



# 'MyRedTides' a fast and easy web application for sharing Harmful Algal Bloom information in Sabah, Malaysia

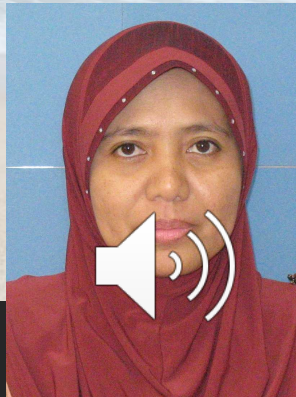
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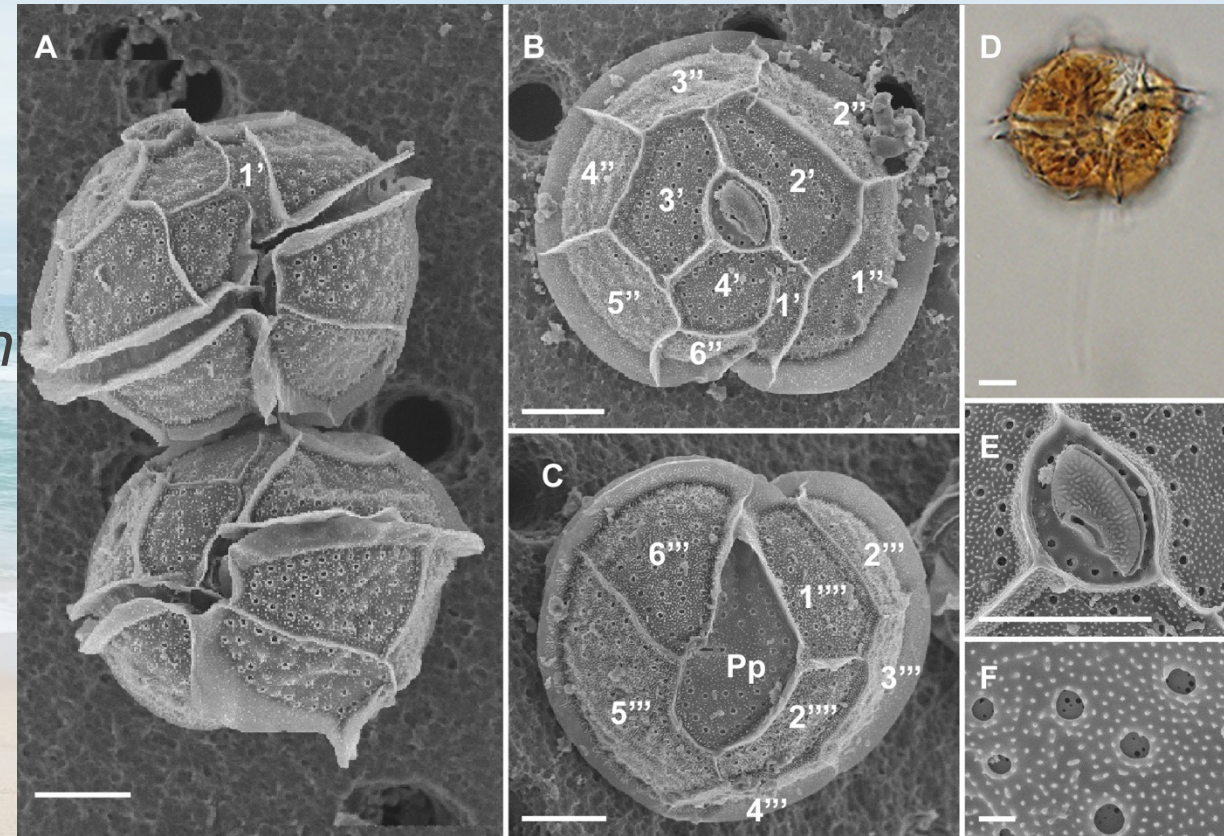
[normahwaty@iium.edu.my](mailto:normahwaty@iium.edu.my)





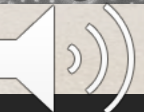
# Introduction – HAB in Sabah Coastal waters

- *Pyrodinium bahamense* var *compressum*
- Bloom started from 1976
- Thousands of human illnesses including *death*



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Daily Express  
1/10/97

# Red Tide warning

By ALEX ONG

KOTA KINABALU: The public have been advised to be extra careful when consuming seafood following the detection of up to three times the toxin level of the poisonous Red Tide in catches here.

