



Our ref: CORP F2025/000293  
Receipt No: 22177554

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31 October 2025

Removed from Disclosure Log

C/- Guardian Australia

Removed from Disclosure Log

Dear Removed from Disclosure Log

### Determination under the *Freedom of Information Act 1991*

I refer to your application made under the *Freedom of Information Act 1991* which was received by the Department of Primary Industries and Regions (PIRSA) on 16 September 2025, seeking access to the following:

*“Briefings and reports related to the South Australian algal bloom and the marine heatwave held, commissioned or produced by PIRSA.*

*Dated: 31/05/2025 - 16/09/2025*

*I do not require personal affairs details. I do not require copies of documents already published, e.g. HAB situation updates published on the PIRSA website”*

Accordingly, the following determination has been finalised.

I have located nine documents that are captured within the scope of your request.

#### **Determination 1**

I have determined that access to the following documents is **granted in full**:

Doc No.	Description of document	No. of Pages
3	Minute from Chief Executive, PIRSA to Minister for Primary Industries and Regional Development dated 21/8/2025 re attendance at The Advertiser Bush Summit – Panel Discussion re Algal Bloom	5
5a	Attachment to Document 5 – Harmful Algal Bloom (HAB) – Science Technical Forum – Agenda – 3/6/2025	1
6	Detected Footprint of Impact – Monthly	2
7	Harmful Algal Bloom Science Forum 3/6/2025 - Summary	13

The information removed from Documents 3, 5a and 7 is outside of the scope of your request as the information consists of the personal affairs of individuals.

**Determination 2**

I have determined that access to the following documents is **granted in part**:

Doc No.	Description of document	No. of Pages
1	Minute from Chief Executive, PIRSA to Minister for Primary Industries and Regional Development dated 15/7/2025 re Harmful Algal Bloom (HAB) Taskforce – Briefing and Participation	7
2	Minute from Chief Executive, PIRSA to Minister for Primary Industries and Regional Development dated 12/8/2025 re Algal bloom scanning and assessment	7
3a	Attachment to Document 3 – PIRSA Talking points and key messages – Algal Bloom – Dated 21/8/2025	17
5	Minute from Chief Executive, PIRSA to Minister for Primary Industries and Regional Development dated 13/6/2025 re Harmful Algal Bloom Science Forum	5

The information removed from the above documents is pursuant to Clause 9(1) and Clause 6(1) of Schedule 1 of the Freedom of Information Act.

Clause 9(1) states:

***“9—Internal working documents***

*(1) A document is an exempt document if it contains matter—*

*(a) that relates to -*

*(i) any opinion, advice or recommendation that has been obtained, prepared or recorded; or*

*(ii) any consultation or deliberation that has taken place, in the course of, or for the purpose of, the decision-making functions of the Government, a Minister or an agency; and*

*(b) the disclosure of which would, on balance, be contrary to the public interest.”*

The information removed pursuant to Clause 9(1) consists of the following:

- Documents 1 and 5: Information contained in briefings from a public sector agency to a Minister for internal decision-making purposes.
- Document 2: Information contained in a draft response to an author of correspondence prepared by a public sector agency for consideration of the Premier.
- Document 3a: The exempt material is draft wording for a potential media query or release where the Government was deliberating upon the message to be conveyed in the release and relates to any consultation or deliberation that has taken place, in the course of, or for the purpose of, the decision-making functions of the Government, a Minister or agency.

OFFICIAL

In addressing the public interest test for the Clause 9(1) exemption, I have balanced the following factors:

*In favour of the public interest:*

- Meeting the objects of the Freedom of Information Act favouring access to documents.
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.
- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.
- High level of community, media and Parliamentary interest and concern relating to the algal bloom.

*Contrary to the public interest:*

- The recent age of the information was considered and the continuing relevance of the matters.
- Protection of the deliberative processes of Government.
- Enabling Government to consider proposals without detail being published into the public domain prior to the finalisation of decisions.
- Providing an agency with the ability to undertake internal consultation without unnecessary interference.
- Release of this information would discourage the flow of free exchange of ideas and options during deliberative processes.
- Preserving the integrity of information-gathering processes, including some internal communications, leading up to the finalisation of decisions.
- Disclosing this information may compromise the manner in which information is gathered in the future for the decision-making processes of Government to the detriment of the betterment for South Australia.

Having considered the various factors weighing for and against disclosure, I have determined that disclosure of this information would, on balance, be contrary to the public interest.

The remaining information removed consists of the personal affairs of individuals and is outside of the scope of your request.

**Determination 3**

I have determined that access to the following document is **refused**:

Doc No.	Description of document	No. of Pages
4	Parliamentary Briefing Note dated 11/9/2025 re Algal Bloom overview	25

Access to the above document is refused pursuant to Clause 17(c) of Schedule 1 of the Freedom of Information Act which states:

**“17 – Documents subject to contempt etc**

*A document is an exempt document if it contains matter the public disclosure of which would, but for any immunity of the Crown –  
(c) infringe the privilege of Parliament.”*

The document consists of a briefing note which was specifically prepared for the purpose of use in proceedings in Parliament. Disclosure of this information would infringe the privilege of Parliament.

If you are dissatisfied with this determination, you are entitled to exercise your right of review and appeal as outlined in the attached documentation [Making a Freedom of Information Application | State Records of South Australia \(archives.sa.gov.au\)https://archives.sa.gov.au/sites/default/files/public/documents/Internal\\_Review\\_Application\\_Form\\_1.pdf](https://archives.sa.gov.au/sites/default/files/public/documents/Internal_Review_Application_Form_1.pdf), by completing the “FOI Application Form for Internal Review of a Determination” and returning the completed form to:

Freedom of Information Principal Officer  
Department of Primary Industries and Regions  
GPO Box 1671  
ADELAIDE SA 5001

or via email [PIRSA.FOI@sa.gov.au](mailto:PIRSA.FOI@sa.gov.au)

In accordance with the requirements of Premier and Cabinet Circular PC045, details of your application, and the documents to which you are given access, will be published in PIRSA’s disclosure log. A copy of PC045 can be found at [http://dpc.sa.gov.au/data/assets/pdf\\_file/0019/20818/PC045-Disclosure-Log-Policy.pdf](http://dpc.sa.gov.au/data/assets/pdf_file/0019/20818/PC045-Disclosure-Log-Policy.pdf)

If you disagree with publication, please advise the undersigned in writing within fourteen calendar days from the date of this determination.

Should you require further information or clarification with respect to this matter, please contact Ms Lisa Farley, Senior Freedom of Information Advisor on 8429 0422 or email [PIRSA.FOI@sa.gov.au](mailto:PIRSA.FOI@sa.gov.au).

Yours sincerely



Michelle Griffiths

**Accredited Freedom of Information Officer  
DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONS**



Minute to  
**Minister for Primary Industries and Regional Development**  
**Minister for Forest Industries**

Ref: eA203373

For	<b>Noting</b>
Critical Date	<b>ASAP (for HAB Taskforce meeting on 15 July 2025)</b>
Subject	<b>South Australian Harmful Algal Bloom (HAB) Taskforce – Briefing and Participation</b>

### Synopsis

This brief provides the Minister with background and current information ahead of the first South Australian Harmful Algal Bloom (HAB) Taskforce meeting on 15 July 2025. The prolonged *Karenia mikimotoi* bloom has had significant environmental, public health, and industry consequences. The Taskforce will ensure a coordinated whole-of-government response.

The brief outlines PIRSA's role, current science and monitoring updates, and immediate and future sector support mechanisms.

### Recommendations

That you:

- Note the contents of this brief in preparation for the inaugural HAB Taskforce meeting on 15 July 2025.

**NOTED**

.....  
Hon Clare Scriven MLC  
**Minister for Primary Industries  
and Regional Development**  
**Minister for Forest Industries**  
/ / 2025

**Ministerial Comments -**

## Background

- Since March 2025, South Australia has been impacted by an extensive harmful algal bloom (HAB) event dominated by *Karenia mikimotoi*, an algal species known to cause fish kills and significant disruptions to aquaculture.
- The bloom is associated with persistent marine heatwave (MHW) conditions since September 2024 and has affected a wide range of locations including Gulf St Vincent, Spencer Gulf, Kangaroo Island, Yorke Peninsula, the Fleurieu Peninsula, and the Coorong.
- This is the most widespread HAB event in South Australia since the 2014 Coffin Bay bloom and is considered unprecedented in terms of geographic extent, environmental impact, and duration.
- A coordinated whole-of-government response is required to manage risks to public health, food safety, and the economic viability of affected industries.

## Discussion

### Purpose of the Taskforce

- The South Australian HAB Taskforce is being established to provide a coordinated interagency approach to HAB events. The objectives of the Taskforce include:
  - Strengthening cross-government coordination
  - Improving environmental and risk communication
  - Informing response planning and future resourcing needs
  - Embedding scientific advice and scenario modelling into operational decision-making.
- The Science Advisory Panel to be established alongside the Taskforce will provide technical interpretation and research coordination.

### Current Situation

- As at 11 July 2025, MHW conditions are easing across most coastal waters but remain moderate in deeper offshore zones near Kangaroo Island and Yorke Peninsula.
- Satellite data shows persistent elevated chlorophyll-a concentrations (a proxy for algal presence) in the following regions:
  - Upper Gulf St Vincent (Aldinga to Edithburgh)
  - Upper Spencer Gulf (Hardwicke Bay, Balgowan)
  - North coast of Kangaroo Island
  - Fleurieu Peninsula and eastern Coorong.
- New areas of increased chlorophyll-a concentrations have been noted along Port Wakefield, Hallett Cove, and Kingscote.

### Environmental and Health Impacts

- *Karenia mikimotoi* impacts marine life by clogging gills of fish and invertebrates, leading to mass mortalities.

- While the algae does not produce a human toxin, exposure has caused eye, skin, and respiratory irritation in beachgoers.
- SA Health recommends avoiding foam or discoloured water and remaining indoors if symptoms are experienced.
- Signage has been installed at beaches, and SA Health provides ongoing health advice via its website.

#### Food Safety and SASQAP Closures

- PIRSA's South Australian Shellfish Quality Assurance Program (SASQAP) has closed several oyster harvesting areas, including American River, Port Vincent, and Stansbury.
- A precautionary closure is also in place at Boston Bay, Bickers Island, Lower Eyre and Proper Bay Harvesting Areas where mussel aquaculture occurs.
- These closures are precautionary, based on elevated biotoxins in shellfish tissue exceeding regulatory thresholds.
- Remaining areas are being tested regularly, and product from open sites is confirmed safe to eat.
- The Coorong Harvesting Area where the commercial pipi fishery operates has also been recently closed.
- Public messaging emphasises that live-caught fish are safe for consumption, but dead or washed-up animals should not be consumed.

#### Industry Impacts and Financial Relief

- Numerous reports have been provided to PIRSA from commercial and recreational fishers, particularly those involved in the Marine Scalefish Fishery (MSF) on Kangaroo Island and Yorke Peninsula, as well as oyster growers in Stansbury, regarding the impact of the HAB.
- PIRSA is working with industry to understand the extent of the impacts and has provided regular updates to the commercial fisheries and aquaculture sectors, as well as RecFish SA, such as through the SARDI HAB reports, industry meetings, and direct communication with fishers.
- Recently, the Marine Fishers Association (MFA) and the South Australian Professional Fishers Association (SAPFA), representing the MSF, have been contacted to gather information regarding licence holders who have been impacted by the HAB, and the extent of the impacts. PIRSA is now working with the associations and licence holders to verify the information provided for consideration of targeted pro-rata fee relief (April–June 2025) to those in need; noting that while the full extent and duration of the HAB is uncertain, it is expected to persist beyond the current quarter.
- Notably, MSF licence holders across the sector are impacted to varying degrees by the HAB – some are reporting significant impacts, and some none.
- Concerns have also been raised by the aquaculture sector, particularly from oyster, tuna, and kingfish operators.
- SASQAP has implemented closures for oyster growers in Stansbury, Port Vincent, Coobowie and American River, as well as a pipi closure to 10 km south of the Murray Mouth, which has recently (1 July 2025) been extended to the entire Coorong

Harvesting Area. Regular weekly testing continues in these areas to inform when these areas will be re-opened.

- PIRSA has investigated emergency aquaculture lease movement arrangements, particularly for tuna and kingfish, and has enacted a second quota allocation in lower Spencer Gulf for the Sardine Fishery.

- Clause 9(1)

- On 8 July 2025, the Government announced a targeted 25% fee relief package for the April–June 2025 quarter, covering fisheries and aquaculture fees and seafood safety scheme fees.
- Eligibility is proposed to be assessed by PIRSA’s Fee Relief Review Group using fishing data and sector input.
- Where possible, PIRSA will validate catch data internally, though recent returns may still need to be submitted (particularly from operators using paper-based logbooks).
- Acknowledging that there are impacted operators across the South Australian seafood sectors, PIRSA is continuing to monitor the situation closely and is investigating possible support packages that may be warranted beyond the April–June 2025 period.

- Clause 9(1)

- PIRSA will continue to work with the fisheries and aquaculture sectors on their needs arising out of the HAB going forward, including addressing concerns regarding market impacts, and loss of consumer confidence.

#### Long-Term Risk and Science Response

- Oceanographic modelling through the eSA-Marine system provides short-term trajectory forecasts for algal movement.
- The 3 June 2025 HAB Science Forum highlighted the need for improved long-term forecasting, enhanced data sharing, and investment in ecosystem monitoring.
- International experience suggests *Karenia mikimotoi* blooms can persist for several months, with some cases lasting longer than a year.

#### Forward Planning

- PIRSA will use the Taskforce to:
  - Identify priority science and monitoring gaps
  - Coordinate public communications and interagency protocols
  - Engage industry and regional stakeholders
  - Assess long-term mitigation strategies including resilience-building for aquaculture.

### **Stakeholder / regional impacts, consultation and engagement**

- The HAB has impacted key coastal regions across South Australia, particularly Kangaroo Island, Yorke Peninsula, Gulf St Vincent, Spencer Gulf and the Coorong.
- Stakeholder engagement to date includes:
  - PIRSA is in regular contact with peak bodies and individual licence holders and will continue engagement as catch data and impacts are clarified. PIRSA has received formal correspondence from South Australian Oyster Growers Association (SAOGA), the Marine Fishers Association (MFA) and the South Australian Professional Fishers Association (SAPFA), and individual MSF licence holders requesting fee relief and highlighting concerns about ongoing commercial viability.
  - MSF: PIRSA is working closely with both the MFA and SAPFA, who have provided early returns on the scale of impacts, including summaries of fishing days lost and reduced catch.
  - Oyster Aquaculture Sector: PIRSA has received formal correspondence from SAOGA, outlining operational disruptions, closures under SASQAP, and the financial stress experienced by growers.
  - Charter Boat, Pipi and Lakes and Coorong fisheries licence holders: PIRSA has been in contact with Pipi Co, and the executive officer representing Charter Boat and Lakes and Coorong fisheries licence holders, who is actively collating impact information on behalf of affected licence holders for submission.
- Ongoing collaboration between PIRSA divisions (SARDI, Biosecurity, Fisheries and Aquaculture) and impacted industries to collect and validate environmental, catch, and business impact data.
- Cross-government engagement through the previous HAB Working Group (now HAB Taskforce).
- Public concern and media coverage, including widespread reporting on fish kills, seafood safety, and financial pressure on licence holders.

