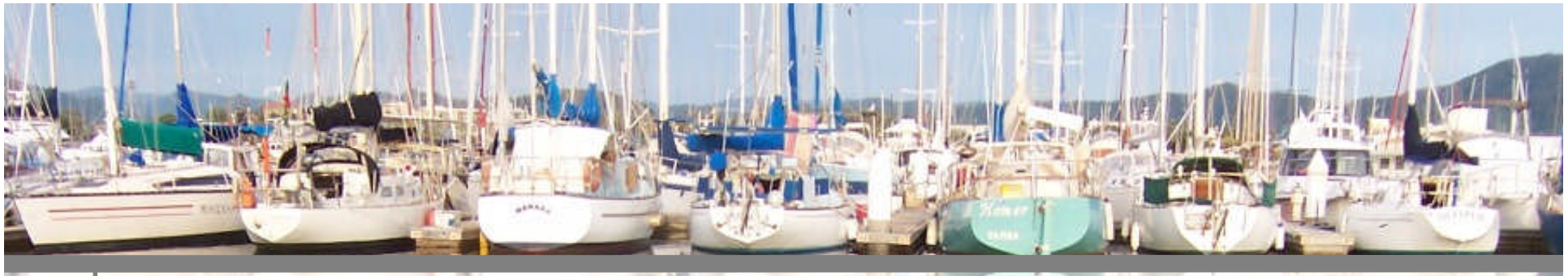

Responding to Sea Level Rise

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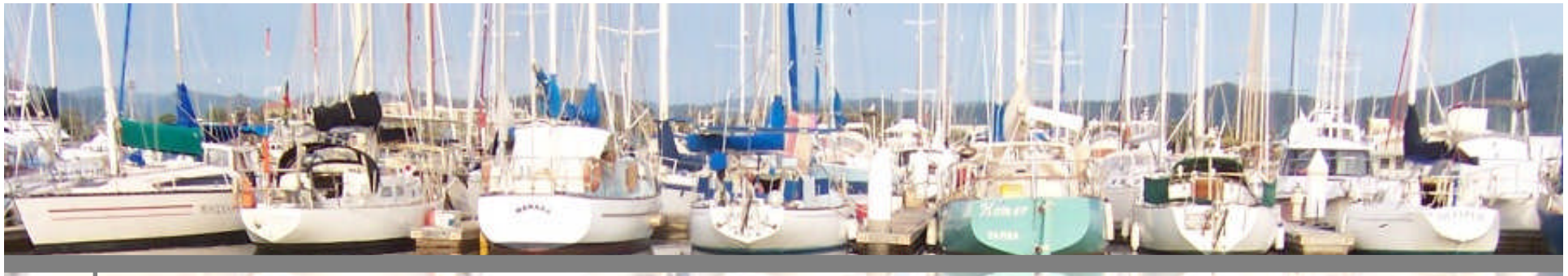
AHD

COFFS HARBOUR
CITY COUNCIL



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Local Government Planning and Infrastructure Implications

Stephen Sawtell

General Manager

Coffs Harbour City Council

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CAUTION
BOAT RAMP
CLOSED
DUE TO
SILTATION
12/03/2004


