

Summary Report

A summary of the Shellfish Brevetoxin Working Group's discussions, considerations and recommendations following the detection of brevetoxin in South Australia.

Context

In mid-March 2025, a significant algal bloom, initially predominantly composed of the species *Karenia mikimotoi*, was identified in the waters of the Fleurieu Peninsula in South Australia. Following the occurrence of the algal bloom, brevetoxin was first detected in bivalve molluscs (shellfish) in South Australia in May 2025 below the regulatory limit of 0.8 mg/kg (equivalent to 200 MU/mg) as specified in the Food Standards Australia and New Zealand (FSANZ) Food Standards Code limit. This detection was the first time brevetoxin had been detected in Australia. Since the initial detection, brevetoxin has been detected in some shellfish species in South Australia, including oysters, mussels, pipi and abalone.

Brevetoxin is a neurotoxin that is produced by the marine dinoflagellate *Karenia brevis* and potentially other species of *Karenia*, *Gymnodinium* and *Chatenella*. On 5 November 2025, initial findings from the scientific paper 'A catastrophic marine mortality event caused by a complex algal bloom including the novel brevetoxin producer, *Karenia cristata* (Dinophyceae)' by Murray et al. (undated – yet to be peer-reviewed and published) suggested that in the South Australian bloom the algae species responsible for producing brevetoxin is *Karenia cristata*.

The consumption of brevetoxins above regulatory limits can result in Neurotoxic Shellfish Poisoning (NSP). Brevetoxins can accumulate in shellfish (bivalve molluscs) via filter feeding but can be found in other marine organisms including molluscs (e.g., abalone). Due to the method and patterns of consumption, regulatory limits relating to food safety are listed for bivalve molluscs in the Food Standards Code.

The South Australian Shellfish Quality Assurance Program (SASQAP) monitors the water quality in approved shellfish harvesting areas of the State and provides food safety protection for the safe consumption of South Australian shellfish. Following the detection of *Karenia* through routine monitoring, meat sampling of shellfish from classified harvesting areas commenced, consistent with the SASQAP monitoring protocols. SASQAP has established protocols used for closures of harvest areas and reopening of closed areas.

Following the detection of brevetoxin in South Australia, the Shellfish Brevetoxin Working Group (SBWG) was established to provide a consultative forum to engage with the State's shellfish industry on strategic issues relating to testing and reporting for brevetoxin to provide greater certainty for market access.

Key working group discussions

This is the first time brevetoxin has been detected in Australia, and more broadly this is the first large spatial scale algal bloom event (approximately 20,000 km²) Australia has experienced, noting

areas within the Spencer Gulf, Gulf St Vincent and Coorong region have been impacted. There are only two locations where *K. cristata* have previously been reported; False Bay and Walker Bay in South Africa in mid-1990s and Newfoundland, Canada, in 2014. There is limited information available on brevetoxin, and in particular brevetoxin produced by *K. cristata*. It was identified in November 2025 that brevetoxin observed in the South Australian algal bloom was likely being produced by *K. cristata*.

To communicate what is currently understood about brevetoxin it was important for the SBWG to discuss the information available on the biological and ecological processes which drive the production of brevetoxin, impact of brevetoxin on specified shellfish and bivalve species, and implications for management of impacted stocks.

SBWG members and meeting attendees have received advice and presentations from experts with experience in managing brevetoxin and algal blooms from the U.S. National Office for Harmful Algal Blooms, Florida Department of Agriculture and Consumer Services, Cawthron Institute, SafeFish, and the University of Technology Sydney. A literature review study is also being completed by the South Australian Research and Development Institute (SARDI) which will be a publicly available document.

The SBWG discussed several challenges and priorities relating to brevetoxin and the main discussions held within the SBWG are as follows:

Review of SASQAP closure and reopening protocols

The SASQAP protocols have been developed in accordance with the South Australian Biotoxin Management Plan, which aligns to the national processes of the Australian Shellfish Quality Assurance Program (ASQAP). The SBWG requested the protocols be reviewed, with a view to support industry and their practices while meeting food safety standards. Food safety requirements around shellfish consumption are a regulatory and industry priority. A need to investigate options to allow flexibility to industry for business purposes, particularly regarding situations in which brevetoxin levels fluctuate between the FSANZ regulatory limit and the precautionary trigger limit of 0.5 mg/kg.

Outcomes of the review were presented to the SBWG and a proposal to amend the existing protocols was provided to the Working Group seeking feedback. Closure and reopening requirements are as follows:

Table 1. Summary of the requirements under the South Australian Biotoxin Management Plan.

