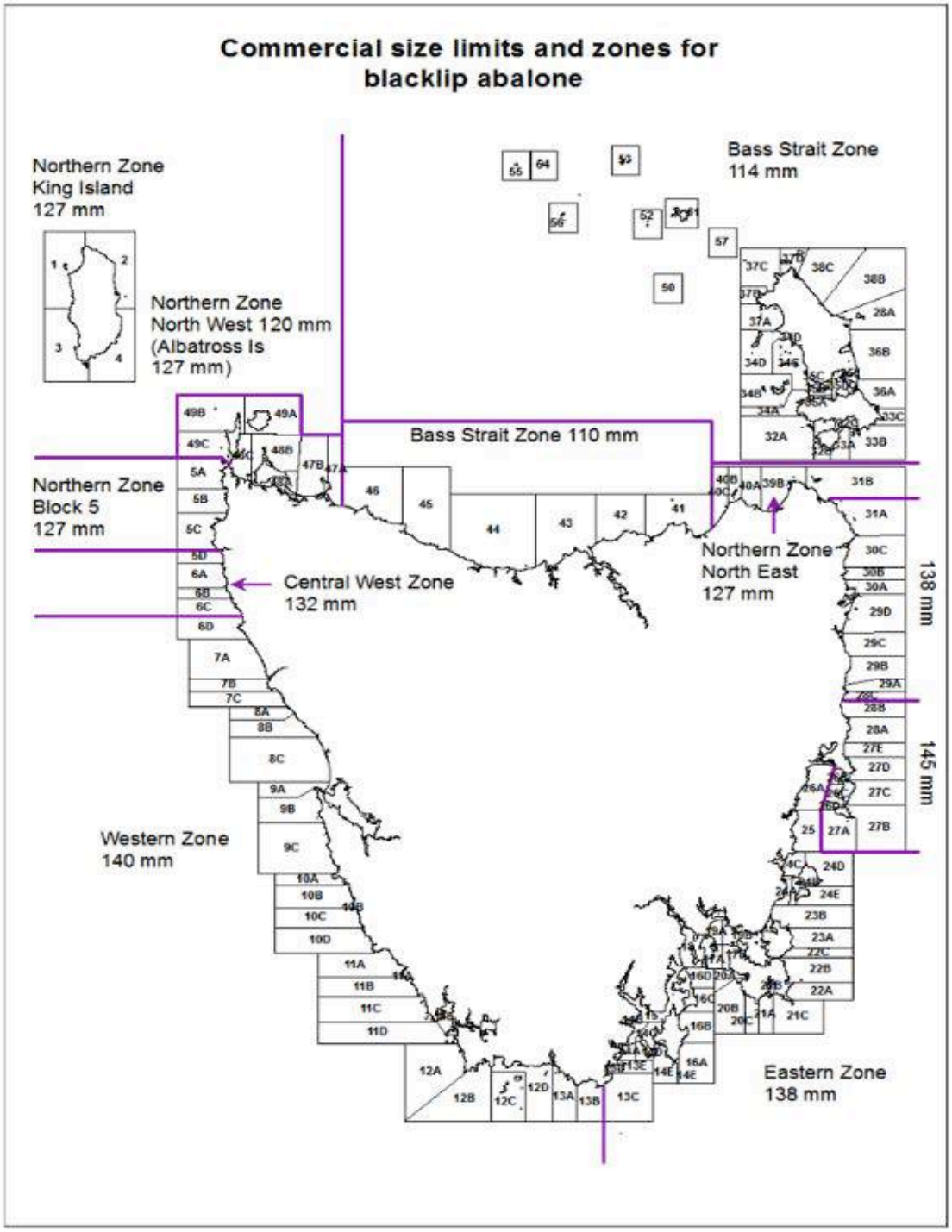
There are four major classes of human illnesses caused following the ingestion of shellfish containing these toxins. They are: Paralytic Shellfish Poisoning (PSP), Diarrhetic Shellfish Poisoning (DSP), Amnesic Shellfish Poisoning (ASP) and Neurotoxic Shellfish Poisoning (NSP).

The toxins causing these illnesses are in turn identified as Paralytic Shellfish Toxins, (PSTs), Diarrhetic Shellfish Toxins, (DSTs), Amnesic Shellfish Toxin (AST or domoic acid) and Neurotoxic Shellfish Toxins (NSTs).

The primary objective of the Abalone Bio-toxin Management Plan (ABMP) is to ensure that abalone commercially harvested from the Eastern Abalone fishing zone meet the minimum food safety standards required for domestic and international market access and the protection of seafood consumers in all markets.

Tasmania has experienced relatively regular bloom events over more than two decades caused by the introduced species *Gymnodinium catenatum*. In 2012, *Alexandrium tamarense* emerged as a species with the potential for harmful algal blooms in Tasmania.

The toxic dinoflagellate *Gymnodinium catenatum* has been present in Tasmania since at least 1979. It is a causative agent of PSP. The first major bloom of *G. catenatum* occurred in south-eastern Tasmania in 1986 resulting in prolonged closures of shellfish



marine farms in the areas involved. Since then *G. catenatum* blooms have become annual occurrences in southern Tasmanian waters.

Following the bloom in 1986, a biotoxin monitoring plan (BMP) was established by the Tasmanian Government to routinely test for the levels of PST's in shellfish from marine farms around Tasmania. The biotoxin monitoring plan was conducted as a component of the Tasmanian Shellfish Quality Assurance Program (TSQAP). Algal monitoring was

added to the BMP in the mid-1990s, to provide an early warning of *G. catenatum* blooms.

Following a review of biotoxin management in Australia in 2001 (Todd, 2001) the BMP was expanded to ensure all shellfish growing areas in Tasmania were being sampled for algae on a regular basis.