### **Management of key risks**

- The Taskforce will enable structured risk identification and response prioritisation.
- Ongoing risks include:
  - Reputational and market access risks for seafood exports
  - Localised ecological degradation and recovery of commercially and recreationally important species
  - Delayed harvest recovery in aquaculture areas
  - Further mortalities and emerging hotspots as conditions evolve.
- Uncertain Duration and Scope: The HAB event remains dynamic and widespread, with no clear indication of when it will resolve. Ongoing monitoring and modelling by SARDI are critical, but variability in environmental conditions means future impacts are unknown and may escalate or persist. The HAB Science Forum identified a range of knowledge gaps which will form the basis of a proposed research and monitoring program for Government's consideration.

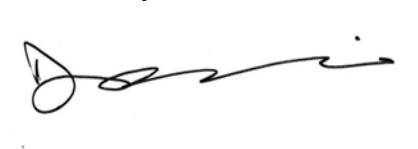
- Mental Health and Social Impact: A failure to respond with timely support could contribute to increasing psychological distress and uncertainty among fishers and growers.
- Cross-Government Expectations and Communication: Alignment and role clarity across agencies is essential to avoid duplication or blurred responsibilities. PIRSA's role is focused on sector support—not leading the environmental or public health response.

**Legislative and/or financial implications**

- The April–June 2025 relief program is capped at **Clause 9(1)** from existing Thriving Regions Fund allocations.
- **Clause 9(1)**

**Attachments**

- *Enclosure: South Australian Harmful Algal Bloom Taskforce Agenda – Tuesday 15 July 2025*



**CHIEF EXECUTIVE**

Department of Primary Industries and Regions

15/7/2025

<b>CONTACT</b>	Prof. Gavin Begg
<b>POSITION</b>	Executive Director
<b>DIVISION</b>	Fisheries and Aquaculture
<b>MOBILE and LANDLINE</b>	<b>Out of scope</b>
<b>Cleared by</b>	Feeras Najjar – General Manager Regulatory and Business Services

# South Australian Harmful Algal Bloom Taskforce Agenda



<b>Meeting title</b>	South Australian Harmful Algal Bloom Taskforce			
<b>Meeting date and time</b>	Tuesday 15 July 2025 3 - 4 pm			
<b>Location</b>	Cabinet Room, Level 15, State Administration Centre			
<b>Attendees</b>	<p>Susan Close, Minister for Climate, Environment and Water  Clare Scriven, Minister for Primary Industries and Regional Development  Co-chairs: Mehdi Doroudi (PIRSA) and Sandy Carruthers (DEW)  Gavin Begg (PIRSA), [Out of scope] (SARDI), [Out of scope] (SA Health), [Out of scope] (SA Health), [Out of scope] (EPA), Gretchen Grammer (SARDI), [Out of scope] (Green Adelaide), [Out of scope] (DEW)  Proxies: [Out of scope] (DEW), [Out of scope] (DEW), [Out of scope] (PIRSA), [Out of scope] (SARDI)  Apologies: [Out of scope] (DEW); Mike Steer (SARDI); [Out of scope] (DEW), Georgie Cornish (PIRSA), [Out of scope] (EPA); [Out of scope] (DEW)  Executive Officer: [Out of scope]</p>			
<b>Item</b>	<b>Time</b>	<b>Discussion item</b>	<b>Paper</b>	<b>Responsible</b>
1	3:00	Acknowledgement of Country; welcome and apologies		Mehdi
<i>We acknowledge the traditional owners of the land on which we meet today and pay our respects to their Elders past and present and extend that respect to other Aboriginal and Torres Strait Islander people who are present today</i>				
2	3:05	Establishment of the Harmful Algal Bloom Taskforce <ul style="list-style-type: none"> <li>Transition of HAB Working Group to the Taskforce</li> <li>Terms of Reference and ministerial priorities</li> <li>Establishment of the HAB Reference Group</li> </ul>	Paper - Approved Terms of Reference	Minister
3	3:30	Establishment of a Communications and Engagement Plan	Verbal	[Out of scope]
4	3:40	Establishment of a Science Advisory Panel	Paper	Sandy
5	3:50	Response and recovery actions <ul style="list-style-type: none"> <li>Immediate actions - algae monitoring &amp; marine observations</li> <li>Identification and collation of priority actions</li> <li>Commonwealth engagement</li> </ul>	Verbal	Mehdi & Sandy
6	4:00	Meeting close		Sandy



Minute to  
**Minister for Primary Industries and Regional Development**  
**Minister for Forest Industries**

Ref: eA203495

For	<b>Noting and Signature</b>
Critical Date	Nil
Subject	<b>Correspondence from <sup>Clause 6(1)</sup> [REDACTED] – Algal bloom scanning and assessment</b>

### Synopsis

Information is provided in response to correspondence from <sup>Clause 6(1)</sup> [REDACTED] regarding resourcing and assessment of the impact of the harmful algal bloom in the waters of the Fleurieu coast.

A draft briefing for the Premier's consideration (Attachment A) and a draft letter of reply for the Premier's signature (Attachment B) are provided also.

### Recommendations

That you:

- Note the information provided in the brief.  
**NOTED**
- Sign the attached briefing to the Premier (Attachment A).  
**SIGNED / NOT SIGNED**

.....  
Hon Clare Scriven MLC  
**Minister for Primary Industries  
and Regional Development**  
**Minister for Forest Industries**  
/ / 2025

**Ministerial Comments -**

## Background

- The Premier and Minister have received correspondence from <sup>Clause 6(1)</sup> [redacted] <sup>Clause 6(1)</sup> [redacted] requesting urgent resources be made available to enable scanning and assessment of coastal waters off the Fleurieu Peninsula, like that recently undertaken in the Gulf St Vincent to assess the impact of the harmful algal bloom.
- Information regarding the observations undertaken in the Gulf St Vincent and plans for future investigations are provided below. A draft briefing to the Premier and a draft letter of reply from the Premier to <sup>Clause 6(1)</sup> [redacted] are attached.

## Discussion

- South Australia's flagship fisheries patrol vessel *MV Southern Ranger* operated in the Gulf of St Vincent on Wednesday 16 July 2025. Onboard were staff, from PIRSA Fisheries and Aquaculture, SARDI, and the Department of Environment and Water (DEW), who gathered water samples and carried out underwater observations of the harmful algal bloom to better understand the effect on the ecosystem.
- The voyage departed from Outer Harbor and travelled to Ardrossan, Rapid Head, Carrickalinga and Aldinga; the last three locations being on the western coast of the Fleurieu Peninsula.
- At all four locations – which are sanctuary zones – video footage was collected of the ocean floor. Water samples were taken at these sites, as well as at another five sites enroute.
- It is expected that the information gathered from this trip together with data already held by both DEW and PIRSA will help inform the future direction of the science and monitoring program to investigate the impacts of the bloom.
- The current focus is on analysing the information and data collected to date. The need for further underwater observations is being discussed.
- Additionally, South Australian government scientists are engaging with the wider scientific community globally regarding the latest research on algal blooms and observation and management tools that have been established in other countries, such as New Zealand, where this particular type of bloom has occurred.

## Stakeholder / regional impacts, consultation and engagement

- The algal bloom has affected fishers and other industries associated with the Marine Scalefish Fishery on Kangaroo Island and Yorke Peninsula, as well as shellfish growers in Stansbury, Stansbury, Port Vincent, Coobowie, American River and the Boston Bay, Bickers Island, Lower Eyre and Proper Bay Harvesting Areas within the Port Lincoln Growing Area.
- Charter boat operators and fisheries around the River Murray mouth, Lakes and Coorong have also been impacted to varying degrees.
- Ongoing monitoring of shellfish harvesting areas by the South Australian Quality Assurance Program (SASQAP), has resulted in several temporary and precautionary closures of shellfish harvesting areas to ensure food safety standards are upheld.
- PIRSA continues to work with the Marine Fishers Association, the South Australian Professional Fishers Association and the South Australian Oyster Growers Association to assess the scale of the impact and target support.

- Public forums are being held for impacted coastal communities and a trusted single point of information and contact for timely, accurate, and clear communication to industry and the public, including a single phone hotline, website, consistent physical signage and information, has been established.

### Management of key risks

- PIRSA via SASQAP continues to monitor closed shellfish harvesting areas with the view to opening them as soon as the relevant food safety standards are met.
- Rigorous ongoing testing is in the interest of food safety and is aimed at assuring consumers of commercially harvested oysters, mussels, cockles and scallops that they are safe to eat.
- Public information campaigns focused on rebuilding confidence and driving visitation to our coastal regions and marine based tourism businesses and promoting the seafood industry and benefits of recreational fishing are underway.
- To further support the public in accessing relevant and timely information the State Government has established an online information page available at [www.algalbloom.sa.gov.au](http://www.algalbloom.sa.gov.au) .
- SARDI Algal Bloom Situational updates are being provided up to twice a week to the commercial fisheries and aquaculture sectors and RecFish SA and are available on the PIRSA website.
- Latest public health advice, including water quality alerts, is also available on [algalbloom.sa.gov.au](http://algalbloom.sa.gov.au) .

### Legislative and/or financial implications

- The Commonwealth and State Governments are providing a joint \$28 million harmful algal bloom support package (\$14 million from each government). The package covers industry support, science and research, communications, community support and clean up.
- This is in addition to the fee relief measures announced earlier this month and the \$1,500 direct support payments to impacted primary producers.
- The costs associated with the MV Southern Ranger voyage were funded from the science and research component of the joint Commonwealth and State harmful algal bloom support package.

### Attachments

- A. Draft briefing to the Premier
- B. Draft letter of reply from the Premier to Clause 6(1)



### CHIEF EXECUTIVE

Department of Primary Industries and Regions

12 / 8 / 2025

<b>CONTACT</b>	Prof Mike Steer
<b>POSITION</b>	Executive Director
<b>DIVISION</b>	SARDI
<b>MOBILE and LANDLINE</b>	Out of scope
<b>Cleared by</b>	Acting Research Director, Aquatic and Livestock Sciences



MINUTES forming ENCLOSURE to eA203495

TO: PREMIER

SUBJECT: CORRESPONDENCE FROM Clause 6(1) – URGENT  
RESOURCES TO SCAN AND ASSESS THE WATERS OF THE  
FLEURIEU COAST

### Purpose

- You have received correspondence from Clause 6(1) concerning resources to scan and assess the impact of the harmful algal bloom in the water of the Fleurieu coast.

### Discussion

- South Australia's flagship fisheries patrol vessel *MV Southern Ranger* operated in the Gulf of St Vincent on Wednesday 16 July 2025. Onboard were staff, from PIRSA Fisheries and Aquaculture, SARDI, and the Department of Environment and Water (DEW), who gathered water samples and carried out underwater observations of the harmful algal bloom to better understand the effect on the ecosystem.
- The voyage departed from Outer Harbor and travelled to Ardrossan, Rapid Head, Carrickalinga and Aldinga; the last three locations being on the western coast of the Fleurieu Peninsula.
- At all four locations – which are sanctuary zones – video footage was collected of the ocean floor. Water samples were taken at these sites, as well as at another five sites enroute.
- The information gathered from this trip together with data already held by both DEW and PIRSA will help inform the future direction of the science and monitoring program to investigate the impacts of the bloom.
- The costs associated with this trip were funded from the science and research component of the joint Commonwealth and State harmful algal bloom support package.
- The current focus is on analysing the information and data collected to date. The need for further underwater observations is being discussed.
- Additionally, South Australian government scientists are engaging with the wider scientific community globally regarding the latest research on algal blooms and observation and management tools that have been established in other countries, such as New Zealand, where this particular type of bloom has occurred.

**Recommendation/s**

That you:

1. Note the attached briefing.
2. Consider and sign the attached letter of response to Clause 6(1)

**Noted/Approved/Not Approved**

(signature) \_\_\_\_\_  
Hon Peter Malinauskas MP  
**PREMIER**

\_\_\_\_ / \_\_\_\_ / 2025

Hon Clare Scriven MLC  
**MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT**  
**MINISTER FOR FOREST INDUSTRIES**

/ / 2025

Clause 6(1)

eA203495

Dear Clause 6(1)

Thank you for your recent letter of about resourcing and assessment of the impact of the harmful algal bloom in the waters of the Fleurieu coast.

The voyage of the *MV Southern Ranger* on 16 July included visits to three locations on the western coastline of the Fleurieu Peninsula: Rapid Head, Carrickalinga, and Aldinga. At each of these sites, water samples were collected and underwater observations were conducted.

The information collected from this voyage, together with data already held by South Australian Government scientists, will help inform the future direction of the science and monitoring program to investigate the impacts of the bloom.

Clause 9(1)

Yours sincerely

Peter Malinauskas  
**PREMIER**

/ / 2025



Minute to  
**Minister for Primary Industries and Regional Development**  
**Minister for Forest Industries**

Ref: eA203350

For	<b>Noting</b>
Critical Date	<b>21 August 2025</b> (for The Advertiser Bush Summit on 22 August)
Subject	<b>Attendance at The Advertiser Bush Summit</b>

**Synopsis**

Latest information regarding the algal bloom and the Government's response is provided in preparation for your attendance The Advertiser Bush Summit in Mt Gambier on Friday 22 August 2025.

**Recommendations**

That you:

- Note the brief.

**NOTED**

.....  
Hon Clare Scriven MLC  
**Minister for Primary Industries  
and Regional Development**  
**Minister for Forest Industries**  
/ / 2025

**Ministerial Comments -**

## Background

- You are attending The Advertiser Bush Summit in Mt Gambier on Friday 22 August 2025 and participating in a panel discussion about the algal bloom.
- The latest information about the algal bloom and the Government's response to its impacts is provided in preparation.

## Discussion

### *Algal bloom background*

- A significant algal bloom of the species *Karenia mikimotoi* in South Australia was identified in mid-March 2025, initially in the waters around the Fleurieu Peninsula, specifically near Waitpinga and Parsons Beach. Since then, it has impacted other areas of the South Australian coast including the eastern coastline of Eyre Peninsula, parts of southern Yorke Peninsula, the Coorong, Kangaroo Island and several suburban Adelaide beaches.
- Exceptionally warm ocean temperatures (marine heatwave) have been affecting southern Australian waters since September 2024. These elevated water temperatures are considered a contributing factor to the bloom. While there have been slight reductions in sea surface temperatures due to seasonal cooling, temperatures in South Australian coastal waters have remained significantly above average during Autumn and Winter, supporting the persistence of the bloom.
- Other potential contributing factors include nutrient influx from the Murray River floods in the summer of 2022-23 and a sustained upwelling event of nutrient-rich, deep ocean water in the summer of 2023-24.
- The scale and the longevity of this current bloom event is unprecedented.
- It is difficult to predict the duration of algal blooms. Factors that can lead to the decline or end of the bloom include a change in environmental conditions such as cooler temperatures, increased mixing and water flow, decreased sunlight, and decreased nutrient availability.
- For these reasons, the current bloom is dynamic and can travel depending on weather, ocean circulation, and environmental conditions.
- It is considered likely that this bloom event will recur in the future. *Karenia* algal blooms have shown recurrent behaviour in other parts of the world, like the Gulf of Mexico, and similar non-cyst and cyst-forming species have been observed to recur regularly once established. While *Karenia* species do not produce long-term resting cysts, they produce short-term pellicle cysts which are thought to aid in extending bloom sequences.

