# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Overview

The 2026 Harmful Algal Bloom (HAB) Symposium brought together over 200 researchers, government agencies, industry leaders, and community members to discuss the unprecedented marine crisis that has been impacting South Australia (SA) since March 2025. This historic event affected more than 30% of the state's coastline and caused the death of approximately one million marine animals.

The two-day Symposium, built on last year's HAB Science Forum, showcased the significant scientific progress made over the past year, while emphasising the importance of ongoing collaboration to safeguard marine ecosystems and support local industries and communities. HABs are not unique to SA; they are an increasing challenge nationally and globally. Events like this Symposium play an important role in bringing together diverse perspectives, experience and expertise to strengthen our collective understanding and preparedness. The Symposium identified where the scientific knowledge on HABs remains incomplete, helping to determine future research priorities.

## Introduction

The Honourable Clare Scriven MLC, Minister for Primary Industries, Regional Development and Forest Industries, opened the Symposium following an Acknowledgement of Country. The Minister highlighted that the HAB impacting SA in 2025/26 is one of the most severe naturally occurring marine wildlife mortality events ever recorded in Australia. In response, the joint South Australian and Australian Government Algal Bloom Response packages directed $162.5 million towards immediate emergency relief, industry recovery grants, and investment in research, capability and long-term scientific infrastructure. This response included $3.2 million to establish the Office for Algal Bloom Research (OABR), which brings together the South Australian Research and Development Institute's (SARDI) existing expertise and seven additional specialist positions engaged to address identified capability gaps. As a centre for HAB research, the OABR will strengthen Australia's preparedness for future events, support national collaboration and link research with operational decision-making. Other key achievements supported through the broader response include the deployment of six new oceanographic moorings for real-time monitoring and the creation of an accredited local laboratory for rapid brevetoxin testing, which has reduced result turnaround times from weeks to days.

The Symposium reviewed 15 months of intensive work in which science played a central role in shaping South Australia's response during a period of significant uncertainty. The event showed how early community reports were progressively built into a coordinated management approach, with a clear focus on strengthening readiness for future HAB events. It was noted that complex environmental challenges require integrated science and strong partnerships across organisations, jurisdictions and disciplines to guide coordinated action and strengthen future response capability.

A national overview of the Integrated Marine Observing System (IMOS) highlighted the value of national research infrastructure, funded through the National Collaborative Research Infrastructure Strategy (NCRIS), in providing freely available data through the Australian Ocean Data Network (AODN). The presentation underscored the importance of combining data streams to better understand bloom drivers and announced $58.8 million in new funding for Coastal Research Infrastructure (CoastRI), a new NCRIS-funded initiative. CoastRI will connect land and sea and provide critical data to improve understanding of coastal risks, water quality and potential future HAB events across Australia.

The global context of HABs was also explored in this session, providing a broad overview of the biological, environmental and climatic factors that can influence HAB development. HABs are historical and naturally occurring phenomena, that can be shaped by “bottom-up” factors such as nutrients, temperature and light, as well as “top-down” pressures including grazing, sinking, viruses and antagonistic bacteria. Climate change, ocean acidification and unusual local conditions can further affect bloom dynamics. The presentation noted that near-term forecasting is improving through real-time data and integrated modelling, but long-term prediction remains limited by the complexity of planktonic communities and species-level ecological understanding.

## Theme 1: Drivers

Theme 1 examined the possible drivers of the 2025/26 SA HAB event. Attribution remains complex and uncertain, with no clear evidence of a single dominant driver or definitive causal pathway.

Typical hypotheses for origins of algal bloom events include the introduction of algal species through ballast water or international vessel movements, or the stimulation of an endemic but rare resident species.

Advanced molecular analysis confirmed *Karenia cristata* as the dominant species driving the HAB impacting SA across 2025 and 2026. Analysis of archived DNA from IMOS national reference stations (historical IMOS collections) showed that *Karenia cristata* is endemic to SA waters and has been present at low abundance for at least a decade, rather than an introduced invasive species.

Environmental preconditioning likely contributed to the rapid proliferation of this resident species, driven by a unique confluence of events: the largest Murray River flooding in 70 years in 2022–23, record-strength coastal upwelling in 2023–24, and a subsequent 10-month marine heatwave that created the calm, stratified conditions thought to be necessary for the bloom to intensify.