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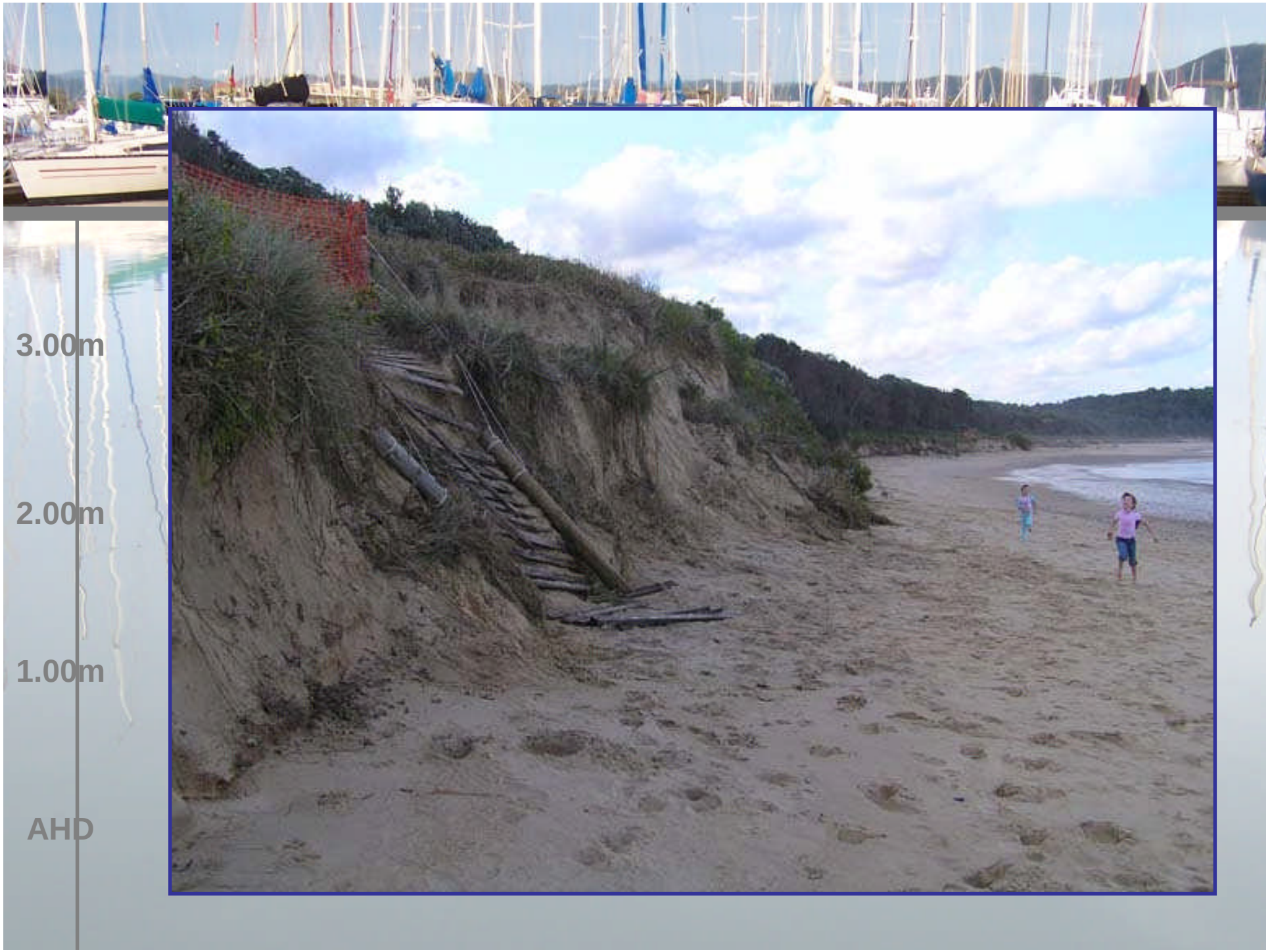
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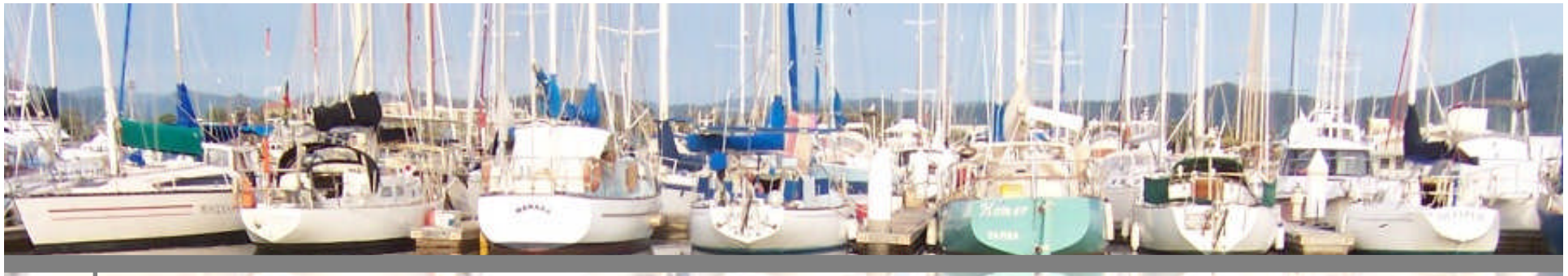

