

Project 5.14 – Identifying water quality and ecosystem health threats to the Torres Strait from runoff arising from mine-derived pollution



National Environmental Science Programme

WHAT IS THE PROJECT LOOKING AT?

This project is looking at what sediments and chemicals are coming from the Fly River into the Torres Strait and whether they pose any risks to the marine plants and animals. The waters of the Fly River in Papua New Guinea are polluted by trace metals such as copper and sediments from the Ok Tedi mine. The Fly River flows all year, mostly into the Gulf of Papua, but under certain environmental conditions these waters can flow into the Torres Strait region. The project is investigating how often and to what extent the Fly River waters enter the Torres Strait region, and its sediment and chemical loadings. The concentrations of chemicals from that come from the mine are being tested at locations across the Torres Strait. Results to date show that in general, the waters are very clean. The highest trace metal concentrations were found in the north around Boigu and Saibai.

WHAT ACTIVITIES WERE UNDERTAKEN AROUND MASIG?

- Field collection of sediment and water samples to assess concentrations of mine-derived chemicals in the Torres Strait (October 2016)
- Onsite continuous monitoring (loggers) of wind, temperature and salinity
- Weekly salinity monitoring conducted by TSRA Rangers since February 2017
- Computer modelling of Fly River water movement
- Update of satellite remote sensing of water quality conditions and assessment of turbidity patterns, 2008-2019
- Scoping of gene analysis to assess changes in environmental conditions (October 2016).

WHAT HAVE WE FOUND IN THE AREA AROUND MASIG?

- Salinity measurements at Masig Island were slightly lower than average values for seawater.
- At Masig Island, lower salinities were occasionally measured in the Sager (SE trade wind) seasons in 2016 and 2017. Comparison with the local rainfall data from the continuous loggers and satellite imagery and the hydrodynamic modelling results indicate that this may be influenced by freshwater from the Fly River discharge.
- There were low concentrations of trace metals in waters and sediments.





On average (2008-2018), the assessment of satellite images showed that:

- Water quality impact in this area is dominated by low turbidity waters. This area has very limited exposure to highly turbid (brownish/muddier) waters, but it does occur sometimes in the Kuki (NW monsoon) season. These conditions could also be caused by local wind and currents which can lead to resuspension of sediments at certain times of the year.

CONCLUSION SO FAR:

- The Fly River waters are likely to impact on water quality in the areas around Masig and Ugar occasionally during the Sager (SE trade wind) season.

WHAT'S NEXT?

We are undertaking further investigations of how often and how far the influence of Fly River waters are entering the region by:

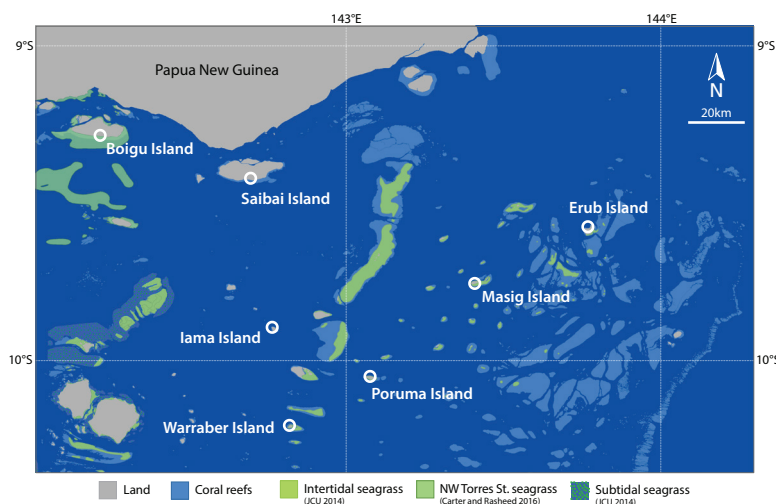
- Continuing weekly salinity monitoring by TSRA Rangers.
- Testing the new satellite data Smartphone app to give further information on nearshore areas.
- Potentially collecting more sediment, water and seagrass samples for trace metal analysis in the region.
- Maintaining onsite loggers for the continuous measurement of salinity and turbidity.
- Continuing modelling and remote sensing work to better understand the extent of influence of Fly River waters, and the fine sediment and associated chemicals it carries, and try to isolate the influence of local wind and current-driven resuspension from Fly River waters in increasing local turbidity.
- Follow up on a recommendation to conduct interviews with the local community about their perceptions of the influence of the Fly River in the local area.