**Knowledge Gaps and Future Direction:**

- Drivers of HABs: Develop a better understanding of what drives proliferation of certain HAB species over others in specific locations, and the timeframes over which they persist.

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Theme 2: Oceanography

The Oceanography theme of the Symposium focused on the integration of real-time monitoring, satellite technology, and sophisticated modelling to transition from a reactive crisis response to a predictive early warning system.

The first presentation detailed the establishment of a multidisciplinary early detection and forecasting system at SARDI, combining monitoring, remote sensing, data integration and predictive modelling to support earlier detection and more informed decision-making. A major achievement recognised in this presentation was the deployment, in strategic locations in SA waters, of six new oceanographic moorings equipped with novel HAB sensors. These sensors can distinguish the unique fluorescence signatures of key HAB species in real-time, including *Karenia*, providing immediate data on cell concentrations and other water quality parameters such as dissolved oxygen and salinity. This framework aims to provide a blueprint that can be adapted for future events involving different algal species, supporting pragmatic decision-making for government and industry.

The second presentation focused on a collaborative initiative led by CSIRO AquaWatch with SARDI, that brings together in-situ sensing and daily high-resolution satellite imagery to deliver enhanced environmental intelligence. A critical challenge identified was that standard global satellite algorithms often overestimate chlorophyll in SA's optically complex gulf waters by as much as 250%. To address this, researchers are building regional spectral libraries and physics-aware deep learning models that can correct for local interferences like coloured dissolved organic matter. Once fully operational, this system will provide real-time water quality maps and four-week-ahead forecasts to help narrow down monitoring regions and provide early warnings to aquaculture and fisheries sectors.

The final presentation in this session described hydrodynamic and bio-optical modelling being undertaken by CSIRO in collaboration with SARDI to better understand bloom initiation and movement. Using an integrated Environmental Modelling Suite, the work simulates complex processes such as nutrient cycling, sediment transport and larval dispersal across different spatial scales. A key focus is the species-specific parameterisation of *Karenia*, including the "package effect", where cell size and pigments influence light absorption and can affect how blooms are detected in remote sensing data. These models are being used to undertake hindcasts to identify environmental triggers of the 2025/26 HAB event and scenario testing to explore how future blooms may respond under different conditions, including management interventions or habitat restoration.

**Knowledge Gaps and Future Direction:**

- Mechanistic Model Development: Further develop mechanistic models to allow for testing hypotheses about HAB drivers and assess how specific events, such as flood conditions, influence bloom formation and behaviour.

- Model Validation: Expand observational datasets, including data from Imaging FlowCytobots and large-scale offshore surveys, to underpin models and AI-driven products and improve confidence in outputs.
- Predictive Limits: Improve understanding of the major forcing factors that constrain forecasts beyond 30 days, including species-level ecological processes that limit long-term prediction.
- Spectral Library Refinement: Continue refining region-specific spectral libraries to address local chlorophyll overestimation and advance remote sensing products for South Australian waters.
- Satellite Remote Sensing: Develop methods to analyse optically complex South Australian waters and integrate HAB species-specific physiological traits into monitoring and forecasting models.
- Detection of Other Species: Expand monitoring and forecasting capability beyond *Karenia* and *Chattonella* to include other harmful species that may emerge in future events.

## Theme 3: Aquaculture

The Aquaculture theme of the Symposium explored the critical intersection between HABs and the sustainability of SA's seafood sector, focusing on toxin dynamics, research capability building, and the investigation of mitigation approaches applied locally and globally, with discussion on their strengths and limitations.

On-farm monitoring undertaken by SARDI revealed that brevetoxins (BTX) in oysters can take up to 19 weeks to decline to safe levels (0.8 mg/kg), which is significantly longer than observed in experimental relay situations. This research is vital to ensure seafood safety and determine appropriate harvest reopening times.

To strengthen future preparedness, researchers at SARDI have successfully established pure laboratory cultures of numerous HAB species isolated from the SA bloom event, including *Karenia cristata* and *K. mikimotoi*. These cultures are foundational for understanding the species' unique physiology and are essential for toxin profiling, calibrating real-time sensors, and providing the material needed to validate new diagnostic tools.

