

GEO SMART ASIA 2017

Assessing climate change impacts - Utilization of GIS, Side Scan Sonar and Video in Creating Marine Habitat Map of Kuala Linggi, Melaka, Malaysia.

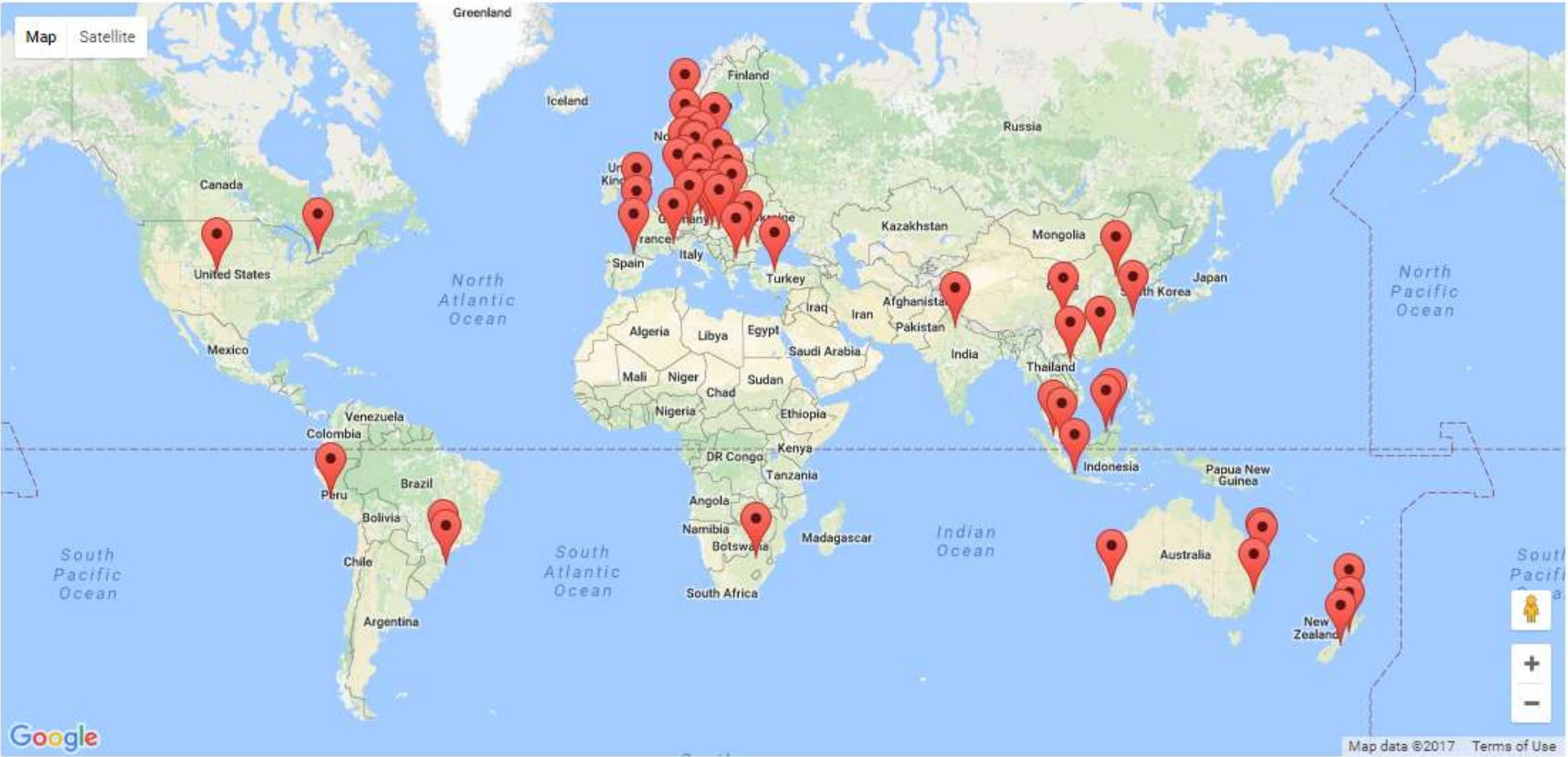
Abdullah, N. A., Chiffings, T., Golingi, T., Auluck, M.
DHI Water and Environment (M) Sdn. Bhd.



