MARINE BIOTOXIN MANAGEMENT PLAN

NSW SHELLFISH PROGRAM

NSW GOVERNMENT
Department of Primary Industries
Food Authority

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AUGUST 15

Contents

Abbreviations and acronyms

ASP	Amnesic Shellfish Poisoning
ASQAAC	Australian Shellfish Quality Assurance Advisory Committee
ASQAP	Australian Shellfish Quality Assurance Program
Food Authority	NSW Food Authority
DAWR	Department of Agriculture and Water Resources
DEC	NSW Department of Environment and Conservation (formerly EPA)
DSP	Diarrhetic Shellfish Poisoning
ELISA	Enzyme Linked Immuno-Sorbent Assay
Fisheries	NSW Department of Primary Industries (NSW Fisheries)
FSANZ	Food Standards Australia New Zealand
Health	NSW Health and Public Health Units
HPLC	High Performance Liquid Chromatography
IMVS	Institute of Medical and Veterinary Science
Industry	NSW Farmers' Oyster Committee Oyster Farmers' Association of NSW Inc Local Estuary Shellfish Programs Pipi Biotoxin Management Plans
LCMS	Liquid Chromatography/Mass Spectrometry
MAB	Marine Algal Biotoxin (Management Plan)
MU	Mouse Units
NATA	National Association of Testing Authorities, Australia
NSP	Neurotoxic shellfish poisoning
NSWSP	NSW Shellfish Program
PAL	Phytoplankton Action Level
PSP	Paralytic Shellfish Poisoning
RACC	Regional Algal Coordinating Committee

Introduction

This document should be read in conjunction with the NSW Shellfish Industry Manual and Australian Shellfish Quality Assurance Program (ASQAP) Manual.

1.1 Background

Bivalve shellfish are filter feeders extracting phytoplankton from the water. Some species of marine phytoplankton produce natural toxins which, when filtered by bivalve shellfish are concentrated to levels which are harmful to humans. Consumption of contaminated shellfish can cause toxic shellfish poisoning, of which there are four types: Paralytic Shellfish Poisoning (PSP), Diarrhetic Shellfish Poisoning (DSP), Neurotoxic Shellfish Poisoning (NSP) and Amnesic Shellfish Poisoning (ASP).

Toxic shellfish poisoning poses a health risk to consumers of shellfish both from commercially and recreationally harvested shellfish. For shellfish producers there is also a risk of damage to consumer confidence and export trade. These risks can be reduced through the application of *Marine Biotoxin Management Plans*.

1.2 Aims and objectives

The aim of the *Marine Biotoxin Management Plan* is to protect shellfish consumers from the hazards of marine algal biotoxin poisoning.

To achieve this aim:

- A monitoring program combining both phytoplankton and shellfish toxin testing must be implemented. Phytoplankton monitoring is used to provide an early warning of the potential for contamination of shellfish with marine biotoxins, however shellfish testing is used to make harvesting and regulatory decisions.
- Rapid response methods are in place to respond to a marine biotoxin event minimising the risk of human illness.
- Media management of information provided to the public is coordinated.

1.3 Scope

This *Marine Biotoxin Management Plan* is designed primarily for aquaculture and commercial wild shellfish harvesting, but could also be implemented by responsible agencies for the protection of recreational gatherers.

Control of recreational shellfish harvest will involve close liaison between the NSW Food Authority and NSW DPI (Fisheries) who have the regulatory authority to close areas for recreational harvest.

2 ADMINISTRATION

The legislation for administrating the safety of shellfish in NSW consists of both National and State legislation. The cooperation and close liaison between Food Standards Australia New Zealand (FSANZ), Department of Agriculture and Water Resources (DAWR) and NSW government departments is necessary for effective management.

2.1 Legislation

National:

- Australia New Zealand Food Standards Code
- *Export Control Act 1982*
- Export Control (Fish and Fish Products) Orders 2005
- *Australian Shellfish Quality Assurance Program Operations Manual*

State:

- *Fisheries Management Act 1994* (NSW)
- *Food Act 2003* (NSW)
- Food Regulation 2015 (NSW)
- *Public Health Act 199*1 (NSW)

Government departmental roles and responsibilities in marine biotoxin management are detailed in Appendix 10.

2.2 Local *Marine Biotoxin Management Plan*

In NSW the Local Shellfish Program in each harvesting area is responsible for having a *Marine Biotoxin Management Plan*, which contains[1]:

1. agency and personnel contact details at local and state levels,
2. the frequency of shellfish and phytoplankton monitoring for each growing area,
3. procedures for phytoplankton and shellfish sample collection and dispatch,
4. early warning indicators,
5. contingency plans,
6. a statement of the role of the Regional Algal Coordinating Committees, including their role in the release of media statements,
7. procedures for notification of results to industry and others,
8. procedures for harvest area closure and re-opening,
9. procedures for detention and recall of harvested product,
10. contact details for the laboratories used, and
11. harvest area maps and management plans, indicating all sample sites and operating requirements.

[1] All harvesters are required to have a copy of item 11.

Appendix 11 contains a copy of the generic *Wild Harvest Biotoxin Management Plan*.

3 SAMPLING

Sampling marine phytoplankton and biotoxins in accordance with the requirements set out in this plan is mandatory under the legislation. This monitoring is required to manage the potential health risks posed to consumers by toxic algae.

3.1 Sampling site selection

Sample sites are established by the Food Authority based on the requirements set out in the ASQAP manual.

Please refer to ASQAP manual for further details.

3.2 Sampling frequency

In NSW two sampling options have been adopted. Each option provides security in detecting potential marine biotoxin events:

1. Fortnightly sampling of water for algae levels plus monthly sampling of shellfish for biotoxin analysis where stock is present and being harvested, or
2. Where shellfish stock is not regularly present or transient (such as open ocean beaches), weekly sampling of water for algae levels will be accepted.

3.3 Shellfish sample species

Shellfish samples will be taken from the commercial species harvested in the area. This means Sydney rock or Pacific oysters in oyster harvest estuaries, mussels where they are harvested, as well as pipis, cockles or other bivalve shellfish in wild harvest areas. Should there be a toxin event in a harvest area then each individual shellfish species harvested should be sampled. This will assist in determining the food safety risk of each species.

If a toxin event occurs in a commercial harvest area that is known to be used for recreational harvest then the Food Authority will immediately contact the NSW DPI (Fisheries) who have the regulatory responsibility to prohibit recreational harvest and decide appropriate sampling strategies for recreational species.

3.4 Phytoplankton species to monitor

Appendix 9 contains a list of phytoplankton species present or likely to be present in Australian waters categorised as the following:

Category A Species known to be present in Australian waters and proven to produce toxins either in Australia or internationally.

Category B Potential toxin-producing species (ie. toxicity untested or unclear) known to be present in Australian coastal waters.

Category C Other potential toxin-producing species worldwide that may be present in Australian waters.

Appendix 6 lists the trigger levels for phytoplankton species in Category A. These relate to an integrated sample collected with a tube/hose sampler for mussel areas or by a grab sample for oyster and pipi harvest areas.