This session also examined global and local approaches to HAB mitigation, including modified clay trials led by the SA Environment Protection Authority (EPA) in collaboration with SARDI. While the treatment removed more than 96% of algal cells, it caused significant non-target toxicity and had no effect on reducing existing toxin levels. As a result, it was not recommended for further use in the open environment.

A major breakthrough in SARDI's monitoring capability has been the application of advanced molecular tools, including qPCR that can identify and quantify specific toxic HAB species from an environmental sample within one to two hours. These rapid molecular assays provide a significant improvement on traditional taxonomic methods, supporting earlier detection and enabling near real-time management responses. Application of an additional molecular tool, DNA metabarcoding, further strengthens this capability by allowing scientists to analyse entire dinoflagellate communities and track how species interact and change throughout a bloom event.

By preserving and storing these samples in a permanent molecular bank, researchers can also revisit these historical samples as new testing tools become available, helping ensure SA is better prepared to protect its marine environment and seafood industry from future events.

**Knowledge Gaps and Future Direction:**

- Species Traits and Physiology: Improve understanding of the life cycle, nutritional modes and metabolic pathways of *Karenia cristata*, including responses to light and temperature.
- Strain Comparison: Compare *Karenia* strains collected across different locations and timeframes to assess potential genetic variation and evolutionary change between field samples and laboratory cultures.
- Toxin Profiling: Characterise the brevetoxin profiles produced by local *Karenia* species and compare them with internationally reported species to improve risk assessment and testing approaches.
- Environmental Triggers: Investigate how nutrients such as iron and silica influence bloom intensity and clarify the potential role of cysts in bloom initiation and persistence.

## Theme 4: Environmental Sampling

Theme 4 outlined the rapid expansion of SA's HAB surveillance capability, led by SARDI. What began as an initial reactive response to community observations evolved into a coordinated, statewide monitoring program, with sampling increasing from fewer than 10 initial sites in March 2025 to more than 300 stations by 2026. This provided unprecedented situational awareness across the coast. A 10,000 cells/L operational trigger for *Karenia* was also introduced to categorise areas as either 'active bloom' or 'watch' zones, helping government focus resources, guide management responses and provide clear, data-driven public updates.

This expanded coverage was enabled by key partnerships and targeted capability building. Collaboration with the Charter Boat Fishery Association gave SARDI scientists access to offshore sites, helping track the bloom's footprint beyond the shoreline. At the same time, work with the South Australian Shellfish Aquaculture Quality Assurance Program (SASQAP) strengthened SARDI's in-house capability by upskilling scientific staff in specialised phytoplankton identification and enumeration. Monitoring data are now integrated into a publicly available dashboard administered by the Department for Environment and Water (DEW), providing weekly updates to the community and supporting more informed responses to future HAB events.

Building on findings outlined in the Drivers section, molecular analysis undertaken by the University of Technology, Sydney, on archived marine DNA samples from IMOS national reference stations showed that *K. cristata* has been present in local waters since at least 2017. This was a critical finding, shifting the scientific focus from tracking a possible introduction to understanding how a resident species could rapidly proliferate under unique environmental conditions.

The Symposium also showcased the power of citizen science through the “Phytoplankton of South Australia” group, which empowered coastal residents to contribute to the response. Volunteers were trained to use affordable microscopes and digital reporting tools to identify and map local algae, creating a broad community monitoring network that complemented formal surveillance.

The response was further strengthened by intensive field research led by SARDI, including a seven-day voyage on the Fisheries Patrol Vessel Southern Ranger that collected more than 1,500 samples for various laboratory analyses and used underwater drones to monitor sensitive marine habitats like giant cuttlefish breeding sites. Dedicated environmental monitoring by the Environmental Protection Authority (EPA) investigated whether the seafloor could act as a long-term reservoir for harmful toxins. This research provided important clarity for the public, showing that while brevetoxins could be detected in seagrass and sediments, they generally dissipated within 60 days in SA’s coarse, sandy coastal environments.

**Knowledge Gaps and Future Direction:**

- Public Understanding: Improve communication through the OABR to build public understanding of HAB causes and impacts, including clarifying that not all sea foam, discoloured water or phytoplankton are harmful.
- Adaptive Response Framework: Refine the adaptive response framework developed during the 2025 event, including species-specific operational triggers and thresholds that can be applied to future HABs.
- Archived Sample Analysis: Explore potential collaborations to process and analyse archived marine DNA and Lugols preserved samples, supporting cost-effective research and training for future HAB scientists.

