

Investigation of Dune Profile Changes at Park Beach, Coffs Harbour, NSW.

By Jayden Kachel



Acknowledgements:

- Daniel Rodger - JBPacific
- Kyran Crane - Coffs Harbour City Council
- NSW Crown Lands

1

The Study Area

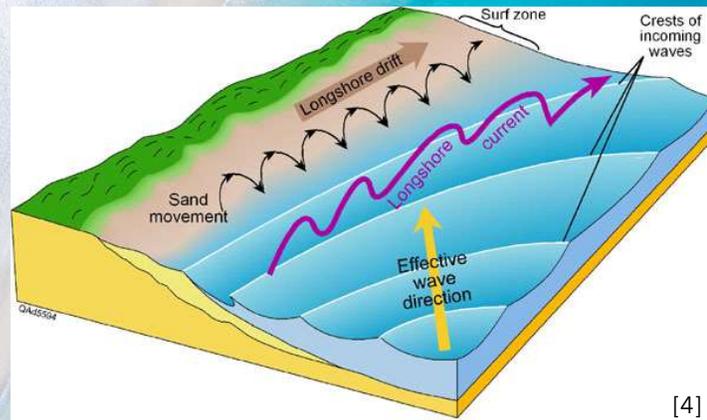
- Coffs Harbour is situated on the East Coast of New South Wales (NSW), Australia
- This study will focus on Park Beach, one of the 38 beach embayments that stretch along the 79km of coastline on the Coffs Coast [1]



2

Longshore Sediment Transport

- Longshore sediment transport (LST), also known as littoral or longshore drift, is a naturally occurring sediment transport system [2][3]



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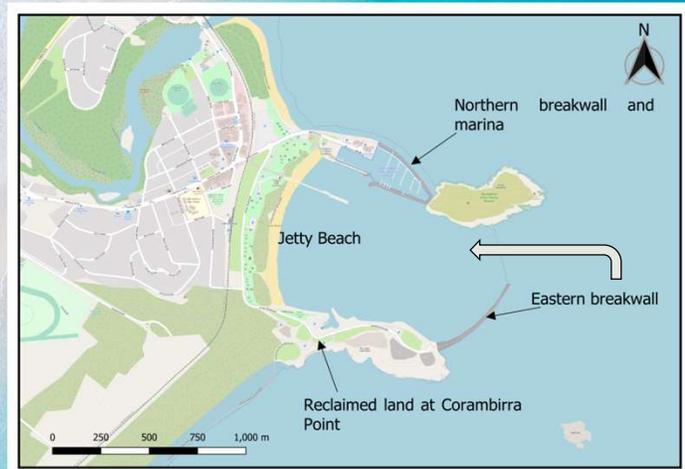
Longshore Sediment Transport



4

The Harbour

- Three main constructions have changed the shape of the coastline to create a harbour, which has impacted sediment transport.
- Up to 50,000m³ (2/3) of the sediment transported by LST is trapped in the harbour because of these changes to the coastline [6].



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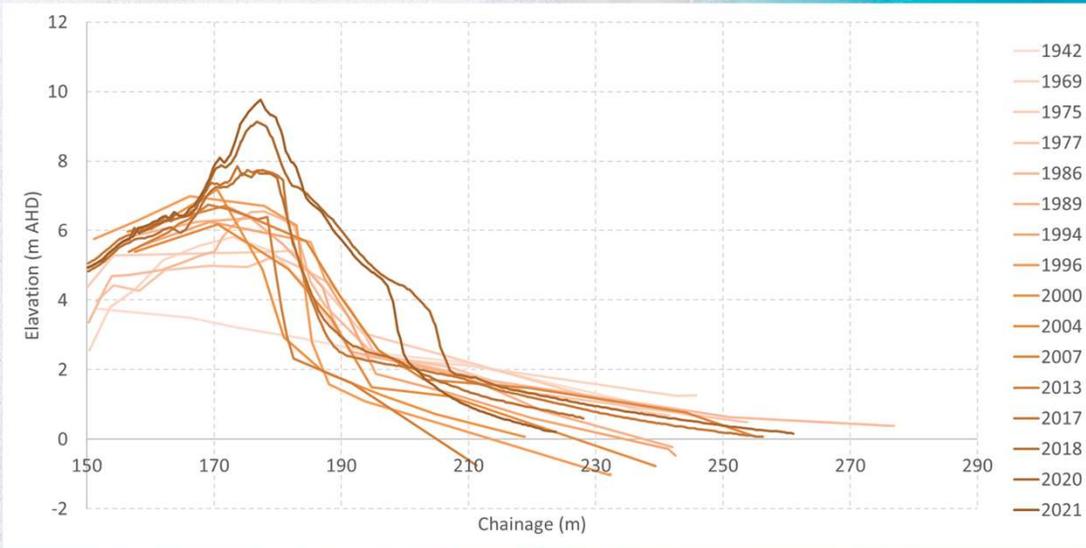
The Study

- This study aims to investigate if there has been a build-up of sediment on Park Beach and identify why there has been an increase in build-up over recent years.



