BONDI

Its geologic past; its 150 years of change; its future

Bruce Thom

www.wentworthgroup.org
Why is Bondi so iconic?

- Proximity
- East Australian Current
- Sydney climate
- Topographic setting
- Geology- geomorphology
Geological Evolution

STEP 1

Fold-Belts

500-300 my
Geological Evolution

STEP 2

Sydney Sedimentary Basin
300-200 my

Volcanic intrusions
150 my
Gondwana at 280 – 240 million years
Geological Evolution

STEP 3

Opening Tasman Sea

80 – 60 my
Geological Evolution

STEP 4

- Subsidence continental margin
- River valley incision

60-10 my
Geological Evolution

STEP 5

• Continental sea-level rise
• Planation inner continental shelf
• Formation of cliffs
• Sand migration to north
  10 - <1 my
Geological Evolution

STEP 6

• Last Interglacial to Last Glacial Maximum

• High to low sea level (-120m)

140,000 – 15,000 yr
Geological Evolution

STEP 7

Postglacial Marine Transgression to “Stillstand”
15,000 – 6,500 yr

6,500yr – to present day beach-barrier-lagoon
Inner Shelf Sand Bodies

3 stage development

12,000 yr
7,000 yr
Present sea level
Beach Dynamics

Closed compartment of quartz sand

Rip cell dominated
Pre-European Occupation

Shelf plain

Beach to estuary

Rock platform to cliff
Early European Land Grants

Roberts “Bundye” 1811-1851

Hall/O’Brian 1851-1882

Public Resumption 1882

Council Trustee 1885
Late 19th Century

Destabilize dunes

Sewer Outfall 1889

Attempts to stabilize dunes

Infill lagoons
Early 20th century

Continued stabilization

Baths

Completion of Promenade 1923

Dune removal - subdivision
Mermaid Rock Ben Buckler

Rock platforms

Storm events

July 1912

Origins of The Rock
Beach and Ben Buckler, Bondi, Sydney.
Mid 20th Century

Piers

Real estate consolidation

World War II
Late 20\textsuperscript{th} century events

May – June storms 1974

November Storm 1987 (2007)

Sewer Outfall offshore

Olympic Stadium 2000
Bondi Today

Resilient dynamic closed system
A Sustainable Future?

Can Bondi adapt to impacts of climate change?

Need for nourishment: when?

Collapse of cliffs: when?
### Components of the sea level rise planning benchmarks

<table>
<thead>
<tr>
<th>Component</th>
<th>Year 2050</th>
<th>Year 2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea level rise</td>
<td>30 cm</td>
<td>59 cm</td>
</tr>
<tr>
<td>Accelerated ice melt</td>
<td>(included in above value)</td>
<td>20 cm</td>
</tr>
<tr>
<td>Regional sea level rise variation</td>
<td>10 cm</td>
<td>14 cm</td>
</tr>
<tr>
<td>Rounding*</td>
<td>-</td>
<td>-3 cm</td>
</tr>
<tr>
<td>Total</td>
<td>40 cm</td>
<td>90 cm</td>
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</tbody>
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* Rounding was adopted as the projections have a degree of uncertainty, and adopting values to the nearest centimetre would imply a high degree of accuracy in the projections.
Thank you

www.wentworthgroup.org
www.australiancoastalsociety.org