## Theme 5: Ecosystem Impacts

The Ecosystem Impacts theme presented a comprehensive assessment of the environmental impact of HAB’s, including effects on fish stocks, benthic habitats and globally significant marine wildlife mortality events across South Australia’s marine ecosystems.

Extensive research undertaken by SARDI drew together available data to assess the impact of the HAB on SA’s fishery resources, highlighting how scientific evidence was used to inform fisheries management decisions. The integrated assessment program combined commercial logbooks, recreational fishing reports, targeted fishery-dependent surveys, fishery-independent monitoring, bycatch sampling, dive surveys and long-term datasets for key species. By comparing these data with a three-year pre-bloom baseline, researchers assessed the scale of impact to inform the Algal Bloom Fishery Management Roadmap. The results showed clear differences in species resilience. For example Southern Calamari in Gulf St Vincent experienced major declines of more than 80%, including the absence of egg masses, while Blue Swimmer Crab surveys showed strong signs of recovery, increasing by up to 75% in some areas.

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

Seafloor research as part of a National Environmental Science Program project, led by SARDI, utilised towed underwater video cameras across 84 stations to reveal significant damage to deeper marine habitats. The surveys showed that Gulf St Vincent lost a significant amount of sea sponges and macroalgae (seaweed), with some areas replaced by bare sand. A critical finding was that even where structural features like razorfish shells remained, the animals within were often dead, showing that while the physical reef structure persisted, its ecological function as a healthy, living habitat had been lost.

DEW provided preliminary results from the resurveying of 200 long-term monitoring sites, documenting a 50% drop in fish species richness in some metropolitan areas. The research highlighted that while mobile fish could sometimes move away from the bloom, site-attached species and those living near the bottom were highly susceptible. These findings provide an important baseline for tracking the recovery of nearshore marine biodiversity over the coming years.

Research undertaken by Flinders University documented the largest shark and ray mass mortality event ever recorded globally. More than 4,000 sharks and rays were found dead along the coastline, which is 130 times greater than any previously recorded event of its kind. Toxin analysis confirmed the presence of brevetoxins in the gill and liver tissues of deceased sharks, raising serious concerns about the local depletion of resident and range-restricted species.

**Knowledge Gaps and Future Direction:**

- Recovery Trajectories: A key knowledge gap is the long-term recovery timeline for severely impacted groups, including sharks, rays and benthic invertebrates such as razorfish and sponges.
- Ecological State Change: Address the fundamental question of whether impacted ecosystems will recover to their previous condition or have shifted toward a new ecological state.
- Wildlife and Toxin Persistence: Improve understanding of how HABs affect marine wildlife, including effects such as the loss of water repellence in coastal bird feathers, and why brevetoxins may persist in some bivalves after they are no longer detected in sediments.
- Trophic Disruptions: Improve understanding of how the loss of detritivores affects SA's detritus-based gulf systems and the resulting flow-on effects through food webs.
- Benthic Recovery Pathways: Interrogate benthic survey data to improve understanding of ecosystem condition, habitat recovery and longer-term recovery trajectories.

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Theme 6: Impact and Recovery Modelling

The Impact and Recovery Modelling theme explored how ecosystem models can be used to assess the whole-of-system impacts of the 2025 SA HAB event and examine potential recovery pathways under different future scenarios.

SARDI is developing ecosystem models (EcoPath with EcoSim) to better understand how energy flows through SA's marine food webs and how these systems may recover following the HAB. This work has shown that gulf systems are highly productive, with rapid energy throughput and a strong reliance on primary production and detritus-based pathways. These characteristics highlight that impacts can propagate quickly through the food web, while recovery is likely to depend on the re-establishment of these key energy pathways. By applying HAB-related mortality data to the models, researchers can forecast recovery trajectories under a range of future conditions, including potential HAB recurrence, and explore which management levers, such as changes to fishing effort or habitat restoration, could best support healthy ecosystem function and sustainable fishing levels.

**Knowledge Gaps and Future Direction:**

- Model Resolution: Improve ecosystem models to better resolve HAB population dynamics, toxicity pathways and indirect species effects, beyond emergent mortality outcomes.
- Ecological Thresholds: Refine ecosystem models to identify thresholds that can trigger future monitoring, management responses or recovery interventions.

