

Submission to The Algal Bloom Hearing

I am Samantha Sea. I run the Facebook group, Phytoplankton of South Australia.

Three years ago I retired to the beautiful Encounter Bay, on the Fleurieu Peninsula. I was expecting to enjoy the richness of nature, the dolphins, the whales, beautiful small beings that inhabit our rocky shore. But, in those 3 short years I have witnessed two marine disasters unfold. The Murray River flood and now this Algal Bloom.

You can't do much about a flood coming from Queensland. It's been my experience that a flood runs its course then it's done. It killed a lot of carp and fish but hopefully it's done. But an Algal Bloom? You can't even see it with the naked eye. But you can see the results. Fish are dying. Seadragons, sting rays... you've seen the news. But also crabs, limpets, seaweeds. The science tells me it's not over. The high wind and winter didn't blow it away, like the government and council said it would. It just spread north for winter. We still see the foam nearly every day. There are fresh fish kills at Waitpinga, Anthony Rowland will tell you about those.

Please let me tell you a story. On March the 12th, I was on the Big Duck Boat, taking a survey of dolphins for the Kangaroo Island/Victor Harbor Dolphin Watch. It was a nice day, but I noticed foam off Ngalaikorombar (West Island). There was a lot of it. I took pictures.

A week or so later, I was hearing of surfers who were sick from the ocean at Waitpinga (not that far away). They reported foam, coughing and other health issues. To be frank I wasn't feeling great either. I live only streets from the sea.

By April, I was watching foam come in on the bay every day. People were reporting dead rays, seadragons. I'd stopped walking my dog on the beach because I didn't know what we'd be walking in.

There was a warm day and I wanted to go swimming in Encounter Lake. But I saw the horse and carriage to Granite Island had stopped. I phoned a friend and she said they could see the foam. So they stopped. I rang the EPA who put me on to PIRSA. I rang

PIRSA and asked to speak with someone regarding the algal bloom. They asked how to spell Algal Bloom... When I finally spoke with someone else, they said they only respond to reported incidents. They had no baseline of what would be safe water.

We live in a seaside tourist town. We rely on the ocean/beach focussed tourism, boating, whale watching, and all the flow on businesses. And we LIVE HERE.

In April, there was a forum by the Wild South and ecology expert, Faith Coleman came to talk, as well as Elders and Anthony Rowlands - the surfer who first reported it. I asked Faith what we could do to physically help, and she said we needed to know more about it. There was no information or data coming from government departments at that time. So it would take microscopes so we could get data. We should only need the ones they use at schools.

Well, it turned out schools were too busy for this. But Faith also put me onto Gaby at Asis Scientific, and he was very keen to help our beautiful ocean. He loaned me a microscope while we sorted out how someone in the community could identify and count, then I bought my own microscope and we figured out how to make the beginnings of a Citizen Science Water Monitoring Network.

By the beginning of June, I was taking samples off the Big Duck monthly and publishing on our Facebook page Phytoplankton of South Australia (<https://www.facebook.com/share/g/1Cc7hw2Ayz/>). There's an iNaturalist project too. This way, specialist scientists from across the globe can look and have data to work with.

To date I've processed about 80 samples - from Whyalla to the Coorong, all in about 3 months. My (and now our) work is overseen by Faith and her mother Peri Coleman, so if anything needs adjusting, they catch it. I've written a handbook - based on Faith and Peri's water monitoring manual and my own experience. It's available to anyone, under the Files section on the Phytoplankton of South Australia Group.

While we welcome the data now available from SARDI, until the 7th of August, it was only for the Coorong and Metro Adelaide. The only other publicly accessible results that I know of are on our page. And I'd like to discuss that a little but let's start with some examples of our work.

Faith told me about the sea sparkle that Ethan (who is on your VH panel) gathered and I went and collected some from him too, photographed it, and sent it to Faith, so she could confirm it was Noctiluca scintillans, that night. Channel 7 used my footage of it in a travel cup. I don't know what happened to the sample Nathan gave Fisheries, who arrived before me and have more resources.

A local fisher and businessman, Rod Ness, brought me a sample from the Largs North Boat Ramp - on the edge of the Dolphin Sanctuary. It was full of Karenia, but something else... I called it blobbies and sent a pic to Peri, because there were so many of them.

Please remember mine is a self funded student microscope, it has limitations. We pushed all those limitations because Peri feared it could be raphidophytes - toxic to fish that eat them, and dolphins that could eat the fish. My counts acted like an early warning sign. I flagged an issue, Peri got another sample the next day and confirmed (on her pro scope) it was only coccoliths. But had it been raphidophytes, we'd have known right away.

Last week (3rd September) another sailing friend, Paul, brought me a sample from the Port River Sailing Club. There's 27,667 *Karenia*/mL in that. The toxic action level for fish from Hallegraeff (2024) is over 2,000-3,000/mL. But now compare it to the sample Rod Ness brought me over the blood worm run on 30th July, about a month earlier, from the Royal South Australian Yacht Squadron marina. There were 10,944/mL *Karenia* and a further 10,778 dinoflagellates/mL (sometimes there are hard to identify when squished up, so I count them as dinoflagellates - this is a process Peri and Faith have recommended)

This is up to a possible 20,000 *Karenia*/mL. Rod asked me to test that water, because he thought something was up there. Decades of experience will do that.