In the spring of 2012 a widespread bloom of the PST producing alga *Alexandrium tamarense* occurred on the east coast of Tasmania. The initial event and impact on shellfish products was missed by the BMP in operation at the time. The widespread presence of this organism subsequently caused closures of marine farms and wild shellfish harvesting in all east coast growing areas from Ansons Bay to Blackman Bay, as well as in several growing areas in the south east of the state.

The Tasmanian Government and the shellfish aquaculture industry commissioned an independent and expert review of the event. The report and recommendations (Campbell et al., 2013) was delivered in September 2013. Following this the TSQAP BMP was reviewed to ensure that the recommendations were adequately adopted.

From a food safety perspective, the key risks to commercially harvested abalone are the PST producers *G. catenatum* and (potentially) *A. tamarense*.

In light of these risks, the ABMP aims to ensure that commercially harvested abalone meet the minimum food safety standards required for market access and protection of seafood consumers.

It will achieve this by integrating into the TSQAP and responding to risk triggers by closing of affected areas and re-opening these closed areas following tissue sampling and testing.

Please note that the ABMP does *not* cover other species harvested in Tasmania (i.e. Greenlip abalone), recreationally caught abalone, or farmed abalone.

Please also note that whilst there is scientific evidence that shows that abalone may absorb sufficient toxins from *G.catenatum* during a bloom event to exceed the recommended maximum human health threshold, as of August 2017, no such evidence exists for *A.tamarense*. All abalone sampled and tested during *A.tamarense* blooms to date have yet to attain PST levels exceeding the human health threshold. New research is necessary to confirm that *A.tamarense* actually poses a food safety risk for Tasmanian blacklip abalone. Until this research is conducted however, the ABMP will assume a risk to human health may exist and will manage the risk accordingly.

The ABMP is intended by design to be open to a process of review, modification and improvement, should there be any significant changes in the industry in the future (e.g. a new species is implicated in toxin production, there is a shift in the mode of production of PST, increases in knowledge enabling managers to more accurately predict bloom dynamics, etc.). The ABMP will be revised and appropriately amended, to reflect any change in risk to consumers associated with this updated information.

2. Relevant Legislation

The maximum acceptable levels of bio-toxins in bivalve shellfish for human consumption are prescribed in the Australia New Zealand Food Standards Code - Standard 1.4.1 - Contaminants and Natural Toxicants.

Please note that this FSANZ standard is for bivalves and does not specifically reference univalves such as abalone. The relevant reference for abalone is referred to within the Codex Alimentarius Standard 312-2013 *"Standard for live abalone and for raw fresh chilled or frozen abalone for direct consumption or for further processing"*

Codex Standard 312-2013 states that "the Competent Authority must have mechanisms in place to ensure that the part of the abalone to be consumed meets with the marine biotoxins level in the *Standard for Live and Raw Bivalve Molluscs (CODEX STANDARD 292 -2008)".*

The Tasmanian Shellfish Quality Assurance Program (TSQAP) administers the TSQAP Bio-toxin Management Plan.

TSQAP manages the opening and closing of growing areas using the provisions of the Tasmanian Primary Produce Safety (Seafood) Regulations 2014. In order to provide access for Tasmanian shellfish products to local and interstate markets, the TSQAP must meet the requirements of the Australian Shellfish Quality Assurance Program (ASQAP) Operations Manual (Version 2009-01). In order to gain access to export markets the TSQAP must also meet standards relating to shellfish harvested for export provided in the Export Control (Fish and Fish Products) Orders 2005, administered by the Commonwealth Department of Agriculture.

The Australia New Zealand Food Standards Code - Standard 4.2.1 - Primary Production and Processing Standard for Seafood states that bivalve shellfish businesses comply with the Standard if they comply with the conditions of the ASQAP Manual or conditions recognised by the relevant authority. Compliance with the ASQAP Manual is verified through audits conducted under supervision of the Product Integrity Branch of the Department of Primary Industries, Parks, Water and Environment (DPIPWE).

The Australia New Zealand Food Standards Code is incorporated in Tasmanian law under the Primary Produce Safety Act 2011 (PPSA) and given effect by the Primary Produce Safety (Seafood) Regulations 2014.

Public health concerns are managed under the Public Health Act 1997, and product recalls are managed under the Food Act 2003 and relevant state and federal laws.

The Living Marine Resources Management Act 1995 provides for the licensing of marine farms for shellfish and the harvest of shellfish from wild fisheries (such as clams and scallops). The Act is administered by the Marine Farming Branch and the Wild Fisheries Management Branch of DPIPWE.

3. Responsibilities

3.1 Tasmanian Shellfish Quality Assurance Program (TSQAP)

TSQAP is responsible for preparing and implementing the BMP in all Tasmanian commercial bivalve shellfish growing areas (with the exception of commercially harvested wild scallops). These areas may be either marine farming or wild harvest areas. In the implementation of this BMP, TSQAP has the following responsibilities:

- The oversight of the sampling program, including, ensuring appropriate sampling equipment is maintained in each growing area and determining the locations and frequencies for the collection of algal and shellfish meat samples from marine farms/wild harvest areas on a regular basis.
- Ensuring the sampling frequency is maintained at the prescribed rate and that any additional samples are collected when required.
- Appointing and training samplers to an appropriate level.
- The implementation of closures and re-openings of growing areas affected by potentially toxic algae and bio-toxins, including the notification of all parties concerned, maintaining records of these closures and re-openings.
- Advising growers/wild harvesters as well as relevant authorities including the Commonwealth Department of Agriculture, DPIPWE and DHHS of any circumstances that may require the recall or withdrawal of shellfish product from marketplace.
- Implementation of the surveillance plan.
- The coordination of the analysis of algal and shellfish meat samples with appropriate Laboratories including: Managing the performance of those laboratories, the arrangement of sample transportation to laboratories when marine farms are in the open status, or when TSQAP believes the growing area is nearing re-opening conditions, reporting results to the shellfish grower, sampler or harvester.
- Liaising with agencies, businesses and other entities collecting relevant algal and/or algal toxicity information.
- Conducting an annual review of the performance of each growing area including a review of the bio-toxin risk status.
- Reviewing the BMP annually to ensure appropriate sampling regimes, ongoing compliance with relevant food safety and market access standards and international best practice for bio-toxin management.