## Theme 7: Recovery

The Recovery theme of the Symposium detailed the multifaceted strategies designed to restore SA's marine biodiversity and build long-term resilience, encompassing restorative aquaculture, community-led shellfish reef projects, and integrated ecological planning to safeguard the state's coastal environments for the future.

Restorative aquaculture research at SARDI is using hatchery techniques to help rebuild at-risk fish populations. This work could expand beyond current Snapper restocking to include pilot programs for protected species such as King George Whiting and Weedy Seadragons, which require specialised live food production. This approach aims to boost fish stocks and restore healthy ecosystems alongside traditional management measures.

DEW is developing SA's ecological recovery plan to support the transition from reactive emergency management to a long-term, science-led resilience and recovery framework. A risk assessment identified 30 – 90 macroalgae species at risk of extinction due to their restricted range, highlighting the need for a broad ecosystem perspective and recovery actions that extend over the long-term. Drawing parallels to the Deepwater Horizon oil

spill response, the plan recognises that recovery may take more than 10 years and focus needs to be centred on restoration of foundational habitats to ensure a source of recruits for the next generation of marine life.

Research by Adelaide University highlighted the success of community-based shellfish reef restoration, where volunteers help deploy recycled oyster shells in biodegradable bags. Despite the intensity of the bloom, native flat oysters recruited in very high numbers—hundreds of thousands in some areas—which demonstrates their resilience compared to species such as razorfish. These reefs provide important foundations for biodiversity and help restore habitats that have been lost over the past 200 years.

The South Australian Government, through the Department for Premier and Cabinet, outlined the State's $162.5 million recovery plan to address the social, economic and ecological impacts of the HAB. The package spans grants, cleanup activities and blue carbon restoration, alongside broader health, industry and environmental support. The HAB's unique slow-onset nature, as opposed to emergencies such as fire or flood, led the government to adopt a scenario-based approach to build adaptive pathways for the future. This ensures that if a HAB event occurs, pre-defined triggers and management tools are ready to protect coastal communities and businesses.

**Knowledge Gaps and Future Direction:**

- Intervention Sequencing: Improve understanding of how to sequence and scale active interventions, such as macroalgae restoration, to effectively augment natural recovery processes.
- Ecological Recovery Planning: Strengthen the ecological recovery plan by incorporating additional data and defining clear, measurable objectives to guide recovery actions and assess success.
- Shellfish Reef Recovery: Continue monitoring existing and newly constructed reefs to assess recovery from HAB impacts and performance under different environmental conditions.
- Restocking Success: Develop clear measures to assess the effectiveness of restocking programs in supporting species recovery and broader ecosystem resilience.
- Future Response Governance: Establish clear governance structures and scalable intervention pathways to support coordinated responses to future HAB events.

## Theme 8: Regulatory Policy

The Regulatory and Policy theme of the Symposium examined the science-based management frameworks and comprehensive support packages implemented to assist the seafood sector, while detailing the rapid establishment of accredited local testing capabilities and international collaborations used to ensure seafood safety and maintain market access during the HAB.

PIRSA detailed the challenges faced by the seafood industry, including significant infrastructure damage to

oyster farms and high levels of economic anxiety. In response, the government support package included fee relief for 183 licence holders and grants to help businesses remain viable. PIRSA also introduced the Algal Bloom Fishery Management Roadmap, an evidence-based tool to provide industry with predictable guidelines for when fishing areas could be safely reopened.

The South Australian Shellfish Quality Assurance Program (SASQAP) identified the first detection of brevetoxins in Australian shellfish, leading to the closure of affected harvest areas and protecting consumers while the brevetoxin-producing species, *Karenia cristata,* was confirmed. A major breakthrough was the rapid establishment of an accredited local testing laboratory, soon to be operational at SARDI, which will reduce testing turnaround times from around 14 days to 3–5 days and provide the scientific certainty needed to reopen harvest areas as soon as the product is safe.

Work by SafeFish and the University of Tasmania evaluated rapid brevetoxin test kits to determine whether they could help speed up seafood safety screening. The trials found that some kits could reliably triage samples by identifying those that were clearly safe, reducing the need for more expensive and time-consuming laboratory testing. While these are not yet on-farm tests, they represent a significant potential saving in time and money for the industry during future events.