For more information please contact:

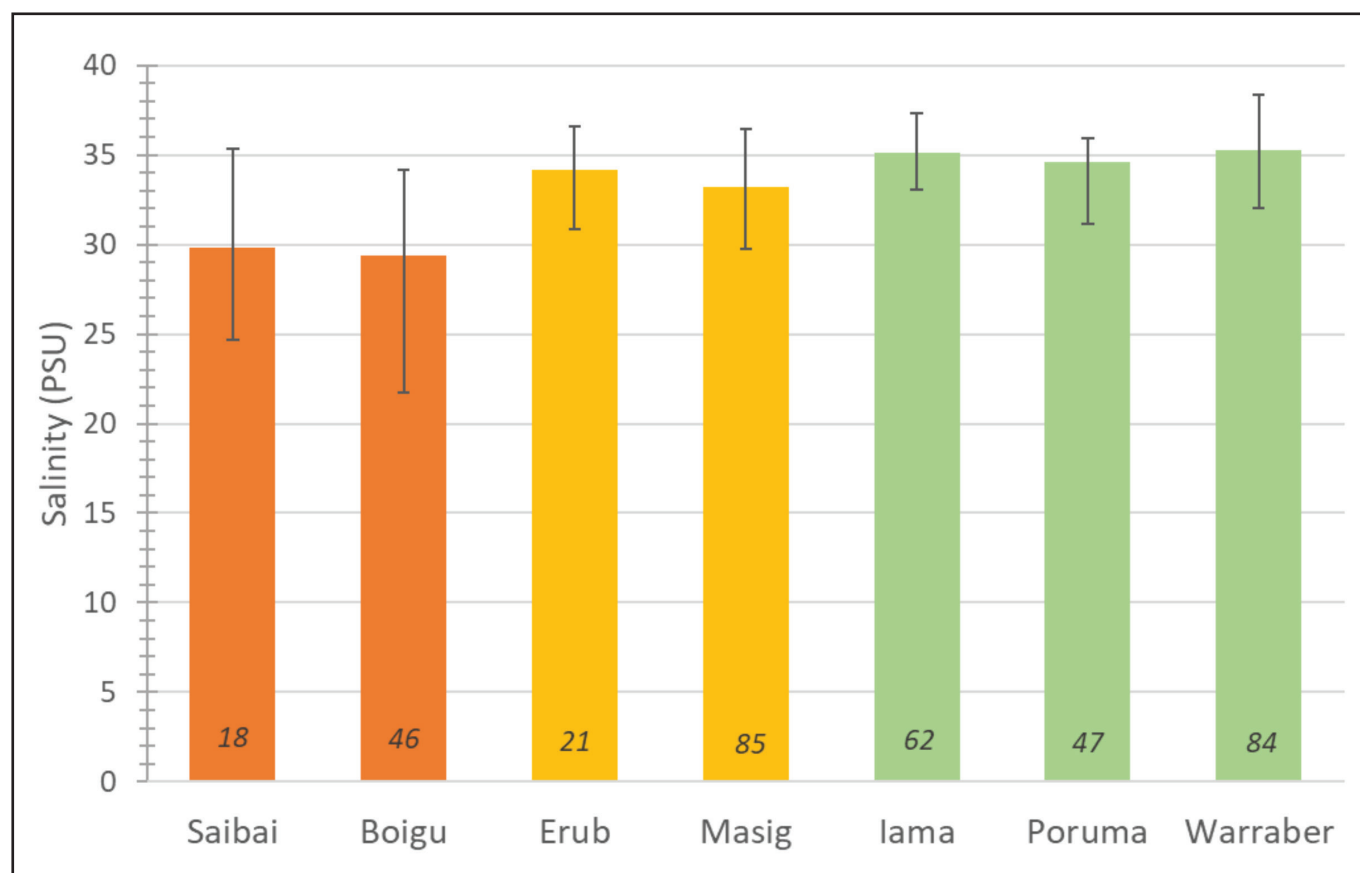
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ADDITIONAL SALINITY MONITORING RESULTS