3.2 Marine Farming Branch (DPIPWE)

The Marine Farming Branch within DPIPWE issues marine farming licenses and has a responsibility for ensuring the conditions of the license are met. It is a standard condition of all shellfish marine farming licenses that "the license holder will only harvest shellfish from the premises to which this license relates for human consumption or for on-growing for human consumption in accordance with the Tasmanian Shellfish Quality Assurance Program".

3.3 Product Integrity Branch (DPIPWE)

The Tasmanian Shellfish Quality Assurance Program sits within the Product Integrity Branch of DPIPWE. This Branch also oversees the compliance of shellfish businesses or individuals with their respective food safety management systems, which includes ensuring that they do not harvest for human consumption during bio-toxin closures. This Branch is also responsible for gathering information and conducting product withdrawals as described in a MOU on the Regulatory Management and Coordination of Food Recalls in Tasmania. The MOU was developed between DHHS, DPIPWE and the Tasmanian Dairy Industry Authority in July 2014.

3.4 Licensing and Administration Branch (DPIPWE)

The Licensing and Administration Branch of DPIPWE issues commercial fishing licences for the harvesting of wild shellfish including abalone. It is a condition of these licence types "that the licence holder must comply with the requirements of the Tasmanian Shellfish Quality Assurance Program".

3.5 Public Health Services (DHHS)

The Food Safety team sits within Public Health Services in DHHS. Under the aforementioned MOU this team is responsible for conducting the risk assessment to determine whether a food recall (both consumer and trade) is required, overseeing all food recalls and liaising with relevant parties, including FSANZ, regarding any recall action undertaken.

3.6 Shellfish Marine Farmers and Wild Harvesters

In relation to the proper implementation of the BMP, shellfish marine farmers and wild harvesters have the following responsibilities:

- Providing algal and shellfish meat sampling in their respective shellfish growing or harvesting areas by nominated marine farmers/wild harvesters.
- The transport of TSQAP staff or their agents around marine farms/wild harvest areas for the purpose of sample collection when required.
- Maintaining a recall plan and the capability to implement it.
- Arranging sample transportation and liaising with laboratories for the analysis of shellfish
  samples for toxicity testing when the growing/harvesting area is in the closed status.

3.7 Tasmanian Abalone Council Ltd (TACL)

The TACL is the peak representative body for the wild caught abalone industry in Tasmania. It represents and advocates on behalf of abalone divers, quota owners and processors. The TACL liaises and collaborates with all of the above entities to ensure that consumers receive abalone that is safe for human consumption. The key contacts within the TACL for the management of this plan are as follows (as of March 2017)

Chief Executive: Dean Lisson 0419 599 954, deanlisson@tassie.net.au
Administration Officer: Jillian Freeman 03 6169 2050, 0419 276 556, admin@tasabalone.com.au

4. Monitoring and notification of risk

TSQAP oversee and manage a continuous environmental sampling and monitoring regime that is focussed in those areas of the Tasmanian coastline where marine farming activities are taking place (bivalve shellfish - oysters and mussels).

The monitoring program involves regular sampling and testing of phytoplankton (algae) and shellfish meat (oysters and mussels) in the marine farming regions along the North and East coasts of Tasmania.

Algal (phytoplankton) sample sites have been selected on the basis that they are areas where toxic cells are most likely to appear first, and be at greatest concentrations. Consideration has been given to depth, predominant currents, tidal and riverine influences and the practical issues of accessing the sites.

In several growing areas with a history of toxic algae occurrences, secondary sampling sites have been identified that may provide for monitoring during blooms. Secondary sites exist in Big Bay, Moulting Bay, Okehampton Bay, Blackman Bay and Port Esperance.

A list of all algal sample sites in the state with their co-ordinates is given in Appendix 2. Shellfish meat sampling is provided from those parts of the growing area that are currently being harvested for market.

The TSQAP sampling and monitoring program does not include abalone – rather it is focussed on oysters and mussels grown in marine farms along Tasmania's coastline. Having said that, the trigger to close abalone blocks for harvesting by commercial abalone divers is based on exceedence of toxicity thresholds for biotoxins in shellfish as prescribed in the Australian and New Zealand Food Standards Code, Standard 1.4.1. and also prescribed in Codex Standard 292-2008

The toxicity thresholds for shellfish detailed in Standard 1.4.1 are as follows:

Please refer to the below table:

Toxin group	Maximum Level
Paralytic Shellfish Toxin (Saxitoxin equivalent)	0.8 mg/kg
Amnesic Shellfish Toxin (Domoic Acid equivalent)	20 mg/kg
Diarrhetic Shellfish Toxin (Okadaic Acid equivalent)	0.2 mg/kg
Neurotoxic Shellfish Toxin	200 MU/kg

In the absence of abalone-specific triggers for paralytic shellfish toxin (PST), the ABMP adopts the trigger for shellfish as a precautionary measure. Current triggers for PSTs in shellfish (oysters, mussels, scallops) meat are based on national guidelines (FSANZ, 2011). The current regulatory level for PST is **80 µg saxitoxin/100 g edible flesh, or 800µg/kg**.

The status of growing areas can be checked from the TSQAP website:

http://dpipwe.tas.gov.au/biosecurity/product-integrity/food-safety/seafood/shellfish-quality/harvest-area-status

The status of growing areas may also be checked via a recorded message service (03 6166 0726). Typically these services are updated within two hours during normal office hours.