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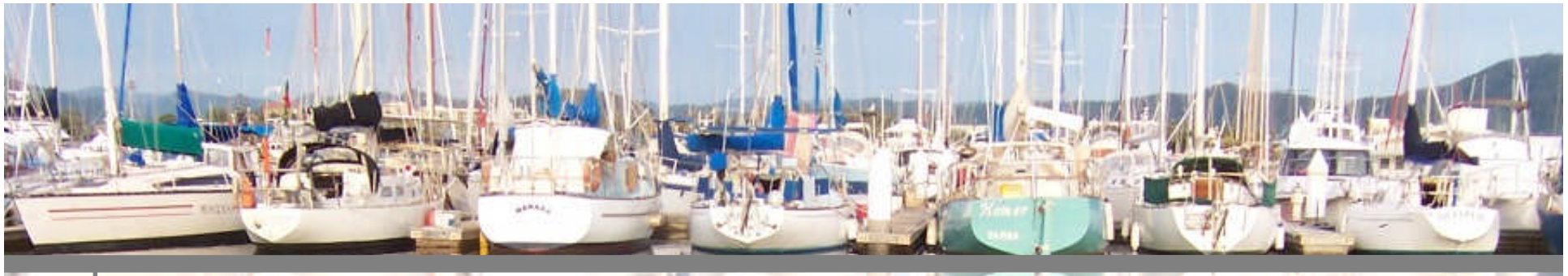
Data

Sourcing

Validating

Interpreting



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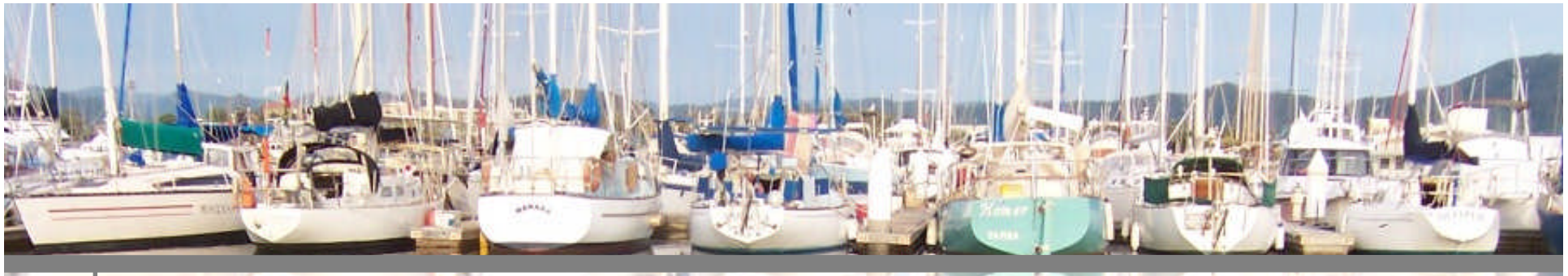
Direction

Government to establish a “level”



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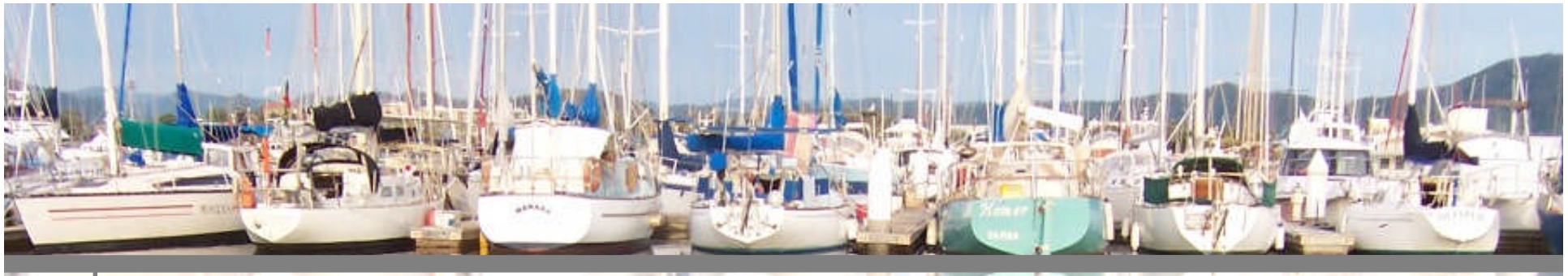
Floodplain Risk Mgt Guideline

"Practical Consideration of Climate Change"