Introduction



Over 50 offices worldwide

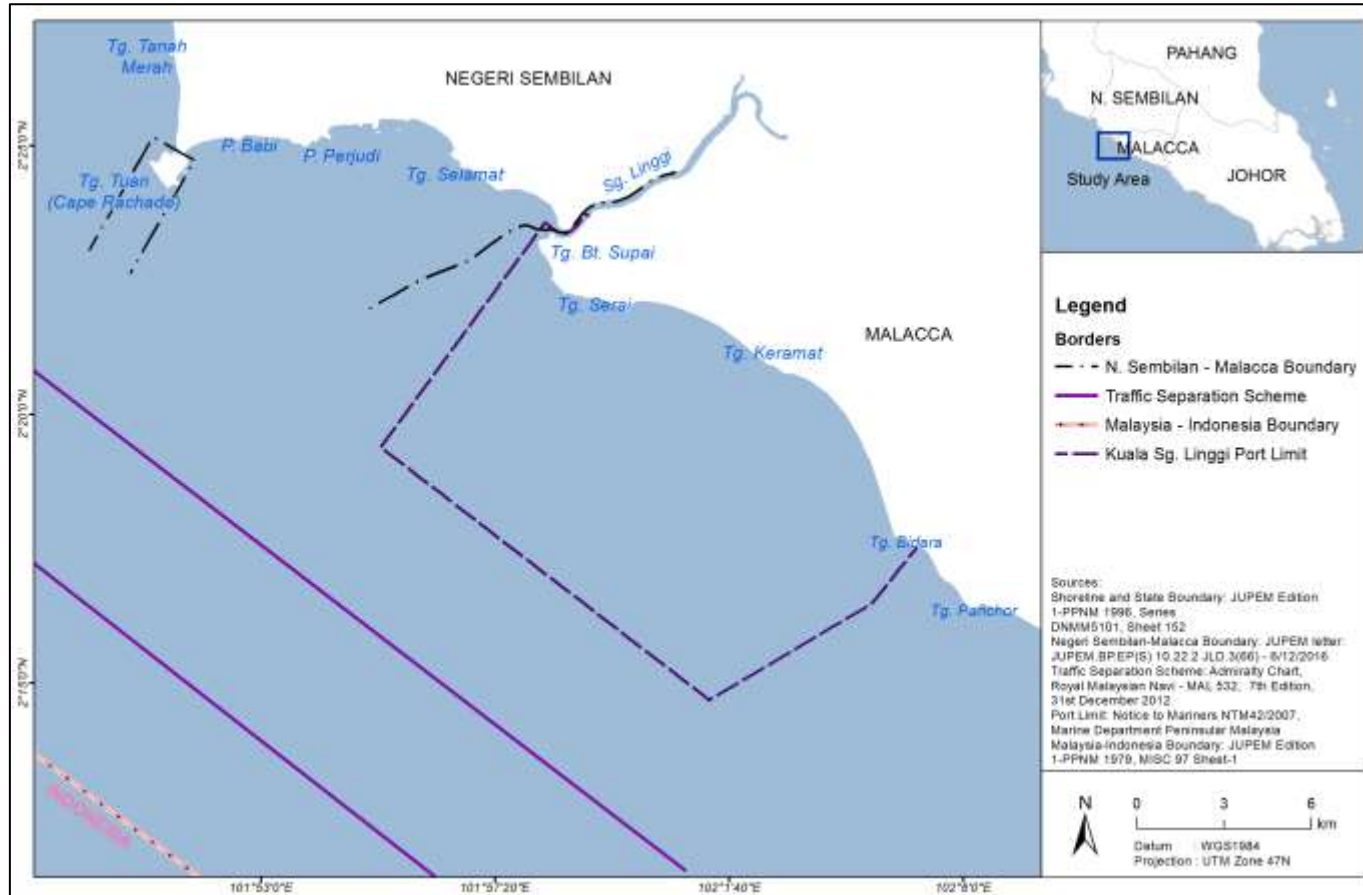


Study Area



Country: Malaysia
State of Malacca and
Negeri Sembilan waters

Study Area



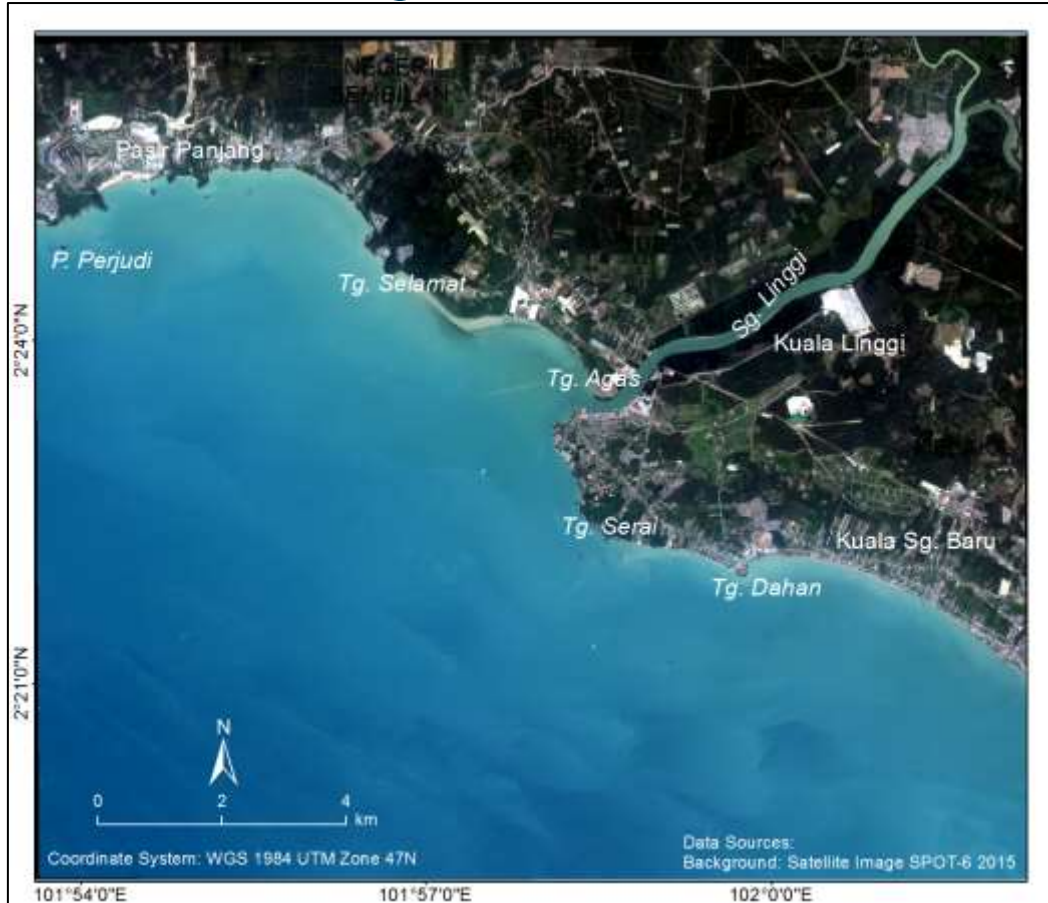
- Near border of N. Sembilan and Malacca waters
- No published papers on presence of marine habitat (coral/ seagrass) within study area

Statement of Problems

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1. Huge area to cover in limited amount of time
2. Turbid water
3. Strong current