The people, especially those residing in Beaufort, must be very careful when taking seafood as a high level of toxin has been discovered. The Health and Services Department warned in a statement Tuesday.

The Department said cockles taken from the Binsuluk and Pimping areas contained a toxin level of between 1,210 MU and 870 MU.

The Fisheries Department, which is monitoring the toxin level of the waters, usually impose a ban on shellfish when level reaches 400 MU.

The red tide phenomenon, a seasonal occurrence peculiar to the sea in Sabah's West Coast, is caused by the rapid growth of planktons which turn the sea surface a reddish colour.

Sea creatures which consume these planktons produce a neuro-toxin that affects the nervous systems of all vertebrates which can kill consumers.

The illness caused by consuming the toxin is referred to as "Paralytic Shellfish Poisoning".

A Red Tide outbreak in 1980 killed four children and two children the following year.

The symptoms of red tide illness include vomiting, diarrhoea, nausea, hypersalivation, inability to swallow and numbness, among others.

The incubation period from time of consuming to the onset of symptoms may be immediate or after 34 hours.

Japanese researchers have warned that Sabah is one of the high risk Red Tide occurrence area which is expanding over the years.

Red tide was also discovered around the same time in Kuala Penyu.

The first known Red Tide outbreak in Sabah occurred in 1976 and was considered the worst outbreak to date in the state.

In March 1976, almost 200 people suffered from illness which were linked to Red Tide.

## Woman dies, 43 ill after eating mussels

By STEPHANIE LEE  
stephanielee@thestar.com.my

KOTA KINABALU: A 23-year-old woman died and over 40 people have been hospitalised after they ate toxic mussels due to the red-tide phenomenon.

They were rushed to three hospitals early yesterday morning after eating the mussels bought at the Inanam night market and collected along the Likas Bay beach area.

Sabah Health Director Dr Christina Rundi said 43 people, aged between two and 70, were being treated at the hospital and one man was in critical condition.

The victims were from eight villages within the Inanam area, Kolombong, Likas and one from Tuaran district, she added.

Dr Christina said people should avoid buying, selling and collecting



Red alert: Some of the shellfish poisoning patients recuperating at the hospital.

shellfish such as clams and mussels. The red-tide phenomenon is triggered by a deadly algae bloom, which produces toxic or harmful effects to marine life and turns the water red.

Najihah Paktta, 45, who was visiting eight of her relatives at the Queen Elizabeth Hospital, said all of them had consumed mussels bought from

street pedlars at about 8pm on Tuesday, and detected the symptoms three hours later.

Earlier at the press conference, Sabah Fisheries Department director Rayner Stuel Galid also warned people against consuming clams and other shellfish until further notice.

"Three people have died from such cases so far," he said.

### Red tide alert

What is red tide poisoning

- > A condition in which shellfish such as clams, oysters, and mussels accumulate a deadly toxin produced by naturally occurring marine algae
- > Shellfish such as mussels are "filter feeders", meaning that they eat by straining food particles from water, including toxic algae
- > If the concentration of red-tide-causing algae is high, shellfish can accumulate dangerous levels of PSP toxin in their tissues
- > The red tide phenomenon which began in November 2012 in Sabah, along the west coast areas, is expected to continue until June
- > The worst case of red tide poisoning in Sabah was in 1976 when seven people died and over 200 others were hospitalized with Paralytic Shellfish Poisoning (PSP)