### *Algal bloom impacts*

- Brevetoxins, a group of neurotoxins produced by some *Karenia* species, have been detected during this bloom event for the first time in Australian waters.
- As *Karenia mikimotoi* is not known to produce brevetoxins, it provides evidence that other algae species are likely involved with this bloom event. Multiple species have been detected and the following identified:
  - *Karenia mikimotoi*
  - *K. longicanalis*
  - *K. brevisulcata*

- *Karlodinium veneficum*
- *Karenia brevis* has not been detected and the species causing the brevetoxin is yet to be confirmed.
- The detection of brevetoxins has been managed in line with Australia's standard procedures for managing biotoxin detections and its detection demonstrates that the South Australian Seafood Quality Assurance program (SASQAP) in place is robust and effective. Brevetoxins have been detected in shellfish, at 10 locations in South Australia currently closed for harvesting (Stansbury, Coobowie, Port Vincent, American River, The Coorong, Boston Bay, Bickers Island, Lower Eyre, Proper Bay and Franklin Harbour).
- As at 18 August, the SASQAP testing regime has led to precautionary closures at the American River, Port Vincent, Coobowie and Stansbury oyster harvesting areas and for the commercial harvesting of pipis between the River Murray Mouth to 10 kilometres south of the mouth.
- A precautionary closure also remains in place at the Franklin Harbour Harvesting Areas due to the detection of brevetoxins, while further monitoring occurs in the area.
- Previous precautionary closures at Proper Bay, Boston Bay, Bickers Island and the Lower Eyre harvesting area within the Port Lincoln Growing Area have now reopened for both oysters and mussels. The closures were implemented due to the presence of brevetoxins.
- PIRSA is regularly engaging with impacted shellfish harvesting producers during these current temporary closures. PIRSA through SASQAP continues to monitor the closed harvesting areas with the view to opening them as soon as the relevant food safety standards are met.
- While we acknowledge the impact this is having on affected producers, our rigorous ongoing testing regime is in the interest of food safety and is aimed at assuring consumers of commercially harvested oysters, mussels, cockles and scallops that they are safe to eat.
- The algal bloom event in South Australia has caused mass fish and shellfish deaths by damaging gills and depleting oxygen. This reflects a global trend where algal blooms harm diverse marine life through toxins, oxygen depletion, and physical damage, thereby impacting marine ecosystems.
- It is estimated the algal bloom has affected over 470 species of fish, invertebrates and associated marine and coastal diversity. This has included commercial species such as pipis and snapper, iconic biodiversity such as the state's leafy sea dragons, and larger marine life, including a variety of sharks and rays.

#### *State and Federal Government Support*

- In July, the Federal and State Governments announced a joint \$28 million algal bloom support package; \$14 million being provided by each government.
- The comprehensive package covers industry support, science and research, communications, community support and clean up.
- This is in addition to the fee relief measures and the \$1,500 direct support payments by the State Government to impacted primary producers.
- Under the joint State / Federal support package, key industry support measures include a Fisheries and Aquaculture Assistance Grant and a Small Business Support

Grants for eligible commercial fishers, aquaculture licence holders and small businesses impacted by the algal bloom.

- Other support measures include the waiving of food safety, fisheries and aquaculture licence fees for the June and September quarters.
- Impacted licence holders are encouraged to work with their industry association to access the fee relief process. The relevant industry associations are compiling claims and submitting them to PIRSA for assessment.
- Mental health and wellbeing support is available to licence holders facing financial hardship via the State Government's Rural Support Grant, the Rural Financial Counselling Services and the Family and Business Support program.
- A national seafood industry program, Stay Afloat, is also available for affected commercial fishers, charter operators and seafood processors via [www.stayafloat.com.au](http://www.stayafloat.com.au)

### **Stakeholder / regional impacts, consultation and engagement**

- The State Government has established an algal bloom information web page which is available at [www.sa.gov.au/algalbloom](http://www.sa.gov.au/algalbloom)
- SARDI Algal Bloom Situational updates have been provided to the commercial fisheries and aquaculture sectors and RecFish SA since 11 April 2025. These updates are provided twice weekly depending on satellite data availability and are available on the PIRSA website at [www.pir.sa.gov.au/hab](http://www.pir.sa.gov.au/hab)
- Latest public health advice, including water quality alerts, is available on the SA Health website.
- The Department of Environment and Water, supported by EPA and PIRSA through SARDI, has developed an initial Algal Bloom Water Quality Dashboard.
- Information about industry support grants is available at [www.business.sa.gov.au/algal-bloom](http://www.business.sa.gov.au/algal-bloom)
- Information about fee relief for eligible primary producers is available on the PIRSA website at [www.pir.sa.gov.au/fee-relief](http://www.pir.sa.gov.au/fee-relief).
- The State Government has established the Algal Bloom Reference Group which comprises of representatives from the Seafood Industry to help affected industries and stakeholders respond to and recover from the algal bloom.

### **Management of key risks**

- A summer response plan is being prepared, if the bloom does not dissipate in coming weeks.

### **Legislative and/or financial implications**

- Support packages for affected industries are being provided by State and Federal Government.

**Attachments**

A. PIRSA talking points – Algal Bloom



**CHIEF EXECUTIVE**

Department of Primary Industries and Regions

21/8/2025

<b>CONTACT</b>	Prof Mike Steer
<b>POSITION</b>	Executive Director
<b>DIVISION</b>	SARDI
<b>MOBILE and LANDLINE</b>	Out of scope
<b>Cleared by</b>	Director, Office of the Chief Executive

# Talking points and key messages

## Algal Bloom

Last updated **21 August 2025**

Objective ID: xxxx

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### Key Messages

- The Department of Primary Industries and Regions (PIRSA) continues to work with other relevant government agencies on the current *Karenia* species algal bloom that has been occurring in South Australian waters since March, particularly around the eastern coastline of Eyre Peninsula, part of southern Yorke Peninsula, Fleurieu Peninsula, Coorong and Kangaroo Island.
- Brevetoxins, a group of neurotoxins produced by *Karenia* species, have also been detected during this bloom event for the first time in Australian waters.

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- This is a dynamic situation as the bloom travels depending on weather and water conditions and the impact on people in these areas can therefore be unpredictable.
- The event is likely being driven by an ongoing marine heatwave impacting southern Australian waters, with water temperatures currently 2.5°C warmer than usual, as well as relatively calm marine conditions with little wind and small swells.
- Nothing can be done to dilute or dissipate the bloom. Similar outbreaks around the world have generally lasted between a week to several months depending on wind, rain and ocean temperature fluctuations.
- The *Karenia* species can cause marine species mortalities at varying concentrations and is known to impact the gills of fish.
- It is estimated the algal bloom has affected over 470 species of fish, invertebrates and associated marine and coastal diversity. This has included commercial species such as pipis and snapper, iconic biodiversity such as the state's leafy sea dragons, and larger marine life, including a variety of sharks and rays, all found dead.
- All commercially available seafood from South Australian waters is safe to eat.
  - Bivalves (oysters, mussels, scallops, cockles) or abalone available for sale is frequently tested to ensure it meets strict safety standards and is safe to eat.
  - If you catch fish, crabs, prawns, lobsters, or squid yourself, they are safe to eat if cleaned thoroughly and gutted before cooking.
  - Do not eat self-collected bivalve molluscs (like oysters, cockles, mussels, pipis, scallops) or abalone, as they have not been tested for brevetoxin which causes gastro like symptoms.
  - Never eat dead or dying fish, cockles or other marine life found on the beach because of decomposition and spoilage.
- South Australian beaches are open to the public for recreation, swimming and enjoyment.
  - From time-to-time depending on currents and wind conditions, a beach may be impacted by *Karenia* and you may see discoloured water and foam.
  - Visiting the beach can be enjoyed, but if experiencing symptoms, move away from the beach.
  - If the water is clear, it's fine to swim.
  - Avoid swimming in obviously affected areas and avoid contact with discoloured water or foam.
- It is also safe to take your dog to the beach. For their safety, keep them away from sick or dead fish and other marine animals, and avoid letting them swim in discoloured water or foam. If your dog does enter the water, wash them in cleanwater afterwards.
- If symptoms are more severe or do not resolve, seek medical advice from a GP and call 000 if it is a medical emergency.

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- Latest public health advice, including water quality alerts, is available on the SA Health website and [www.algalbloom.sa.gov.au](http://www.algalbloom.sa.gov.au).
- PIRSA would also like to remind people that if they notice something unusual involving dead or dying fish along any waterways or the coast to call FISHWATCH on 1800 065 522. Concerns over water quality can be made to the EPA on 1800 623 445 or via [yourepa@sa.gov.au](mailto:yourepa@sa.gov.au)
- To assist with determining the impacts and threats from this current bloom, South Australian HAB Situation Updates, produced by SARDI, have been provided to the commercial fisheries and aquaculture sectors, as well as RecFish SA since 11 April 2025. These updates are provided twice a week depending on satellite data availability and are available on the PIRSA website.
- To further support the public in getting relevant and timely information the State Government has also established a one-stop-shop of information at [www.sa.gov.au/algalbloom](http://www.sa.gov.au/algalbloom)

## Talking points

### What we know about the algal bloom

- A significant algal bloom of the species *Karenia mikimotoi* in South Australia was identified in mid-March 2025, initially in the waters around the Fleurieu Peninsula, specifically near Waitpinga and Parsons Beach. Since then, it has impacted other areas of the South Australian coast including the eastern coastline of Eyre Peninsula, parts of southern Yorke Peninsula, Coorong and Kangaroo Island
- An algal bloom refers to a significant growth of microscopic algae that can affect marine life, human health and water quality.
- A marine heatwave, defined as a period of exceptionally warm ocean temperatures, has been affecting southern Australia since September 2024. These elevated water temperatures are considered a contributing factor to the bloom. While there have been slight reductions in sea surface temperatures due to seasonal cooling, temperatures in South Australian coastal waters have remained significantly above average for this time of year (up to +1 to +3°C above the long-term 90th percentile in various updates), supporting the persistence of the bloom.
- Other potential contributing factors include nutrient influx from the Murray River floods in the summer of 2022/23 and a sustained upwelling event in the summer of 2023/24.
- This algal bloom event in South Australia has caused mass fish and shellfish deaths by damaging their gills and depleting oxygen. These blooms reflect a global trend where HABs harm diverse marine life through toxins, oxygen depletion, and physical damage, thereby impacting marine ecosystems.
- Brevetoxins, a group of neurotoxins produced by *Karenia* species, have been detected during this bloom event for the first time in Australian waters.

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- As *Karenia mikimotoi* is not known to produce brevetoxins, it provides evidence that other Algae species are likely involved with this bloom event. Multiple species have been detected and the following identified:
  - *Karenia mikimotoi*
  - *K. longicanalis*
  - *K. brevisulcata*
  - *Karlodinium veneficum*
- *Karenia Brevis* has not been detected and the species causing the brevetoxin is yet to be confirmed.
- The detection of brevetoxins has been managed in line with Australia's standard procedures for managing biotoxin detections and its detection demonstrates that the South Australian Quality Assurance program in place is robust and effective. Brevetoxins have been detected in shellfish, at 10 locations in South Australia currently closed for harvesting (Stansbury, Coobowie, Port Vincent, American River, The Coorong, Boston Bay, Bickers Island, Lower Eyre, Proper Bay and Franklin Harbour).
- It is estimated this algal bloom has affected over 470 species of fish, invertebrates and associated marine and coastal diversity. This has included commercial species such as pipis and snapper, iconic biodiversity such as the state's leafy sea dragons, and larger marine life, including a variety of sharks and rays, all found dead.
- The scale and the longevity of the bloom event currently affecting South Australia is unprecedented.
- It is difficult to predict the duration of algal blooms. Factors that can lead to the decline or end of the bloom include a change in environmental conditions such as cooler temperatures, increased mixing and water flow, decreased sunlight, and decreased nutrient availability.
- For these reasons, the current bloom is dynamic and can travel depending on weather, ocean circulation, and environmental conditions.
- It is considered likely that this bloom event will recur in the future. *Karenia* blooms have shown recurrent behaviour in other parts of the world, like the Gulf of Mexico, and similar non-cyst and cyst-forming species have been observed to recur regularly once established. While *Karenia* species do not produce long-term resting cysts, they produce short-term pellicle cysts which are thought to aid in extending bloom sequences.
- The South Australian Algal Bloom Situation Updates, produced by SARDI, have been provided to the commercial fisheries and aquaculture sectors, as well as RecFish SA since 11 April 2025. These updates are provided twice a week depending on satellite data availability and are available on the PIRSA website.

## Hot Topics

### Links to Desalination (If needed)

- No health issues are known to be associated with brine discharged from desalination plants and brine is not linked to increased algal growth. All marine desalination plants operated by SA Water are

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regulated by the Environment Protection Authority, which ensures appropriate management of brine outflow.

Experts say the bloom is believed to be caused by a mix of natural events, including:

- A marine heatwave since September 2024 with water about 2.5°C warmer than normal.
- Floodwaters from the River Murray in 2022–23 brought extra nutrients into the sea.
- A cold-water upwelling in summer 2023–24 lifted more nutrients to the surface.
- **Van Ruth 2012 report** - Van Ruth's 2012 report was a small sample size comparing the last year before the Port Stanvac desalination plant was operational and the first year of its operation.
- One of the recommendations of the research was for ongoing monitoring to occur to determine if HABs would grow due to the plant's discharge.
- Subsequent research and ongoing monitoring over the 13 years since this report was published has confirmed intermittent low levels of harmful algae species in the natural environment.
- Importantly, these algae are only occasionally found in the area and levels have not steadily increased in the past 13 years, indicating that the desalination discharge is not promoting the growth of HABs.

### Visit by Dr Donald Anderson and interactions with other international researchers

- As part of the research program into the current algal bloom, the State Government is working with the wider scientific community globally on research that has already been done in relation to *Karenia* blooms. This has included other observation and management tools that have been established in other countries.
- Dr Anderson is the Senior Scientist, Biology Department and Director, Cooperative Institute for the North Atlantic Region and Director, US National Office for Harmful Algal Blooms at the Woods Hole Oceanographic Institution.
- **As part of this work the government became aware of Donald Anderson's research into algal blooms and their management which led to an invitation to visit South Australia which is occurring this week.**
- **During his visit Dr Anderson is meeting researchers from SARDI and DEW along with government agencies including PIRSA, DEW, EPA, SA Health and industry representatives to look at current management strategies including testing arrangements and provide advice and feedback based on his own experience of algal bloom management.**
- The State Government first liaised with Dr Anderson at the beginning of August during a meeting PIRSA - SARDI and DEW scientists and officials held with relevant personnel from the United States National Oceanic and Atmospheric Administration (NOAA).
- In addition to NOAA and following on from the SARDI Science Forum held in June which also included representatives from New Zealand's Cawthron Institute, PIRSA-SARDI has also liaised with scientists and researchers from the Irish Marine Institute, The Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute (USA), the Chinese Institute of Oceanography, the Fisheries and Aquaculture Division of the UN Food and Agriculture Organisation along with other relevant Australian research institutes.