Satellite Image – Overview

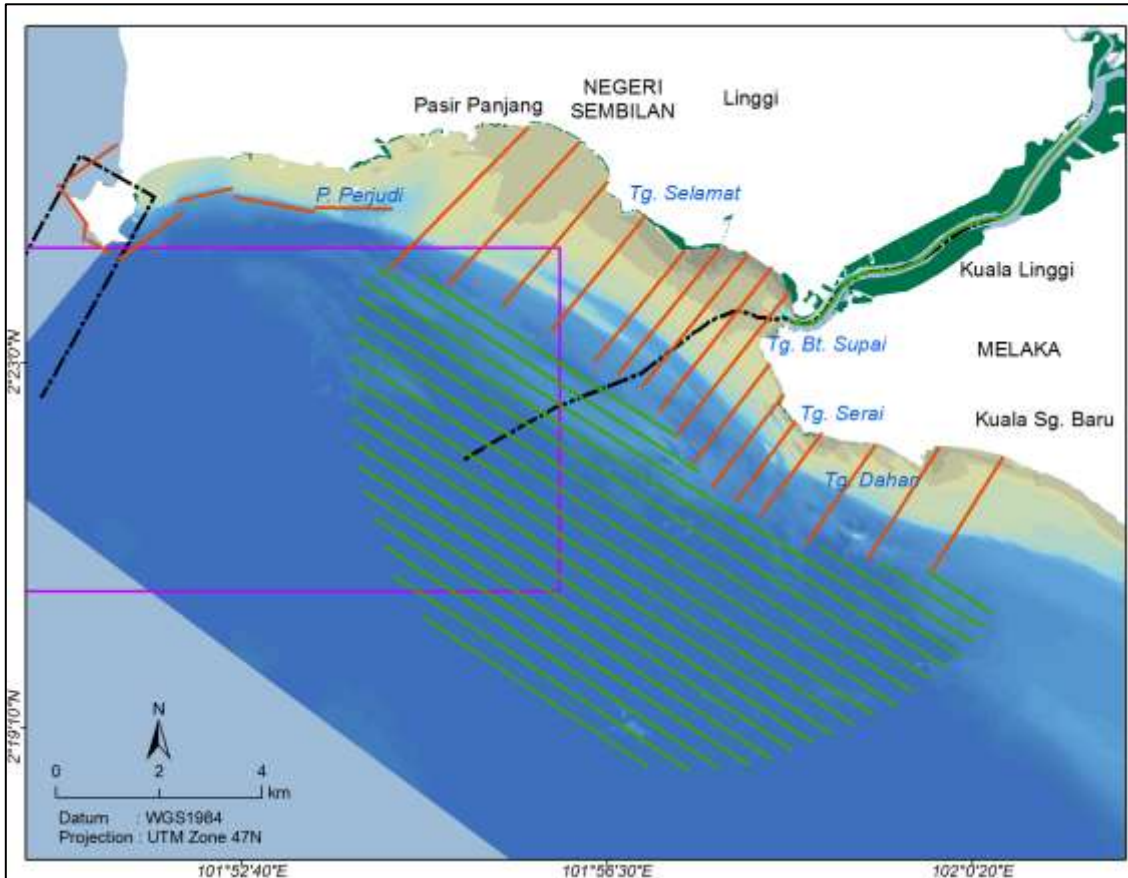


Methodology

Side scan sonar and splash/tow camera



Survey Area – designated survey lines



Legend

- Tow Cam Transects
- Side Scan Sonar Transects
- Negeri Sembilan - Malacca Marine Boundary
- Tg. Tuan Designated Heritage Zone
- Mangrove

Side Scan Sonar – Survey Equipment

- Side Scan Sonar
- GPS and DGPS signal receiver
- Single beam echo sounder
- HYPACK 2013 software



SSS Mechanism

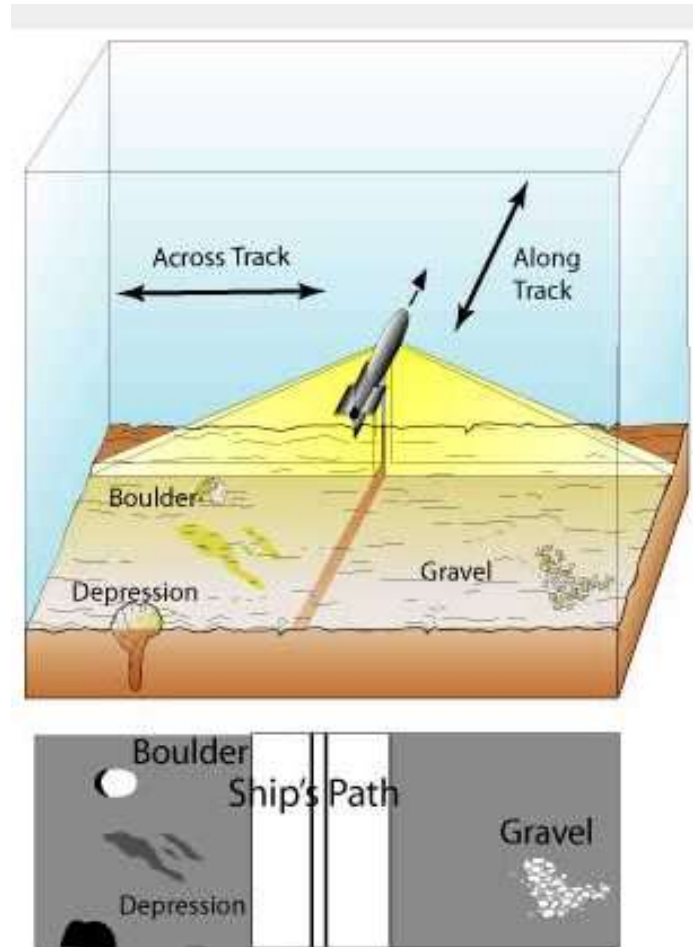
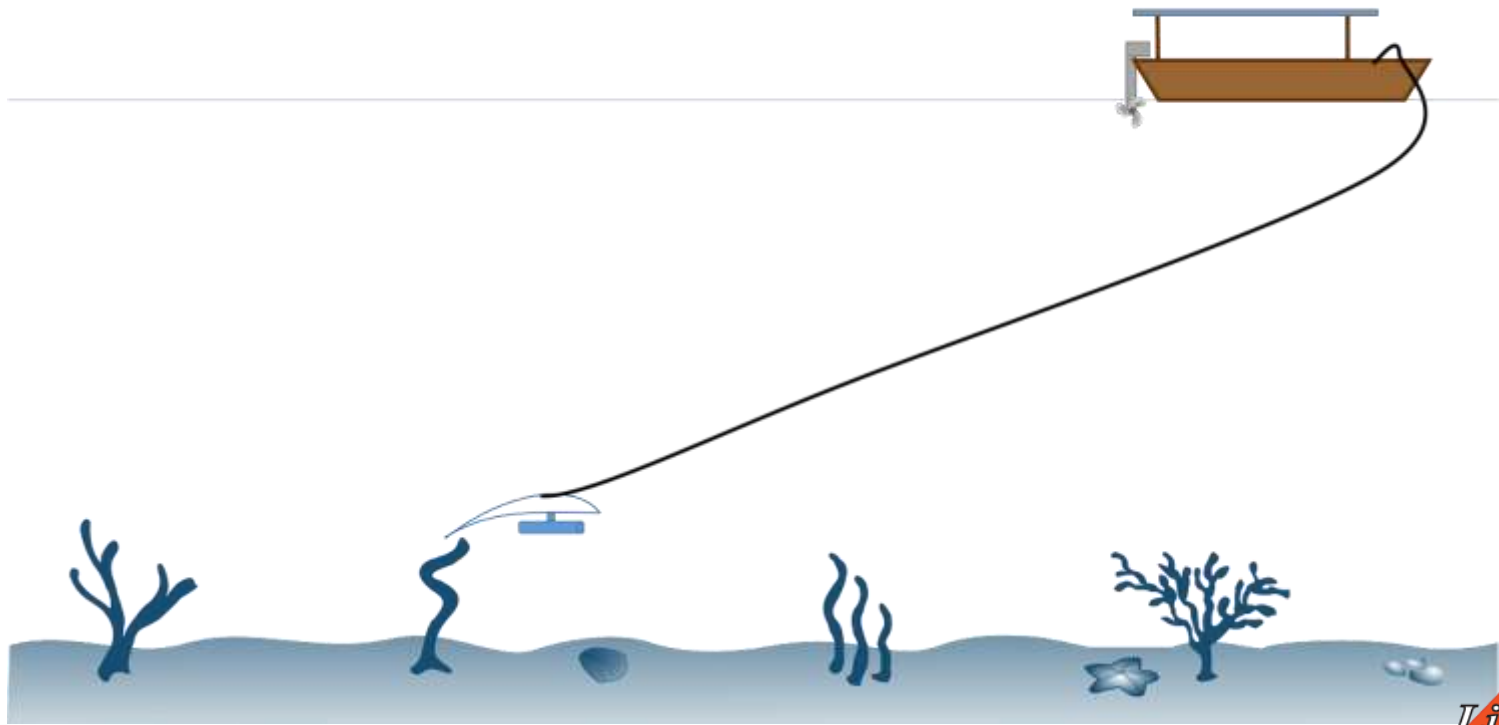


Figure adapted from Able, 1987.