#### Precautions:

- > Do not consume shellfish of any kind during this period until further notice



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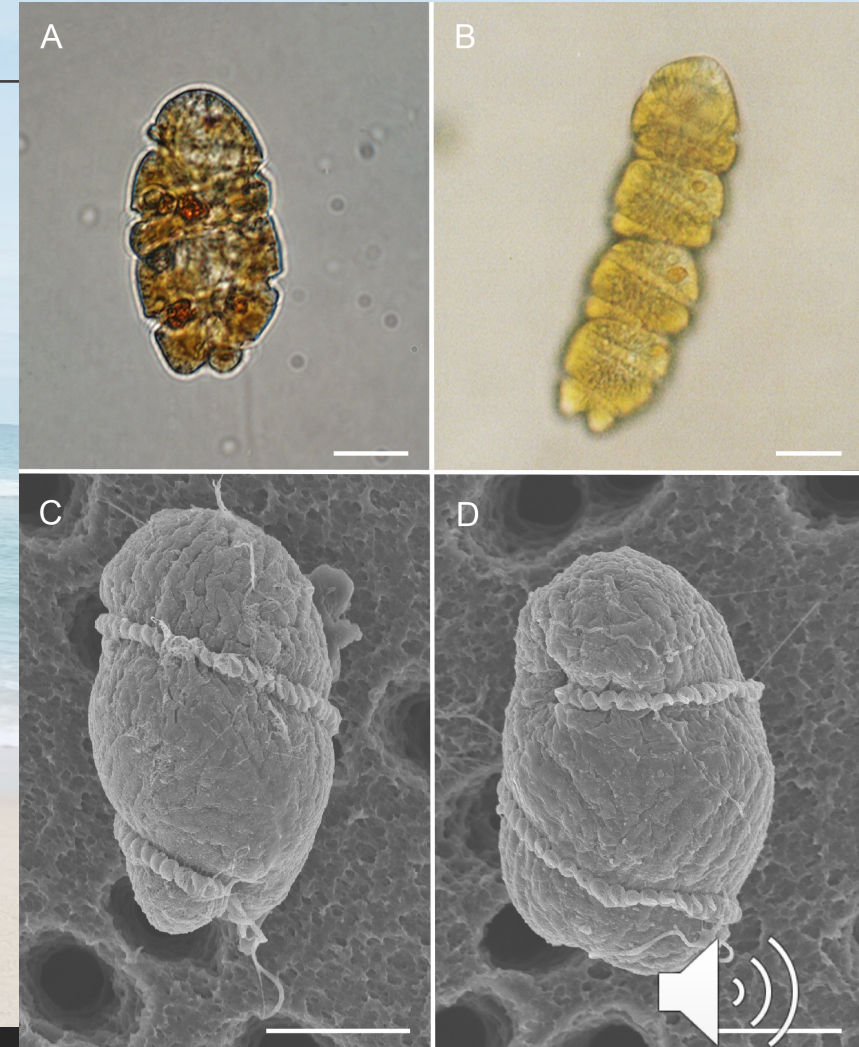
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# Introduction – HAB in Sabah Coastal waters

- *Margelifidinium polykrikoides*
- Bloom started in 2005
- Loss to aquaculture industries

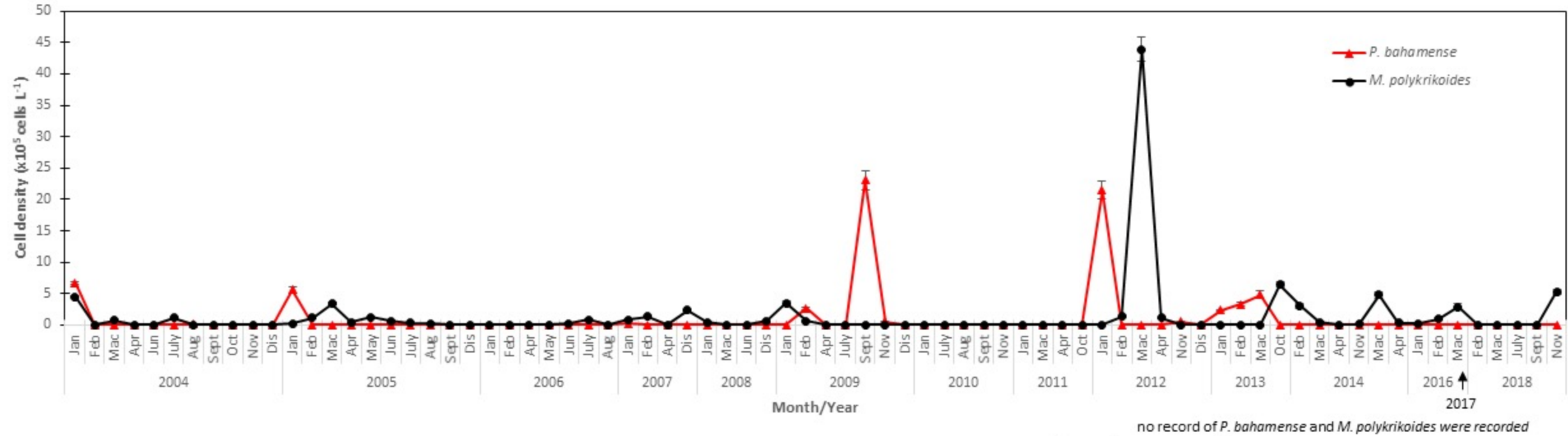


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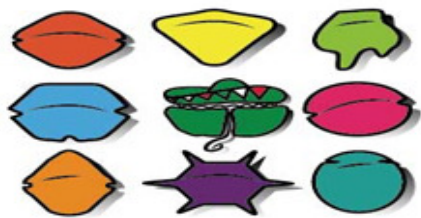
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# 3.1 Temporal distribution HABs (2004-2018) in Kota Kinabalu, Sabah