## Coastal/Beach clean up

- The Department of Primary Industries and Regions (PIRSA) has been working proactively throughout the current algal bloom event with all coastal councils and other State Government partner agencies to progress the most effective clean up arrangements at impacted beaches.
- The State Government is committed to supporting regular and ongoing beach assessments and proactive clean up as required. A priority for both the State and Local Governments is that any clean up operation is conducted as quickly and as safely as possible, keeping in mind the location, density and distribution of carcasses at the site and ensuring that such activities will also have the least impact on the wider environment.
- To assist PIRSA and supporting agencies with ongoing monitoring people are being reminded that if they do notice something unusual along the coast to contact FISHWATCH on 1800 065 522.

## Cuttlefish (DEW response to Yahoo News 15/08/25)

- **Has the cuttlefish population been impacted?**
- The algal bloom has not reached the Cuttlefish Coast and there is no evidence to suggest the algal bloom is affecting cuttlefish or associated marine habitats at this stage. Cuttlefish may be vulnerable to the algal bloom should it be detected at Cuttlefish Coast.
- **Will eggs be moved to a different location?**
- Marine scientists who are experts in the Giant Australian Cuttlefish are examining potential options for protecting cuttlefish eggs.
- **How will the department monitor the situation?**
- Government scientists will continue to monitor the bloom via satellite imagery and water testing. Weekly testing will be undertaken at 5 sites on Eyre Peninsula.
- **How many cuttlefish are involved in the migration every year?**
- Tens of thousands of giant Australian cuttlefish congregate in the Cuttlefish Coast each year.

## Where can people seek more information

- To further support the public in getting relevant and timely information the State Government has now established a one-stop-shop of information which is available at [www.sa.gov.au/algalbloom](http://www.sa.gov.au/algalbloom)
- SARDI Algal Bloom Situational updates, which assists with determining the impacts and threats from this current bloom, have also been provided to the commercial fisheries and aquaculture sectors and RecFish SA since 11 April 2025. These updates are provided twice a week depending on satellite data availability and are available on the PIRSA website at [www.pir.sa.gov.au/hab](http://www.pir.sa.gov.au/hab)
- Latest public health advice, including water quality alerts, is also available on the SA Health website
- The Department of Environment and Water (DEW), supported by EPA and PIRSA through SARDI, has developed an initial Algal Bloom Water Quality Dashboard.

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- Currently the dashboard covers 18 metropolitan sites, including West Lakes, Port River, Patawalonga River and off the end of four jetties, and 22 sites in the Coorong where State Government agencies are taking weekly water samples. Plans are underway to expand this monitoring to other regional areas.
- Water testing is undertaken every Monday by Australian Water Quality Services. Quick scans are available in about three days and full species results in about five days.
- The dashboard will continue to improve and evolve as more results come online, its functionality improves, and we understand use patterns.
- PIRSA has also been providing advice and information regularly to the commercial fishing and aquaculture sectors, RecFish SA, local government and local members of Parliament, this information has also been made public through PIRSA's website.

### State/Federal Government funding package

The Federal and State Government's last month (July) announced a joint \$28 million harmful algal bloom support package (\$14 million being provided by each government).

The comprehensive package covers industry support, science and research, communications, community support and clean up.

This is **in addition** to the fee relief measures announced earlier this month and the \$1,500 direct support payments to impacted primary producers.

The key measures in this harmful algal bloom support package includes:

#### Science and Research

- Coastal Monitoring Network - investing in expanded early detection and monitoring of harmful algal bloom species through real time sensors (buoys), satellite imagery and oceanographic modelling, with rapid detection of harmful algal blooms and early warning systems for industry.
- New national testing laboratory in SA for harmful algal bloom and brevetoxin/biotoxin testing. Currently, samples are sent to New Zealand for analysis, resulting in delays of up to a week.
- Rapid assessment of fish stocks and fisheries to quantify impact, including modelling ecological impacts on near shore marine ecosystems and all sanctuary zones utilising remote underwater video surveys and dive surveys.
- Citizen Science - rapid meta-analysis of citizen science records and documented ecological impacts to provide a baseline understanding from which to assess recovery.
- Develop a dedicated harmful algal bloom response plan for future bloom events.

#### Communications

- Harmful Algal Bloom Taskforce to meet every Thursday, with a media conference to follow to keep the public informed on latest developments.
- Public forums for impacted coastal communities and a trusted single point of information and contact for timely, accurate, and clear communication to industry and the public including a single phone hotline, website, consistent physical signage and information.

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- Public information campaigns focused on rebuilding confidence and driving visitation to our coastal regions and marine based tourism businesses and promoting the seafood industry and benefits of recreational fishing
- Community support and clean up
- Community Fund to support activities and small projects in affected communities.
- Beach clean-up funding for local government to assist cleaning up dead fish and marine life.

### Industry support (part of \$28 million package)

- More businesses will now be eligible for the algal bloom industry support, announced earlier this month, with the State Government this week announcing an expansion and extension of the availability of grant programs on offer.
- This follows the Government's close monitoring of the rollout of the grants along with liaison with industry representatives on both the **\$10,000 Small Business Support Grant** and the **Fisheries and Aquaculture Assistance Grants of up to \$10,000**.

#### Algal Bloom Small Business Support Grant

- The \$10,000 Algal Bloom Small Business Support Grant is designed to support a broader range of eligible marine industry businesses (small businesses and not-for-profit organisations) that have experienced a material reduction in revenue as a result of the algal bloom event.
- **For the \$10,000 Small Business Support Grant** – the closing date has now been extended to 30 November 2025 (it was previously 30 September) along with the extension of the requirement to demonstrate a decline in business turnover in any consecutive three-month period from 1 April 2025 to 31 October 2025.
- Commercial fishery or aquaculture licence holders who have had their licence fee waived by PIRSA are also now eligible to seek support from this grant program
- Under the \$10,000 Algal Bloom Small Business Support Grant small businesses will be able to apply if they can demonstrate a 30 per cent decline in business turnover. Eligible businesses include:
  - marine or coastal tourism operators
  - charter boat and fishing charter operators
  - marine-based sport and/or schools (e.g. surf school)
  - commercial fisheries and aquaculture licence holders
  - seafood processors
  - marine/fishing supply chain manufacturers/retailers (e.g. tackle shops, suppliers)
  - coastal caravan parks and camping grounds and accommodation
  - beachfront kiosks/cafés

#### Algal Bloom Fisheries and Aquaculture Assistance Grant

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- The one-off Algal Bloom Fisheries and Aquaculture Assistance Grant provides grants of up to \$100,000 to those who have been unable to catch or harvest their usual volume of marine species, have had to stop operations due to extended harvest closures, or have experienced major reductions in catch.
- The Algal Bloom Fisheries and Aquaculture Assistance grant is aimed at assisting eligible South Australian commercial fisheries or aquaculture licence holders with fixed costs and overheads including utilities, rent, finance and interest payments.
- The closing date for the **Algal Bloom Fisheries and Aquaculture Assistance Grant** has also been extended to 30 November 2025 (it was previously 30 September) and includes the extension of the requirement to demonstrate a decline in catch/harvest and decline in business turnover to any consecutive three-month period from 1 April 2025 to 31 October 2025
- There are two tiers in this grant system – a tier 1 Initial Grant and a tier 2 Secondary Grant. Under the changes there has been reduction in the requirement to demonstrate a minimum business turnover of \$100,000 to \$75,000
- Commercial fishery or aquaculture license holders who can demonstrate a minimum business turnover of \$75,000 in financial year 2023-24 or 2024-25 and has had its license fee waived by PIRSA, are now entitled to the immediate one-off Initial Grant (tier 1) \$25,000 payment subject to demonstrating:
  - a decline in catch/harvest of 30 per cent or more in any consecutive 3-month period from 1 April 2025 to 31 October 2025, compared to the corresponding 3-month period in the year prior; or
  - the closure of a licence holder's harvest area for an extended period (greater than 1 month) as a result of a direction by PIRSA due to elevated levels of brevetoxin; or
  - that PIRSA has approved a licence fee waiver under the 2024-25 Algal Bloom Fee Relief Program.
- The additional Secondary Grant (tier 2) of up to \$75,000 is also available depending on business turnover, and subject to demonstrating (in addition to the Initial Grant requirements) a decline in business turnover of 30 per cent or more in any consecutive three (3) month period from 1 April 2025 to 31 October 2025, compared to the corresponding three (3) month period in the year prior.
- The Secondary Grant payment is calculated as follows:
  - \$25,000 if business turnover in 2023-24 was above \$200,000.
  - \$50,000 if business turnover in 2023-24 was above \$400,000.
  - \$75,000 if business turnover in 2023-24 was above \$600,000.
- The Government will continue to review the grant program and make further adjustments where necessary.
- In addition to support grants, the State Government has also waived fishing licensing fees for the September quarter, this follows the fees being waived for the June quarter. Fishing licensing fees will continue to be reviewed on a quarter-by-quarter basis, with fee relief extended if necessary.
- Information on both grants is available at [www.business.sa.gov.au/algal-bloom](http://www.business.sa.gov.au/algal-bloom)
- Feedback PIRSA has received from industry is that the bloom has affected those involved in the Marine Scalefish Fishery on Kangaroo Island and Yorke Peninsula, as well as shellfish growers

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in Stansbury, Stansbury, Port Vincent, Coobowie, American River and the Boston Bay, Bickers Island, Lower Eyre and Proper Bay Harvesting Areas within the Port Lincoln Growing Area.

- Charter boat operators and fisheries particularly around the River Murray mouth, Lakes and Coorong have also been impacted to varying degrees.
- The Department of Primary Industries and Regions (PIRSA) will continue working with the Marine Fishers Association (MFA), the South Australian Professional Fishers Association (SAPFA) and the South Australian Oyster Growers Association (SAOGA) to assess the scale of the impact and target support.
- Impacted licence holders are encouraged to work with their industry association to access the fee relief process. The relevant industry associations are compiling claims and submitting them to PIRSA for assessment.
- For impacted commercial fishers, charter boat operators and aquaculture operators who are not a member of an association or represent themselves you can contact PIRSA directly on 8207 5332 or email [PIRSA.fisheriesbusiness@sa.gov.au](mailto:PIRSA.fisheriesbusiness@sa.gov.au)
- Information on licence fee relief is available on the PIRSA website at [www.pir.sa.gov.au/fee-relief](http://www.pir.sa.gov.au/fee-relief)
- The State Government has now also established the Algal Bloom Reference Group which comprises of representatives from the Seafood Industry to help affected industries and stakeholders respond to and recover from the algal bloom. This Group will not only identify key issues for the State Government to consider in managing and recovering from the algal bloom but also identify opportunities for further engagement and information sharing and provide ideas for consideration towards an expanded scientific monitoring program.

### **Mental Health and Wellbeing Support**

- Fisheries and Aquaculture licence holders facing financial hardship due to the algal bloom are eligible for the State Government's Rural Support Grant, administered by RSP Relief Fund. Individuals can receive up to \$1,500 in financial assistance to help cover essential household expenses such as utilities, groceries, rates and medical costs.
- Support is also available for licence holders facing financial hardship through the Rural Financial Counselling Services (FRCS) and the Family and Business Support (FaBS) Program. These Services provide financial counselling and wellbeing support for primary producers experiencing hardship.
- The State Government has also invested an additional \$160,000 in the Stay A Float program, which focuses on enhancing boating safety and supporting the mental health and wellbeing of individuals within the seafood industry including affected affected commercial fishers, charter operators and seafood processors. For further information visit [www.stayafloat.com.au](http://www.stayafloat.com.au)

### **Additional Commonwealth funding and Prime Minister's visit – 20 August**

- Prime Minister Anthony Albanese visited Kangaroo Island to see some of the impacts of the algal bloom and meet with impacted businesses on 20 August 2025.
- During this visit, he committed additional Commonwealth funds for:

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- \$4 million for direct funding to local government for grants to assist those local communities who are dealing with challenges posed by the algae
  - \$2.25 million in targeted scientific research support
  - \$2 million to enhance the monitoring and data collection of marine heatwaves through the CSIRO's water quality system called AquaWatch
  - \$250,000 for algal bloom related research informed by the South Australian Algal Bloom Science Panel through the National Environmental Science Programme.
- Also announced was the engagement of local company Agilex Biolabs to develop the methodology to allow the testing for brevetoxins to be carried out at its Thebarton laboratory.
  - Funded and announced as part of the original \$28 million package, the local lab will be the first in Australia to test for brevetoxins in shellfish, fast tracking results for small businesses impacted by South Australia's algal bloom.
  - Currently, the testing performed by the South Australian Quality Assurance Program (SASQAP) results in samples to be sent to New Zealand for analysis, resulting in delays of up to a week.
  - The move to a new national testing in Adelaide will significantly reduce that delay, meaning businesses can more quickly return to normal once brevetoxins reduce to safe levels.

### Keeping Our Seafood Safe – SASQAP Testing and Shellfish Closures

- PIRSA conducts regular ongoing monitoring of shellfish harvesting areas by the South Australian Quality Assurance Program (SASQAP), a joint initiative by the State Government and the shellfish sector, which conducts a rigorous ongoing testing regime aimed at assuring consumers of commercially harvested oysters, mussels, cockles and scallops that they are safe to eat. As part of this program harvesting areas are often temporarily closed as a precaution to ensure food safety standards are upheld.
- Currently this testing regime has led to **precautionary closures** at the American River, Port Vincent, Coobowie and Stansbury oyster harvesting areas and the commercial harvesting of pipis between the Murray Mouth to 10km south of the mouth.
- A **precautionary closure** also remains in place at the Franklin Harbour Harvesting Areas due to the detection of brevetoxins while further monitoring occurs in the area.
- Previous precautionary closures at Proper Bay, Boston Bay, Bickers Island and Lower Eyre harvesting area within the Port Lincoln Growing Area has now reopened for both oysters and mussels. The closure was implemented due to the presence of brevetoxins.
- PIRSA is regularly engaging with impacted shellfish harvesting producers during these current temporary closures. PIRSA through SASQAP continues to monitor the closed harvesting areas with the view to opening them as soon as the relevant food safety standards are met.
- While we acknowledge the impact this is having on affected producers, our rigorous ongoing testing regime is in the interest of food safety and is aimed at assuring consumers of commercially harvested oysters, mussels, cockles and scallops that they are safe to eat.

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- PIRSA conducts regular ongoing monitoring of shellfish harvesting areas by the South Australian Quality Assurance Program (SASQAP), a joint initiative by the State Government and the shellfish sector, which conducts a rigorous ongoing testing regime aimed at assuring consumers of commercially harvested oysters, mussels, cockles and scallops that they are safe to eat. As part of this program harvesting areas are often temporarily closed as a precaution to ensure food safety standards are upheld.
- The majority of South Australia's shellfish harvesting areas that are not part of regular seasonal closures remain open and their produce is safe to eat. Regular ongoing testing in these open harvest areas continues to ensure the harvested produce food safety standards are upheld. This means there is no public health concern.
- A total of 76.7% of the oyster aquaculture production areas are currently open around the State, and 85.8% of the total number of licences are operating in open harvest areas.
- In terms of the Pipi Fishery, this harvesting area remains closed. There are 11 licence holders in this fishery. The mussel sector has now fully reopened.