3.5 Sample size

Phytoplankton water samples will be between 500ml and 1 litre.

Shellfish samples will consist of at least 15–18 good size shellfish for standard Jellet scan test. Other testing method requirements will be advised by the NSW Shellfish Program.

3.6 Environmental information

The following environmental parameters will be recorded on your *Environmental Sampling Sheet*:

1. Physical data: tidal movement, salinity and water temperature, or any other details that you deem relevant.
2. Meteorological: rainfall, wind speed and direction, cloud cover.

3.7 Sampling safety

Sampling officers must carry out sampling in a safe manner. If conditions are believed to be hazardous, sample collection must be rescheduled and undertaken as soon as practicable.

3.8 Sampling officers

Sampling officers should be trained in sampling for shellfish and phytoplankton. New sampling officers must undergo a training program conducted by the Food Authority.

3.9 Sample handling/care

- Phytoplankton: Water samples should be transported in a manner which minimises major temperature changes. Samples should not have ice added during transport, should not be refrigerated and should not be allowed to heat up (eg. by leaving them in the sun).

  Samples should be collected so as to leave a small air space in the sample bottle.
- Shellfish samples should be supplied shucked and frozen for biotoxin analysis only, unless otherwise advised by the NSW Shellfish Program.

  When shipped live, Pacific oysters, mussels, pipis and all other shellfish should be kept cool, packed with ice to maintain a temperature of 10˚C or less. Sydney rock oysters should be shipped cool at approximately 15°C.

Appendices 2 and 3 list the organisations that can provide analytical services for phytoplankton analysis of water samples and biotoxin analysis of shellfish flesh.

Results from all phytoplankton and biotoxin analysis must be reported to the NSW Shellfish Program within 24 hours of receipt of results.

4 MONITORING

4.1 Routine marine biotoxin monitoring

The routine frequency of marine biotoxin monitoring will be stated in the individual growing area's *Marine Biotoxin Management Plan*.

For sampling frequency please refer to section 3.

Samples must be collected using either bottle samplers or tube/hose samplers to provide quantitative information upon which management decisions can be made. Net hauls may also be used to collect qualitative information regarding species that are present.

4.2 Contingency plan for marine biotoxin events

Contingency plans must be prepared in the event of a biotoxin event occurring in any of the following scenarios:

- Presence of phytoplankton species above the levels stated in Appendix 6.
- Presence of any phytoplankton species known to be a toxin producer internationally, but not previously observed or tested in Australian waters.
- Investigation of areas where marine biotoxin levels are increasing but may not have exceeded a regulatory limit (Appendix 7).
- To monitor the movement of toxic phytoplankton species between growing areas.

Testing under the presence of hazardous marine algae or biotoxins will be as directed by the Food Authority.

4.3 Result reporting and notification

Where either phytoplankton or shellfish results exceed triggers stated in Appendix 6 and 7 the NSW Shellfish Program Manager must be notified immediately by telephone, and followed up with a confirmatory fax or email.

The NSW Shellfish Program Manager will then provide details on follow-up sampling and closures that may be enforced within the shellfish harvest area. The Food Authority is also responsible for informing RACC and DPI of any marine biotoxin events (Appendix 10).

5 AREA CLOSURE (INCLUDING VOLUNTARY) AND REOPENING PROCEDURES

Harvest areas may be closed by either the local program or the NSW Shellfish Program. Harvest areas may only be reopened by the NSW Shellfish Program Manager when closed due to a marine biotoxin or algal event.

5.1 Mechanism for closure and reopening

- The Program Manager will close a shellfish growing area to harvesting and the movement of all shellfish immediately that any criteria in section 5.2 are met.
- The closure area will extend to the nearest sample site below regulatory closure level or at the discretion of the Program Manager.
- Closures may be made on a species specific basis due to differences in accumulation and depuration rates of toxins by different shellfish species. Each species should be tested to determine the toxin levels.
- Where a commercial area is included in a closed area, the closure notice will be faxed to the local coordinator who is required to contact all local growers. The Food Authority will contact relevant industry representatives, DAWR and the appropriate RACC. The RACC secretariat will coordinate notification of government agencies and issue any required press release.
- A backdated recall of commercial product should be made (refer to section 7).

5.2 Closure criteria

The following criteria determine whether a closure needs to be put in place:

- Marine biotoxins are present in shellfish in levels over the regulatory levels in Appendix 7 or have been detected as a positive in the Jellet screen test.
- Cases of human illness consistent with the case definitions for PSP, NSP, DSP and ASP (Appendix 8) have resulted from the consumption of shellfish from a particular area, or
- The Program Manager determines a closure is necessary for any other reasons (eg. toxins present in neighbouring areas, potential toxin producing phytoplankton species which have not previously been recorded are present in the area).
- Any shellfish harvest area not sampled for either phytoplankton or biotoxins in exceedance of 3 days over their chosen sampling frequency (listed in section 3.2 above) must be closed.
- Any shellfish harvest area which has not had either phytoplankton or biotoxin results reported within 7 days over their chosen sampling frequency (listed in section 3.2 above) must be closed

5.3 Industry instigated closure

Industry may choose to instigate a voluntary closure based on criteria such as toxins in neighbouring areas, rising levels of toxin in shellfish, rising levels of toxic phytoplankton, or any other criteria deemed important enough to necessitate a closure.

5.4 Reopening criteria

A shellfish growing area closed due to marine biotoxins shall not be reopened until the NSW Shellfish Program Manager has determined that each of the following requirements for reopening has been adequately addressed:

- Shellfish biotoxin testing must be negative (Jellet scan) or below regulatory limits by HPLC as set out in Appendix 7.
- For PSP and ASP positive tests above regulatory limits three consecutive samples from the same species and sites are to be collected over a minimum 14 day period (ie. sample on day 1, day 7 and day 14).
- For NSP positive tests above the regulatory limits two consecutive samples shall be collected with the second sample being no earlier than 2 days after taking the first initial negative sample.
- For DSP positive tests above regulatory limits two consecutive samples shall be taken with the second sample being 7 days after taking the initial negative sample.
- Phytoplankton testing must be below closure trigger values as set out in Appendix 6.

Differences in clearance rates of different toxins may need to be considered when making these decisions. The Program Manager should consider and judge if the level of other potentially toxic phytoplankton species are increasing and therefore will not necessitate another closure within a short timeframe.

Other factors that must be considered prior to a harvest area reopening include:

- No cases of human illness notified to the health authorities and consistent with accepted case definitions (Appendix 8) for PSP, NSP, ASP, or DSP shall have resulted from the consumption of shellfish harvested since the date of collection of the first clearance sample from within or adjacent to the closed area.
- Shellfish from adjacent areas shall be sampled and the results shall have been evaluated for their relationship to the area to be opened. Toxin levels shall be decreasing or static in adjacent areas.
- The hydrography of the area and the pattern of toxicity at sample sites shall have been considered in assessing the potential of a reoccurrence of the toxicity.
- All major shellfish harvesting areas in the area to be opened shall have been represented by the spread of sampling sites.
- The types of shellfish sampled from the area shall be representative of those species normally harvested from the area.
- The density of potentially toxic phytoplankton species shall be proportionally related to the overall phytoplankton community and the plankton transport and retention currents, where this information is available.
- Other conditions or limitations may be imposed if considered necessary by the Program Manager.