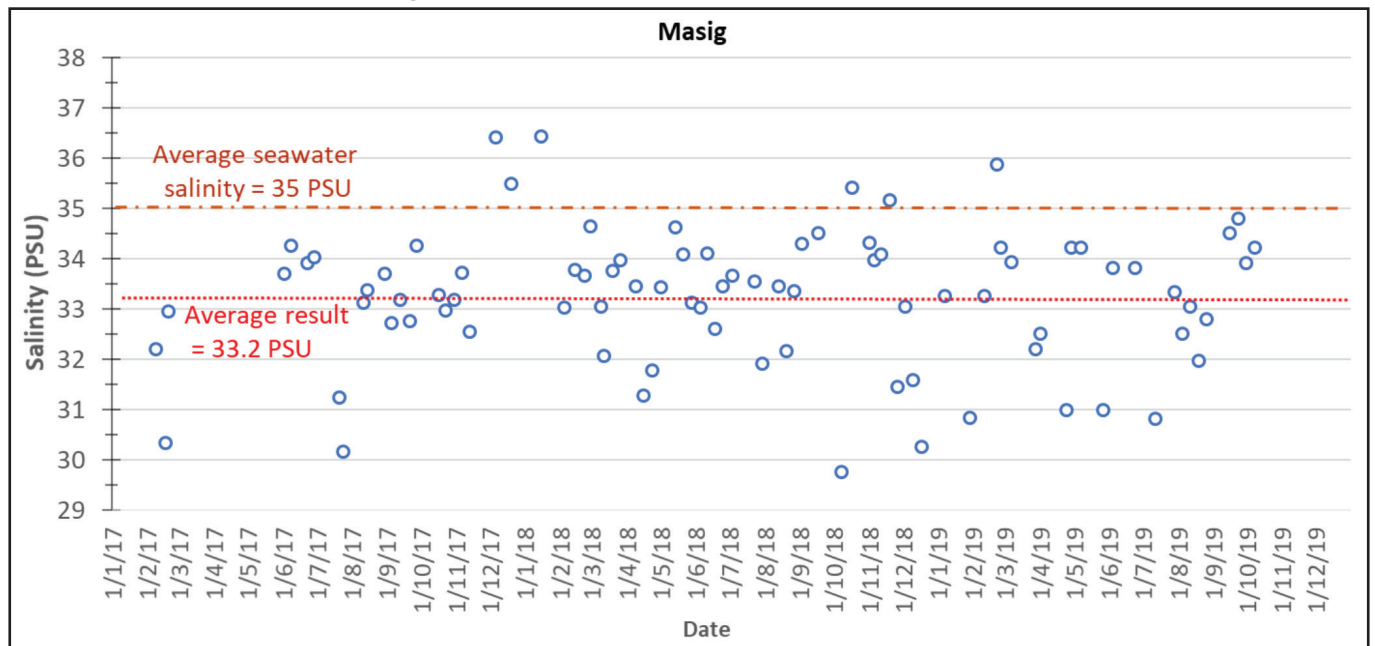
- TSRA Rangers have been involved in a weekly salinity monitoring programme from 2017 in 7 locations across the Torres Strait.
- The results continue to show that the **northern sites were exposed to lower salinity waters and greater salinity ranges compared to the mid and southern parts of the Torres Strait.**
- The salinity measurements at Masig were slightly below the average salinity for seawater (typically around 35 PSU) at 33.2 PSU. The range of values also relatively high at 6.7 PSU. Comparison with the local rainfall data, satellite imagery and hydrodynamic modelling results indicate that salinity at Masig may be periodically influenced by Fly River discharge, although further monitoring is required to confirm these results.



The graph below shows all the salinity results measured by the Rangers in the project. The lines show the minimum and maximum salinity values recorded at each location. The number inside the bars is the total number of samples collected at each island. *Colour code shows current understanding of the degree of influence from the Fly River waters. **ORANGE:** Highest, **YELLOW:** Periodic and **GREEN:** Lowest.*



Masig Island results, 85 samples reported as at October 2019



We would like to thank the TSRA Rangers for their participation in this project, and in particular, Francis Nai, Edna Nai and Loice Naawi for conducting salinity monitoring at Masig Island, and to Troy Stow and Boggo Gela for their assistance with the project