Underwater Splash/Tow Camera

- Modified manta-tow method
- SHARK Marine video system

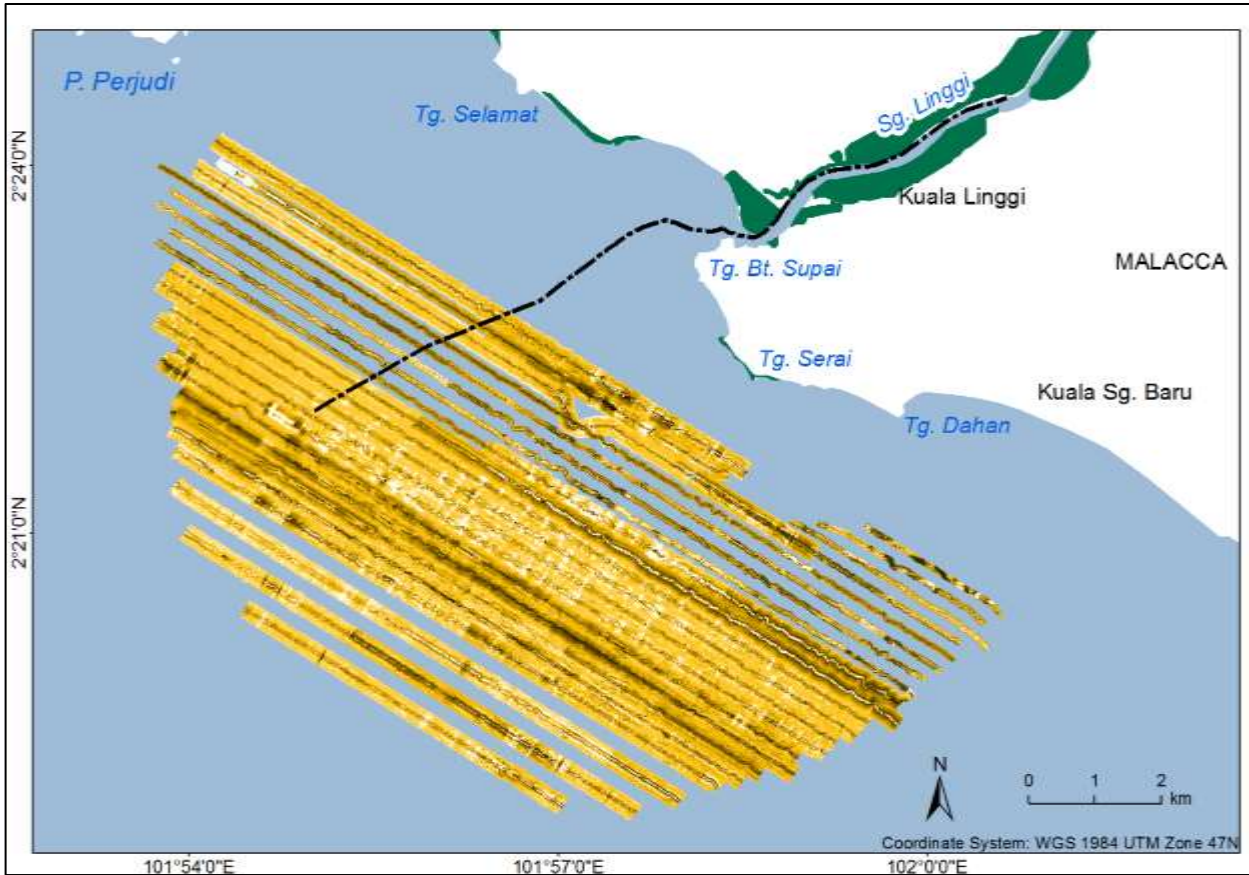




Data Output



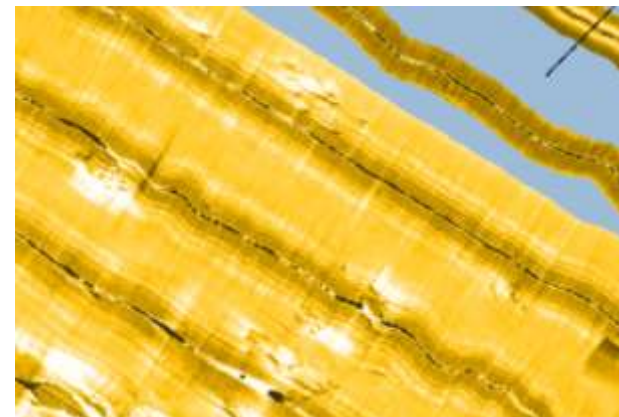
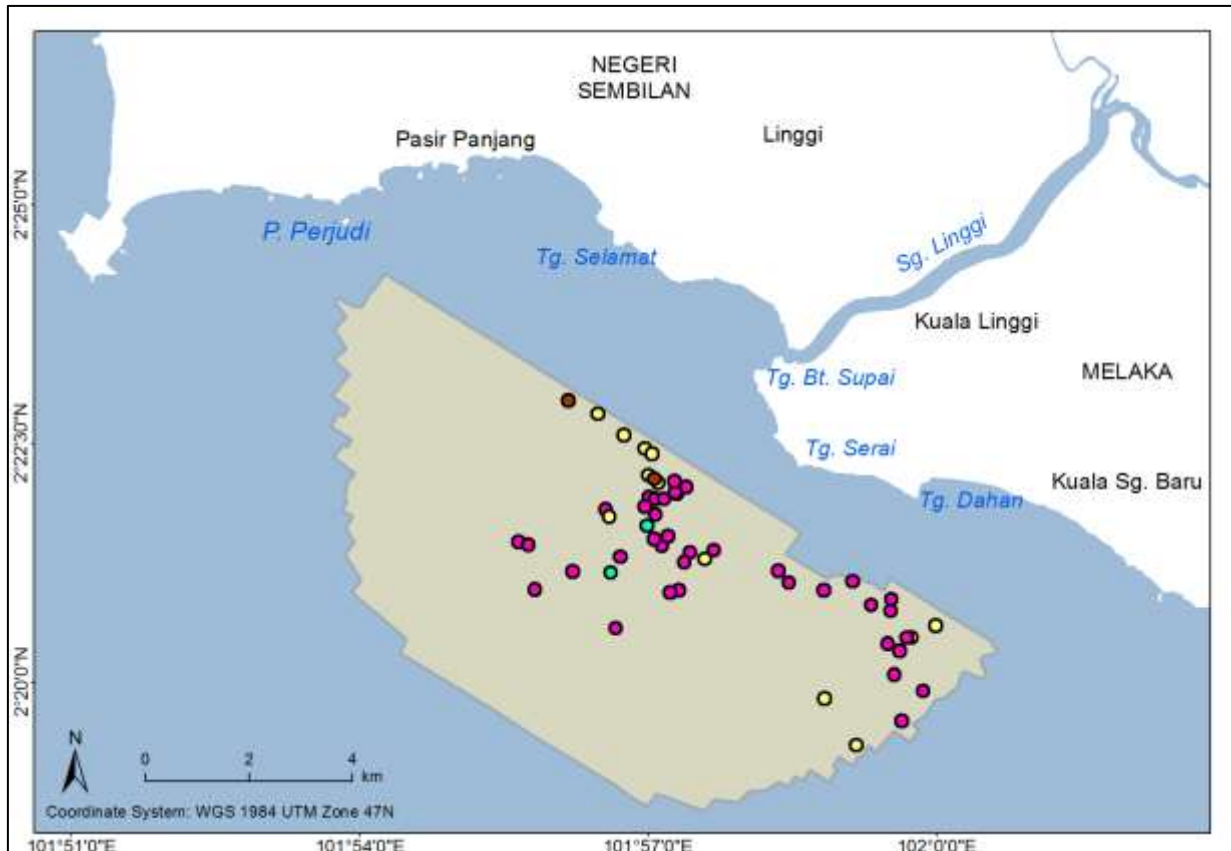
Side Scan Sonar