Resumption of harvest may be accompanied by weekly sampling for at least two weeks, or as prescribed by the Food Authority.

6 INVESTIGATION OF ILLNESS DUE TO TOXIC SHELLFISH POISONING

6.1 Notification

All suspected cases of toxic shellfish poisoning are notifiable as cases of suspected foodborne illness to NSW Health and Public Health Units. It is the responsibility of NSW Health and the Public Health Units to ensure that general practitioners are aware of the need to notify suspected cases so that these can be followed up.

6.2 Investigation

Where toxic shellfish are suspected of being the cause of an illness, it is the responsibility of NSW Health and the Public Health Units to undertake epidemiological investigations and the Food Authority to determine the source of the contamination and the method of handling the shellfish.

6.3 Immediate action to be taken in suspected toxic shellfish poisoning case

1. **Restrictions**: Where investigation suggests that toxic shellfish may be the cause of illness, an immediate closure should be placed on commercial and recreational harvesting pending the results of more detailed investigations.
2. **Phytoplankton**: Water samples should be transported in a manner which minimises major temperature changes. Samples should not have ice added during transport, should not be refrigerated and should not be allowed to heat up (eg. by leaving them in the sun).
3. **Closures** of harvesting areas: Should be accompanied by immediate additional sampling of both shellfish and water in the affected area to determine the levels and size of the area affected. The level of toxins in the shellfish must be determined in order to define the closure area, or closures will be implemented on a Jellet screen positive. Harvesting must cease until regular monitoring demonstrates that the reopening criteria has been met.
4. **Control** of movement of harvested shellfish: It is the responsibility of FSANZ to undertake a product recall/detention with the cooperation of the appropriate responsible agencies including the Food Authority and industry.
5. **Notification**: Notices shall be placed in prominent places near harvesting areas advising the public of the closure and to advise against consuming shellfish from within the closed area. This notification is the responsibility of NSW DPI (Fisheries).
6. **Communication**: Liaison between all appropriate organisations and individuals will be established to ensure that investigations are well coordinated. The organisations and individuals may include:
    - RACC to coordinate the whole of government response
    - The Food Authority
    - Industry
    - DAWR
    - Phytoplankton laboratory representative
    - Biotoxin laboratory representative
7. **Sampling**: Samples should be taken where available and may include remains of meals, samples of commercial product from the same batches of product as consumed, and samples taken from the suspected harvesting areas.

Samples need to be of sufficient size to allow analysis for non-marine biotoxin sources of illness (such as bacterial, viral or chemical contamination) to be eliminated.

If microbiological testing is required, the sample shall be transported in such a way as to prevent contamination, and identified appropriately.

For cases showing gastro-intestinal symptoms, faecal samples should be requested to eliminate bacterial/viral causes of illness.

8. **Funding**: Epidemiological investigation of toxic shellfish poisoning incidents is performed and funded by the relevant Public Health Unit and NSW Health. Harvest area investigations and the associated test costs are funded by the local shellfish program.

7 PRODUCT CONTROL

Product recall is the responsibility of the growers, manufacturers, processors, distributors and retailers of affected product in conjunction with FSANZ and the Food Authority.

A recall shall be instigated within 24 hours of the harvest area closure.

7.1 Product recall

When harvesting or growing areas are closed due to the presence of marine biotoxins, product may need to be recalled or detained. **This recall or detention will be backdated to, and including, the day following the last sample date with clear phytoplankton results or marine biotoxin results below the regulatory limit.**

7.2 Domestic recall

For a recall of domestic product the following procedure is followed:

1. Shellfish farmers are advised to immediately cease harvesting, processing, distribution and sales by the Program Manager.
2. Program Manager notifies the Food Authority Recall Coordinator of the full particulars of the shipment. The Coordinator will liaise with FSANZ.
3. If considered appropriate, a combined media statement will be made by NSW Health and the Food Authority advising the public. If not considered appropriate, the shellfish farmer will place a Recall Notice in the relevant newspapers.
4. The grower(s), manufacturer(s), processor(s), distributor(s) and retailer(s) are advised of all details necessary for them to identify and withdraw product from sale.
5. The return or disposal of the contaminated product is to be arranged by a competent independent authority in an approved sanitary site.
6. A monitoring program or sampling program may be undertaken to determine the extent of the problem and test if the product is acceptable for release.
7. A detailed recall report outlining the full scope of the recall, and the eventual outcomes is signed off by the Recall Coordinator and Program Manager, and is provided to FSANZ.

7.3 Export recall

For a recall of export product the following procedure is followed:

1. Shellfish farmers are advised to immediately cease harvesting, processing, distribution and sales by the Program Manager.
2. Program Manager, DAWR and shellfish farmer determine the full particulars of the shipment and Program Manager advises FSANZ.
3. The grower(s), manufacturer(s), processor(s), distributor(s) and retailer(s) are advised of all details necessary for them to identify and withdraw product from sale.

4. The return or disposal of the contaminated product by the health authority in the country of destination is co-ordinated through DAWR by the industry representative.
5. A monitoring program or sampling program may be undertaken to determine the extent of the problem and test if the product is acceptable for release.
6. A detailed recall report outlining the full scope of the recall, and the eventual outcomes is signed off by the Program Manager, and is provided to FSANZ and DAWR.

7.4 Notification to consumers

Where product has gone beyond the distribution chain to consumers, the consumers may need to be warned. This should be considered part of the recall process. For an effective recall, advertising should occur in all areas where the product is distributed. This may require media releases or paid advertising in newspapers, on radio or on television.

This should occur within 24 hours of an area closure.

7.5 Detained product

Shellfish and shellfish products may be held by the processor until biotoxin sample results from the batch show that levels are below regulatory limits or negative, otherwise product should be returned to farm gate or appropriately disposed of.

7.6 Product traceability

All sales to restaurants and retail outlets (domestic and export) must be traceable to the farm. All packaging carries an identification label or tag in accordance with the following procedures:

1. A durable, waterproof tag is affixed to each container of shellfish by the harvester in accordance with the *NSW Shellfish Industry Manual.*
2. The tag information is applied to a container of shellfish at the time of harvest once the shellstock are cleaned.
3. These details are inscribed on all documentation and packaging to the final point of consumption and accompany individual consignments.

All industry members maintain effective record keeping, showing information on date of sale, quantity and distribution. This information must be made available on request to an Authorised Officer under the *Food Act 2003*. Records of all customer complaints are also maintained.