### Southern Ranger Research Trip (July 2025)

- South Australia's 24m flagship fisheries patrol vessel Southern Ranger operated in the Gulf of St Vincent on Wednesday, 16 July with staff from PIRSA's Fisheries and Aquaculture and the South Australian Research and Development Institute (SARDI) along with the Department of Environment and Water (DEW) to undertake underwater observations and take water samples of the harmful algal bloom to better understand the effect on the ecosystem.
- Departing from Outer Harbor (Adelaide's major port area) the staff took water samples enroute to Ardrossan located at the western side of the gulf, where there is a nearby sanctuary zone around the Zanoni wreck site, from there the Southern Ranger headed down the gulf to Rapid Head which is located 100km south of Adelaide in the Fleurieu Peninsula. Other sites included in the trip were Carrickalinga and Aldinga, both located along the coastline south of Adelaide.
- At all four locations – which are sanctuary zones – video footage was collected of the ocean floor. Water samples were also taken at these sites, as well as another 5 sites.
- Underwater footage captured by the Southern Ranger reveals the impact of the algal bloom across several important marine sanctuaries, with suspected visual signs of the algal bloom and rough seas reducing visibility to less than two metres in places.
- At the Zanoni shipwreck in the Upper Gulf St Vincent Marine Park. The footage shows many of the sponges, cold water corals and other filter-feeding organisms have been clearly impacted at the shipwreck site.
- Around the Aldinga Reef and the Rapid Head sanctuary zones many invertebrates, such as sponges and ascidians, still appeared to be healthy with colour retained in their structures. However, some of these were starting to show signs of stress with white patches appearing in places.
- It is hoped the information gathered from last week's trip along with previous data held by both DEW and PIRSA will also help with the determining the future direction of the science and monitoring program looking into the impacts of the bloom.

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- In addition to the data collected yesterday and what has already been held by SARDI, DEW and PIRSA, we are also working with the wider scientific community globally on research that has already been done in relation to the *Karenia* bloom. We are also looking at other observation and management tools that have been established in other countries, of note New Zealand, where this particular type of bloom has occurred.
- PIRSA and other relevant State Government agencies have been getting together, looking at and trying to understand the impacts of this bloom as soon as we all became aware of it. We have all been working very hard to understand what's going on and where it's all heading and last week's voyage will we believe really help with that process.

### Potential Driver Events – The River Murray floods and prolonged seasonal upwelling

HAB species are a natural part of aquatic ecosystems. They typically exist in low numbers within the water column and sediment.

When environmental conditions become favourable (e.g., increased nutrient levels, specific temperature and light conditions, etc.), these background populations can rapidly multiply, leading to a bloom. This has been the case here in South Australia and experts believe that these successive extreme climatic events that have resulted in increased productivity and dramatic shifts in environmental conditions offer potential plausible contributing factors causing the bloom.

It is believed this event has likely been driven by an ongoing marine heatwave impacting southern Australian waters, with water temperatures currently 2.5°C warmer than usual, as well as relatively calm marine conditions with little wind and small swells.

Other drivers include:

- An unprecedented intense and extended cold-water upwelling in summer 2023-24 (one of the largest on record)
- The 2022-23 River Murray flood event in South Australia, which was the largest since 1956 and the third largest flood event in recorded history and washed extra nutrients into the sea.

While there have been slight reductions in sea surface temperatures due to seasonal cooling, temperatures in South Australian coastal waters have still remained significantly above average for this time of year (up to +1 to +3°C above the long-term 90th percentile in various updates), supporting the persistence of the bloom.

Atmospheric dust and carbon from recent bush fires, particularly those on Kangaroo Island have also been raised as potential contributors.

Seasonal upwelling events occur when nutrient rich, deep ocean water is brought to the surface with upwelling favourable winds, which in SA tend to be South Easterlies in the summer.

Nutrients are key to supporting the bloom growth and the nutrients we are talking about in this instance are Nitrogen, Phosphorous and Carbon.

While most phytoplankton being microscopic plants, grow using photosynthesis which requires energy from sun and nutrients. With the nutrients typically coming in the form of dissolved inorganic nutrients

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(sourced from ocean upwelling or human inputs), however some phytoplankton species, such as *Karenia mikimotoi* (and other dinoflagellate species) can also uptake organic nutrients (potentially from other sources like rivers or decomposing seagrass).

It is recognised that further research is needed to understand these drivers.

This is a dynamic situation and as the bloom travels depending on weather and water conditions, the impact on people in affected areas can therefore be unpredictable. As a first-time event in South Australian waters, has made it even harder to predict how the situation is evolving and impacting on our waters, ocean and coastal life (including land-based animals) and affected regional communities and industries. There is much we are discovering and learning about the *Karenia* species as this incident continues to unfold and we are looking at experiences elsewhere around the world where these type of algal bloom events have occurred to help us gain a better understanding.

So, at the moment while the exact correlation between such incidents as Murray floods and upwellings and the current bloom event here in South Australia cannot be determined/confirmed, we have noted a potential correlation between floods and a similar algal bloom event in Western Australia, while in other parts of the world there have been bloom events after unseasonal hydrological patterns.

To assist with strengthening our knowledge some of the actions to emerge from the the Science Forum held in June include

- Developing a national HAB response forum or network
- Developing a HAB Science Program to address research gaps and future priorities including:
  - Early Detection
  - Monitoring/Forecasting
  - Assessment.
  - Recovery

## Recreational fishing support package

The State Government has also announced a range of measures to support recreational fishing activity during the algal bloom and set-up the recovery of fish stocks.

The commitments include:

- \$300,000 to install a strategically placed recreational fishing reef in an impacted Gulf region to support the survival and reproduction of key recreational species and allow real-time monitoring for citizen scientists, schools, and researchers.
- Establishing a fish stocking program in freshwater bodies such as reservoirs and lakes.
- Opening more reservoirs to recreational fishing were consistent with public health advice.
- Boosting regional tourism by supporting RecFish SA to deliver a series of four fishing events and competitions in regional areas in conjunction with local tackle stores and businesses.
- Supporting RecFish SA to deliver a series of fishing forums at local tackle stores, using fishing personalities and local experts.
- Providing RecFish SA a grant of \$200,000 to further support more than a hundred community fishing clinics and programs across South Australia, fishing events and competitions, and engagement with recreational fishing clubs to boost participation.

## Clause 9(1)

## Water testing dashboard

The Department of Environment and Water (DEW), supported by EPA and PIRSA through SARDI, has developed an initial Algal Bloom Water Quality Dashboard.

The ongoing harmful algal bloom has demonstrated the importance of transparent, timely water quality information for the public and decision-makers.

Currently the dashboard covers 18 metropolitan sites, including West Lakes, Port River, Patawalonga River and off the end of four jetties, and 22 sites in the Coorong<sup>18</sup> where State Government agencies are taking weekly water samples these locations include:

- Grange Jetty,
- West Beach Boat Ramp
- SARDI Caisson Intake
- O'Sullivan's Beach Boat Ramp
- Onkaparinga Rowing Club,
- Patawalonga - at King St Bridge
- The Port River at Dock One and North Haven Boat Ramp
- West Lakes – including the inlet, Lochside Footbridge and the exit.
- Plans are currently underway to expand this testing program to other regional areas.

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- Water testing is undertaken every Monday by Australian Water Quality Services. Quick scans are available in about three days and full species results in about five days.
- It is important to note the dashboard will continue to improve and evolve as more results come online, its functionality improves, and we understand use patterns.
- Striking the right balance between full data transparency and user experience is a priority.
- The dashboard provides a full breakdown of water sampling results, including concentrations of up to 100 types of microalgae.
- This includes *Karenia*, which has affected the South Australian coastline and environment since March 2025.
- Long term, this will help the State Government to understand the local dynamics of the bloom.
- Currently, this also provides a useful understanding of the potential effect on marine species and potential human health effects.
- It is important to stress, as per SA Health advice, that *Karenia* does not cause long-term harmful effects in humans but exposure to discoloured or foamy water can cause short-term skin or eye irritation and respiratory symptoms, including coughing or shortness of breath.
- It is still fine to visit the beach and coastal areas. Public health advice for all 18 testing sites remains unchanged.
- The algal bloom does not cause long-term harmful effects in humans but exposure to discoloured or foamy water can cause short-term skin or eye irritation and respiratory symptoms, including coughing or shortness of breath.
- If you are outdoors and experience irritation, go indoors, close windows and rinse exposed skin. If symptoms are more severe or do not resolve, seek medical advice from a GP and call 000 if it is a medical emergency.
- People and dogs should avoid swimming or surfing in discoloured water, foam or where marine life is dead or in poor health.
- Latest public health advice, including water quality alerts, is available on the SA Health website.

## SARDI Science Forum – 3 June 2025

- An Algal Bloom Science Forum, organised by PIRSA-SARDI, was held at the South Australian Aquatic Sciences Centre in West Beach on 3 June 2025. The event brought together leading aquatic scientists from South Australia, national research institutions and universities, government agencies and other community stakeholders. Experts from New Zealand also provided valuable insight. Outcomes from the meeting have been collated to inform and improve government preparedness to respond to and mitigate future events.
- Significant knowledge gaps were identified during the Science Forum. These include a limited understanding of the biological and ecological processes driving these algal blooms, a lack of rapid and reliable methods for identification at species and community levels, and insufficient knowledge of the types of toxins produced by various algal species and their impacts on organisms and the food web. There are also limited understanding of long-term ecological effects, recovery times, and broader impacts on marine and estuarine ecosystems, as well as a limited capability to detect and forecast algal blooms in near real-time.
- To address these the knowledge gaps, identified needs include: capacity building for species and toxin identification; developing and implementing systems for monitoring and forecasting; evaluating the

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ecological impact and recovery; and developing a national forum for collaboration and knowledge exchange.

### Dead marine wildlife

- Some sick and dead birds have been reported in areas affected by the algal bloom. Illness and deaths of wild birds, while unfortunate, is not an uncommon occurrence, however investigations to determine potential impacts of the bloom are underway and ongoing, and testing for notifiable diseases is also undertaken where required.
- It is possible that the recent storms and rough seas are a contributing factor to some of the deaths.
- We acknowledge that seeing sick and dead wildlife can cause distress. If you find sick or dead wildlife, including marine mammals and wild birds, you should:
  - AVOID contact with the sick or dead wildlife
  - RECORD what you see
  - **REPORT it to the Emergency Animal Disease Hotline on 1800 675 888.**
- These reports are reviewed by scientists including vets and ecologists, who will use their expertise to decide which reports require further investigation.
- Investigations will only be conducted where suitable (fresh) samples can be collected and either there is a suspicion of an infectious disease of biosecurity or public health concern, or the investigation could contribute valuable information to understanding the impacts of the algal bloom.
- It is believed that only animals with gills are at immediate direct risk from the algal bloom.
- It is believed that marine mammals - such as dolphins and seals - are not at immediate risk, but monitoring and testing will continue to be undertaken as required.
- The significance of the algal bloom impacts on the availability of prey species for birds are not yet clear.
- For more information visit [www.algalbloom.sa.gov.au](http://www.algalbloom.sa.gov.au)



Minute to  
**Minister for Primary Industries and Regional Development**  
**Minister for Forest Industries**

Ref: A6939366

For	<b>Noting</b>
Critical Date	Nil
Subject	<b>Harmful Algal Bloom Science Forum</b>

**Synopsis**

SARDI hosted a Harmful Algal Bloom (HAB) Science Forum on 3 June 2025 to bring together scientists from Australia and New Zealand to discuss the current HAB event affecting South Australia, and the knowledge gaps and future research and monitoring needed to mitigate the risks and impacts associated with future HAB events.

**Recommendations**

That you:

- Note that SARDI hosted a Harmful Algal Bloom (HAB) Science Forum on 3 June 2025 to identify knowledge gaps and research needed to mitigate impacts of future HAB events.

**NOTED**

.....

Hon Clare Scriven MLC  
**Minister for Primary Industries  
and Regional Development**  
**Minister for Forest Industries**

/ / 2025

**Ministerial Comments**

## Background

- In mid-March 2025, a significant harmful algal bloom (HAB) was identified in the waters around the Fleurieu Peninsula in South Australia, particularly near Waitpinga and Parsons Beach.
- It appears the HAB impacting South Australia is dominated by *Karenia mikimotoi*, potentially mixed with other harmful algae.
- A HAB is a large growth of microscopic algae that can affect marine life, human health and water quality. They are naturally occurring and found globally.
- The last notable bloom of this type of algae was recorded in Coffin Bay, South Australia in 2014.
- For the first time in Australia, Brevetoxins (an algal toxin produced by *Karenia* spp.) have been identified in three locations in South Australia as part of this occurrence.
- There have been numerous reports from along South Australia's coastline that indicate the current HAB event has caused mass mortalities among fish and invertebrates, damaging their gills.
- HAB events are also known to reduce the amount of dissolved oxygen in the water, generally towards the end of the bloom due to bacteria feeding off the dying algae.
- Brevetoxins can accumulate and concentrate in filter feeding shellfish such as oysters, mussels and scallops, posing a risk to humans if consumed.
- Routine monitoring of shellfish by the Department of Primary Industries and Regions (PIRSA) South Australian Shellfish Quality Assurance Program (SASQAP) identified the Brevetoxins. Following these detections, closures were put in place for three (3) commercial shellfish harvesting areas, Stansbury, Port Vincent and American River, to reduce the risk to public health.
- The scale and the longevity of the HAB event currently affecting South Australia is unprecedented locally, however the impacts are consistent with other HAB events known to have occurred in other parts of the world.
- A marine heatwave, defined as a period of exceptionally warm ocean temperatures, has been affecting southern Australia since September 2024. These elevated water temperatures are considered a contributing factor to the HAB. While there have been slight reductions in sea surface temperatures due to seasonal cooling, temperatures in South Australian coastal waters have remained significantly above average for this time of year (up to +1 to +3°C above the long-term 90th percentile in various SARDI HAB updates), supporting the persistence of the bloom.
- Daily satellite measures of chlorophyll-a levels, an indicator of algae concentrations, with connectivity to the HAB bloom identified off the Fleurieu Peninsula in mid-March, indicate elevated sea surface chlorophyll-a concentrations are currently persisting across many parts of South Australia (**Attachment A**).
- The maps of increases/decreases in chlorophyll-a concentrations determined from satellite imagery do not necessarily confirm the presence of the specific *Karenia mikimotoi* HAB species. Chlorophyll-a is a general indicator of algae abundance. Water samples are required to specifically confirm the presence and concentration of HAB species.

- Oceanographic forecast modelling is being used to predict the trajectory of water masses, and any microalgae within them, over a five-day period based on prevailing ocean currents and environmental drivers, including wind speed and direction.
- It is difficult to predict the duration of HAB events. Factors that can lead to the decline or end of the bloom include a change in environmental conditions such as cooler temperatures, increased mixing and water flow, decreased sunlight, and decreased nutrient availability. For these reasons, the current HAB is dynamic and can travel depending on weather, ocean circulation, and environmental conditions.
- SARDI has been providing South Australian HAB Situation Updates to PIRSA Fisheries and Aquaculture since 11 April 2025; which in turn have been passed to the commercial fisheries and aquaculture industry, as well as RecFish SA. These updates are accessible on the PIRSA website. The updates detail the current environmental conditions influencing the progression of the ongoing HAB.
- Representatives from PIRSA, SARDI, the Department for Environment and Water (DEW), South Australian Environment Protection Authority (EPA), SA Health and the South Australian Tourism Commission (SATC) have formed a HAB Working Group that will guide the State's response to this unprecedented event.