We are benefiting from the lifeline experience of fishers and boaties, who see stuff and know the area. Rod suspected something would be going on in that still water in the marina. Paul saw it in his marina. Both samples told us the same thing, there are a lot of *Karenia*. But Rod's also showed diatoms, which compete for resources. These samples are helping us to build a picture.

This is the power of our citizen monitoring. See something. Bring it to a microscope. Share the data.

Here's a little of what my last month looked like (and why I missed the submission date, I do apologise)

- Processing the monthly water samples from the Big Duck (which I have done since June, and they're on your panel). We collect from offshore Waitpinga Cliffs, West Island (Ngalaikolambar), Wright Island (Ikkiwar), Seal Island, Olivers Reef, Pullen Island sites. They also bring me samples from the Coorong and other interesting water when they see it. Over the 3 months we've sampled, it's started to look clearer! But there is still some manky foam out there. You can see the results on the Phytoplankton of South Australia group.
- Processing two samples from Normanville and Carrickalinga that a swimmer, Kat, brought me because she was concerned about what she was swimming in - no *Karenia* in the count! But there is a very cool Peri story behind this too, ask me, I'll tell you.
- Processing a sample that Anthony Rowland (who is on your panel) brought me from Waitpinga beach (as opposed to offshore from the Big Duck). The results

are quite different. It's interesting to see. We make this available to anyone who wants to see the group. We share because we care.

- Collecting 12 samples from along the Onkaparinga and counting them for Peri Coleman. I'm working on a new report feature, so they're not on the page yet, frankly, I'm trying to get the time to do them.
- After all that, I enter results on the Facebook page and iNaturalist.
- Write a ppt presentation and present for Mike Bossley to his Ocean Ambassadors.

I am told you are interested in suggestions on how to fix this. These are my thoughts/requests.

We want to work with the government. It is an enormous task and such a huge coastline. This is where citizen science can shine. We can respond much faster locally. The local fishers and boaties know the area and what it should look like. They can get samples to us quickly. They know where to look, for example, the marinas in Outer Harbor. Locally, we test our Encounter Bay samples from the Bluff jetty or off a boat, because where the government is testing off the boat ramp becomes too stirred up with sediment, diesel, and other human made contributions and may not be really representative. It's this sort of local knowledge that gives citizen science the edge which we're happy to share.

We can be your early warning sign. Just like the Largs North boat ramp samples with "blobbies" we don't need to know what something is, we just need to identify we don't know it - flag the identification - and if it's something, the government scientists can come in. If it's not, they haven't wasted a lot of resources.

We could use more microscopes and people to use them. Some councils are buying their own and getting training for staff/community, so they can pull together to fight this. This week Faith and I are in Yorke Peninsula delivering training for their community. We're available for training, which does include costs for our expert.

Our identifiers could use some help, there are more and more samples and it will get overwhelming. I wonder if there might be some hours available from a government scientist(s) to help review our iNaturalist and Facebook posts and offer identifications. It will benefit both sides.

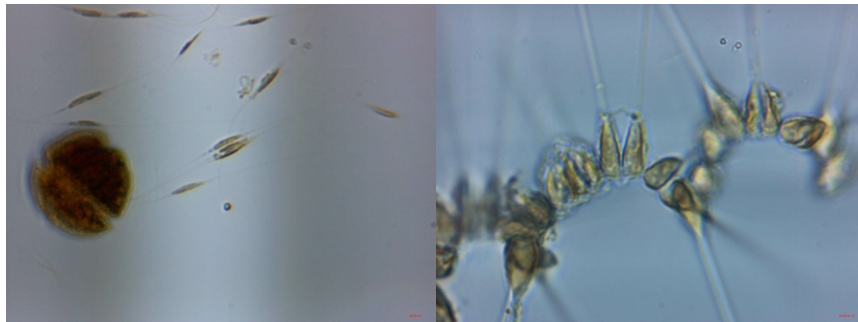
I hear from the fishers that they are struggling mentally. They are not going out on the ocean. Their boats lie dormant. What if we repurpose them as citizen science data / sample collectors. They could go out and collect samples off shore and return the samples for testing. The idea would be to supply fuel vouchers, perhaps \$30-\$50 so the fishers are not out of pocket and they get the mental health benefit.

I don't know if this is possible, but we'd like a little for research and development and additional tools. Rod and I have some ideas for getting samples from depths - to see where the *Karenia* is going. I have a couple of samples from 16.9m at Seacliff Reef and 6.5m at Port Hughes, but they were from a diver friend. We're looking at a way to use a hose and pump/ foot valve to retrieve samples. We'd like the temperature too. We are going to do this for ourselves, but going forward, it would be great to get this to other boats and locations too.

Finally, this is bigger than anyone realises. Putting citizen science in place will save resources and empower the community to have some control over their environment. We want to work with the government, and community to understand and control this. We can track the damage and track the renewal and recovery and use that data for future investigations.

Thank you for reading. Please excuse any typos or grammatical errors, I've been a bit busy ;)

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- ☐ Left: *Karenia* with *Nitzschia* diatoms
- ☐ Royal South Australian Yacht Squadron
- ☐ Right: *Asterionellopsis*, Middleton Beach