6

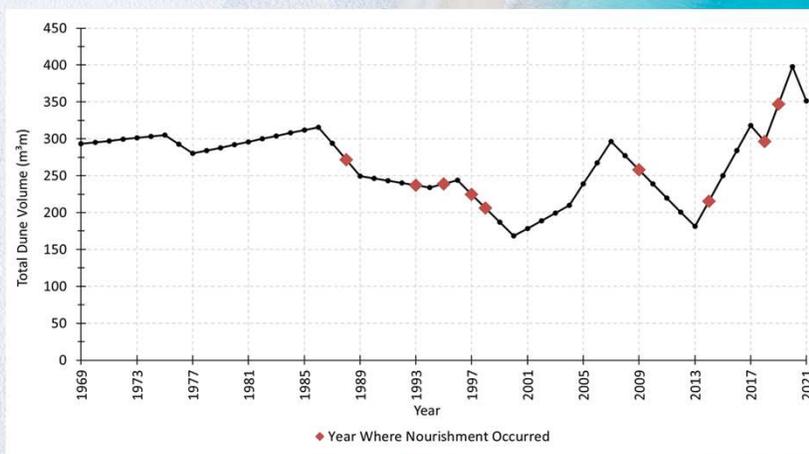
Results



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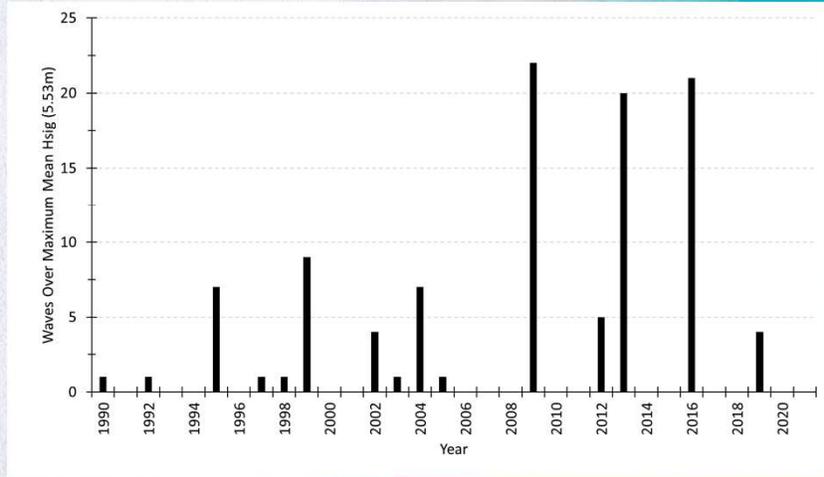
Results

Dredging and nourishment information was obtained from historical reports, news articles and Crown Lands.



8

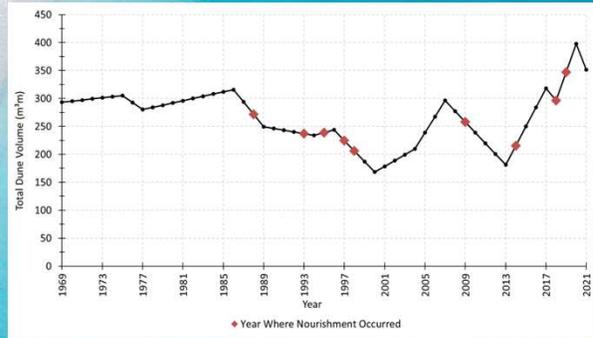
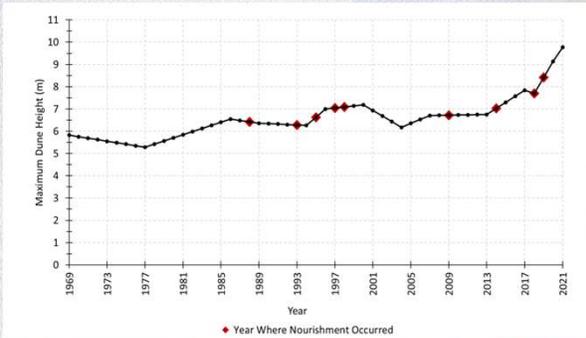
Results



9

Discussion

- Through data analysis, this study has confirmed that there has been a gradual increase in dune height since 1969
- It has also confirmed that in the last three years, there has been a major increase in dune height and volume.