Legend

- Negeri Sembilan - Malacca Marine Boundary
- Mangrove

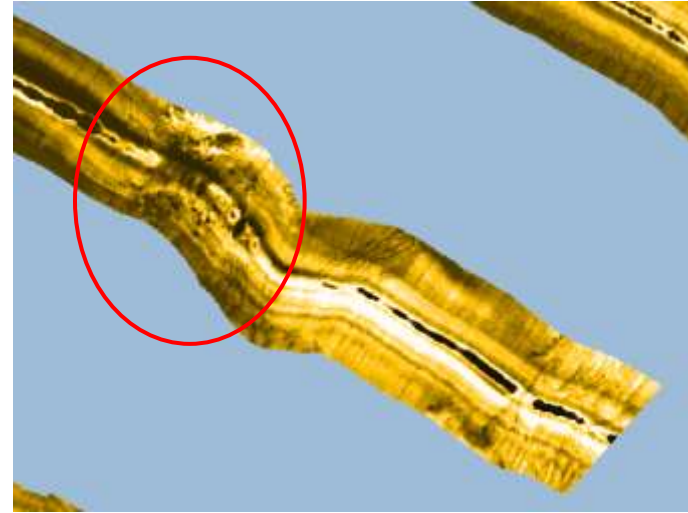
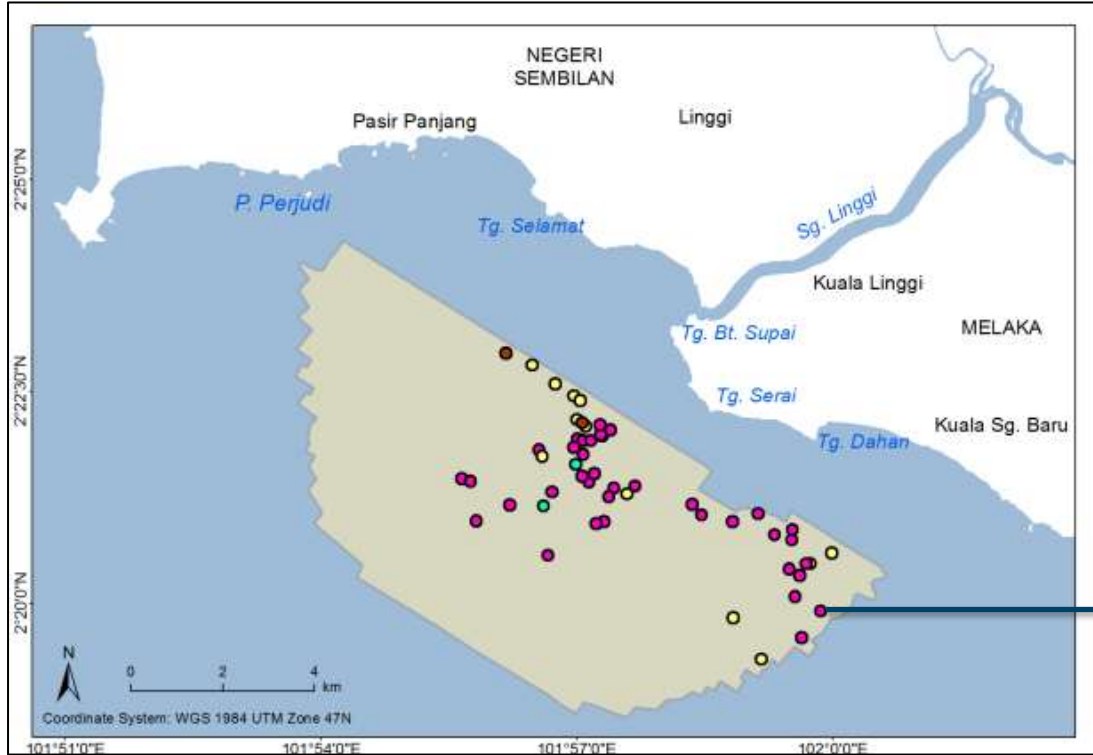
Verification of Side Scan Signature