	Approach	Closure	Open
Oysters	Regulatory	≥0.8 mg/kg	Two consecutive declining or static results (minimum 7 days apart) less than regulatory limit (0.8 mg/kg). Nil or declining <i>Karenia</i> counts.
	Advice to Industry	Consider a precautionary closure when brevetoxin levels are above 0.5 mg/kg and not declining	

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		And / OR if <i>Karenia</i> spp. counts are increasing.	
Mussels	Regulatory	≥0.8 mg/kg	Two consecutive tests a minimum of 7 days apart are below the regulatory level of 0.8 mg/kg and decreasing or static. Nil or declining <i>Karenia</i> counts.
	Advice to Industry	Consider a precautionary closure when brevetoxin levels are above 0.5 mg/kg and not declining And / OR if <i>Karenia</i> spp. counts are increasing.	
Pipi	Regulatory	≥0.8 mg/kg	Two consecutive tests a minimum of 7 days apart are below the regulatory level of 0.8 mg/kg and decreasing or static. Nil or declining <i>Karenia</i> counts.
	Advice to Industry	Consider a precautionary closure when brevetoxin levels are above 0.5 mg/kg and not declining And / OR if <i>Karenia</i> spp. counts are increasing.	

The South Australian Biotoxin Management Plan provides for a precautionary closure based on rising levels of brevetoxin or *Karenia* species. For regulatory purposes, parameters aligned with the food safety limits be utilised, with advice provided to industry allowing for industry to manage harvesting activities when results are close to regulatory limits. Industry will need to consider the recall exposure risk associated with the above proposed approach. This approach requires timely communication of results by the regulator to industry.

Harvest of pipi for bait purposes

Under SASQAP harvest closure notices, a harvest area closure applies exclusively to the harvest of shellfish or specified bivalves for human consumption. Pipi are harvested for the purposes of human consumption and bait and it was discussed by the SBWG whether pipi should be harvested for bait purposes if a closure is in place under SASQAP. Regulator advice indicated that any product harvested during a closure period should be packaged in clearly labelled packaging which identifies the product contained within are not for human consumption.

It is not possible under the *Fisheries Management Act 2007* to specify the purpose of harvest of aquatic resources (rather the Act prescribes the 'taking' of aquatic resources), and following previous decisions, it was agreed that harvest for bait purposes can occur under a harvest area closure notice issued by SASQAP.

Partial reopening of the Coorong Harvest Area for pipi

The Coorong Harvest Area is a 75 km stretch of beach in South Australia's south-east which is classified as an approved harvesting area for export by the federal Department of Agriculture, Fisheries and Forestry (DAFF). The Coorong Harvest Area is classified as a single area and the area has been opened and closed as a whole. Along the Coorong Harvest Area there are sampling sites, called 'CORs', of which water and meat samples are taken. Noting sampling results further from the Murray Mouth towards Kingston indicated lower levels of brevetoxin, the pipi industry requested consideration of a partial reopening strategy of the Coorong Harvest Area whereby areas which meet SASQAP reopening criteria could be open for harvest for human consumption.

Since the detection of brevetoxin above the regulatory limit on Youngusband Peninsula in pipi, the classified area has been closed. The *Primary Produce (Food Safety Schemes) (Seafood) Regulations 2017* (the Regulations) allow for part of a classified harvest area to be opened or closed by notice to accredited producers. This allows discretion as to whether a whole harvest area is opened or closed, or whether a harvest area is partially opened or closed in response to monitoring results.

As such, a partial reopening strategy has been developed and endorsed by industry and the Minister for Primary Industries and Regional Development and DAFF to permit harvesting of pipi within detailed zones allowing partial opening of the Coorong Harvest Area as illustrated in Figure 1. Details of partial opening will be provided in a notice to industry with notification also publicly available on the SASQAP website.