10

Cause of the Build Up

- To allow boats to access the inner harbour, a large portion of the 50,000m³ of sediment that is trapped by LST annually needs to be removed (dredged) [6] [7].
- To offset downdrift recession Park Beach receives the nourishment.



Photo: Daniel Rodger

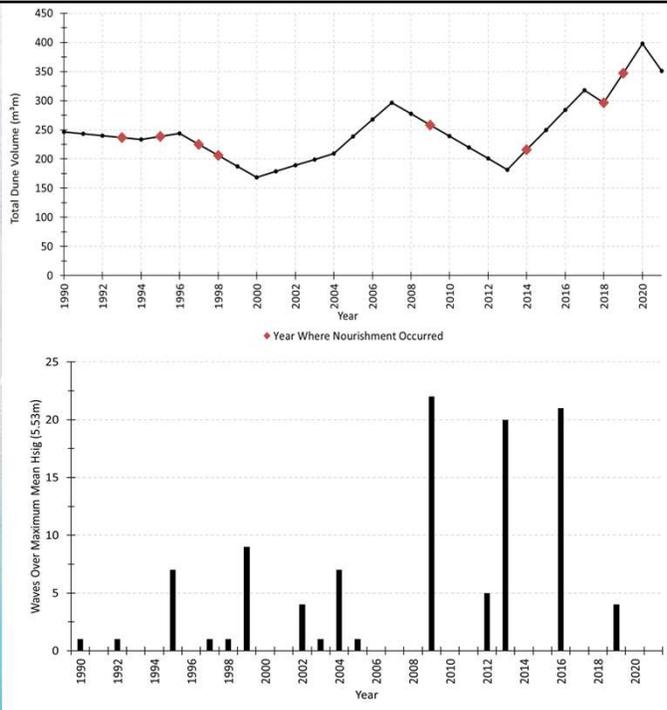


Photo: Daniel Rodger

11

Reflected in the results?

- Nourishment lag (delay)
- Storm events
- A flood event in 2009 as well as large storm events in 2013 and 2016 are suspected to have created the dips in the Volume Graph for their respective years.



12

Recent Increase

- From 2018-2021
- Caused by the most recent 2019 nourishment event.
- 16,000m³ placed onto the beach and moulded by bulldozer [8]
- 10,000m³ placed into nearshore zone

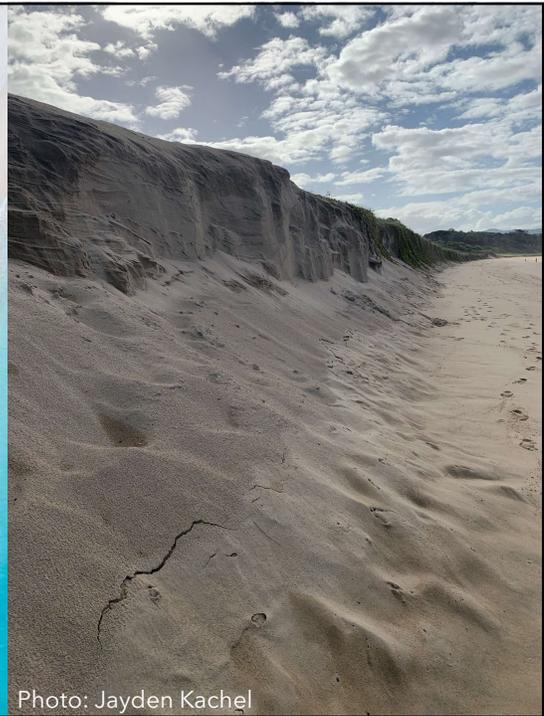


Photo: Jayden Kachel

13

Change in Coastal Protection

- Between 2011-2021 the increased dune volume at Park Beach has changed from 65m³/m to 160m³/m (above 4m AHD) [6]



Photo: Jayden Kachel

14

Conclusion

- Confirmed increase in dune height and volume.
- Likely caused by nourishment.
- Nourishment should continue - better management
- Dangerous



Photo: Jayden Kachel

15

References

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- [2] - Wolanski, E., McLusky, D., Flemming, B., & Hansom, J. (2011). *Estuarine and Coastal Geology and Geomorphology*: Academic Press
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- [7] - Carley, J. T., Wyllie, S. J., Lord, D. B., & Cox, R. J. (2006). *Coastal Processes in the Coffs Harbour Region*, Proceedings of the 15th NSW Coastal Conference
- [8] - Department of Industry. (2019). *Review of Environmental Factors - Proposed Maintenance Dredging (Approach Channels) - Coffs Harbour FINAL*.

16