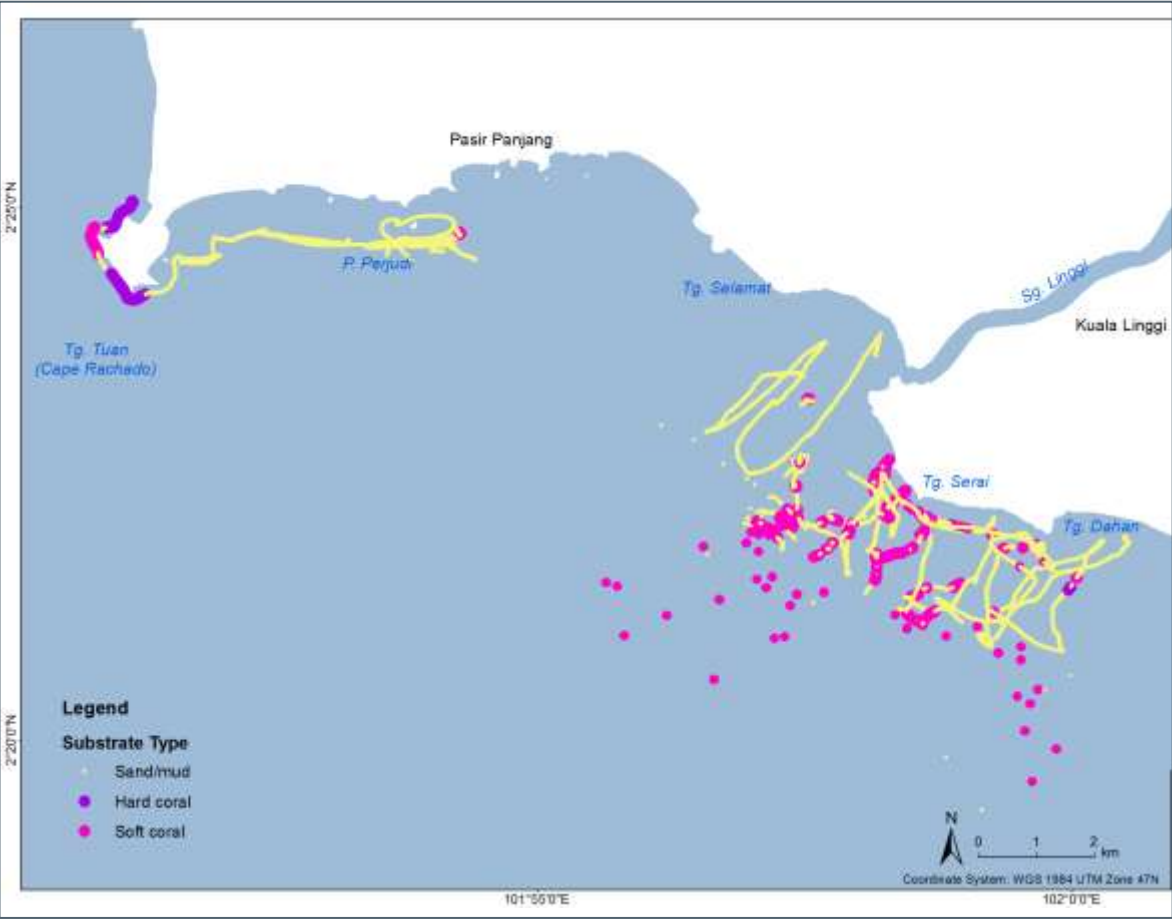
Legend

Drop-point

- mud
- sand
- rubble
- soft coral

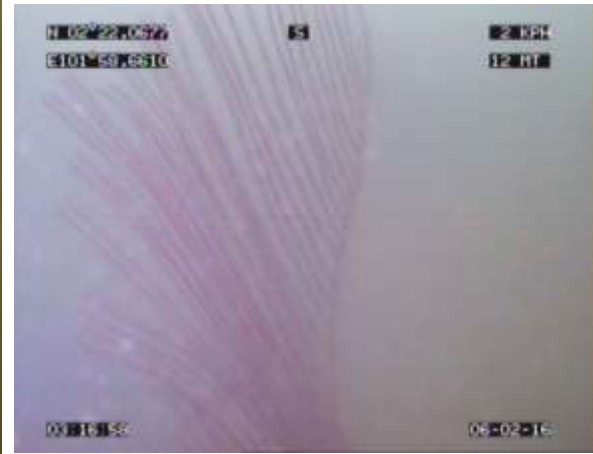


Splash cam output



Video output





Dominant coral: Octocorallia, Alcyonacea: soft coral and sea fans

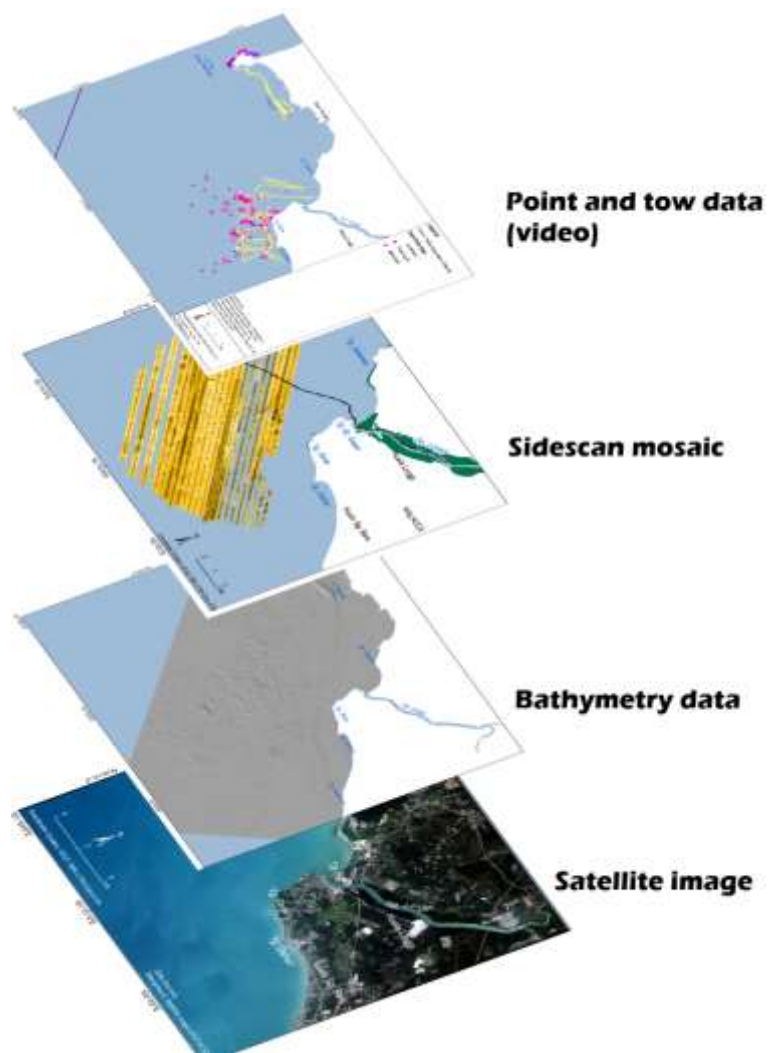
Some identified species:

- *Annella mollis*
- *Ctenocella pectinate*
- *Junceella* sp.
- *Dichotella gemmacea*