## Discussion

- SARDI hosted a HAB Science Forum at the South Australian Aquatic Sciences Centre at West Beach on 3 June 2025.
- The forum was open to the scientific community and brought together leading scientists from State and Federal government agencies, national research institutes and universities, and the private sector. HAB experts from New Zealand also provided valuable insight.
- Discussions at the forum focused on two main areas: reviewing the latest scientific findings and operational insights related to HABs, including understanding the impacts on marine ecosystems, industries, communities and public health, and identifying knowledge gaps: and the priority actions required for ongoing and future research and monitoring to forecast, mitigate and manage future events. A copy of the forum agenda is attached for information (**Attachment B**).
- Whilst not in attendance, the seafood industry provided questions that were discussed at the forum.
- The Science Forum identified the need to:
  - Develop monitoring and forecasting programs for HABs in South Australia, including of remote regions.
  - Accurately identify HABs at both species and community level – both genetically and morphologically.
  - Identify algal toxins and their effect on different organisms, including humans.
  - Establish a certified laboratory in Australia equipped to accurately identify Brevetoxins.
  - Evaluate the impact of HABs on marine ecosystems, fish stocks and productivity, biodiversity, connectivity and food webs; and recovery timelines and feasibility, which will involve consolidating existing datasets.
  - Identify environmental conditions that can contribute to the formation and persistence of HABs.

- Compare the South Australian HAB event with similar occurrences in other regions around the world.
- Develop risk assessment, response plans and a data management framework to better manage HABs in the future.
- Develop a national HAB response.
- Key actions from the Science Forum:
  - Share information gathered during the Science Forum with the Whole of Government HAB Working Group to facilitate the prioritisation of research needs and the development of a Science Program aimed at addressing research gaps and future priorities. Funding options will also be evaluated as part of this process.
  - PIRSA to assist the Whole of Government HAB Working Group in organising an industry forum in the coming weeks to provide an update on the current situation and address industry concerns or queries.

#### **Stakeholder / regional impacts, consultation and engagement**

- The Science Forum was accessible to members of the Australian scientific community, and included subject matter experts from New Zealand, ensuring that specialists in HAB research and management played a key role in discussions.
- The seafood industry was informed of the Science Forum and contributed questions that were discussed during the event. PIRSA will assist the Whole of Government HAB Working Group in convening an industry forum in the coming weeks to provide updates on the HAB situation and address industry concerns and questions.

#### **Management of key risks**

Clause 9(1)



- It is important to note that even though a biotoxin not previously found in Australian waters has been detected as part of this HAB event, it is being managed in line with Australia's standard procedures for managing biotoxin detections. Its detection demonstrates that SASQAP protocols are robust and effective.
- SASQAP specifically monitors South Australian classified waters that are approved for harvesting. Commercially harvested shellfish are exclusively sourced from these monitored waters.

#### **Legislative and/or financial implications**

- The HAB Working Group will explore funding options for the proposed HAB Science Program.

**Attachments**

- A. South Australian Harmful Algal Bloom (HAB) Situation Update: 04-06-2025
- B. Agenda Harmful Algal Bloom Science Forum.



**CHIEF EXECUTIVE**

Department of Primary Industries and Regions

13/6/2025

<b>CONTACT</b>	Prof Mike Steer
<b>POSITION</b>	Executive Director
<b>DIVISION</b>	SARDI
<b>MOBILE and LANDLINE</b>	Clause 6(1)
<b>Cleared by</b>	Dr Gretchen Grammer, SARDI Aquatic and Livestock Sciences

# Harmful Algal Bloom (HAB) - Science Technical Forum

**Date / time:** Tuesday, 3 June 2025, 9:00am to 1:00pm (ACST)

**Location:** Conference Room, SARDI West Beach / Microsoft Teams

## 1. Welcome and Objectives (9:00am)

South Australia is currently experiencing a Harmful Algal Bloom (HAB) of unprecedented proportions, impacting a range of industries and communities. The purpose of this workshop is to consult broadly across Australia's HAB science expertise to better understand current knowledge and gaps regarding HABs.

Information from this workshop will inform the State Government and be used to prepare for, reduce impacts from, and mitigate risks associated with future HABs.

## 2. Overview, Current HAB Situation, Scientific Understanding (biology, ecology, drivers and impacts) & Knowledge Gaps (9:15am)

- Summary of remote sensing and oceanography (Out of scope, SARDI) (10 mins)
- Impacts on environment: fish kills on Kangaroo Island (Out of scope, Southern Fishery & Ecosystem Solutions) (10 mins)
- South Australian Shellfish Quality Assurance Program: Brevetoxin Response (Out of scope, SASQAP) (10 mins)
- Overview of fish-killing HABs in Australia with a focus on *Karenia* (Out of scope, University of Technology, Sydney) (10 mins)
- A New Zealand perspective of dealing with fish-killing HABs and *Karenia* (Out of scope and Out of scope, Cawthron Institute, New Zealand) (10 mins)
- Reoccurring HABs in Western Australia - identification, toxin studies, annually monitoring (Out of scope, Department of Water and Environmental Regulation (WA)) (10 mins)

Open discussion on knowledge gaps of HABs; and limitations of existing monitoring tools and systems (40 mins)

## BREAK – 10:55 to 11:10am

## 3. Future Research and Monitoring Needs (11:10am)

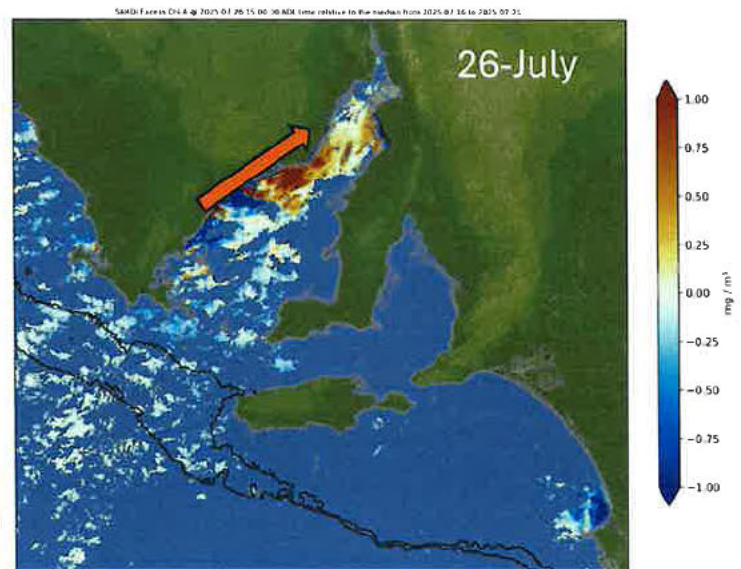
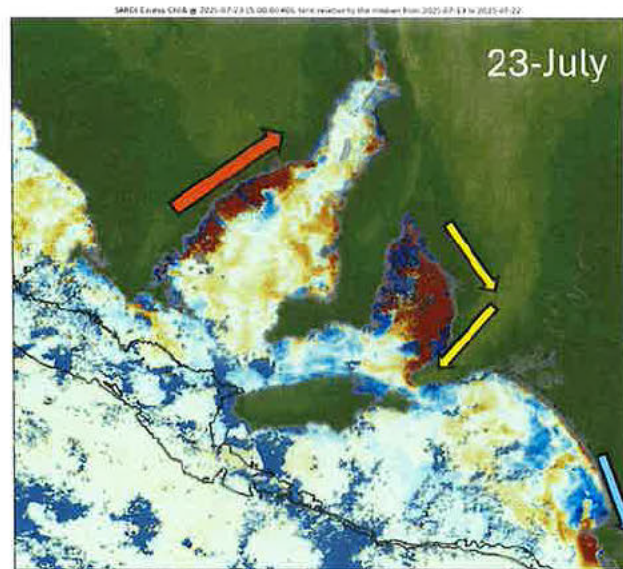
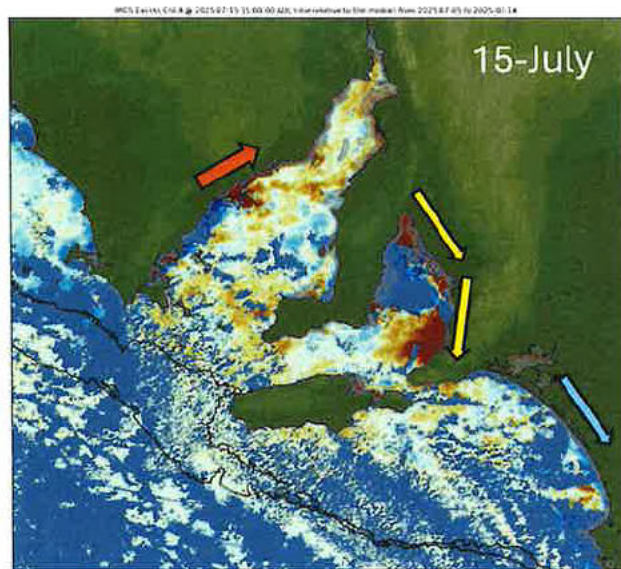
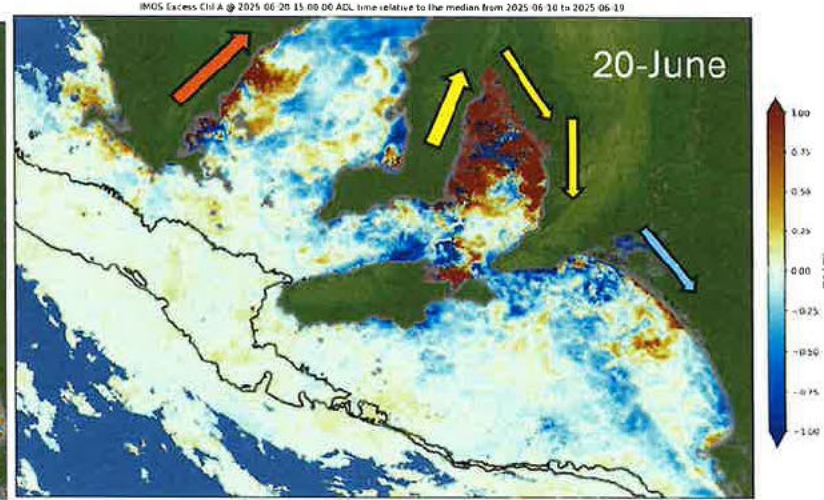
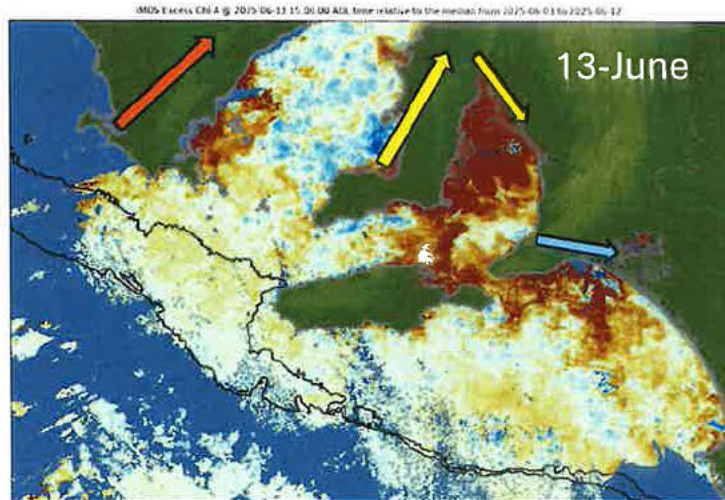
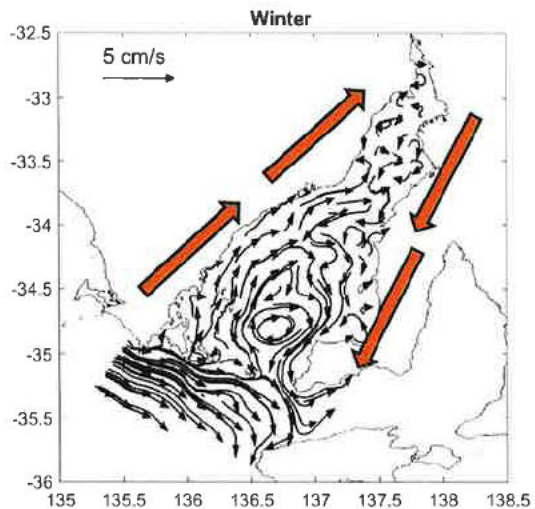
- Early detection using real time sensors, forecasting and the value of big data for future R&D (Out of scope, SARDI) (10 mins)
- Remote sensing and forecasting systems (Out of scope, CSIRO) (10 mins)

Open discussion about future research needs with a focus on (60 mins):

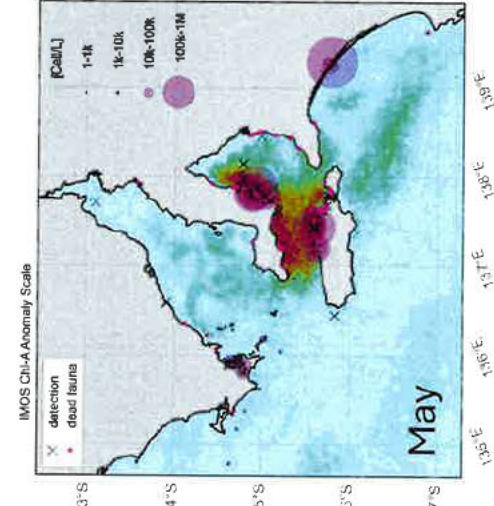
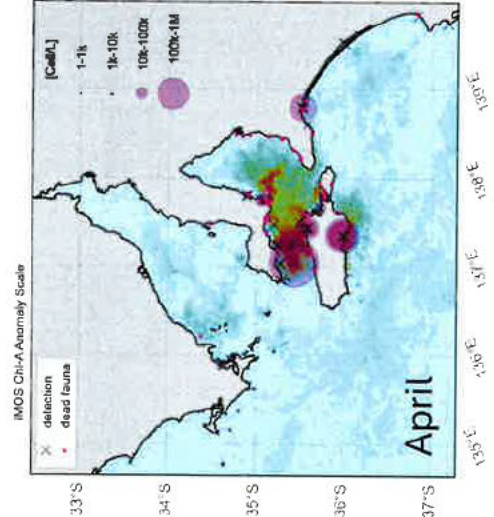
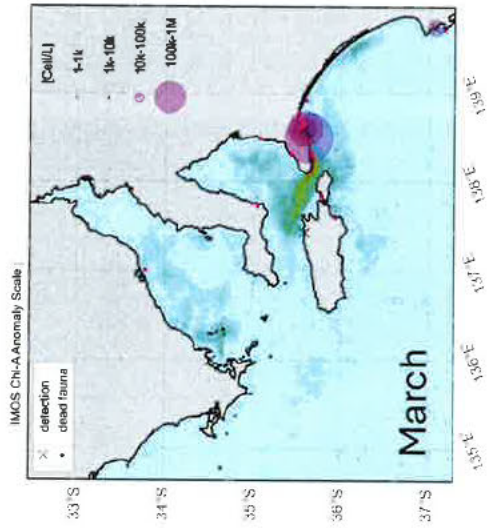
- Formation of HABs (biology, ecology and drivers)
- Likely impacts
- Predict and manage in the future (monitoring)