Appendix 1 Contacts

Organisation	Position	Phone	Fax
NSW Food Authority Shellfish Program	Program Manager	02 9741 4848 0407 078 269	02 9741 4896
RACC* – Metropolitan & South Coast	RACC Coordinator	02 8838 7506 0448 091 982	
RACC – Hunter	RACC Coordinator	02 4904 2568	
RACC – North Coast	RACC Coordinator	02 6653 0120	
DECCW Pollution Line		131 555	
DPI	Principal Manager Aquaculture	02 4916 3856 0419 185 365	02 4981 9074
DPI	Oyster Manager	02 4916 3906	02 4981 9074
NSW Health	Manager Water Unit	02 9391 9000	
DAWR	Fish Export Manager	02 6272 4978	
Local Government	Refer to your local council		

*Note RACC = Regional Algal Coordinating Committee

Appendix 2 Approved laboratories for phytoplankton enumeration and identification

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1. Microalgal Services

Contact Steve Brett
Ph: 03 9578 2158
Fax: 03 9578 2463
Email: microalgae@bigpond.com
algae@bigpond.net.au

Address 308 Tucker Road
Ormond VIC 3204

Full identification and counting service:

- Full identification and enumeration of phytoplankton species
- Detailed counts of harmful or toxic species
- Detailed examinations and identifications using fluorescence microscopy and electron microscopy
- Identification of harmful phytoplankton to species level

Results: Within 24 hours of receipt.

Directions: Send one 500ml–1L sample plus a net tow (both fixed with Lugols Iodine) per sample site. If samples can be delivered within 24 hours of collection 2 x 500ml samples (one live, one fixed) plus a net tow (fixed) is preferred.

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2. Cawthron Institute

Contact Paul McNabb
Ph: +64 3 548 2319
Fax: +64 3 546 9464
Email: paul.mcnabb@cawthron.org.nz

Address Attn: Biotoxin Laboratory

Cawthron Institute

98 Halifax Street East

Nelson, New Zealand

Phytoplankton identification and counting.

Results: Negative results can be provided in 1–2 days of receipt, positive results within 3–4 days. Notification via phone if a sample looks to be positive.

Directions: The Cawthron Institute recommends a maximum of 24 hours between sampling and receipt of samples at the laboratory.

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3. Blooming Algae

Contact Penny Ajani

Ph: 02 9389 4725

Mob: 0418 222 996

Email: Penelope.Ajani@optusnet.com.au

Address 29 Willis Street

Kingsford NSW 2032

Phytoplankton identification, counting and local sampling.

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4. Hunter Water Laboratories

Contact Robin Woodward

Ph: 02 4935 0500

Fax: 02 4935 0500

Address 23 Rosegum Close

Warabrook NSW 2304

Phytoplankton identification and counting.

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5. Sydney Water

Contact Sreema Guruge

Email: Sreema.Guruge@sydneywater.com.au

Address Sydney Water Monitoring Services™

51 Hermitage Rd

West Ryde NSW 2114

Marine and freshwater algal identification and enumeration.

Appendix 3 Approved laboratories for biotoxin analysis

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1. Advanced Analytical Australia

Contact Chris Rigden
Ph: 02 9888 9077
Fax: 02 9888 9577

Address Advanced Analytical Australia
11 Julius Avenue
North Ryde NSW 2113

Method:

- LCMSMS – ASP, DSP, Azaspiracids, cylindrospermopsin, gymnodimine, spirolide & yessotoxin.
- HPLC – PSP toxins.

Results: Samples received by Wednesday are reported by Friday.

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2. Coffs Harbour Environmental Laboratory

Contact Bev Wadleigh
Ph: 02 6648 4460
Fax: 02 6648 4466

Address Coffs Harbour Environmental Laboratory
38 Gordon Street
Coffs Harbour NSW 2450

Method:

- Jellet screening test – ASP, DSP, PSP

Results: Lab only tests on Friday unless prior arrangements are made by local program.

3. Cawthron Institute

Contact Paul McNabb
Ph: +64 3 548 2319
Fax: +64 3 546 9464
Email: paul.mcnabb@cawthron.org.nz

Address Attn: Biotoxin Laboratory
Cawthron Institute
98 Halifax Street East
Nelson, New Zealand

Method:

Samples submitted for individual toxin tests may include:

- PSP Mouse Bioassay and HPLC
- ASP/DSP by LCMS
- ASP by LCMS
- NSP by LCMS

Recommended suite of tests:

- PSP (HPLC), ASP/DSP (LCMS) and NSP (LCMS)

Results: Negative results can be provided in 1–2 days of receipt of samples, positive results within 3-4 days. Notification via phone if a sample looks to be positive.

Directions: Please specify the tests you wish to have completed and the type of sample using the provided laboratory form. The Cawthron Institute recommends a maximum of 24 hours between sampling and receipt of samples at the laboratory.

Appendix 4 Marine biotoxin monitoring program sample collection form

NSW SP LABORATORY REQUEST FORM – ENVIRONMENTAL SAMPLES

Local estuary SP: Blue River Fax: 02 9555 5558

Report results to: Joe Bloggs

Phone: 02 9555 5557

Copy results and this form to: NSW SP Phone: 02 9741 4848 Fax: 02 9741 4896

A. SAMPLE HISTORY

Routine sample ☐ Event sample ☒ Event type Rainfall

Comments: Rainfall and the accompanying runoff suspected of impacting product

Rainfall recorded during the previous period (mm)

24 hours	48 hours	72 hours	72 hours–1 week
22	30	35	50

B. SAMPLE DETAILS

Indicate sample type and testing required – **ONE** request form per species **AND** per test method

☒ Shellfish *Oyster Species* ☒ *E. coli* Rapid Method (DPM) [AS1766.2.12]

☒ Sydney Rock ☐ Pacific ☐ Native ☐ *E. coli* MPN Method [AS 1766.2.3]

☐ Mussel ☐ Other (Specify Test) _____

☐ Other_____

OR

☐ Water

☐ Duplicate sample to verify non NATA testing (if applicable)

☐ Faecal coliform MF [AS 4276.7]

☐ Faecal coliform MPN [AS 4276.6]

☐ Other (Specify Test)_____

Zone	Site No°	Lease No°	Date	Time	Density/ Salinity	Temp (°C)	Tide	Comment (eg local activities & prevailing weather)
A – Lynns Bay	1	80/000	29/08/00	13:00	1020	17	Mid Ebb	Heavy rain, wind southwest, 5–10 knots, flooding
A – Lynns Bay	2	91/000	29/08/00	13:30	1020	16.5	3/4 Ebb	Heavy rain, southwesterly winds, 7–10 knots, flooding
B – Channel Creek	1	94/000	29/08/00	13:45	1021	17.5	3/4 Ebb	Moderate rain, southwesterly winds, 10 knots
C – Peters Creek	1	93/000	29/08/00	14:00	1023	17	Low	Light rain, southwesterly winds 10–15 knots sediment stirred up

C. SAMPLER DETAILS

Name: Joe Bloggs Approved Sampler No°: 1234 Date: 01/09/08

Signature*: Joe Bloggs

* I certify that correct sample collection procedures have been followed and all details recorded above are accurate.