Habitat Map using GIS

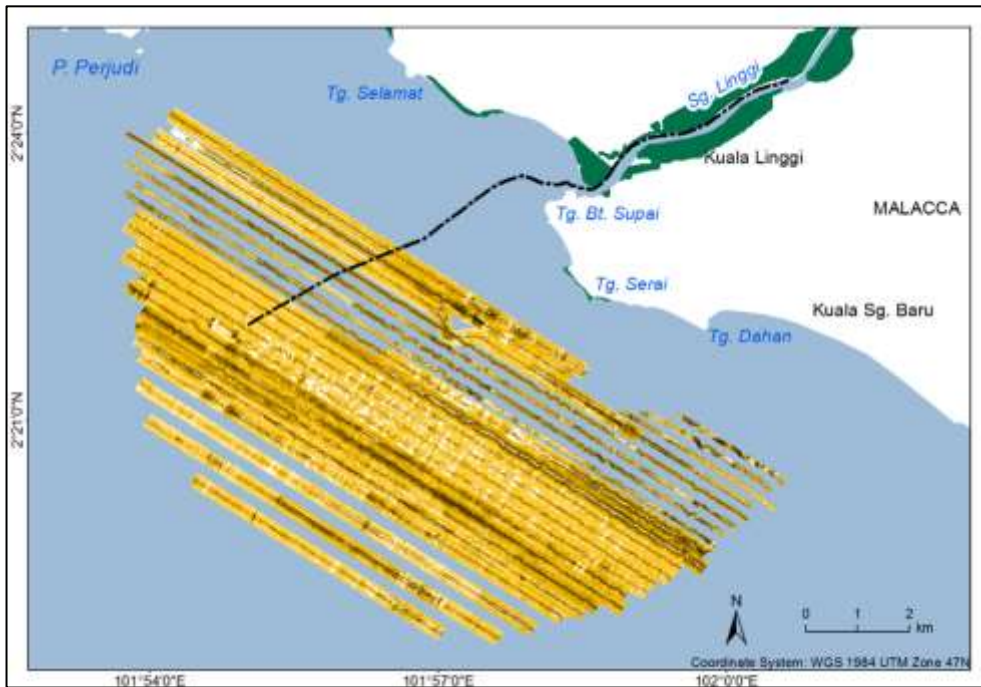


Layering in GIS

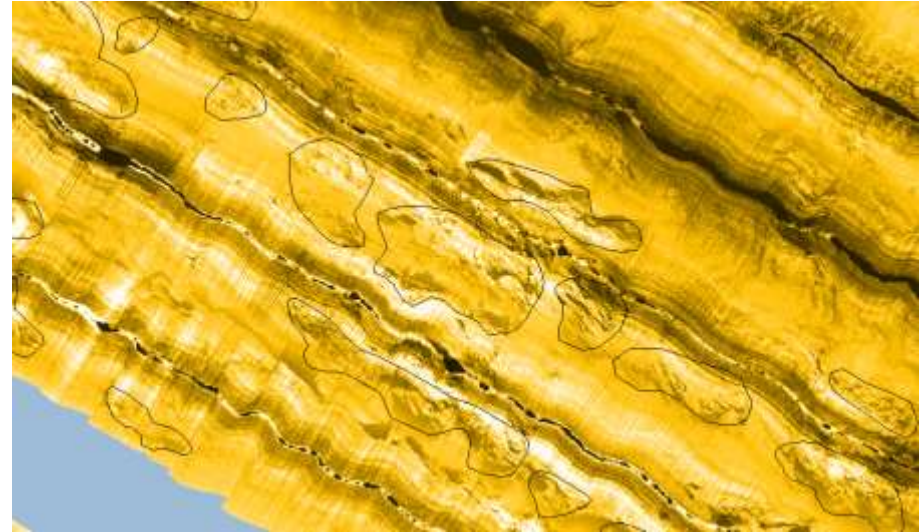
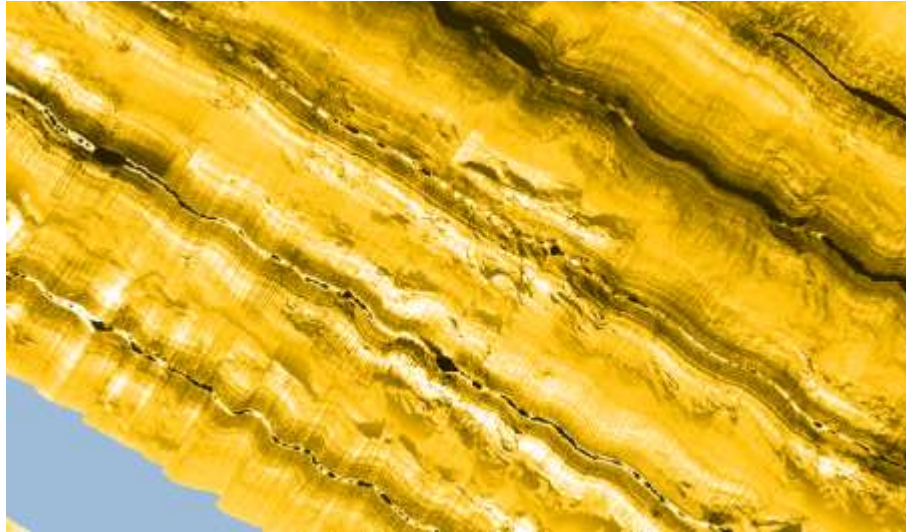