**Fig. 2** Cell density of *Pyrodinium bahamense* and *Margalefidinium polykrikoides* ( $\times 10^5$  cells  $L^{-1}$ ) 2004 -2018



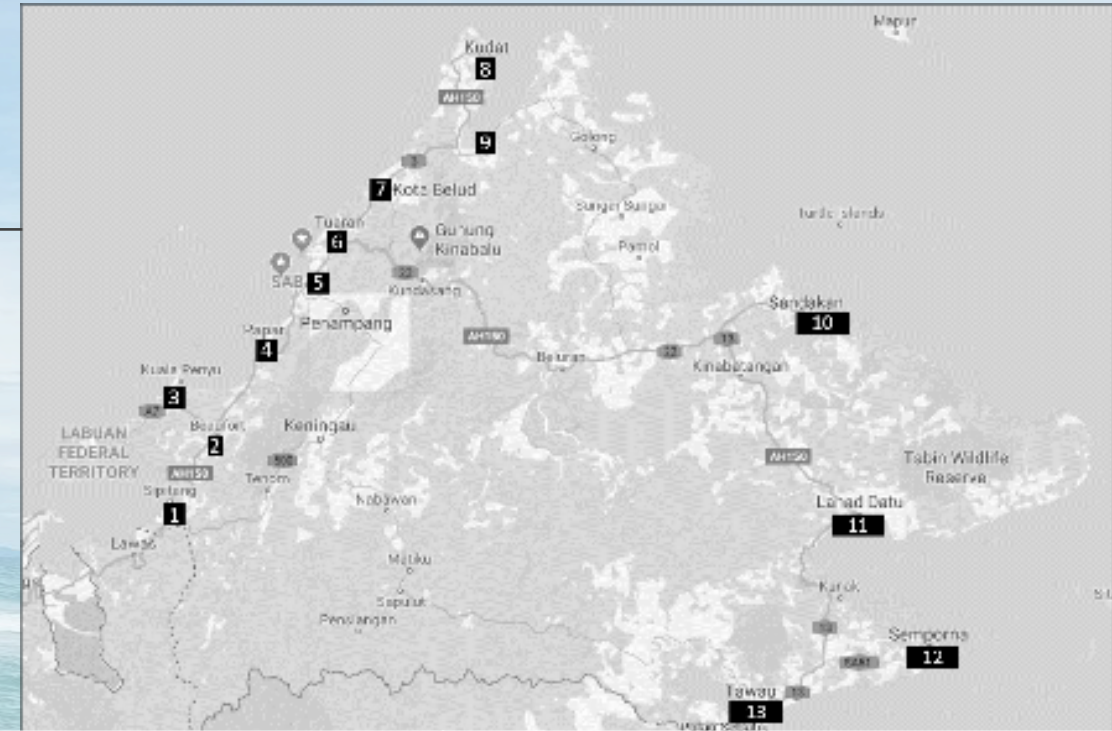