OFFICE USE ONLY

Laboratory Job Number: _____

(Please fax request form as submitted with samples with report to the NSW SP)

Appendix 5 Phytoplankton sampling procedures

Collecting phytoplankton samples using the hose sampler

Equipment:	Tube/Hose sampler
	Clean bucket – rinse with sea water
	Sample bottles – 2 for each sample taken
	Lugol's Iodine for preserving one of the samples
	Polystyrene bins for transporting samples
Method:	
Prepare tube/hose	Remove bung from end
Collect sample	Lower weighted end first
	Hold top end securely
	Lower very slowly to maximum possible depth (max 15m, note depth on bottle) so as not to disturb any layers of phytoplankton in the water column
	Take care not to hit the bottom
Retrieve sample	Replace bung securely in top of tube and pull up
	Empty water into the bucket
	Fill sample bottles ensuring water is well mixed. Lower plastic bottle into bucket leaving a small air space at top. Fill two plastic bottles with sample water. Leave one as it is, **immediately** preserve second sample with Lugol's iodine (sample should resemble a light apple juice colour when preserved). Invert gently to mix.
	Label each bottle clearly with date, site and whether preserved or not
	Whilst examination of live material is ideal, it can only be used if there is minimal delay between collection and analysis (less than 24 hours)

Collecting phytoplankton using the plankton net

Equipment:	Plankton net (20µm)
	Plastic bottle
	Lugol's iodine

Method:

Check gear	Ensure weight is attached to bottom, rope securely tied
Set up sampler	Place plastic bottle into net, secure with hose clip
Take sample	Lower to just above the bottom (ideally so the weight doesn't hit and stir up the bottom)
	Slowly but steadily pull the net up
Wash net	Wash material adhering to inside of net towards the container end by gently dipping and shaking the net
Preserve sample	Remove sample container and cap
	Preserve one sample with Lugol's Iodine immediately (preserved sample should resemble light apple juice colour)

Appendix 6 Phytoplankton action levels

The following table summarises the phytoplankton levels (in cells/litre) which are used to trigger sampling of shellfish flesh. The levels relate to discrete or composite samples. These levels are a combination of levels used internationally and in various states in Australia. They should be revised as further monitoring and research is undertaken and supports a change.

Phytoplankton species	Toxin	Trigger flesh sampling# (cells per litre)	Alert level – Close harvest area pending flesh testing results	Issue public health warning (cells per litre)
Alexandrium minutum#	PSP	200	500	5000
Alexandrium ostenfeldii#	PSP	200	500	5000
Alexandrium catenella#	PSP	200	500	5000
Alexandrium tamarense#	PSP	200	500	5000
Alexandrium spp#.	PSP (?)			
Gymnodinium catenatum	PSP	1000 mussels 2000 other shellfish	5000	5000
Pseudonitzschia (P.multiseries & P.australis)*	ASP	50,000	500,000	N/A
Pseudonitzschia delicatissima group - historically non-toxic in Australia	ASP (?)	500,000		N/A
Karenia cf brevis	NSP	1000		5000
Dinophysis acuminata	DSP	1000		N/A
Dinophysis acuta	DSP	500		N/A
Dinophysis caudata	DSP	500		N/A
Dinophysis fortii	DSP	500		N/A
Dinophysis hastata	DSP	500		N/A
Dinophysis mitra	DSP	500		N/A
Dinophysis rotundata	DSP	500		N/A

Phytoplankton species	Toxin	Trigger flesh sampling# (cells per litre)	Alert level – Close harvest area pending flesh testing results	Issue public health warning (cells per litre)
Dinophysis tripos	DSP	500		N/A
Total Dinophysis spp.	DSP	500		N/A
Prorocentrum lima	DSP	500		N/A

Note: For *Pseudonitzschia spp.* risk remains high for a minimum of two weeks post bloom crash.

The cell levels within each toxin group are cumulative, eg 600 cells/l of both *D. acuta* and *D. fortii* would mean a total count of 1200 cells/l, exceeding the critical level to initiate flesh testing.

Alexandrium species may be difficult to identify when numbers are low. If any doubt exists, they should be treated as potentially toxic.

* Species within the Pseudo-nitzchia groups are difficult to identify. The toxic species of most concern in each group are listed for those laboratories that have capacity to identify these algae to species level. Otherwise all algae within these groups should be considered potentially toxic.

Appendix 7 Marine biotoxin regulatory closure levels

The following are the regulatory limits for marine biotoxins in the edible portions of shellfish:

Paralytic Shellfish Poisoning (PSP)

PSP toxins greater than or equal to 0.8mg of saxitoxin equivalent/kg of edible shellfish flesh (~4MU), by mouse bioassay with a maximum observation time of 1 hour. Precautionary closure on Jellet positive.

Neurotoxic Shellfish Poisoning (NSP)

NSP toxins (brevetoxin) greater than or equal to 200MU/kg of edible shellfish flesh, by ether extraction and mouse bioassay with a maximum observation time of 6 hours.

Amnesic Shellfish Poisoning (ASP)

ASP toxins greater than or equal to 20mg/kg of domoic acid in edible shellfish flesh by high performance liquid chromatography (HPLC) Precautionary closure on Jellet positive.

Diarrhetic Shellfish Poisoning (DSP)

DSP toxins greater than or equal to 0.2mg/kg of edible shellfish flesh (~5MU) by 24-hour mouse bioassay or HPLC Electrospray Mass Spectrometry. Precautionary closure on Jellet positive.

NB: DSP toxins include okadaic acid, DTX1, DTX2, DTX3, PTX, PTX2, (PTX2-sa is currently regarded as non-toxic), YTX, 45-OH YTX and azaspiracids. There is debate about the human toxicity of some of these compounds, but these should be regulated for as DSP toxins until further testing, including toxicology studies, have been completed and more appropriate levels are able to be set. Internationally this is the accepted way to deal with these toxins where little is known about them.

Appendix 8 Toxic shellfish poisoning case definitions

8.1 Surveillance case definition for all forms of toxic shellfish poisoning

Suspected case (general clinical case definition)

- Vomiting or diarrhoea occurring within 24 hours of consuming shellfish, or
- any of the following neurological symptoms occurring within 24 hours of consuming shellfish:
- neurosensory
- paraesthesia, ie numbness or tingling around the mouth, face or extremities
- alternation of temperature sensations such as a prickly feeling on the skin during a bath/shower or exposure to sun, or difficulty distinguishing hot or cold objects
- neuromotor/neurocerebellar:
    - weakness such as trouble rising from seat or bed
    - difficulty swallowing
    - difficulty breathing
    - paralysis
    - clumsiness
    - unsteady walking
    - dizziness/vertigo
    - slurred/unclear speech
    - double vision
- or one or more of the following neurological signs/symptoms occurring within 48 hours of consuming shellfish:
    - confusion
    - memory loss
    - disorientation
    - seizure
    - coma

8.2 Paralytic Shellfish Poisoning (PSP) case definition

Suspected case (clinical case definition)

The following neurological symptoms occurring within 12 hours of consuming shellfish:

- neurosensory,
- paraesthesia, ie. numbness or tingling around the mouth, face or extremities, and
- one of the following neuromotor/neurocerebellar symptoms:
    - weakness
    - difficulty in swallowing
    - difficulty in breathing
    - paralysis
    - clumsiness
- unsteady walking
- dizziness/vertigo
- slurred/unclear speech
- double vision

Probable case

- Meets the case definition, and
- detection of PSP biotoxins at or above the regulatory limit in shellfish obtained from near or at the same site (not leftovers) within 7 days of collection of shellfish consumed by the case (current level: 80µg/100g shellfish).