Data processing using ArcGIS 10.3

Hillshade of bathymetry raster



Digitizing hard substrate – manually

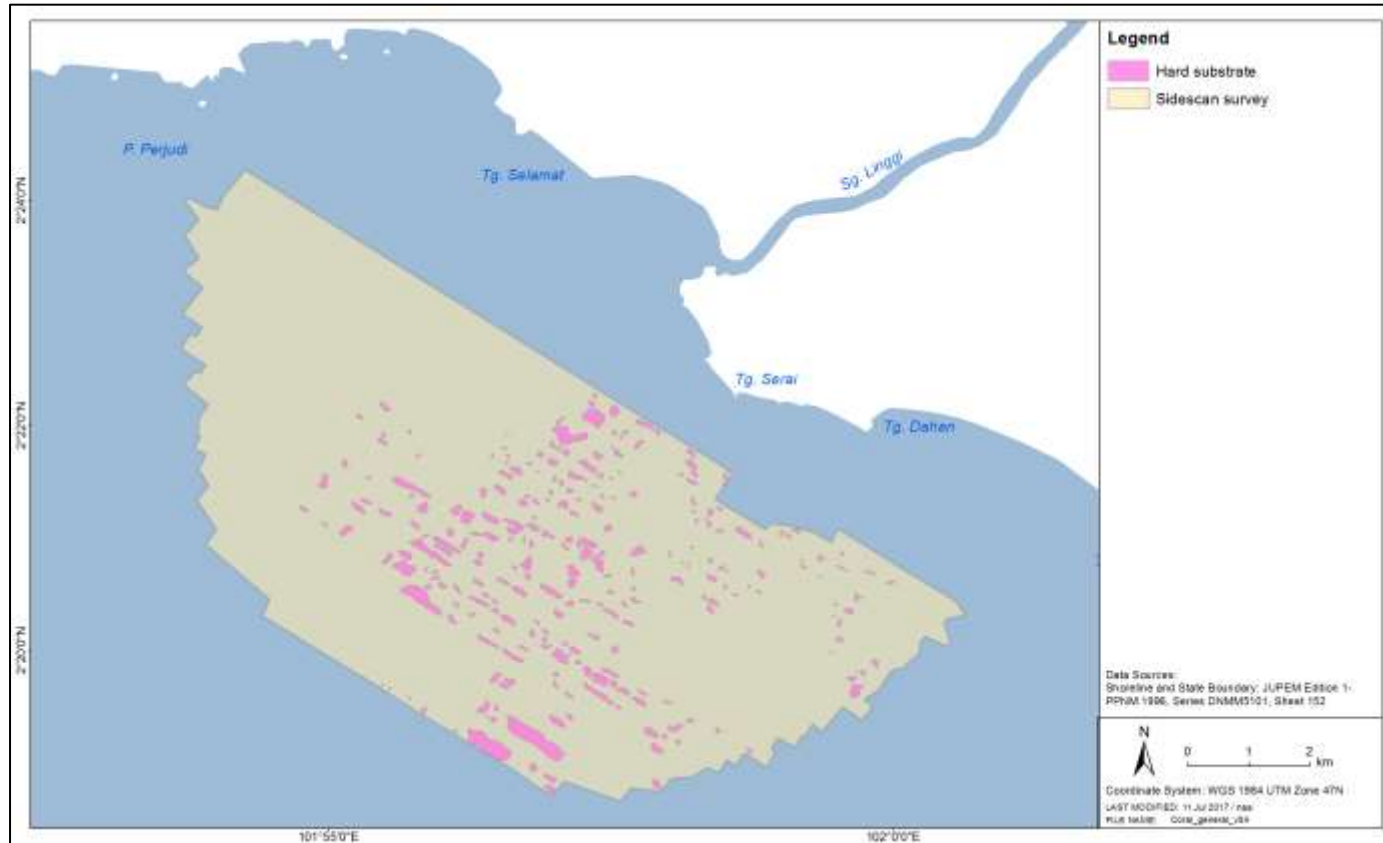


Additional Data: Sediment Investigation Report

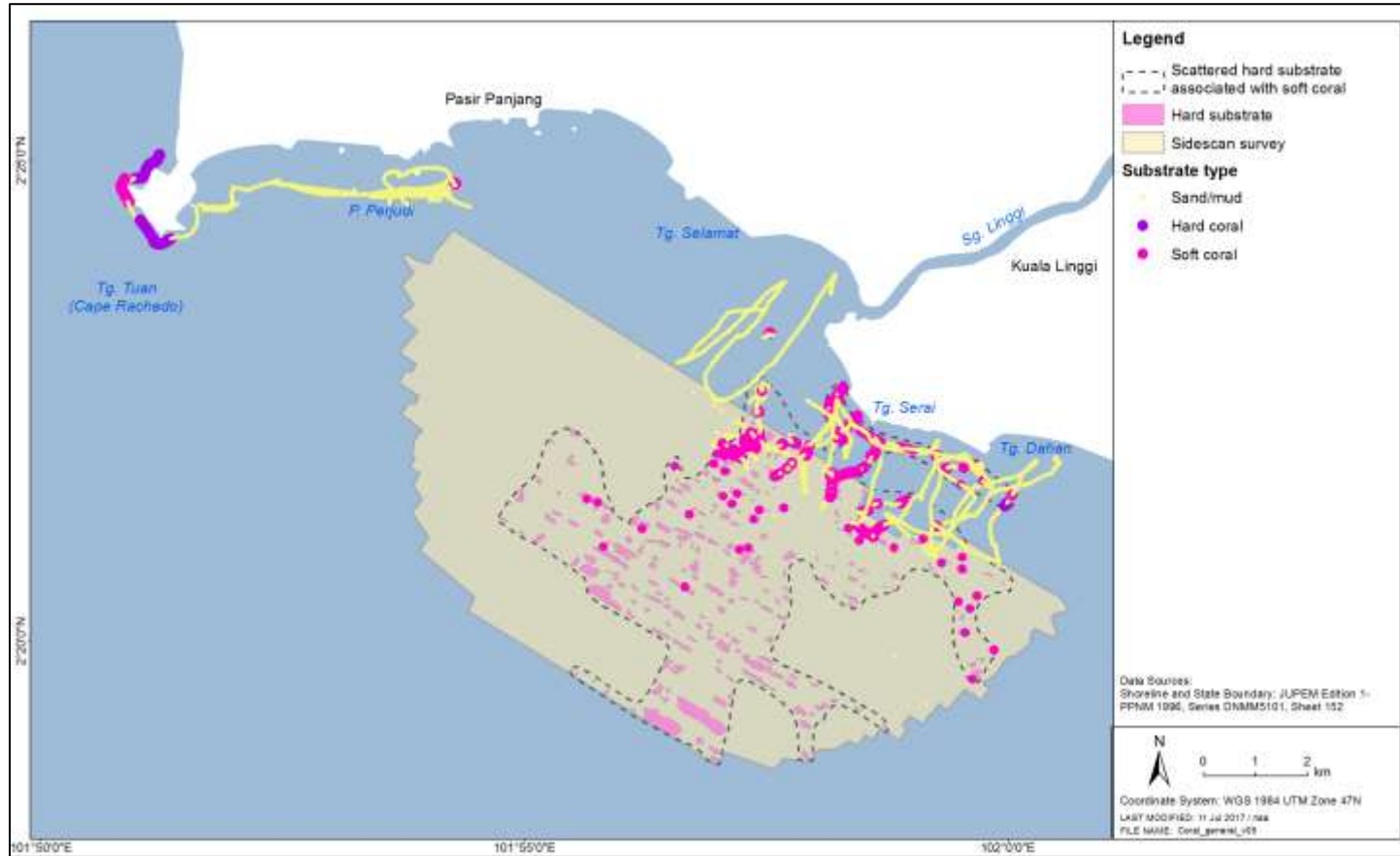
Cross section of borehole



Hard substrate area – with soft corals and sea fan



Final habitat map



Discussion



- Combination of methods - **efficient** method (Bickers,2009).
- **Video verification is crucial**
- Survey speeds-limited by the amount of **cable deployed**, the **drag on the cable** and **current speed/direction**.

- Cable drag distance - accurate map
- Higher resolution, better data, more expensive

Conclusion



This case study shows that it is possible to use a combination of techniques to establish a habitat baseline over a significant area in a reasonable time. That should be adequate to monitor changes from climate change and other impacts as it can ID individual macro species and their distribution.



Thank you

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