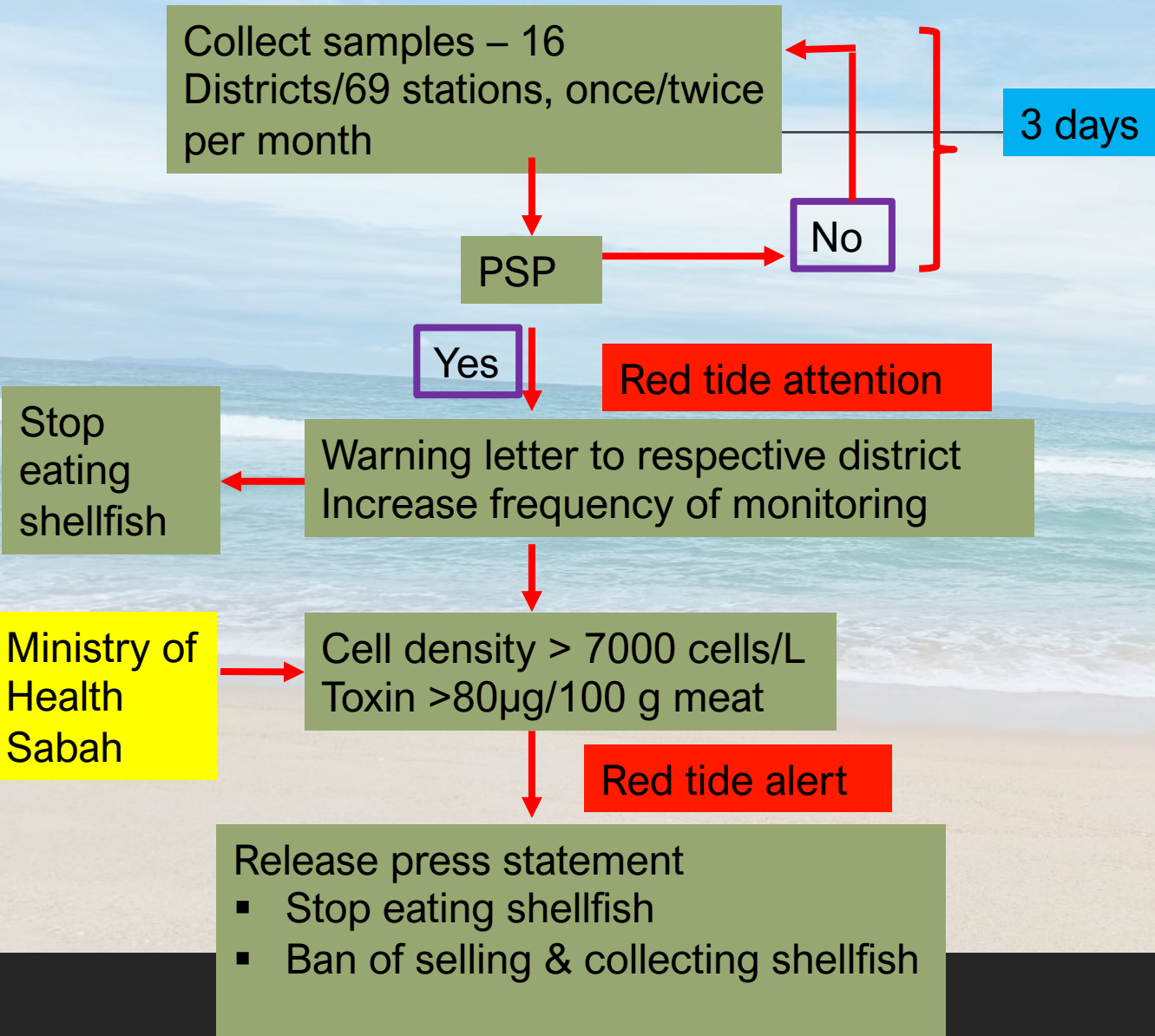
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# Monitoring of HAB in Sabah coastal waters by the Department of Fisheries Sabah