Confirmed case

- Meets the clinical case definition, and
- detection of PSP biotoxins in leftover shellfish at a level that meant the case consumed a dose likely to cause illness (current level: 10MU/kg body weight, about 2µg/kg body weight).

8.3 Neurotoxic Shellfish Poisoning (NSP) case definition

Suspected case (clinical case definition)

Two or more of the following neurological symptoms occurring within 24 hours of consuming shellfish:

- neurosensory,
- paraesthesia, ie. numbness or tingling around the mouth, face or extremities,
- alternation of temperature sensations such as a prickly feeling on the skin during a bath/shower or exposure to sun, or difficulty distinguishing hot or cold objects, and
- one of the neuromotor/neurocerebellar symptoms:

- weakness
- difficulty in swallowing
- difficulty in breathing
- paralysis
- clumsiness

- unsteady walking
- dizziness/vertigo
- slurred/unclear speech
- double vision

Probable case

- meets the clinical case definition, and
- detection of NSP biotoxin at or above the regulatory limit in shellfish obtained from near or at the same site (not leftovers) within 7 days of collection of shellfish consumed by the case (current level: 20MU/100g shellfish).

Confirmed case

- meets the clinical case definition, and
- detection of NSP biotoxins in leftover shellfish at a level resulting in the case consuming a dose likely to cause illness (current level: 0.3MU/kg body weight

8.4 Amnesic Shellfish Poisoning (ASP) case definition

Suspected case (clinical case definition)

- vomiting or diarrhoea or abdominal cramps, occurring within 24 hours of consuming shellfish, and
- no other probable cause identified by microbiological examination of a faecal specimen from the case or microbiological testing of left-over food, and/or
- one or more of the following neurological signs/symptoms occurring within 48 hours of consuming shellfish: confusion
    - memory loss
    - disorientation
- seizure
- com

Probable case

- meets the clinical case definition, and

- detection of ASP biotoxin at or above the regulatory limit in shellfish obtained from near or at the same site (not leftovers) within 7 days of collection of shellfish consumed by the case (current level: 20ppm domoic acid/100g shellfish).

Confirmed case

- meets the clinical case definition, and
- detection of ASP biotoxins in leftover shellfish at a level resulting in the case consuming a dose likely to cause illness (current level: 0.05 mg/kg body weight).

8.5 Diarrhetic Shellfish Poisoning (DSP) case definition

Suspected case (clinical case definition)

- vomiting or diarrhoea occurring within 24 hours of consuming shellfish, and
- no other probable cause identified by microbiological examination of a faecal specimen from the case or microbiological testing of left-over food.

Probable case

- meets the clinical case definition, and
- detection of DSP biotoxin at or above the regulatory limit in shellfish obtained from near or at the same site (not leftovers) within 7 days of collection of shellfish consumed by the case (current level: 20 µg/100g shellfish or 5 MU/100g)

Confirmed case

- meets the clinical case definition, and
- detection of DSP biotoxins in leftover shellfish at a level resulting in the case consuming a dose likely to cause illness (current level: ingestion of 48 µg or 12 MU).

Appendix 9 Phytoplankton species

Some name changes have occurred since original publication of the Cawthron report. These have been included in the list below and the list will be updated as new information is provided on toxigenic genera. The IOC (UNESCO) has a comprehensive and regularly updated list of harmful microalgae.

Category A – Species known to be present in Australian waters and proven to produce toxins either in Australia or internationally:

Alexandrium catenella (saxitoxin and derivatives)

Alexandrium minutum (saxitoxin and derivatives)

Alexandrium ostenfeldii (saxitoxin and derivatives, also produces spirolides in Canada)

Alexandrium tamarense (saxitoxin and derivatives, also has non-toxic strains)

Dinophysis acuminata (pectenotoxin, okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis acuta (pectenotoxin, okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis caudata (pectenotoxin, okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis fortii (pectenotoxin, okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis hastata (okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis mitra (okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis rotundata (okadaic acid?, dinophysis toxins? and diol esters?)

Dinophysis tripos (some strains produce okadaic acid, dinophysis toxins and diol esters)

Gymnodinium catenatum (saxitoxin and derivatives)

Gymnodinium cf *breve (Karenia* cf *brevis)* (brevetoxins)

Prorocentrum lima (okadaic acid?, dinophysis toxins? and diol esters?)

Pseudonitzschia australis (domoic acid)

Pseudonitzschia delicatissima (domoic acid)[HNTA]

Pseudonitzschia fraudulenta (domoic acid) [HNTA]

Pseudonitzschia multiseries (domoic acid)

Pseudonitzschia pseudodelicatissima (domoic acid) [HNTA]

Pseudonitzschia pungens (usually non-toxic, but toxic strains produce high concentrations of domoic acid per cell)

Pseudonitzschia turgidula (domoic acid)

Pyrodinium bahamense var. *compressum* (in tropical habitats) (saxitoxin and derivatives)

Note: [HNTA] Historically non-toxic in Australia

Category B – Potential toxin producing species (ie toxicity untested/unclear) known to be present in Australian coastal waters:

Alexandrium pseudogonyaulax (possible STX and derivatives, goniodomin)

Chattonella marina/antiqua (possible brevetoxins)

Fibrocapsa japonica (possible brevetoxins)

Heterosigma akashiwo (possible brevetoxins)

Pseudonitzschia cuspidata (possible domoic acid)

Pseudonitzschia heimii (possible domoic acid, non-toxic in New Zealand)

Pseudonitzschia lineola (possible domoic acid)

Pseudonitzschia multistriata (possible domoic acid, non-toxic in New Zealand)

Pseudonitzschia subfraudulenta (possible domoic acid)

Pseudonitzschia subpacifica (possible domoic acid)

Category C – Other potential toxin producing species world-wide that may be present in Australian waters:

Alexandrium angustitabulatum (possible saxitoxin and derivatives, identified in New Zealand waters)

Alexandrium acatenella (possible saxitoxin and derivatives)

Alexandrium cohorticula (possible saxitoxin and derivatives)

Alexandrium fraterculus (possible saxitoxin and derivatives)

Alexandrium fundyense (possible saxitoxin and derivatives)

Alexandrium lusitanicum (possible saxitoxin and derivatives)

Alexandrium tamiyavanichi (possible saxitoxin and derivatives)

Coolia monotis (produces cooliatoxin)

Dinophysis norvegica (Major DSP producer in Europe)

Gymnodinium aureaolum (possible brevetoxins)

Gymnodinium bidigitatum ((possible brevetoxins) found in New Zealand waters)

Gymnodinium galatheanum (Karlodinium micrum) (possible brevetoxins)

*Gymnodinium impudicum (*possible brevetoxins)

Gymnodinium mikimotoi (Karenia mikimoto) (possible brevetoxins)

Gymnodinium papillionaceceum Karenia papillonacea) (possible brevetoxins)

Gymnodinium pulchellum (Takayama pulchella) (possible brevetoxins)

Gymnodinium selliforme (Karenia selliformis) (gymnodimine, found in New Zealand waters)

Lingulodinium polyedra (yessotoxin producer in Japan)

Nitzschia navis-varingica (domoic acid was recently confirmed for an isolate from brackish Vietnamese waters)

Ostreopsis siamensis (produces palytoxin)

Pfiesteria piscicida Not possible to identify with routine monitoring. Culturing and immunolabelling required

Prorocentrum concavum (okadaic acid?, dinophysis toxins? and diol esters?)