## 4. Workshop Summary and Next Steps (12:30pm)

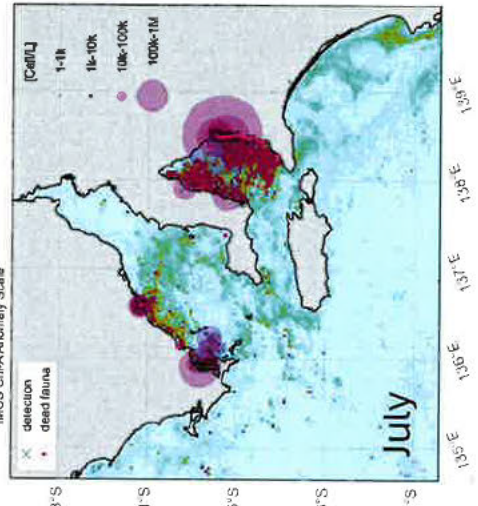
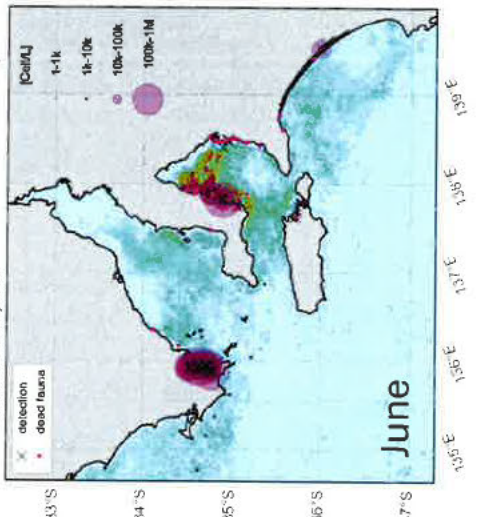
- Summary of key themes, research priorities and actions (30 mins)



# Detected Footprint of Impact – Monthly



- Maps include:
- magnitude of monthly-averaged chla increases compared to the 21-year (2002-2023) median conditions
  - all SA Gov. water sampling for *Karenia* sp.
  - reported fish kills (from PIRSA FishWatch)



# Summary

## Harmful Algal Bloom Science Forum

**Date / time:** Tuesday, 3 June 2025, 9:00am to 1:00pm (ACST)

**Location:** South Australian Aquatic Sciences Centre and Microsoft Teams

### Acknowledgement of Country

*“We acknowledge and respect the traditional custodians whose ancestral lands we are meeting upon here today. We acknowledge the deep feelings of attachment and relationships of Aboriginal peoples to country. We also pay respects to the cultural authority of Aboriginal people attending from other areas of Australia present here.”*

### Participants

The forum was open to the scientific community and brought together leading scientists from State and Federal government agencies, national research institutes and universities, and the private sector. Experts from New Zealand on harmful algal blooms (HAB) also provided valuable insight.

A full list of participants is provided in Appendix 1.

### Presentations

- Summary of remote sensing and oceanography (Out of scope [redacted] SARDI)
- Impacts on environment: fish kills on Kangaroo Island (Out of scope [redacted], Southern Fishery & Ecosystem Solutions)
- South Australian Shellfish Quality Assurance Program: Brevetoxin Response (Out of scope [redacted] SASQAP)
- Overview of fish-killing HABs in Australia with a focus on *Karenia* (Out of scope [redacted], University of Technology, Sydney)

- A New Zealand perspective of dealing with fish-killing HABs and *Karenia* (Out of scope), Cawthron Institute, New Zealand)
- Reoccurring HABs in Western Australia - identification, toxin studies, annually monitoring (Out of scope), Department of Biodiversity Conservation and Attractions in WA (DBCA)
- Early detection using real time sensors, forecasting and the value of big data for future R&D (Out of scope), SARDI)
- Remote sensing and forecasting systems (Out of scope), CSIRO)

## Background

South Australia is currently experiencing a Harmful Algal Bloom (HAB) of unprecedented scale, duration and impact across a wide range of marine industries and coastal communities.

The HAB was first detected in mid-March in the waters around the Fleurieu Peninsula in South Australia, particularly near Waitpinga and Parsons Beach. Testing has revealed the HAB impacting South Australia is dominated by the dinoflagellate *Karenia mikimotoi*, potentially mixed with other harmful algae species.

Daily satellite measures of chlorophyll-a levels, an indicator of algae concentrations, with connectivity to the HAB bloom identified off the Fleurieu Peninsula in mid-March, have been used to track the bloom (Figure 1).

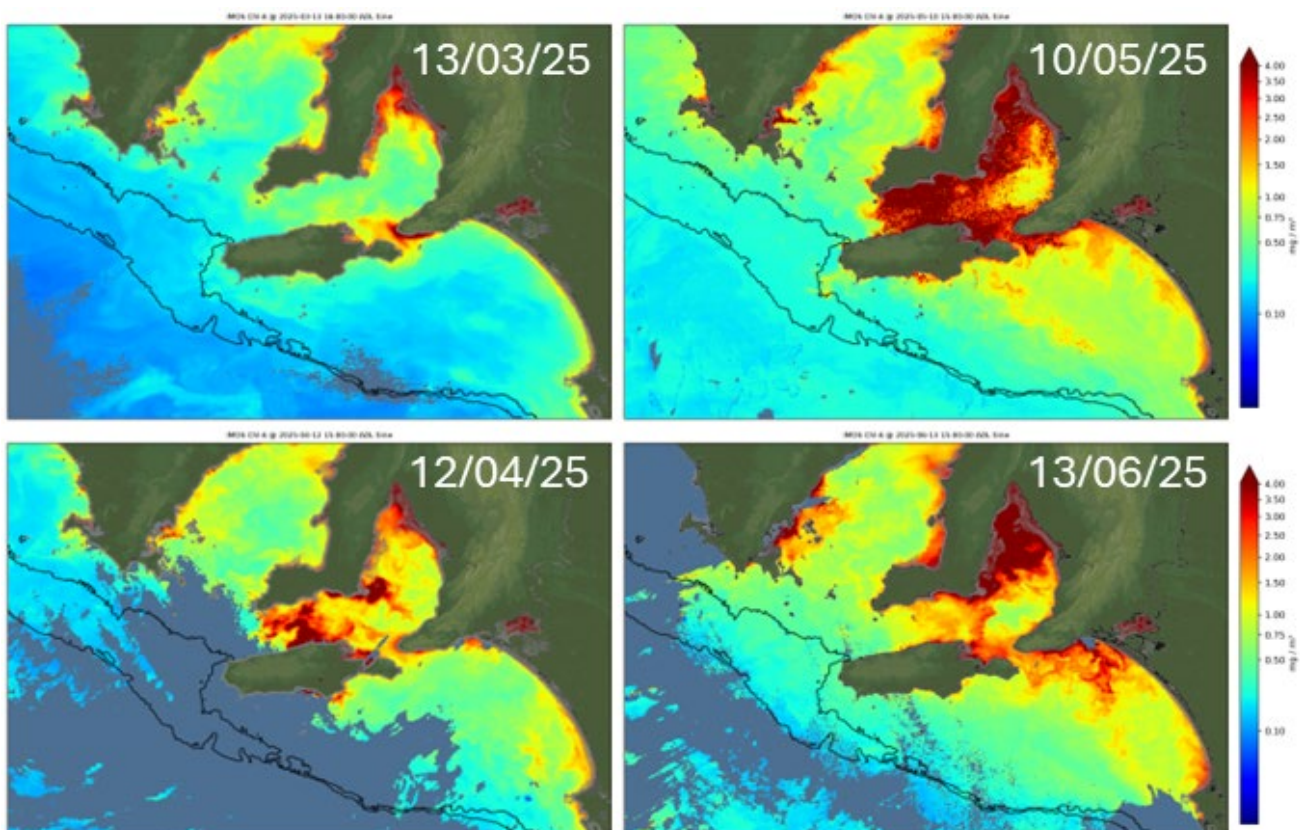


Figure 1. Examples maps of the daily sea surface chlorophyll a (chl<sub>a</sub>) maps used over the period March to June 2025 to track the spatial dynamics of the bloom. Red shading indicates areas of high chl<sub>a</sub> biomass. Regions where no data is available due to cloud cover are shaded in grey-blue. Source: <https://oceancurrent.aodn.org.au/>

Satellite measures of chl<sub>a</sub> concentrations (Figure 1) in shallow waters (i.e. <30 m depth) can be affected by optical issues (e.g. bottom reflectance, seagrass detection) which can lead to the over-estimation of chl<sub>a</sub> levels. To remove these biases maps showing daily increases and decreases in chl<sub>a</sub> relative to the median conditions observed over the previous ten days have been produced (Figure 2). These maps have provided a useful product to determine areas of active chl<sub>a</sub> increases and decreases, noting areas of high chl<sub>a</sub> do not necessarily confirm the presence of the specific *Karenia mikimotoi*. Combined with in-situ surveillance, and forecasts of the ocean circulation provided by the eSA-Marine ocean modelling system, the maps have provided a useful tool to inform the potential presence and trajectory of the HAB.

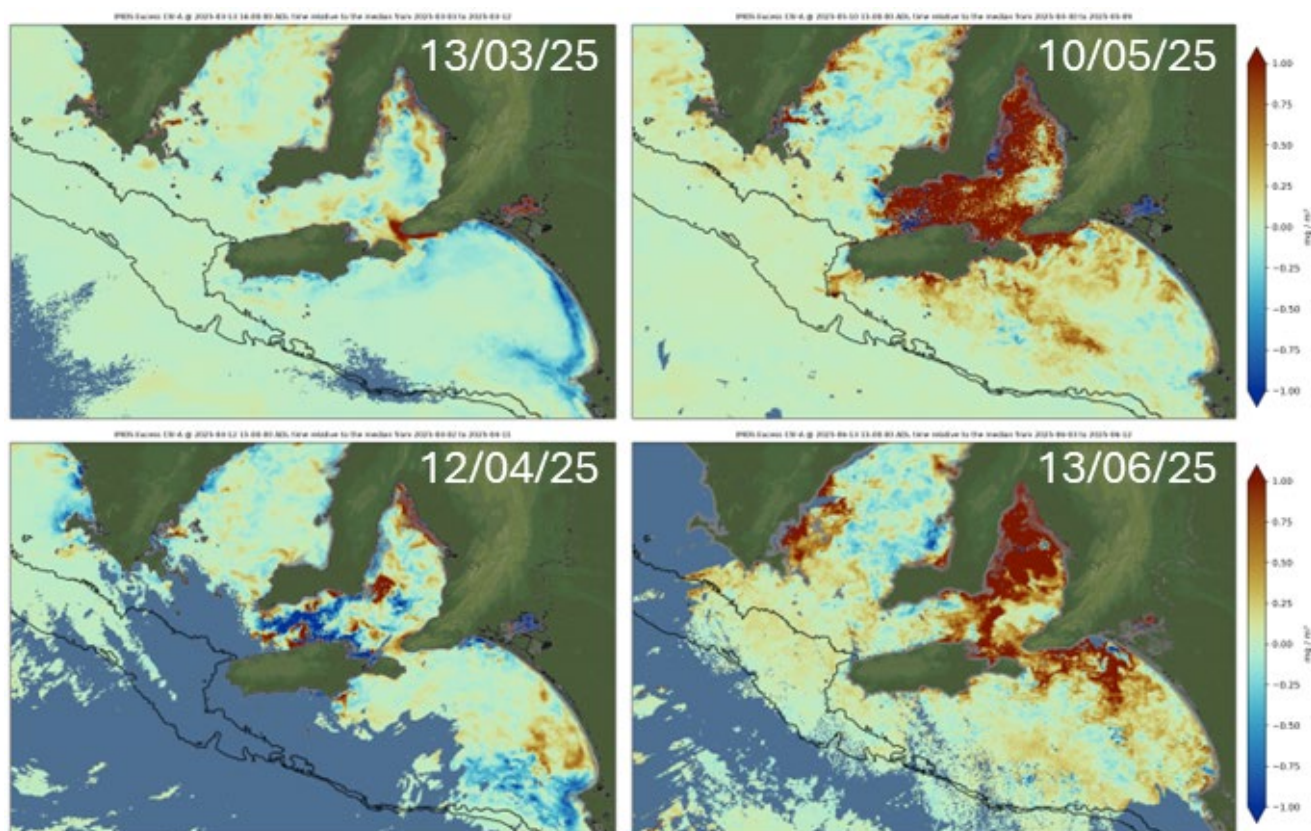


Figure 2: Maps showing daily increases and decreases in chl<sub>a</sub> over the bloom course. Regions where no data is available due to cloud cover are shaded in grey-blue. Source: SARDI Oceanography.

Currents efforts to monitor the HAB have included using satellite measures of chl<sub>a</sub> (Figures 1 and 2) and water sampling. Water samples are collected and sent to microalgal taxonomists to confirm what algal species are present and in what concentration via light microscopy. Additional water samples for more accurate determination of species using molecular methods have been undertaken but have long

turnaround times before results are received. Real-time HAB indicator sensors, being trialled by SARDI in Port Lincoln, have been effective in providing early detection but are still undergoing validation to determine their accuracy and resolution.

Brevetoxins, a group of neurotoxins produced by *Karenia* species, have been identified as part of this bloom event for the first time in Australian waters. *Karenia mikimotoi* is not known to produce brevetoxins, providing further evidence that other *Karenia* spp. are likely involved.

The detection of brevetoxins has been managed in line with Australia's standard procedures for managing biotoxin detections. Its detection demonstrates that the program in place is robust and effective.

PIRSA's SASQAP program (the South Australian Quality Assurance Program) specifically monitors South Australian classified waters that are approved for harvesting and commercially harvested shellfish are exclusively sourced from these monitored waters.

SARDI prepares regular HAB Situation Updates (~two times a week) which are made accessible on the PIRSA website.

## Current knowledge

### General

Harmful algae refers to specific species of marine phytoplankton that have a negative impact on marine ecosystems, and this can be via the production of harmful toxins. Toxin-producing algae constitute only a small fraction of marine phytoplankton, are naturally occurring, and found globally.

Toxins are species-specific (even strain-specific), with different toxin types having different effects and levels of threat to both marine systems and humans (e.g. some kill fish and others accumulate in shellfish). SASQAP regularly monitors waters around shellfish harvesting areas to address the human health risk presented by toxic algal species and the marine biotoxins they produce.

Fish-killing HABs occur everywhere in the world, with *Karenia mikimotoi* and other *Karenia* species, *Karlodinium* (another genus of dinoflagellates) and a range of raphidophytes being significant contributors.

Identification of the harmful algae species prevalent in the bloom is critical in understanding the toxic effects that are occurring or may occur. Some algal species become problematic at very low densities that cannot be detected by traditional remote sensing technologies, while other species need to achieve a higher biomass before impacts become significant.

Impacts from the HAB have potentially devastating implications for industries such as fisheries, aquaculture and tourism, aquatic recreation activities including fishing, coastal communities and human

health as well as broader ecosystem health. However, challenges remain in understanding the full extent of the impacts and the resilience of marine ecosystems as well associated estuarine ecosystems (such as the Coorong in South Australia).

## Secondary effects of HABs

Depletion of dissolved oxygen has been associated with HABs, which generally occurs towards the end of the bloom when the algae start to die off and decompose, and bacterial consumption of dying algae takes place. The effects of deoxygenation will be more pronounced on fish in HAB events where the harmful algae have impacted the gills of fish. Salinity changes, stratification, or inputs of freshwater in the system can impact osmoregulation as well.