Cawthron Institute shared more than 30 years of New Zealand's experience from similar HAB events, which have occurred in their region since the early 1990s. This work highlighted the complex chemistry of brevetoxins and identified critical global data gaps, including the need for standardised toxic equivalency factors and a better understanding of how toxins affect the food web over the long term.

**Knowledge Gaps and Future Direction:**

- Toxicological Metrics: Develop toxic equivalency factors for brevetoxin analogues to support consistent conversion into standardised seafood safety units.
- Method Fitness: Assess whether current instrumental testing methods are appropriately calibrated or overly conservative compared with traditional bioassay approaches.

## Theme 9: Health

Theme 9 outlined the public health impacts of the HAB, including significant eye and respiratory irritation among beachgoers and coastal residents. These symptoms were generally self-limiting and resolved once exposure stopped. SA Health is undertaking a systematic review of emergency department presentations to better understand the relationship between reported symptoms, cell concentrations, and environmental factors such as wind and waves.

Findings from The Algal Bloom Shed, a citizen science initiative that tracked symptoms in real time, highlighted the value of community reporting during the bloom. While these findings are based on self-selected community

reporting rather than a full population survey, the portal showed that females aged 30 to 70 were the most frequent reporters of symptoms such as scratchy throats and lethargy, and that one in three respondents sought medical attention. The event also underscored the mental health impacts of the bloom, including eco-anxiety and the loss of the beach as a safe and restorative space for coastal communities. These findings point to the need for improved public understanding of HABs and greater support for communities affected by their broader social and emotional impacts.

A presentation on the cultural impacts of HABs on First Nations coastal communities was planned for this session but could not proceed due to an unexpected scheduling conflict. This remains an important area for further engagement and future discussion.

**Knowledge Gaps and Future Direction:**

- Misinformation: Strengthen OABR-led communication to address misinformation and disinformation about HAB causes, impacts and response actions.
- Irritation Mechanisms: Determine whether reported symptoms are caused by aerosolised biotoxins, whole cells or physical cell particles, and clarify how cell densities relate to health impacts.
- Testing Capability: Develop local capability for rapid test kits and aerosolised brevetoxin testing to support faster assessment of human health risks.
- Community Impacts: Undertake systematic community surveys to better understand the lived experience of HABs, including long-term exposure, mental health, socio-economic and broader community impacts.
- Animal Health Impacts: Improve understanding of HAB-related effects on domestic animals, wildlife and marine species.
- First Nations Engagement: Meaningfully engage First Nations communities to incorporate Indigenous knowledge into health monitoring and Sea Country management.

## Harmful Algal Bloom Initiatives

### ANZ HABnet

The Australia-New Zealand Marine Harmful Algal Bloom Network (ANZHABnet) was established in July 2025 as a direct response to the recent HAB, aiming to unify regional expertise and build national capability. This collaborative network has rapidly grown to approximately 240 members from every Australian state and territory, as well as New Zealand, representing a diverse range of disciplines across government, industry, and research sectors. Its primary purpose is to foster research and training while providing a platform for the rapid dissemination of expert knowledge during bloom events. The network is currently transitioning toward becoming a formal, self-sustaining incorporated entity to ensure long-term coordination and preparedness at both regional and international levels.

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

**National Environmental Science Program (NESP) HAB project**

The National Environmental Science Program (NESP) HAB project is undertaking a national assessment of HAB preparedness and future needs. The project is focused on summarising Australia's current scientific capabilities for HAB surveillance and response, particularly in relation to environmental impacts and seafood safety. By identifying gaps in monitoring and forecasting, it aims to develop a comprehensive framework to improve national readiness for future events involving diverse algal species. This work involves broad stakeholder engagement, including surveys and interviews, to inform a coordinated approach to future research and operational policy.

## Collaboration, strategy and future opportunities

The Symposium highlighted that long-term resilience to HAB events depends on continuing to develop our collective national preparedness through strengthened scientific and strategic partnerships. Efforts will continue to focus on fostering community, industry and university integration to leverage existing expertise and operational resources, supported by governance arrangements that coordinate inter-agency responses and cultivate the next generation of researchers.