Managing the turnaround time (TAT) between the time of sampling to the time at which results are available to TSQAP is critical to assisting growers and harvesters in managing the risk of biotoxin contamination of produce.

TSQAP has worked with samplers, couriers and laboratories to optimize TAT and is currently working with a process that generally provides resolution within a working week.

Typically samples for algal and biotoxin analysis are collected early in the week from all growing areas.

- Shellfish meat samples delivered to TSQAP by noon on Tuesday are consigned to the laboratory for screening on Thursday and confirmation on Friday. The laboratory will generally provide verbal alerts of screens that will need to go to confirmation on Thursday and provide verbal and written reports by Friday afternoon.
- Algal samples are consigned directly to the laboratory. Initial alerts can generally be provided from Wednesday and written reports by Friday afternoon or the following Monday.

TSQAP maintains close and regular contact between samplers and the laboratories to ensure that samples are provided and that results are communicated within the time-frames outlined above. There is a clear understanding that samples provided to laboratories by Tuesday noon will be analysed and reported before close of business on Friday. TSQAP will follow up any potential departures from this level of performance.

Every Friday afternoon TSQAP compiles the biotoxin and algal reports and issues an email report (the Tasmanian Biotoxin News) that goes to an unrestricted mailing group that includes all growers and harvesters as well as regulators, processors and researchers. An example of a typical email report is included as Appendix 3.

The EO of TSIC is a member of the Harmful Algal Bloom Emergency Management Group (HAB EM) and all email communication with the Group is cc'd to the TACL CEO and Admin Officer.

For further detail regarding the sampling and testing protocols please refer to the latest version of TSQAP Biotoxin Management Plan (Version 3.1, September 2015).

The weblink to the Plan is:

http://dpipwe.tas.gov.au/Documents/TSQAP_Biotoxin_Management_Plan.PDF

5. Trigger for abalone block closure

Marine Farms growing oysters or mussels may be closed due to biotoxins when:

- Marine biotoxins are present in shellfish meat over the regulatory levels.
- Cases of human illness consistent with case definitions for PSP, NSP, DSP, and ASP have resulted from the consumption of shellfish from a particular area (refer Appendix 6 of TSQAP BMP).
- TSQAP determines a closure is necessary for any other reasons (e.g. toxins in samples at closure levels in adjacent areas, lack of current sampling, or presence of new potentially toxic algae in area).
- Potentially toxic algae are present in levels above those listed in Appendix 4 of the TSQAP BMP and there is no simultaneous data on toxin levels in shellfish meat.

When the closure of an oyster or mussel growing area is warranted for either an exceedence of the maximum level of biotoxins in meat or algal abundance in water the TSQAP Manager or an authorised officer will notify the CEO and Administration Officer of the Tasmanian Abalone Council Ltd as soon as possible by email and phone. Abalone harvest blocks adjacent to a closed marine farm may then be considered for closure following a discussion of associated biotoxin risk. The TSQAP Manager decides whether or not to close an abalone harvest block or blocks based on his/her assessment of the risk following discussion with the TACL CEO.

6. Notification of a harvest closure

Abalone industry

When PSP risk warrants closure of an abalone sub-block, the TACL will ensure notification of the following parties:

- **Abalone harvesters** (to be notified by SMS and/or email)

- **Abalone Processors/exporters** (to be notified by SMS and/or email)
- Note – abalone processors approved for export will also be notified of biotoxin area closures by the Commonwealth Department of Agriculture and Water Resources (DAWR).

Processors

TSQAP maintains a list of Shellfish Processors. This group is notified by email at the same time as marine farmers/wild harvesters are notified of closures.

The Manager of TSQAP will also ensure notification of the following parties:

Tasmanian Government

Contacts include the Public Health and Food Safety areas of the Department of Health and Human Services (DHHS) and the Marine Farming and Product Integrity areas of the Department of Primary Industries, Parks, Water and Environment (DPIPWE).

Australian Government

The principal contact is the area with responsibility for food export in the Department of Agriculture.

Local Government Environmental Health Officers (EHO)

Details of all Tasmania Local Government (EHOs) are contained in a separate document the Incident Communication Protocol held by DHHS.

Public Announcement

When any marine farming/wild harvest area is closed by TSQAP for biotoxin reasons or public health concerns, the TSQAP website is updated with the details of current closures (http://dpipwe.tas.gov.au/biosecurity/product-integrity/food-safety/seafood/shellfish-quality/harvest- area-status) which is also available for public viewing.

Following email receipt of confirmation of an abalone harvest area closure from the TSQAP Manager to the TACL CEO and TACL Office Manager, abalone divers, quota owners and processors will be notified by SMS and/or email – this notification will be actioned by the Tasmanian Abalone Council Administration Officer.

7. Response from Commonwealth Department of Agriculture and Water Resources

Trigger for sampling abalone

When Tasmanian Shellfish Quality Assurance Program (TSQAP) monitoring detects the presence of biotoxins and/or potentially toxic phytoplankton in waters and/or shellfish meat samples that contain paralytic shellfish toxins (PST) levels which result in closure of shellfish harvest areas (i.e. above 0.8 mg/kg), the Commonwealth Department of Agriculture and Water Resources (DAWR) requires abalone sampling information from potentially affected abalone catch zones.

