



Groyne Assessment Report

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OBJECTIVE

To assess the effectiveness of the 20 Groynes installed on 2014 at Makaunga and Talafo'ou beaches and suggest the appropriate actions to implement as a way forward.

BACKGROUND INFORMATION

Sediment Budget at the Hahake Region



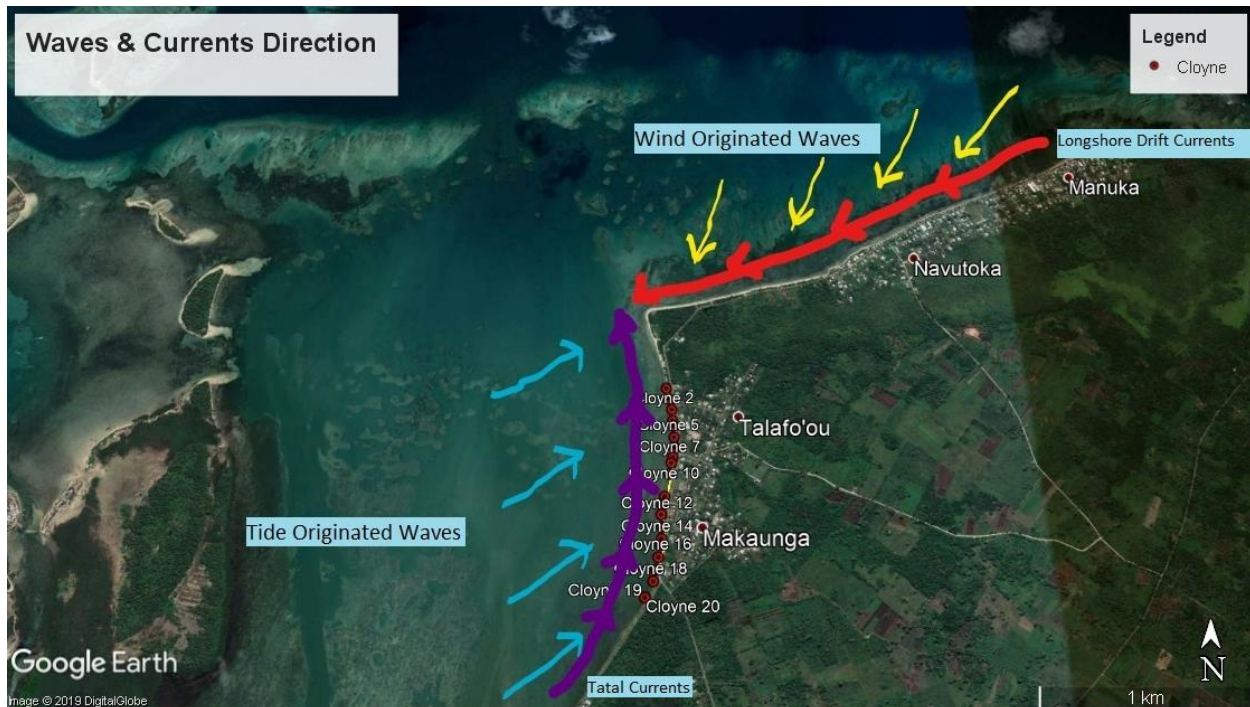
The source of sediment at this zone is from the eastern side of Tongatapu. The south east trade winds impact on the eastern side to generate a very high wave energy environment. The effect of strong waves on the coastal brought more offshore sand into the beaches and more effectively at the time of cyclone. The strong longshore drift current transported sands from the beaches at the eastern side and deposit along the other beaches further to the north and western part of Hahake region.

Project Area: Makaunga and Talafo'ou Beach



This is a very low elevation coastline experienced with frequent erosions. Erosional scarp noticed along the beach berm close to the edge of the Hahake road parallel to the shoreline. The height above High Water Mark (HWM) to the top edge of the erosional scarp approximately below 2 meters in average therefore, it is highly vulnerable to extreme erosions and flooding specifically at the event of natural

disasters.



Dominant waves and currents action resulted with the formation of Niutao peninsula at the region of Nukuleka to Manuka. Beaches seem to be developed, formed and characterized by the tidal and longshore drift currents. Longshore drift current is a very weak longshore current, moving along southern direction. Tidal current has the same relatively strength of the longshore current but flow on the opposite direction to the longshore current.

There are few vegetation along the beach but not quite sufficient to prevent further erosions.

ASSESSMENT PROCEDURE

Site direct observation and geological assessment conducted by our qualified Assistant Geologist. Drone mapping and photographs also completed by our technicians and GIS officer in consistent time interval. Comparison and analytical assessment of maps practices also and gathering of information from those who involved in the early monitored program of this project.

RESULT

The area was filled up with abundance of sand from the 'Emeline and Niutao beach and levelled up to the highest ground elevation.



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It is noticed that huge amount of sand has eroded from the beach until at its normal stable state now. Sands are only deposit symmetrically on both sides of the 17 groynes from the northern side of Talafo'ou beach and the other 3 groynes to the southern end have few to no sands at all. More sands discovered at the groynes with closed distance apart than the far distance one. It is also notified that sands among groynes have been eroded. Quantity of beach sands decreases as going further on the southward trend.



DISCUSSION

This beach is associated with very low energy waves concluded with a very low rate of sediment deposition. Both waves and tides are the controlling fundamentals of sediment movement at the area.

Sands at distance between groynes were consumed by the process; they were removed and deposited along each groyne axis and the rest being washed away offshore as results of the overall net force originate from the two currents' collision.

This is a part of a channel and the tidal current can be growing stronger at the narrow section in the beginning of Makaunga Village (groynes 17-20). The disruption of the crashing of the longshore and tidal current at this specific area generates strong offshore back wash of sand.

The groyne's structure, positioning and layout are considered to readjust. Inward Groynes' end should have been placed affirm the undisturbed area beyond the erosional scarp edge. This is to prevent the skipping of sand due to strong wind weather condition that may encourage huge amount being washed offshore.

CONCLUSION

Based on the result this project is fails to accomplish its goal of trapping, collecting and maintaining of sands at the beach.

Trapping and collecting of sands at these beaches through any means of natural mechanisms cannot archive suitable quantity that can completely protect the area from natural disasters due to low sediment deposition rate and extreme low elevation.

This is a very high risk coastal area concerning the location of community settlement. The government should take action as soon as possible.

However in terms of protecting the property and life of the citizen and the nation, the government stake holders should work together for a last long solution for this coastline and to implement immediately.

RECOMMENDATION

1. To discard the initial project activity and implement a 1.5 meter high rock revetment rehabilitated with geotextile mat immediately for Makaunga and Talafo'ou foreshore.
2. To establish a committee, each member from the relative government stake holders who's responsible to all activity interacts with the coastline and to make sure that the committee's main obligation involve examine and indicate the best practices to implement in each coastline development, to avoid the wasting of fund.
3. All individuals responsible for EIA to every development practices interfere the natural process, should hold a minimum of Bachelor Degree in earth science or geology from a recognized University. This is to prevent the false activity suggested and inaccurate interpretation.