| Warning Class      | Cell density (cells/L)  |
|--------------------|---|
| Red tide attention | <i>P. bahamense</i> ; >1000<br><i>M. polykrikoides</i> ; >1000    |
| Red tide alert     | <i>P. bahamense</i> ; >7000<br><i>M. polykrikoides</i> ; >5000    |
| Warning lifted     | When cell density lower than safety level for 3 consecutive weeks |

Jipanin et al. 2019



# Data collected

Data are recorded in excel sheet

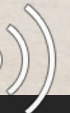
Share with respective stakeholders

| District         | Collected Data       | Location                        | Sample collected   | Result                                      |         |         |
|------------------|----------------------|---------------------------------|--|---|---------|---------|
|                  |                      |                                 |  | Toxicity Level<br>(µg Poison/100<br>g meat) | Sel A/L | Sel B/L |
| 1. KOTA KINABALU | 05.04.2018           | Dumpil, Putatan                 | Tiram ( <i>Crassostrea</i> sp.)                                    | 1   | ND      | ND      |
|                  | 06.04.2018           | Putatan                         | Lokan ( <i>Geloina coaxan</i> )                                    | 1   | ND      | ND      |
|                  |                      | Yayasan Sabah                   | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Pulau Sepanggar                 | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Pulau Gaya                      | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Ko-Nelayan                      | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Teluk Likas                     | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | 12.04.2018           | Dumpil, Putatan                 | Tiram ( <i>Crassostrea</i> sp.)                                    | 1   | ND      | ND      |
|                  |                      | Yayasan Sabah                   | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Pulau Sepanggar                 | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Pulau Gaya                      | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Ko-Nelayan                      | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Teluk Likas                     | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | 19.04.2018           | Dumpil, Putatan                 | Tiram ( <i>Crassostrea</i> sp. )                                   | 1   | ND      | ND      |
|                  | 20.04.2018           | Putatan                         | Lokan ( <i>Geloina coaxan</i> )                                    | 1   | ND      | ND      |
|                  | 24.04.2018           | Yayasan Sabah                   | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Pulau Sepanggar                 | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Pulau Gaya                      | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Ko-Nelayan                      | Air Laut 1.5 m   | ND  | 0       | 0       |
| Teluk Likas      |                      | Air Laut 1.5 m                  | ND   | 0   | 0       |         |
| 26.04.2018       | Dumpil, Putatan      | Tiram ( <i>Crassostrea</i> sp.) | 1  | ND  | ND      |         |
| 30.04.2018       | Teluk Likas          | Air Laut                        | ND   | 0   | 0       |         |
| 2. TUARA         |                      |                                 |  |   |         |         |
| 3. KOTA BELUD    | 13.04.2018           | Usukan                          | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Sg. Umpul                       | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Pantai Emas                     | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  | 20.04.2018           | Usukan                          | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Sg. Umpul                       | Air Laut 2.0 m   | ND  | 0       | 0       |
|                  |                      | Pantai Emas                     | Air Laut 2.0 m   | ND  | 0       | 0       |
| 4. KOTA MARUDU   | 10.04.2018           | Laut Kg. Tg. Batu               | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      |                                 | Tiram ( <i>Crassostrea</i> sp. ) & Kupang ( <i>Perna viridis</i> ) | 1   | ND      | ND      |
|                  |                      | Sg. Taritipan                   | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      |                                 | Dalus( <i>Meretrix</i> sp. )                                       | 1   | ND      | ND      |
|                  |                      | Kuala Sg.Bandau                 | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Laut Kg. Marasin-Sim            | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | 18.04.2018           | Laut Kg. Tg. Batu               | Tiram ( <i>Crassostrea</i> sp. ) & Kupang ( <i>Perna viridis</i> ) | 1   | ND      | ND      |
|                  |                      | Sg. Taritipan                   | Dalus( <i>Meretrix</i> sp. )                                       | 1   | ND      | ND      |
|                  |                      | 19.04.2018                      | Laut Kg. Tg. Batu  | Air Laut 1.5 m                              | ND      | 0       |
|                  | Sg. Taritipan        |                                 | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | Kuala Sg.Bandau      |                                 | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | Laut Kg. Marasin-Sim |                                 | Air Laut 1.5 m   | ND  | 0       | 0       |
| 5. KUDAT         | 22.03.2018           | Laut Explanade                  | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Laut Tampakan                   | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Laut Batu Putih                 | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  | 25.04.2018           | Laut Explanade                  | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Laut Tampakan                   | Air Laut 1.5 m   | ND  | 0       | 0       |
| 6. KUALA PENYU   | 17.04.2018           | Laut Tg. Kapor                  | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Kg. Melikai                     | Lokan ( <i>Geloina coaxan</i> )                                    | 1   | ND      | N       |
| 7. BEAUFORT      |                      | Purun Pasir                     | Dalus ( <i>Meretrix</i> sp. )                                      | 1   | ND      | N       |
|                  |                      |                                 |  |   |         |         |
|                  | 12.04.2018           | Pantai Bongawan                 | Air Laut 1.5 m   | ND  | 0       | 0       |
|                  |                      | Pantai Andus                    | Air Laut 1.5 m   | ND  | 0       | 0       |



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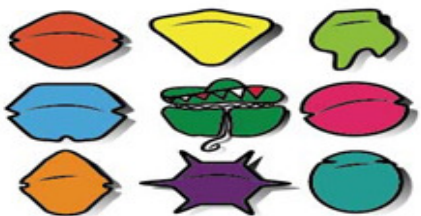