Sampling Information

1. A minimum of 5 abalone must be sampled from each abalone catch zone potentially affected. Samples must be taken by an independent sampler (i.e. an individual who has no investment and is not a stakeholder within the industry) or a sampler who is approved by the department.
2. Each individual abalone will have separate samples taken from the foot and the viscera (i.e. 5 foot and 5 viscera samples from each abalone catch zone potentially affected).
3. Foot and viscera samples from each site to be homogenised (separately), reserving a minimum of half of each individual foot and viscera homogenate.
4. The homogenates from the foot (n=5) and the viscera (n=5) may be pooled (composited) to create one sample for the foot and one sample for the viscera representative of the catch zone. Alternatively, each sample may be tested separately.
5. For pooled samples that return a positive HPLC screen result at or above (≥) 0.4 mg/kg, back-testing of each individual abalone foot/viscera homogenate (n=5) from the implicated site must be undertaken. These tests will be conducted via HPLC screen result.
6. When samples have been individually screen tested, samples that return results of ≥ 0.4 mg/kg (foot or viscera) must have confirmatory analysis undertaken.
7. Where confirmatory tests have been undertaken, these results will be used to determine the export eligibility of abalone from the harvest zone(s) in question.

Export eligibility of harvest zones based on sampling

Once test results have been obtained from each abalone catch zone potentially affected, the export eligibility of each will be determined based on the PST levels found.

For live export to be permitted from a harvest zone, the PST levels in both the foot and viscera of all abalone tested must be below 0.8 mg/kg. Scientific advice may be sought before a final export eligibility decision is made.

Where PST levels are above 0.8 mg/kg in the viscera but are below 0.8 mg/kg in the

foot, only product that has had the viscera removed and rumbled/scrubbed or pressure washed meat (and may be in final form as canned, chilled or frozen) may be exported. However, scientific advice may be sought before a final export eligibility decision is made.

Where test results show PST levels at or above 0.8 mg/kg in both foot and viscera, or where it is evident that the PST levels are increasing, export restrictions will be implemented or remain in place until further testing is undertaken and analysed.

When further sampling rounds are undertaken for the purpose of lifting export sourcing restrictions for abalone, the test results will be analysed on a case by case basis and scientific advice may be sought.

Abalone catch zones in nearby areas that are not covered by TSQAP monitoring must undergo the same testing regime as has been identified above to be eligible to export.

DAWR is responsible for notifying all licensed Tasmanian Abalone Exporters when a biotoxin initiated closure is in place and also when a closed harvest zone is re-opened for export. The notification from DAWR will include an updated *Sourcing/harvesting restrictions for abalone from Tasmania Industry Notice*.

Obtaining export certification

Export registered abalone processing establishments must ensure procedures are included within their approved arrangement that identify the source of all abalone (i.e. block zones). An establishment must be able to present evidence at audit that they have complied with the sourcing restrictions.

Canning - validation that canning reduces PST levels

DAWR recognises that the canning process where viscera and pigment are removed through rumbling, high pressure washing or scrubbing prior to canning, may sufficiently reduce the PST levels below the regulatory limit (0.8 mg/kg).

However, there is insufficient data that identifies the extent of reduction of PST levels in abalone that occurs during this processing.

Until results are presented that support the reduction in PST levels (i.e. pre and post processing analysis of abalone samples), the department will require end product testing of canned abalone product where sourcing restrictions are currently in place.

8. Sampling Methods

The acquisition of abalone samples for PST testing must be supervised by an independent sampler (i.e. an individual who has no investment and is not a stakeholder within the Tasmanian abalone industry). The sampler must be approved by the TSQAP Manager to carry out abalone sampling.

An abalone diver may transport the sampler to the designated sampling sites on board a licensed commercial abalone vessel provided advance approval is sought and received from the TSQAP Manager. The diver may collect the abalone samples under the direct supervision of the approved sampler. The diver must obtain a permit from DPIPWE to dive for the abalone samples and must comply with all conditions within the permit. Following collection of the abalone samples by the diver, the sampler is then responsible for labelling, prepping and transporting the samples to the laboratory for analysis.

The cost of collecting, preparing, transporting and analysis of abalone samples is borne by the Tasmanian abalone industry via the Abalone Over-catch Trust Fund although from time to time, some costs will be shared with DPIPWE.

9. Closed abalone harvest areas

Upon receipt of notification by the TSQAP Manager and/or the TACL of a closed abalone harvest area, abalone divers are responsible for ensuring that they comply with the latest Classification Notice issued by DPIPWE under the Primary Produce Safety (Seafood) Regulations 2014 which is available for download from the following weblink :

http://dpipwe.tas.gov.au/SiteAssets/TSQAP_Current_harvest_status.pdf

The TACL Administration Officer will forward the relevant *Classification Notice* weblink to all TACL members upon advice of an updated status report from TAQAP.

All abalone divers must comply with this notice until they are notified by the TSQAP Manager and/or the TACL that the area has re-opened for harvest.

In the event that a diver mistakenly harvests abalone from a closed block, he must immediately notify the processor that has received the abalone as well as DPIPWE and the TACL.

Similarly, upon receipt of notification by DAWR, the TSQAP Manager and/or the TACL of a closed abalone harvest area, abalone processors must comply with the most current Commonwealth Department of Agriculture and Water Resources (DAWR) *Sourcing/harvesting restrictions for abalone from Tasmania industry notice* which is available for download from the following weblink :

http://www.agriculture.gov.au/export/controlled-goods/fish/industry-advice-notices/2016

All abalone processors must comply with this notice until they are notified by DAWR, the TSQAP Manager and/or the TACL that the area has re-opened for harvest.

In the event that a processor receives abalone from a closed block, the processor must quarantine the abalone and immediately notify DPIPWE and DAWR. DPIPWE and/or DAWR will oversee the management of the quarantined shipment from that point forward.

10. Product Recall Protocols

Recalls are designed to protect public health and safety and the reputation of the business concerned. It is a legal requirement under Tasmanian law for food businesses to have systems in place to ensure the recall of unsafe food, to document the system and to comply with it when recalling food.