**Scientific and Strategic Partnerships**

- Office for Algal Bloom Research: Continue to build on the OABR's established role as a national centre for HAB research, connecting scientific capability across jurisdictions and translating research into preparedness, response and recovery outcomes.
- National and International Networks: Strengthen collaboration with national and international partners to draw on diverse expertise, share knowledge and accelerate HAB research, including:
  - » supporting the continued development of ANZ HABnet as a growing Australia–New Zealand network for HAB expertise, training and rapid knowledge sharing.
  - » drawing on the NESP HAB project to assess national preparedness and identify future science, monitoring and policy needs.
  - » collaborating with the Cawthron Institute in New Zealand to advance biotoxin analysis and compare the molecular structure of algal strains from different regions.
  - » continuing the partnership with Woods Hole Oceanographic Institution in the United States to incorporate emerging monitoring technologies into SA's early detection system.
  - » working with national and international aquariums to advance mysid culture and captive breeding techniques for Seadragons in support of restorative aquaculture.
- Modelling and Infrastructure: Leverage NCRIS-funded IMOS and CoastRI infrastructure to provide critical

data, advance oceanographic models, refine spectral libraries and develop AI-driven spatial forecasting in partnership with CSIRO, the Bureau of Meteorology and others.

- Co-investment: Explore the potential for philanthropic and strategic co-investment to advance HAB research and support broader initiatives, such as a National Ocean Health Strategy.

**Community, Industry and University Integration**

- Citizen Science Integration: Incorporate citizen science data into official surveillance and recovery assessments.
- Industry Surveillance Partnerships: Continue partnerships with the fishing, aquaculture and tourism industries to support high-frequency sampling and monitoring of the marine environment.
- Collaborative Research Opportunities: Expand multidisciplinary projects, pursue collaborative grant applications and provide access to extensive banks of archived samples and datasets.
- Participatory Health Monitoring: Collaborate with community organisations, health professionals and veterinarians to develop real-time symptom notification systems and better understand impacts on human and animal health.

**Workforce and Governance**

- Strategic Co-investment: Explore genuine opportunities for co-investment between state and national programs and university research partners.
- Research Career Pathways: Create formal pathways into HAB research for Honours, Masters and PhD students to build long-term expertise.
- Cross-Government Governance: Establish a clear structure with a dedicated control agency and hazard risk reduction leader to coordinate future cross-government responses.

## Closing remarks

The Symposium demonstrated the extraordinary scientific progress made in a remarkably short period, including the deployment of new monitoring infrastructure and the generation of vast environmental datasets. A central theme was that complex environmental challenges require integrated science and strong partnerships, as no single organisation or jurisdiction can solve these issues alone. The newly established Office for Algal Bloom Research will serve as a critical connector and hub within a broader national network and aims to coordinate expertise and translate research into operational decision-making. Moving forward, the focus remains on leveraging existing capabilities, identifying co-investment opportunities, and creating pathways for the next generation of researchers to ensure sustained national expertise, capacity and resilience.

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Participants

Adrian Linnane (SARDI)

Aidan Banks (PIRSA)

Alex Dobrovolskis (SARDI

Alex Macmillan (Conservation SA) (Convservation SA)

Alice Fistr

Alice Jones (AU)

Alison Turnbull (UTAS)

Alison Wright (DEW)

Alistair Hobday (CSIRO)

Amy McLennan (https://www.bloominalgae.com.au/people)

Anastasiia Snigirova

Andreas Seger (UTAS)

Andrew Baker (Data Effects)

Anu Kumar (CSIRO)

Anusuya Willis (CSIRO)

Ben Stobart (SARDI)

Brad Martin (Oz Fish)

Bronwyn Gillanders (AU)

Callum White (SARDI)

Carey Hannaford

Cassandr Urgl (PIRSA)

Chaojiao Sun (CSIRO)

Charles James (SARDI)

Charlie Huveneers (FU)

Chinglen Tensubam (SARDI, OABR)

Chris Beattie (DPC)

Chris Bice (SARDI)

Chris Izzo (FRDC)

Chris Pine (Flinders Uni)

Christopher Bolch (SARDI, OABR)

Christopher Clement Keneally

Claire Webber (SASF)

Crystal Beckmann

Cylus Bamford

Damian Matthews

Daniel Casement (ABSTIA)

David Cunliffe (SA Health)

David McPharlin (PIRSA)

Delahay Miller

Dennis Holder

Dillon Ross Campbell

Elisha Lovell (SARDI)

Elizabeth Weeks (SmartSat CRC)