## This bloom

The north coast of Kangaroo Island has faced extensive impacts from the current HAB, with the HAB spreading across almost the entirety of Backstairs Passage and causing widespread mortalities among fish and invertebrates, particularly benthic and reef-associated species. There have been numerous reports of fish and invertebrates washing ashore. Many of these incidents have been brought to the attention of South Australia's National Parks and Wildlife (Department for Environment and Water), often by the public, with demersal species appearing to be particularly affected.

Following a recent storm (20 May 2025), chlorophyll-a concentrations have decreased in Investigator Strait, including along the western coast of Kangaroo Island, the southern foot of Yorke Peninsula, and the eastern side of Gulf St Vincent. Increases in chlorophyll-a concentrations have been observed along the western side of Gulf St Vincent, in Spencer Gulf from Louth Bay to Port Neill, and around Hardwicke Bay. The HAB is dynamic, and the distribution varies with changes to current environmental conditions.

The HAB is believed to be influenced by recent environmental conditions, including ongoing marine heatwaves under drought conditions and relatively calm weather conditions in South Australia since September 2024, although further research is needed to understand drivers. Other contributing factors may include nutrient influx from the Murray River floods in the summer of 2022/23 and a sustained upwelling event in the summer of 2023/24. Atmospheric dust and carbon from the recent bush fires, particularly on Kangaroo Island were also raised as potentially contributing.

It is considered likely that this HAB event will recur in the future. *Karenia* HABs have shown this recurrent behaviour in the Gulf of Mexico (Florida, USA) and blooms of similar species such as *Karlodinium* (non-cyst forming) and *Alexandrium minutum* / *A. pacificum* (cyst-forming) have been observed to recur regularly once established. *Karenia* species, including *K. mikimotoi*, are not known to produce long-term resting cysts, but instead produce short-term cysts called pellicle cysts that are thought to provide advantage in extension of bloom sequences.

## The New Zealand *Karenia* experience

New Zealand has experienced a number of HAB events, including the catastrophic outbreak of *Karenia brevisulcata* in Wellington Harbour in 1998 that severely impacted marine organisms in the harbour at that time. Respiratory illness and skin rashes were reported with this HAB. Recovery period for the marine ecosystem was between 3 to 5 years.

New Zealand developed a monitoring and research program in response to blooms in the early 1990s. This includes developing thresholds for brevetoxins in shellfish and for *Karenia* species associated with recreational activities and protecting public health (e.g. swimming, surfing, etc.). Research programs were established to understand HABs. Seafood Safety Risks, a program operating since the mid-2000s, focuses particularly on risks from microbes. A newer program investigates how climate change affects HABs and explores the development of new monitoring methods, including remote sensing and *in-situ* monitoring. The health impact of HABs on wildlife is also being considered as part of an emerging aquatic disease program.

Rapid molecular tests, such as real-time qPCR assays, have been developed for high-risk algal species. These tests can provide results within hours of sample receipt. These are particularly important for *Karenia* species that are hard to identify under the microscope.

One limitation of this testing approach is its reliance on pre-existing assays, which means it cannot detect outbreaks of new species or mixed blooms. Consequently, there is a growing shift toward using high-throughput sequencing techniques to analyse the entire community within a sample.

New Zealand is actively researching toxins produced by *Karenia* species and aims to establish analytical methods for effective monitoring. While some toxic metabolites are currently detectable, others remain unidentified. Investigations are also underway to understand the effect of different toxins between and within a species.

## Western Australia

Phytoplankton monitoring in Western Australia is focused on the Swan Canning Estuary (Perth), as well as a number of other estuaries in the Southwest of the state. Monitoring in coastal waters is driven by industry, primarily wastewater treatment plant discharge and some aquaculture-associated WASQAP monitoring. For the coastal sampling programs, the non-WASQAP sampling is typically targeted to the Dec-Mar period only.

HAB Species of note in WA are *Karlodinium* cf. *veneficum*, *Karlodinium* cf. *armiger*, *Alexandrium minutum*, *Alexandrium pacificum*, *Dinophysis* spp., *Prorocentrum* spp., *Heterocapsa* spp., *Pseudonitzschia* spp. Though not known to have bloomed or been associated with mortality events in the past, monitoring has also detected a range of *Karenia* species, with the potential inclusion of *K. brevis*.

Though there is no conclusive evidence, it has been noted that bloom species can establish, or blooms become more intense, a couple of years after local flood events. The first major *Alexandrium* bloom event in the Swan Canning occurred during and in the vicinity of bridge construction works, with a tentative link to sediment disturbance (of cysts). In terms of overall phytoplankton biomass (chl<sub>a</sub>), satellite imagery has shown pulses of high levels associated with marine heatwave events.

There has been a recent highlight of the need to develop capability for cell isolation and phylogenetic analysis to characterise species and look to develop locally applicable primers for qPCR analysis and investigate potential benefit and use of Nanopore sequencing. HAB species characterisation needs to include characterisation of toxins, and this potentially needs development of local skills and equipment.

There is an overall need to consider if current sampling techniques are suitable for these species (collection, preservative and storage), and to get better determination of ecological impacts of these HAB species.

## HAB monitoring

In Australia, monitoring for microalgae / HABs is typically reactive unless associated with a shellfish quality assurance program. HABs are generally reported by the public, and local authorities may establish an algal bloom response monitoring campaign and enhance public communications and warnings if needed.

Other areas of the world that more commonly experience destructive HABs with significant socioeconomic impacts employ advanced technology (real-time monitoring buoys, advanced genetic techniques, and models in combination with satellite data). However, Australia remains heavily reliant on phytoplankton taxonomists using light microscopy.

Satellite remote sensing can serve as an effective tool for monitoring moderate to high biomass blooms in across large spatial scales including remote areas. Satellite data can offer crucial insights into where monitoring and sampling efforts should be concentrated and act as an input for forecasting models. *In-situ* sensors, potentially fitted with plankton samplers or real-time HAB detection sensors, will also provide valuable data needed to improve satellite detection products and develop forecast models.

CSIRO is actively refining/validating these models using machine learning by ground-truthing them with *in-situ* data, while also exploring emerging technologies such as hyperspectral data from NASA satellites. Hyperspectral data are thought to provide enhanced precision in targeting phytoplankton. Water samples will be needed to validate the remote sensing and identify the algae to species level. This information can continue to be fed back into models.

The power of citizen science is employed in other countries, including the USA and UK, to monitor HAB species. Data from these programs being used to trigger more thorough investigation by authorities. Citizen science is being used in the community to monitor the current HAB.

## HAB control

Localised control options to contain HABs and reduce the impact of HABs on offshore aquaculture operations include:

- towing pens away (noting you need to consider licences and certifications, etc.);
- application of a perimeter or skirt especially for surface HABs;
- stop feeding fish to encourage fish to move lower in the water column to try and minimise exposure at the surface (not effective against species such as *Karenia mikimotoi* that occurs throughout the water column); and
- bubble curtains (noting there is a risk with fragile species, such as *Karenia*, that the cells can break and release toxins making them more potent);

Another option used internationally (particularly China and Korea) to control algal blooms threatening valuable fisheries resources includes application of clay minerals with additives mixed with water and sprayed on the water surface to bind and remove both HAB cells and toxins. The composition of the clay mixture needs to be targeted to the specific HAB species and water chemistry for best results to be achieved.

## Industry questions raised during the Science Forum

- *Is there a history of a HAB lasting this long in other parts of the world, and what is the timeframe and success of recovery of commercially fishable stocks?*

There are examples of other *Karenia* blooms lasting this long in other parts of the world. *Karenia* is also well known to reoccur. The impacts and recovery are not well understood and need further investigation.

- *When will the current HAB end?*

This is not known, and it is very difficult to predict. A change towards winter weather patterns of regular cold fronts, cooler water temperatures, and reduced nutrients may help dissipate the HAB.

- *How do we assess the extent of the losses from the HAB?*

Further investigation of the impacts (environmental and to marine industries, local communities etc.) is needed.

The general public and independent researchers along the coast are documenting the bloom by making contributions to iNaturalist, which is assisting in developing our understanding of the

impacts. At this stage, anecdotal evidence appears to indicate that pelagic species are not as impacted as demersal species. This is consistent with similar events elsewhere (e.g. Swan Canning in WA), where a lot of pelagic species moved away during the event and returned soon after the end of the bloom. To get a better assessment of the impacts of this HAB, benthic fauna and habitat assessments, considering the broader ecosystem impacts, will need to be conducted over the next few years.

- *How can forecasting improve in the future to predict these HAB events?*

Satellite remote sensing, combined with data from *in situ* sensors and results from water samples, can enhance monitoring and forecasting models. More research is needed to understand both the drivers of bloom formation and the drivers of bloom collapse.

- *Is there a correlation between recent events (upwellings, Murray Floods) and the HAB?*

This is not yet clear, although a potential correlation between floods and HAB events has been noted in Western Australia. Other HAB bloom events have been noted after unseasonal hydrological patterns in other parts of the world.

- *How does the brevetoxin bioaccumulate in animals and across the food chain, specifically if affected sardines were fed to tuna?*

Brevetoxins are known to bioaccumulate, especially in fatty organs such as the liver. Primarily this occurs in the standard manner, with planktivores and detritivores (bivalves, gastropods, etc.) directly uptaking toxins as they consume *Karenia*, then biotoxin levels accumulate with progression up the food chain until the toxin load reaches a lethal limit. So yes, tuna fed with affected sardines would bioaccumulate higher levels of the toxin. Seabirds that eat fish and any animal that eats brevetoxin-laden wildlife (dead or alive) will then bioaccumulate the toxin. It is important to note that anecdotal evidence appears to indicate that pelagic species, such as sardines, are not being impacted in this bloom, and rather, it is the demersal species that are impacted. This is consistent with similar events reported elsewhere.

- *What is the expected long-term damage and timeframe for the rejuvenation of the habitats impacted, particularly areas in which there appears to be large scall die-offs in all areas of the food chain?*

Further investigation is needed. In Wellington Harbour in New Zealand, the recovery timeframe was in the order of 3 to 5 years.

- *For the shellfish industry (Australia wide) it is critical to gain an understanding of the algae species. For example: In NSW they have previously observed *K. mikimotoi* and *K. papilionacea* but have not detected *K. brevis*. Being able to identify the exact species of *Karenia* that is producing brevetoxins allows industry to respond appropriately to future *Karenia* detections.*

There is a need to build capacity in Australia to be able to accurately and rapidly identify harmful algal species both morphologically and genetically.

## Key Knowledge Gaps

- Limited understanding of the biological and ecological processes driving harmful algal blooms (HABs).
- Lack of rapid and reliable methods for HAB identification at species and community levels.
- Insufficient knowledge of the types of toxins produced by different HAB species and their impacts on various organisms, including humans, and the food web.
- Limited understanding of the long-term ecological effects of HABs, including recovery times and broader impacts on biodiversity, productivity and connectivity in marine and associated estuarine ecosystems.
- Limited capability to detect and forecast HABs in near-real time.
- Biosecurity risks associated with HABs, including disease impacts and invasive species.
- Limited understanding of effective and practical control measures for managing HABs.

## Identified needs

- Continue to collect live samples of harmful algae to isolate and culture algal species for immediate analysis.
- Establish a certified laboratory in Australia to accurately identify Brevetoxins, addressing a critical gap in scientific infrastructure.
- Develop better systems for phylogenetic analysis.
- Review HABs in Australia to understand their biology and ecology, including drivers.
- Develop monitoring and forecast programs for HABs in South Australia, including of remote regions. Monitoring methods should explore the integration of high resolution imagery, satellite remote sensing, in situ real-time sensors which can detect (limited) HAB species to provide early detection, and microscopic and molecular methods.
- Develop standard national approach to genetic ID and monitoring with rapid turn-around time to allow for confident species level determination (semi-quantitative or quantitative) within wild, mixed species samples, when the target species is at very low cell concentrations.

- Identify algal toxins (integrating genetic and chemical analysis), and their effect on different organisms (including humans) and ecosystems.
- Develop regional phytoplankton spectral libraries to improve remote sensing models for South Australian waters.
- Evaluate the impact of, and recovery from, HABs on marine ecosystems - including biodiversity, threatened species, trophodynamics and productivity. Consider the role of marine parks and potential refuges.
- Evaluate the impact and recovery from HAB in estuarine ecosystems, particularly the Coorong, including biodiversity, trophodynamics and productivity to inform management and potential restoration actions.
- Understand how HABs may affect nearby terrestrial wildlife and habitats.
- Understand the threat of HABs to commercial and recreational fisheries and development of locally relevant management options.
- Develop international linkages with regions that have experienced similar bloom events for knowledge exchange on bloom dynamics, monitoring and management.
- Develop coordinated risk assessments, response plans, communications plans and data management frameworks to better manage HABs in the future.
- Take learnings from the current HAB related use of citizen science and platforms/apps that can be applied for this, and develop protocols, guidance and systems to utilise this resource more effectively in future scenarios.
- Develop a national HAB response/ forum / network.

## Key actions

- Share information gathered during the Science Forum with the SA Government Interagency HAB Working Group to facilitate the prioritisation of research needs and the development of a Science Program aimed at addressing research gaps and future priorities. Funding options will also be evaluated as part of this process, which could include national natural disaster relief funds.
- PIRSA to organise an industry forum in the coming weeks to provide an update on the current situation and address industry concerns or queries.
- Circulate key communication steps and messages, once established to Science Forum participants.

# Appendix 1 – Participants

## In-person participants

Gretchen Grammer, SARDI (Chair)

Out of scope (PIRSA)

Out of scope (DEW)

Out of scope (PIRSA Biosecurity)

Out of scope (University of South Australia)

Out of scope (DEW)

Gavin Begg (PIRSA)

Out of scope (SARDI)

Out of scope (The University of Adelaide)

Out of scope (NMSC)

Out of scope (GA, DEW)

Out of scope (SARDI)

Out of scope (PIRSA Fisheries and Aquaculture)

Out of scope (DEW)

Out of scope (CSIRO)

Out of scope (PIRSA)

Out of scope (DEW)

Out of scope (EPA)

Out of scope (SARDI)

Out of scope (PIRSA Biosecurity)

Out of scope (SARDI)

Out of scope (Flinders University)

Out of scope (SARDI)

Out of scope (Microalgal services)

## Online participants

Out of scope (FRDC)

Out of scope (PIRSA)

Out of scope (UTAS)

Out of scope (UTAS)

Out of scope (PIRSA)

Out of scope (DPI, NSW)

Out of scope (Cawthron Institute, New Zealand)

Out of scope (Oz Fish)

Out of scope (SmartSat CRC)

Out of scope (CSIRO)

Out of scope (SA Health)

Out of scope (PIRSA)

Out of scope (The University of Adelaide)

Out of scope (SmartSat CRC)

Out of scope (UWA)

Out of scope (UTAS)

Out of scope

Out of scope (DBCA)

Out of scope (UTS)

Out of scope (Cawthron Institute, New Zealand)

Out of scope [redacted] (UTAS)  
Out of scope [redacted] (PIRSA)  
Out of scope [redacted] (DEW)  
Out of scope [redacted] (CSIRO)  
Out of scope [redacted] (Southern Fishery & Ecosystem Solutions, SFES)  
Out of scope [redacted] (DPI, NSW)  
Out of scope [redacted] (CSIRO)  
Out of scope [redacted] (Flinders University)  
Out of scope [redacted] (UTS)  
Out of scope [redacted] (DEW)  
Out of scope [redacted] (Microalgal services)  
Out of scope [redacted] (SARDI)