

# Wainui Beach

## The Science



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**Environment Advisers & Data Scientists**

# Pieces of the Puzzle

Take cultural values of Wainui Beach –and add  
the science

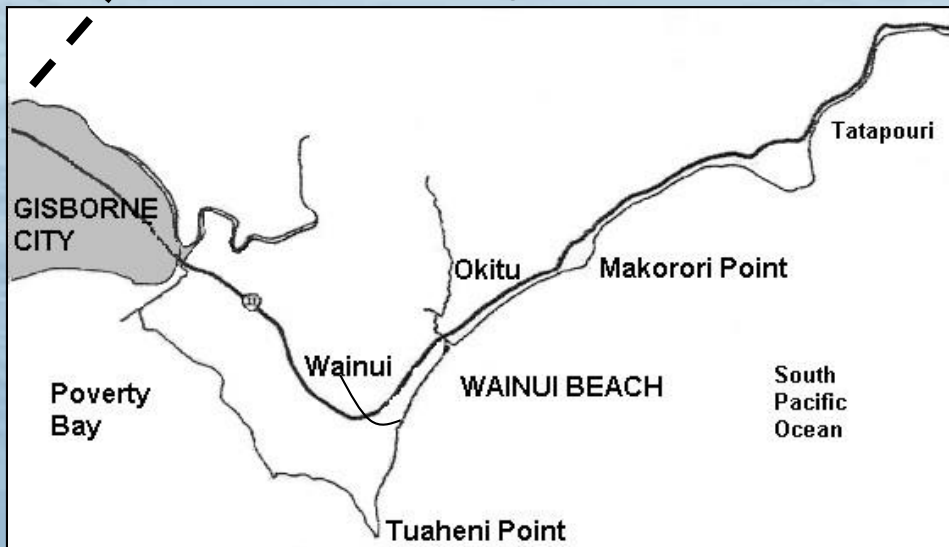


(a) Framework + (b) Waves = (c) Erosion + (d) Surf

# (a) Wainui Framework

Geology & Shoreline

Pocket/Embayed beach:



(N) Makorori  
Tatapouri



Active sand  
beach,  
large dunes



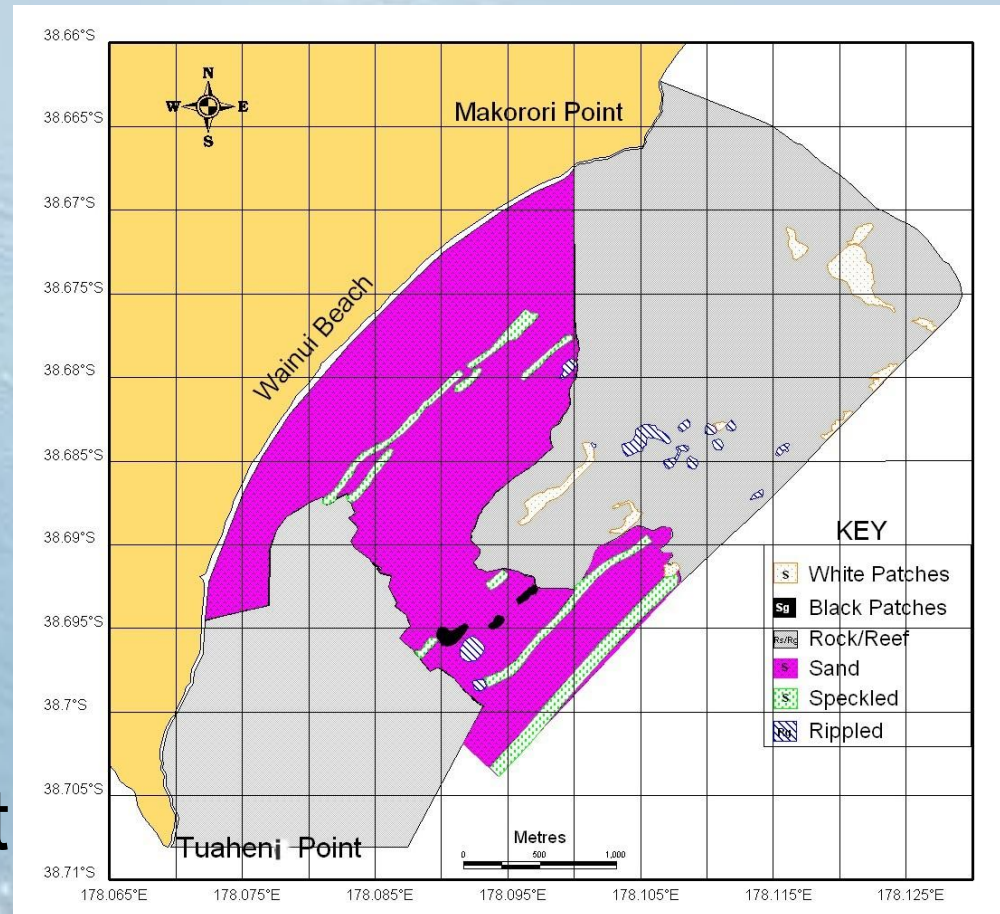
(S) Tuaheni



# (a) Wainui Framework

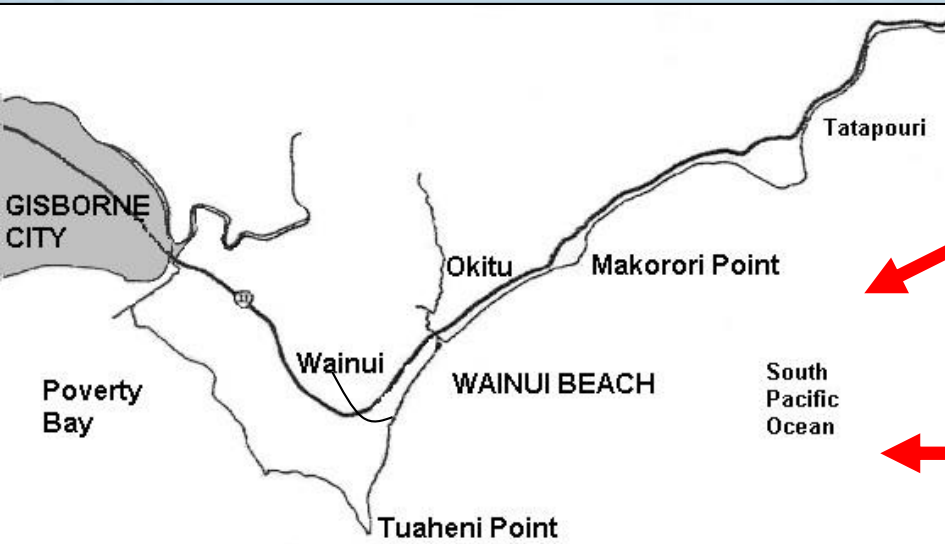
## Seafloor (Bathymetry)

- Large rocky reefs from headlands
- Large reef outcrops (Coopers Bank, Ariel reef)
- Thin veneer of sand over rocky basement