Emillie Passfield (Cawthron Institute)

Emily Mellor (PIRSA F&A)

Emily Rowe

Emma Cannon (PIRSA)

Enya Chitty

Fred Bailleul

Gavin Begg (PIRSA)

Geoff Wood

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Participants

Greg Ferguson (SARDI)
Gretchen Grammer, SARDI (Chair)
Gustaaf Hallegraeff (UTAS)
Hai Tran (SARDI)
Hannah Nunn (SARDI)
Hazel Vandeleur (SA Water)
Hector, Lozano-Montes (SARDI)
Heidi Kenyon (The Algal Bloom Shed)
Hugo Bastos De Oliveria (SARDI)
Ian Gibbins
Jacqueline Stephens (https://www.bloominalgae.com.au/people)
Jade Fredericks (PIRSA)
Jane Sloan (UNSW)
Jason Earl (SARDI)
Jeff Cosgrove (DBCA)
Jessica Kube (PIRSA)
Jodie Van De Kamp
Johanna Williams
Jordan Kent
Joshua Dennis (SARDI)
Judy Halliday (DSD)
Judy Tarus
JulieAnn Stoll (Chairperson, Port Environment Centre)
Karin Hatch, Normanville HAB Monitoring Group
Kate O'Connor (DPC)
Kathryn Wiltshire (SARDI)
Keith Rowling (NMAC)
Kelly King (PIRSA)
Kelly Newton (Health)
Kevin Mark (SARDI)
Khandaker (Rayhan) Mahbub (SARDI / SASQAP)
Kristian Peters (Green Adelaide, DEW)
Kriston Bott (SARDI)
Lachlan McLeay (SARDI)
Letitia Dahl-helm, Environmental Officer, Yorke Peninsula Council
Lissi Whyte (Vater Group)
Lynlee Lowe (SAOGA)
Maddison Gaut (PIRSA)
Mandee Theil (PIRSA F&A)
Mary Pulford
Matt Landos
Matt Read
Matthew Royal (DEW)
Meagan Turner
Michelle Heupel (UTAS)
Michelle Luinstra (Yumbah)
Mike Steer (SARDI)
Milena Fernandes
Miriam Lumb (DPC)
Mollie Owens

FRDC Fisheries Research and Development Corporation
OFFICE FOR ALGAL BLOOM RESEARCH
Government of South Australia Department of Primary Industries and Regions
SARDI South Australian Research and Development Institute
Australian Government

# Harmful Algal Bloom Symposium

2 & 3 June 2026

South Australian Research and Development Institute (SARDI) | 2 Hamra Avenue West Beach SA 5024

## Participants

Molly Ellis Hennekam (AU)
Murphy Homes (DEW)
Nick Secomb (PIRSA Biosecurity)
Pat Tripodi (MSF)
Patrick Burke (SARDI)
Patrick Reis-Santos (AU)
Patty McMahon
Paul Coldrey (Data Effects)
Paul Dee (SAOGA/SAORC)
Penny Ezzy
Phil Bamford, Phytoplankton of SA Recovery group (Yorke Peninsula)
Rachel King (SA Museum)
Rachel Nicholls (SARDI, OABR)
Rob Lewis (Science without Bounds)
Roger Kirkwood
Ruth Eriksen (CSIRO)
Salu McFarland (PIRSA)
Sam Gaylard (EPA)
Samantha Sea (Phytoplankton of South Australia)
Sarah Catalano (SARDI)
Sarah Emmett
Sarah Spurling (PIRSA Biosecurity)
Sarah Ugalde
Sasi Nayar (SARDI)
Scott Bennett (UTAS)
Shannen Smith (SARDI)
Shirley Sorokin
Shreya Dhame (SARDI, OABR)
Skye Fruean (PIRSA)
Sophie Leterme (Flinders University)
Sophie Russell
Stephen Mayfield (SARDI)
Stephen Pahl (SARDI)
Sushmita Mukherji (SARDI)
Tim Carruthers (DEW)
Tim Harwood (Cawthron Institute)
Toby Fox (Yumbah)
Tom Robertson (SARDI)
Valeria Torok (SARDI)
Valerie Barrow (DPC)
Vanessa Beeke (SARDI)
Vinuri Silva (SARDI)
Vittoria Cipriani (SARDI)
Yolande Markey (PIRSA)