Prorocentrum elegans (okadaic acid?, dinophysis toxins? and diol esters?)

Prorocentrum hoffmannianum (okadaic acid?, dinophysis toxins? and diol esters?)

Prorocentrum maculosum (produces prorocentrolides)

Prorocentrum minimum (Prorocentrum cordatum) (The toxin linked to this organism (185 fatalities in Japan) has not yet been elucidated, and the role of *P. minimum* is still in question)

Protoceratium reticulatum (yessotoxin producer in New Zealand)

(? Indicates this toxin has not been confirmed at the time of this report as being produced by Australian strains of this species)

Gonyaulax spinifera (possible yessotoxin)

Pseudonitzschia calliantha (domoic acid)

Numerous *Karenia* species have recently been described. Toxicity and applicability to the Australian program require more investigation.

Appendix 10: Roles and responsibilities of government agencies and local shellfish programs

NSW Food Authority

- Issue food business licences.
- Control the harvesting of shellfish based on sanitary and phyto-sanitary conditions.
- Perform and/or supervise sampling.
- Design sampling programs and approval of biotoxin management plans used by local shellfish program.
- Production of the *Marine Biotoxin Management Plan* and dissemination of information related to the plan.
- Enforce harvest area closures.
- Retain records of food business licences and conditions, closure and re-opening notices of lease sites.
- Perform survey and classification of shellfish growing areas.
- Regulate post harvesting and transport of shellstock.
- Detain product considered to be unfit for human consumption.
- Enforce necessary sanitary controls for processing plants and vehicles handling shellstock.

Local shellfish programs and biotoxin management plans

- Undertake phytoplankton and biotoxin sampling in accordance with the requirements set by the Food Authority.
- Immediately advise the Food Authority when illegal harvesting takes place during a closure.
- Notify the NSWSP of any unusual algal events observed within your estuary.
- Notify DPI of any unusual shellfish or fish kills that occur within your estuary.

Food Standards Australia New Zealand

- Coordinate product recall.
- Set national microbiological limits in food through the Food Standards Code.
- Set national limits for other substances that, if present in food, have the potential to render the food unsuitable for human consumption.

Australian Shellfish Quality Assurance Advisory Committee

- National coordinator and technical advisory group in the development and application of the Australian Shellfish Quality Assurance Program (ASQAP).
- Incorporation of the ASQAP Operations Manual into FSANZ Primary Production and Processing Standard for Seafood (PPPSS) in Division 3 of Standard 4.2.1.
- Provide guiding principles for good governance for government agencies and industry.

NSW Department of Primary Industries (Fisheries)

- Issue aquaculture licences and leases.
- Issue commercial fishing licences.

- Ensure no illegal recreational harvesting takes place when a closure is in place.
- Retain records of licences and conditions.
- Control transport of shellstock between harvest areas.

NSW Health and Public Health Units

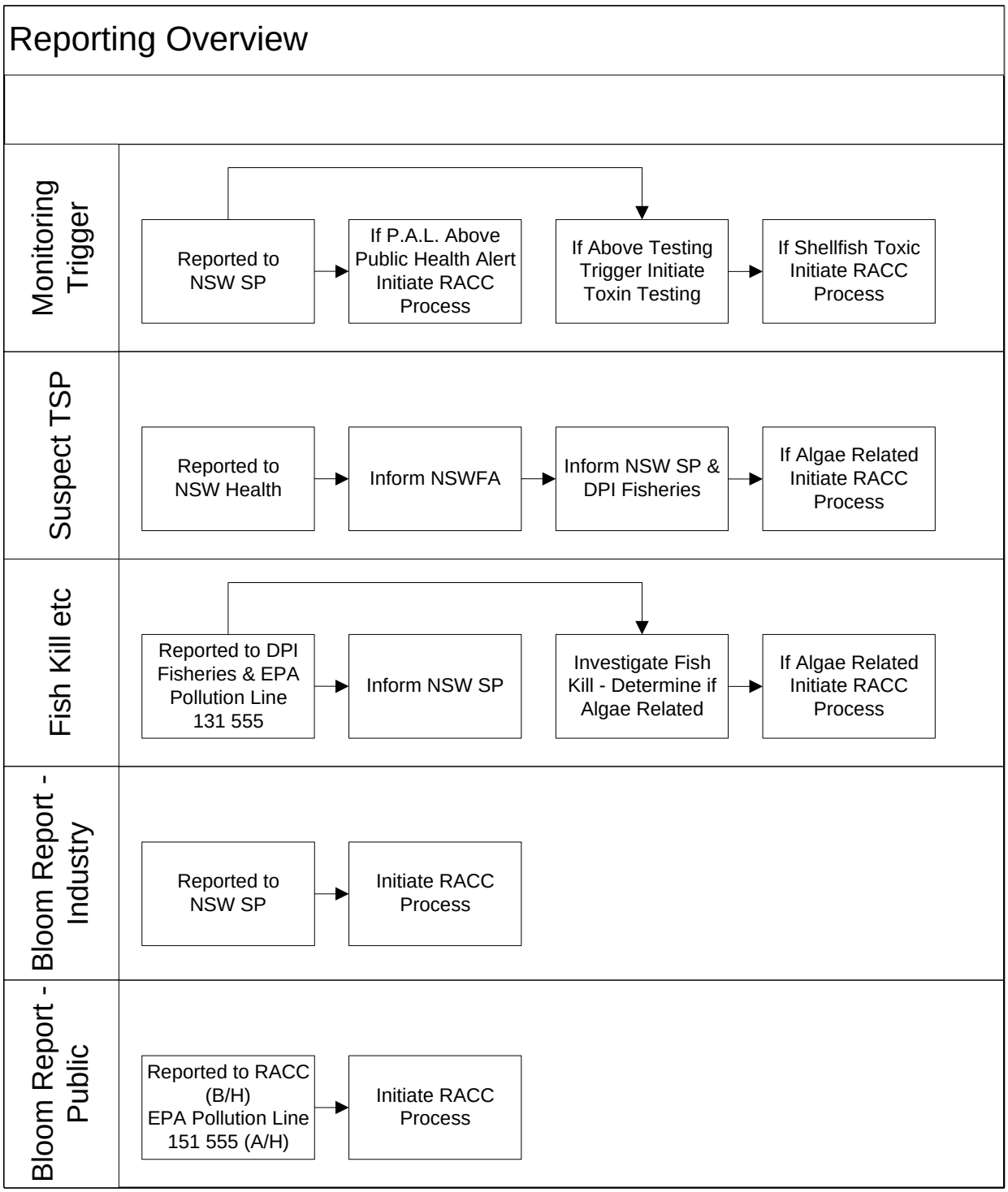
- May receive complaints of foodborne illness through regional Public Health Units.
- Maintain epidemiological data for notifiable diseases (including cases of toxic shellfish poisoning).