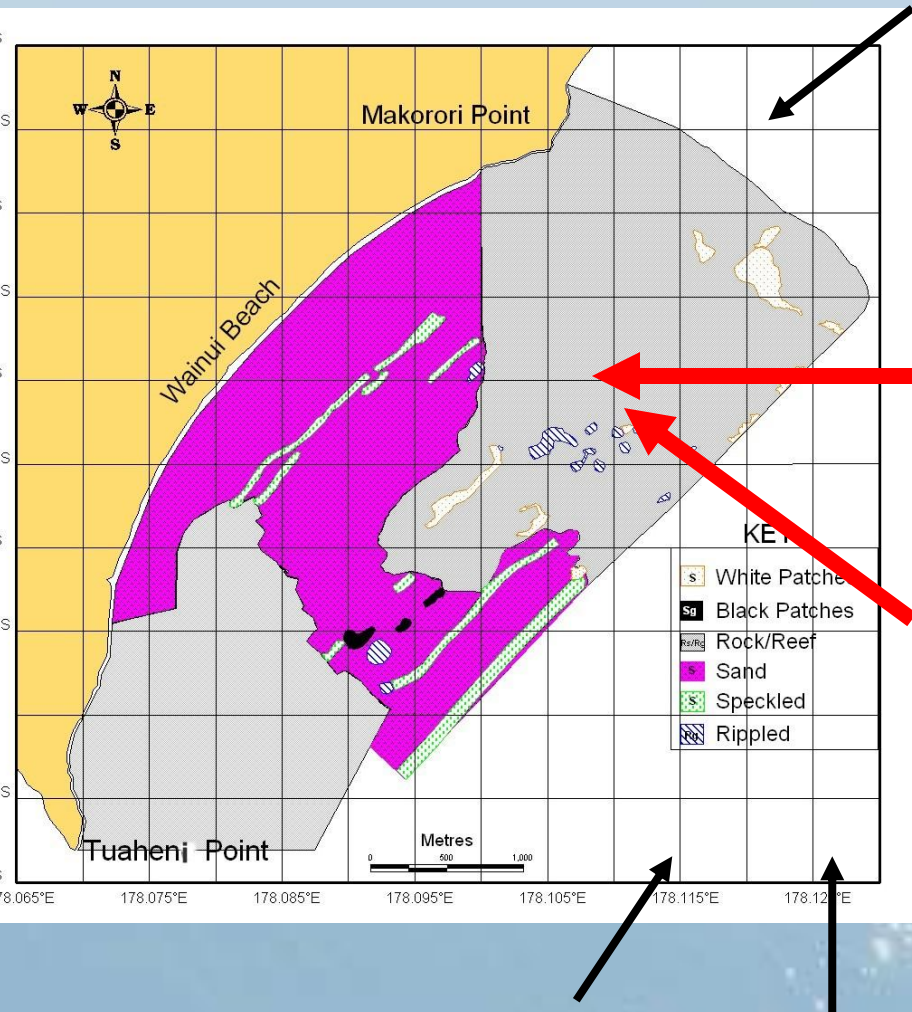
# (b) Wave Climate

Open-ocean coast  
= very exposed



- NE thru E to SW  
= Large/wide storm window
- Huge interference from rocky reefs  
= variable H, dir  
= variable sand motion

# (a) + (b): Wainui Framework



ADD A STORM  
EVENT

SE and E Storms:

= crossshore sand m/mt

= many rips, sandbars

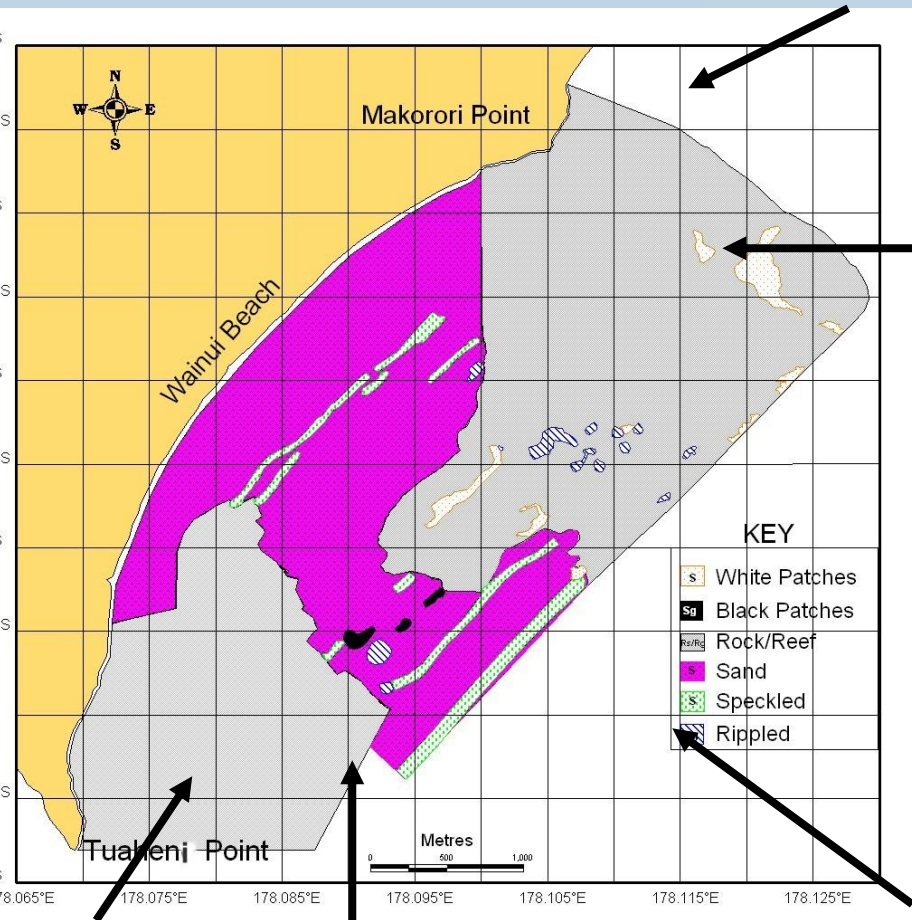
SW, S, NE Storms:

= longshore sand m/mt

(fewer rips, sandbars)



# (a) + (b): Wainui Framework



ADD A STORM EVENT:

Waves, rips, currents

Large sand m/mt

Beach/dune erosion

Underwater sandbars

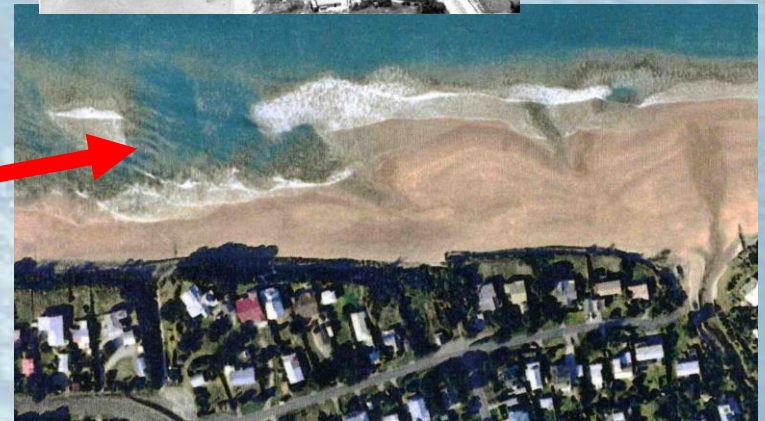
Protect houses

Surf breaks

# (c) Erosion:storm-generated



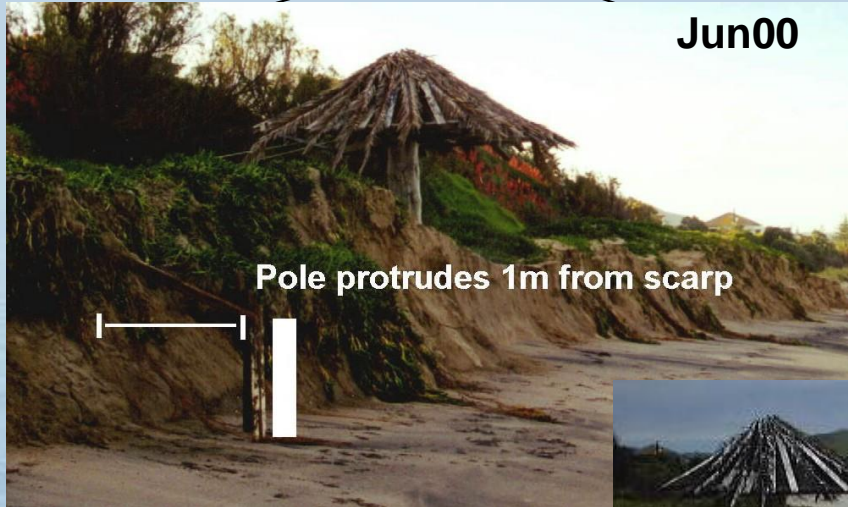
Localised erosion



Rips appear anywhere –erosion cuts large



# (c) Storm Erosion



Storm "cut"

Sand removed in June 2000....



Storm "fill"

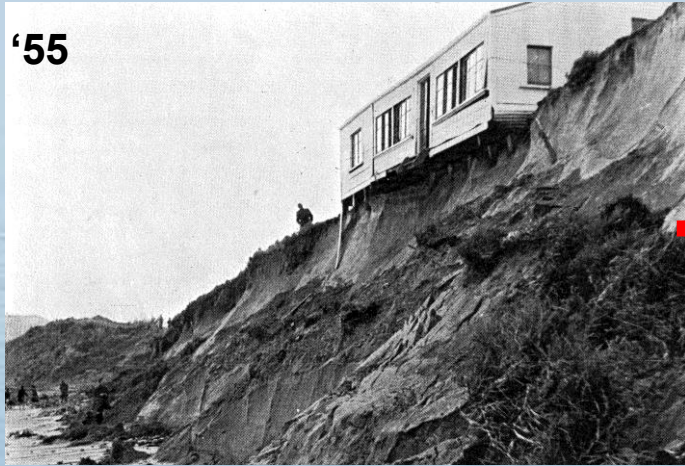
eventually returned!

Generate large temporary beach changes



# (c) Temporary Shift

Time  
LT



PSR





# (d) World-class surf breaks

Moving sand extremely important

Erosion creates  
world-class surf  
breaks



3 surf breaks of  
national significance

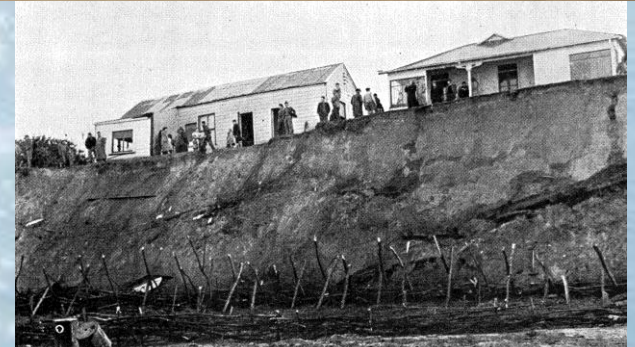


Protects houses (if not to close)

# Large natural dune system

Large natural foredunes

- ~2km is undeveloped: high natural character
- Highest sand dunes in region
- Main source of sand for beach (mainly rocks offshore)





# The Whole Picture



Embayed sandy beach w/ complex seafloor shape

**(a)**

+

**(b)**

Highly exposed, plenty of multi-dir storms

=

Highly dynamic beach, storm erosion from rips/currents

**(c)**

+

**(d)**

Erosion creates surf breaks & natural protection for houses

Wainui: dynamic beach – many elements at play;

Learn from nature: sand m/mt protects & gifts surfbreaks