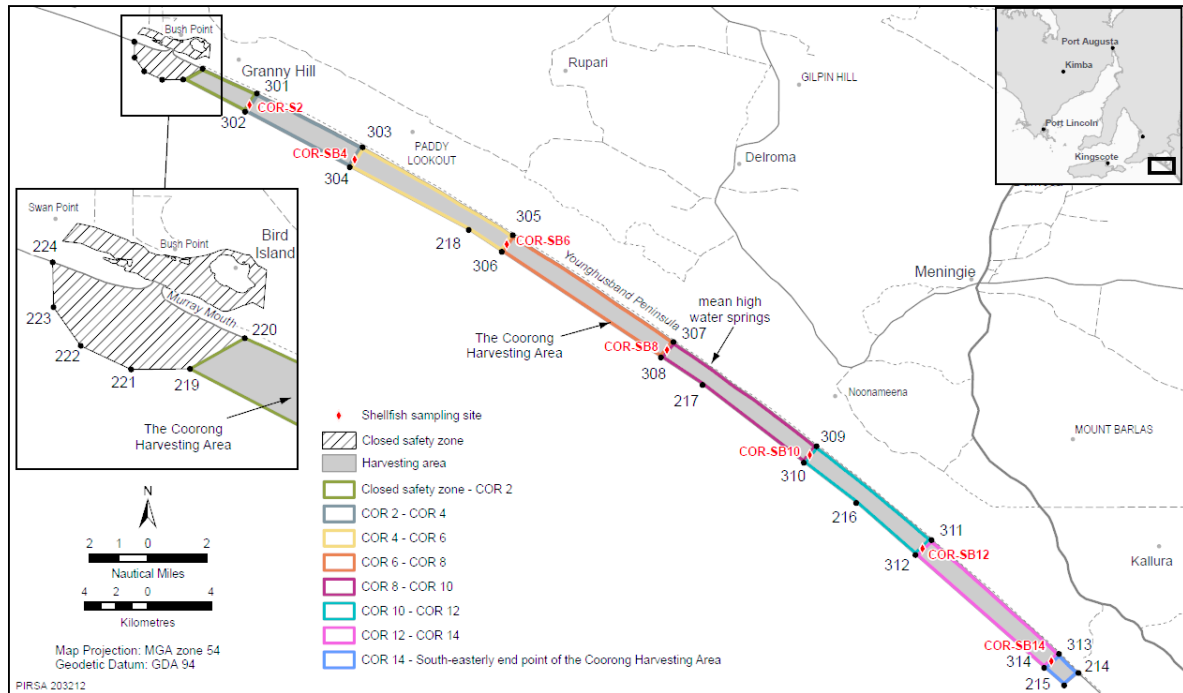


Figure 1. Sampling sites (CORs) at approximately 10 km apart across the length of the total Coorong Harvesting Area.

Identified research project priorities

Accredited brevetoxin testing facility based in Australia and South Australia

A key challenge initially identified by the SBWG was the time delay between shellfish samples being collected to the receipt of test results from the nearest accredited facility which is based in New Zealand. The time delay had direct implications on the trigger level, with a more conservative trigger level being required the longer it takes to receive test results to minimise the risk of product recall.

To address this challenge, the state and federal government have jointly funded a contract with the Thebarton-based laboratory, Agilex Biolabs, to test and quantify for brevetoxin in shellfish including for mussels, oysters and pipi with scope to add other species in the future. The South Australian based laboratory achieved National Association of Testing Authorities (NATA) accreditation on 8 December 2025 and now is the primary brevetoxin laboratory for SASQAP testing; it has reduced the time taken between collection of samples and receipt of test results and aided in the return to business in accordance with the SASQAP protocol.

Depuration rates of mussels, oysters, pipi and abalone

A stakeholder workshop containing representatives from various industry sectors, government agencies and organisations was held on 18 September 2025 to consider gaps in knowledge and identify research priorities relating to brevetoxin and the algal bloom. The research priorities have been provided to the Department for State Development for consideration as part of the Government's Summer Plan Research and Development Program and funding opportunities are being investigated.

Rapid test kits

Rapid test kits (i.e., ELISA test kits) are a quick, convenient and simple kit method to quantitatively detect a specific toxin in a sample. Such tests are used in other jurisdictions for a variety of applications, particularly for industry, and can be used in-field without the need for gear generally restricted to laboratory environments.

The SBWG discussed the benefit of using a rapid test kit as a tool for industry to be better informed and make independent decisions regarding when to harvest product and for business management decisions and will not be used for regulatory decision making. Industry expressed an interest in using rapid tests kits and SafeFish is currently developing tests kits for oysters, mussels, pipi and abalone that are applicable for the brevetoxin detected in South Australia. The test kits are set to be finalised by June 2026.

Reference

Murray, S. A., Bolch, C. J. S., Brett, S., Chan, C. X., Doubell, M., Farrell, H., Gaiani, G., Greenhough, H., Hallegraeff, G., Harding, T. S., Harwood, D. T., Hatfield, R. G., MacDonald, N., Moody, Ian., Bastos de Oliveria. H., Rhodes, L., Selwood, A., Seymour, J., Siboni, N., Snigirova, A., Streiber, N., Rolton, A., Wilkinson, C., Smith, Kirsty, S., (undated), 'A catastrophic marine mortality event caused by a complex algal bloom including the novel brevetoxin producer, *Karenia cristata* (Dinophyceae)', available at <https://doi.org/10.1101/2025.10.31.685766>.