Product recall is primarily the responsibility of the producer (grower), however, the Tasmanian Government has mandatory recall powers where a serious public health and safety risk exists. Ideally, recalls are managed by the producer, in compliance with the recall system and using a pre- existing recall plan. Further details on preparing and implementing a recall plan are available in the FSANZ Food Industry Recall Protocol (www.foodstandards.gov.au/industry/foodrecalls).

Recall action may be required if there is a reasonable possibility that use or consumption of shellfish would cause adverse health consequences as indicated by the safe minimum levels for environmental contaminants and biotoxins.

Abalone exporters are required to maintain traceability records - this must be sufficient written records to identify the immediate supplier and immediate recipient of seafood for the purposes of ensuring the safety of seafood.

For further detail around management of a product recall, please refer to section 7.4 of the TSQAP Biotoxin Management Plan.

11. Monitoring During a Closure

During a biotoxin closure, TSQAP will collaborate with the TACL to co-ordinate the collection of any abalone samples required for analysis.

Data collected from previous toxic algae bloom events has shown that when toxin levels in abalone meats reach high levels there is likely to be a significant time before the toxin levels decrease to acceptable levels – i.e. below the regulatory limit.

The process of depuration of toxins in abalone tissues may take several months (McLeod et. al. 2016 – refer to Reference #4 below). McLeod states that toxicity in abalone had decreased by between 78% and 93% after 140 days had elapsed "post bloom". Collection and analysis of abalone meat samples is a time consuming and expensive exercise and therefore, once the harvest area is closed, further tissue sampling is best left until 3 to 4 months has elapsed following the algal bloom peak.

McLeod highlights two potential monitoring tools during and post bloom which indicate upcoming toxicity in abalone. One is the presence of G. catenatum dinoflaggelate blooms and the other is uptake of PST by wild mussels during a bloom event. McLeod states that wild mussels accumulate PST at a faster rate than abalone

which suggests that they could serve as sentinels of PST accumulation to inform abalone risk management protocols.

However, the slower loss (depuration) rates for PST in abalone foot and viscera tissues compared to mussels demonstrates that absence of PST in mussels does not necessarily infer the absence of PST in abalone and hence mussels may not be an appropriate indicator species for abalone toxicity in the post-bloom phase.

Finally, it is worth noting from McLeod's study that despite the incidence of high PST toxicity in Australian abalone, no associated human illnesses have been reported.

The TACL CEO will liaise with the TSQAP Manager on a regular basis during a biotoxin initiated closure to determine when sufficient time has lapsed following a bloom event to warrant abalone tissue testing with the objective of re-opening any closed harvest area.

12. Re-opening Criteria

The re-opening of a growing/harvest area following a biotoxin closure event will only occur on the basis of abalone meat test results. Algal results may be used to qualify meat testing requirements.

Reopening may occur for all abalone product when abalone samples (foot and viscera) have tested below the PST trigger level of 800µg/kg.

13. Re-opening Procedure

Re-opening will be carried out by a reversal of the closure procedure. All those notified of the closure will be notified of the re-opening by SMS and email.

14. References

1. Tasmanian Abalone Fishery Assessment 2015, Mundy and Jones, February 2017

https://secure.utas.edu.au/__data/assets/pdf_file/0008/951038/TasAbaloneAssessmentFY2015.pdf

2. TSQAP Biotoxin Management Plan version 3.1 September 2015

http://dpipwe.tas.gov.au/Documents/TSQAP_Biotoxin_Management_Plan.PDF

3. 2015 Department of Agriculture and Water Resources Policy – PST in Tasmanian Abalone: Export Eligibility

http://www.agriculture.gov.au/Style%20Library/Images/DAFF/__data/assets/pdffile/0010/2279305/abalone.pdf

4. McLeod, C., et al., Accumulation and depuration of paralytic shellfish toxins by Australian abalone Haliotis rubra: Conclusive association with Gymnodinium catenatum dinoflagellate blooms, Food Control (2016),

https://www.researchgate.net/publication/308957722_Accumulation_and_depuration_of_paralytic_shellfish_toxins_by_Australian_abalone_Haliotis_rubra_Conclusive_association_with_Gymnodinium_catenatum_dinoflagellate_blooms