Department of Agriculture and Water Resources

- Administration of export controls for seafood. The agency administers the export inspection system and provides certification for shellfish exports.
- The registration of premises, including vehicles, which prepare shellfish intended for export.
- The inspection of registered establishments for implementation of good food processing practices.
- Conduct Hazard Analysis Critical Control Point (HACCP) based food processing controls.
- Compliance inspections and audits of land-based shellfish processing establishment in accordance with the Export Control (Processed Food) Orders 1992.
- Audits of the NSWSP (including the *Marine Biotoxin Management Plan*) for harvest areas with export contracts.

Regional Algal Coordinating Committee (RACC)

- Coordinate the state government response to algal blooms and events.



Note: P.A.L. = Phytoplankton Action Level

Appendix 11 *Wild Harvest Biotoxin Management Plan*

Your *Wild Harvest Biotoxin Management Plan* should be written according to the following guide and in accordance with the *NSW Shellfish Industry Manual* and NSW Shellfish Program *Marine Biotoxin Management Plan*.

1. Testing methods and requirements

Water testing will be conducted in the following way to monitor phytoplankton levels in the harvesting areas:

1.1 Sample site selection

- Sites must be representative of water in which harvested shellfish are filtering.
- Consideration will be given to tidal movements to ensure that samples represent the water that shellfish are about to filter rather than the water they have already filtered.

1.2 Sampling frequency

Phytoplankton monitoring is used to provide early warning of potentially harmful species in growing areas. Two options exist for phytoplankton sampling:

- Weekly phytoplankton sampling whilst the area is in the open status.
- Fortnightly phytoplankton sampling with a monthly biotoxin scan (Jellet test or equivalent for DSP, ASP and PSP) of shellfish flesh while in the open status.

1.3 Water sampling procedures

- Water samples will be approximately 500ml to 1 litre.
- Sampling will be carried out in a safe manner. If the conditions are believed to be hazardous, sample collection will be rescheduled and undertaken as soon as viably possible.
- Water sampling will be undertaken by an approved sampler (contact the Food Authority for approval requirements). Sampling officer techniques will be reviewed every second year and, if required, further Food Authority training requested.
- Samples will be collected using clean bottles.
- Samples will not contain silt.
- Samples to be preserved with Lugol's Iodine if delays of 24 hours+ are expected between sampling and laboratory receipt.
- Water samples will be transported in a manner which minimizes major temperature changes. Samples should be stored in refrigerator and transported with icepacks.

Equipment: Plankton net

Clean plastic bottle (500ml–1L)

	Lugol's Iodine

Method: Tow sample

Check gear	Ensure weight is attached to net and rope is securely tied
Set up tow net	Secure sample bottle to base of tow net
Take sample	Lower to just above the sea floor, slowly and steadily pull up the net, shake contents of net into sample jar[2]
Preserve sample	Place sample in container
	Preserve sample with four drops of Lugol's Iodine
Wash net	Rinse net between samples

Method: Grab sample

Using a 500ml–1L container, lower into water and take sample below water surface. Preserve with Lugol's Iodine.

2. Harvest area closures and reopening procedures

2.1 Closure of the harvest area

A harvest area will be immediately closed by either the program coordinator or Shellfish Program Manager if:

- marine biotoxins are detected in shellfish,
- cases of human illness consistent with case definitions for PSP, NSP, DSP and ASP from shellfish consumption are reported,
- toxic algal species exceed closure alert level, or
- the Shellfish Program Manager determines a closure necessary for any other reasons.

2.2 Reopening of the harvest area

A shellfish growing area closed due to marine biotoxins or elevated phytoplankton levels must not be reopened until the NSW Shellfish Program Manager determines it is safe to do so.

Contact the NSW Shellfish Program for sampling requirements if seeking a reopening 02 9741 4848.

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[2] If the surf is too rough several buckets of water maybe poured through the net.

Refer to NSWSP *Marine Biotoxin Management Plan* for further details regarding closure and opening procedures.

2.3 Establishment of an effective communication pathway

An effective procedure for notifying all plan members of changes to harvest area status will be implemented. The procedure must effectively ensure that all plan members can be notified quickly enough to prevent shellfish from closed harvest areas reaching market.

3. Sampling, harvest area status and membership records

Records are maintained and are available for third party auditing that document the basis for all decisions.

- An establishment of a data collection record will be established by the local program, this will allow for better monitoring and risk assessment of marine biotoxin events.
- Early warning signs will be monitored and recorded highlighting changes of potentially toxic phytoplankton species.
- Increased knowledge will be gained through a wider understanding of those species that pose a potential marine biotoxin threat to the commercial harvest of shellfish.
- The NSW Shellfish Program will be advised of all closures and openings (except after closure due to marine biotoxin event when the NSW Shellfish Program Manager must approve the opening) by email at NSWSP@foodauthority.nsw.gov.au or fax 02 9741 4896.
- A register will be maintained of all members who operate under the plan. The register will include all of the following information:
    - name of each member,
    - address and contact phone numbers for each member,
    - NSW Food Authority license number for each member along with a copy of their current license showing a permission to harvest wild shellfish in one or more harvest areas covered by the plan, and
    - DPI fishing endorsement that they operate under.

4. Internal auditing of the management plan

Internal auditing ensures the local program regularly reassesses the biotoxin management plan and corrective actions implemented and recorded.

Internal auditing will be conducted on the following topics and:

- water sampling procedures and methods reviewed,
- closure methods reviewed and monitored in the event of a toxin algae event, and
- record keeping checked for:
    - water sampling dates,
    - test results as provided by the laboratory,
    - opening and closure records, and
    - members of the plan.

5. Product labelling requirements

Refer to the *NSW Shellfish Industry Manual* for labelling requirements.

6. Product recall procedures

An immediate product recall MUST be undertaken by farmers if:

- confirmed reports of food poisoning consistent with biotoxin symptoms, or
- positive biotoxins are detected in shellfish.

7. All members are trained to implement the plan

All members must have a Food Safety Plan implemented that complies with Food Authority requirements. All members must also be trained to effectively implement the biotoxin management plan.

For further information on training programs available please contact the NSW Shellfish Program.

8. Shellfish collected as bait

Shellfish product collected for bait must be clearly identified and labelled to prevent co-mingling with any product for human consumption.

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