# Improvement needed

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- To increase effectiveness of sharing and communication of HAB information among Districts, Departments, Ministries (stakeholders) and community
- To map and update HAB information regularly



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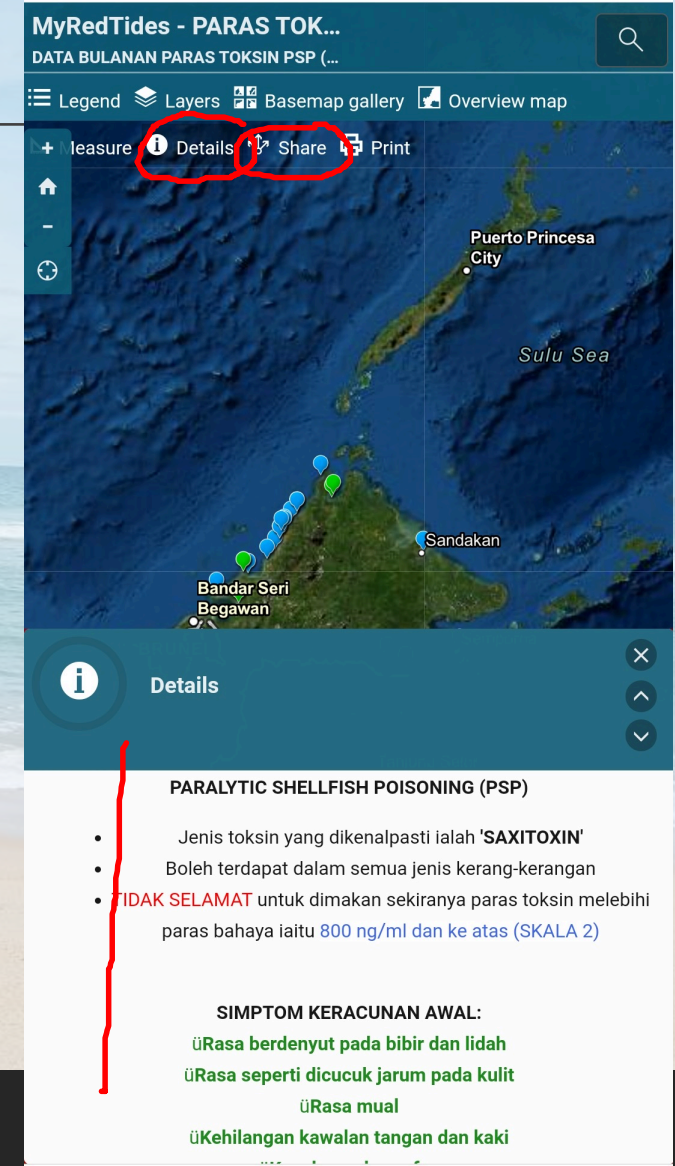
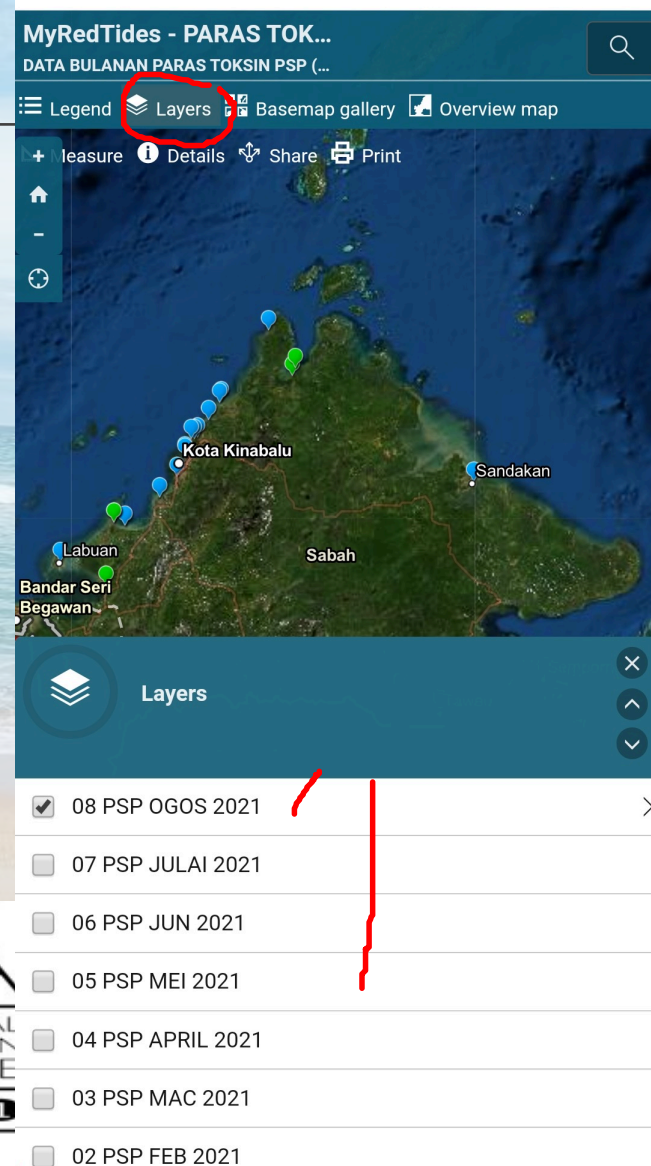
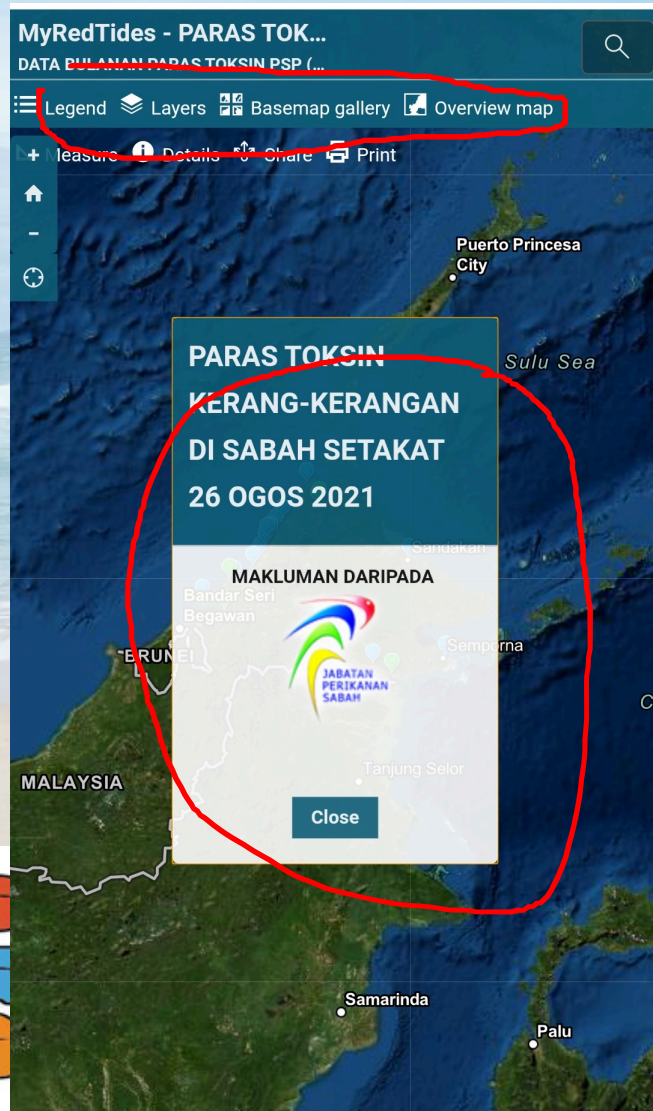
# Workshop on 'Introduction to ArcGIS for Harmful Algal Bloom (HAB) Data Management Using WebApps Applications' 26<sup>th</sup> July 2021 - 27<sup>th</sup> July 2021

- 15 participants from the Fisheries Department Sabah
- Virtual workshop, 2 days
- Developed WebApps using ArcGIS for Department of Fisheries Sabah known as MyRedTides





# Web Apps by the Department of Fisheries Sabah





# Conclusions

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The Web Apps developed :

1. Can enhance outreach programme that is currently be carried out by the Department of Fisheries Sabah
2. Is useful because data collected can be shared faster in more meaningful and interesting ways

Nevertheless, the usage of Web Apps is at preliminary stage because the acceptance and the reaction of stakeholders and local communities are yet to be evaluated.





# Acknowledgements

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- Thanks to ISSHA and EWS for supporting the registration fee to attend this conference