Appendix 1: Detailed maps of abalone sub blocks for East coast Tasmania

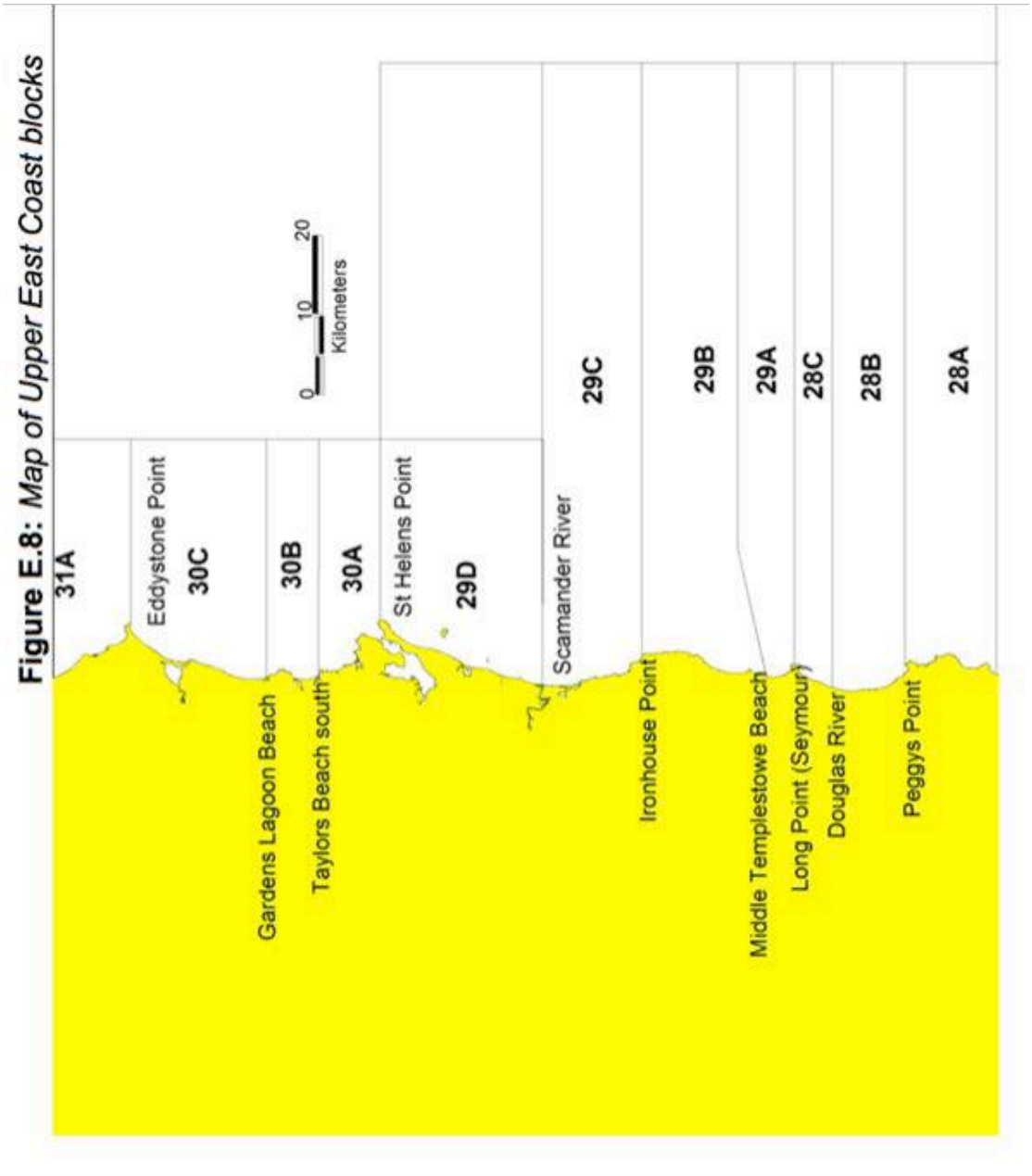


Figure E.7: *Map of Lower East Coast blocks*

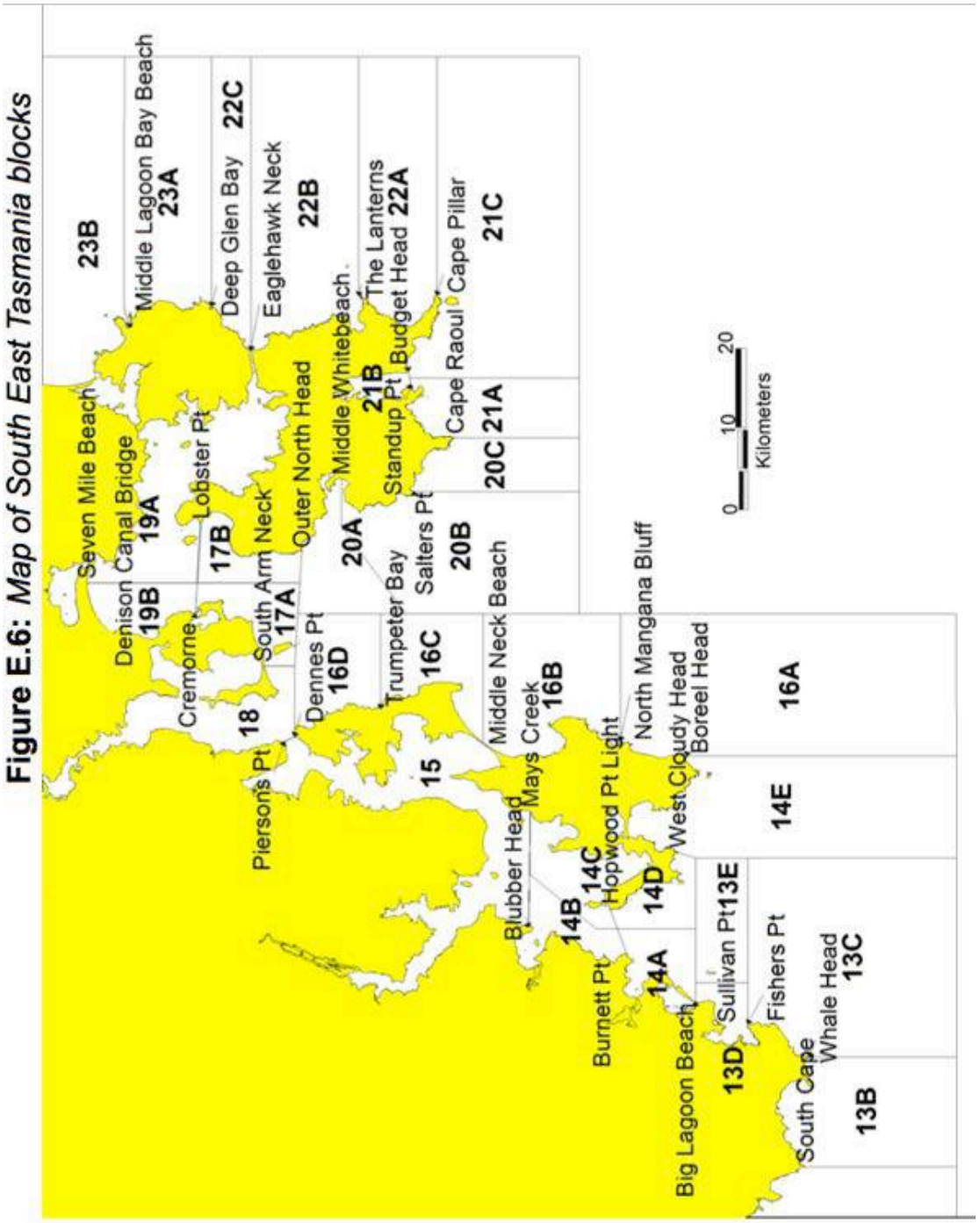


Figure E.6: *Map of South East Tasmania blocks*

Appendix 2: TSQAP Algal sample sites

Site	South (degrees)	East (degrees)	Growing Areas Represented
Sea Elephant River	39.48	144.06	Sea Elephant River
Montagu	40.79	144.90	Montagu, Big Bay
Duck Bay	40.80	145.10	Big Bay, Duck Bay, Kemps Bay
Port Sorell	41.21	146.58	Port Sorell
Ansons Bay	41.05	148.28	Ansons Bay
*Moulting Bay Zone 1	41.32	148.28	Moulting Bay
Moulting Bay Zone 5	41.29	148.29	Moulting Bay
Moulting Bay Zone 6	41.30	148.32	Moulting Bay
Great Oyster Bay	42.13	148.22	Great Oyster Bay
Great Swanport	42.08	148.18	Great Swanport East, Great Swanport West
Little Swanport	42.32	148.01	Little Swanport, Little Swanport Zone 6C
*Okehampton Bay	42.53	147.98	Spring Bay
Spring Bay Growing Area	Bound by 42.59 147.97 – 42.57 148.00 – 42.57 148.03 – 42.62 148.00 – 42.61 147.97		
*Spring Bay Lighthouse	42.56	147.93	Spring Bay
*Triabunna	42.54	147.92	Spring Bay
Blackman Bay	42.88	147.86	Blackman Bay, Blackman Bay East, Little Boomer Bay
Fulham Island	43.25	148.48	Dunalley Bay
King George Sound	42.96	147.82	King George Sound
Norfolk Bay	43.01	147.83	Eaglehawk Bay, Garfish Bay/Dart Island, Little Norfolk Bay
Port Arthur	43.13	147.86	Port Arthur
Pitt Water	42.80	147.49	Pitt Water
Island Inlet	42.82	147.60	Island Inlet Zone 4, Island Inlet Zone 5
Pipe Clay Lagoon	42.97	147.52	Pipe Clay Lagoon
Great Bay	43.19	147.36	Great Bay, Great Bay sub-tidal, Fleurty's Point,
Fleurty's Point	43.25	147.25	Fleurty's Point,
Little Taylor's Bay	43.38	147.20	Little Taylors Bay
Cloudy Bay Lagoon	43.43	147.20	Cloudy Bay Lagoon
Gardner's Bay	43.18	147.10	Gardner's Bay
Deep Bay	43.21	147.09	Deep Bay, Gardner's Bay
Port Esperance	43.33	147.01	Port Esperance
*Port Esperance River	43.20	146.59	Port Esperance
Hastings Bay	43.43	146.93	Hastings Bay
Recherche Bay	43.31	146.54	Recherche Bay

*These sites are not routine monitoring sites, but are secondary sites used when potentially toxic algae are found elsewhere in the growing area.

Appendix 3: Example of weekly Biotoxin News bulletin

Here is a summary of this week's results (W/C 27 February 2017)

Algae Results

-

Duck Bay (27/02/17) – No potentially toxic species detected

Gardners Bay (27/02/17) – No potentially toxic species detected

Port Sorell (28/02/17) – No potentially toxic species detected

Biotoxin Results

Growing Area	Sample Date	Species	PST (mg/Kg)	DST (mg/Kg)	AST (mg/Kg)
Fleurtys Point	26/02/17	Oyster	<0.025	Negative	Negative
Spring Bay	27/02/17	Mussel	<0.025	0.039	Negative
Island Inlet	27/02/17	Oyster	<0.025	Negative	Negative
Great Bay	27/02/17	Oyster	<0.025	Negative	Negative
Moulting Bay Z5	27/02/17	Oyster	<0.025	Negative	Negative
Moulting Bay Z6	27/02/17	Oyster	<0.025	Negative	Negative
Pipeclay	27/02/17	Oyster	<0.025	Negative	Negative
Great Swanport	27/02/17	Oyster	<0.025	Negative	Negative
Great Oyster Bay	27/02/17	Oyster	<0.025	Negative	Negative
Dunalley	27/02/17	Oyster	<0.025	Negative	Negative
Little Swanport	28/02/17	Oyster	<0.025	Negative	Negative
Cloudy Bay	27/02/17	Oyster	<0.025	0.03	Negative
Dunalley	27/02/17	Oyster	<0.025	Negative	Negative
Port Esperance	27/02/17	Oyster	<0.025	Negative	Negative
Hastings Bay	27/02/17	Oyster	0.18	Negative	Negative
Recherche	25/02/17	Oyster	<0.025	Negative	Negative
Gardners Bay	27/02/17	Oyster	<0.025	Negative	Negative
Duck Bay	27/02/17	Oyster	<0.025	Negative	Negative
Pittwater	27/02/17	Oyster	<0.025	Negative	Negative

Note: Algal action triggers can be found in the TSQAP Biotoxin Management Plan version 3.1, Appendix 4.

PST: Paralytic shellfish toxins (max limit = 0.8 mg/Kg)
AST: Amnesic shellfish toxins (max limit = 20 mg/Kg) Note: Negative means <1.0 mg/kg
DST: Diarrhetic shellfish toxins (max limit = 0.2 mg/Kg) Note: Negative means <0.025 mg/kg
*: Sample result to be confirmed
**: Results for samples that arrive at the TSQAP office after 1:00pm on Tuesday may not be available until the following week.
NT: indicates sample not tested for the shellfish toxin group listed.
AC: Analysis continuing