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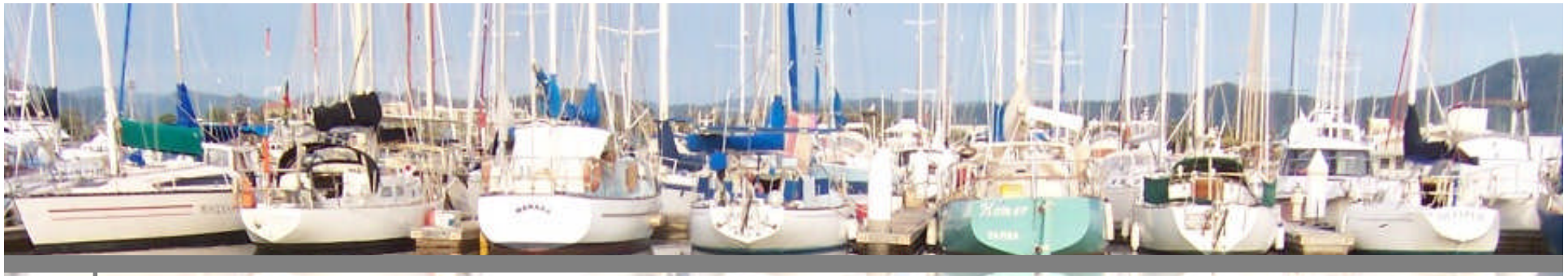
IPCC 2007

Between 2090 and 2100:

- **Global sea level rise: 0.18m to 0.59m**
- **With ice flow melt: 0.18m to 0.79m**
- **NSW Coast: 0.18m to 0.91m**

What to do?



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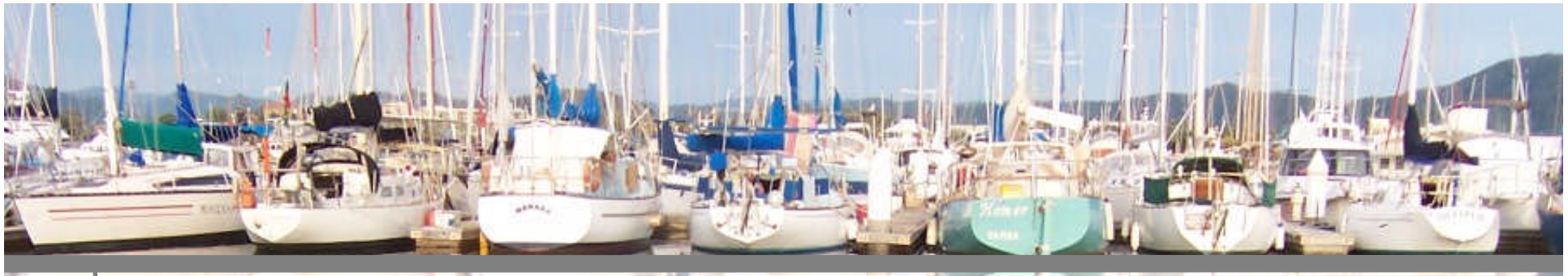
CHCC Initiatives

- Hazard Definition
- Grant Funding
- Flood Studies/Estuary Management
- Working Group



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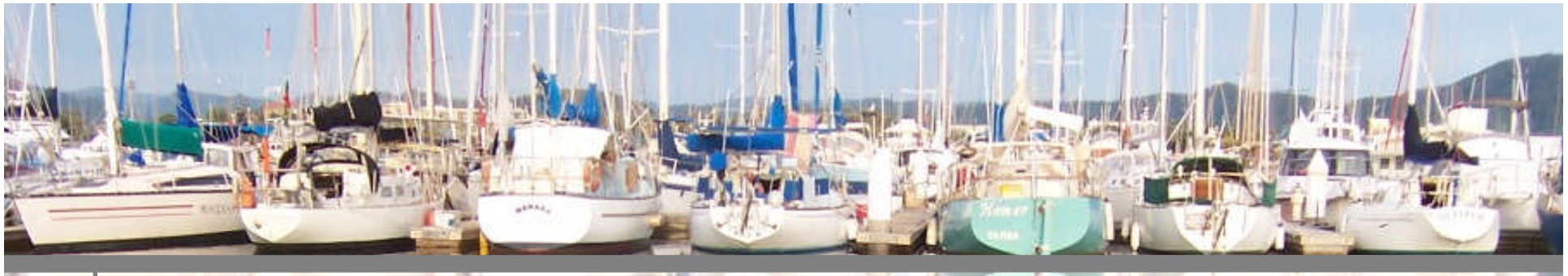
Hazard Definition Study

- Beach Erosion and Recession
- Inundation
- Sand drift / slope stability
- Beach berm heights / ICOLLs
- Climate Change / Sea Level Rise



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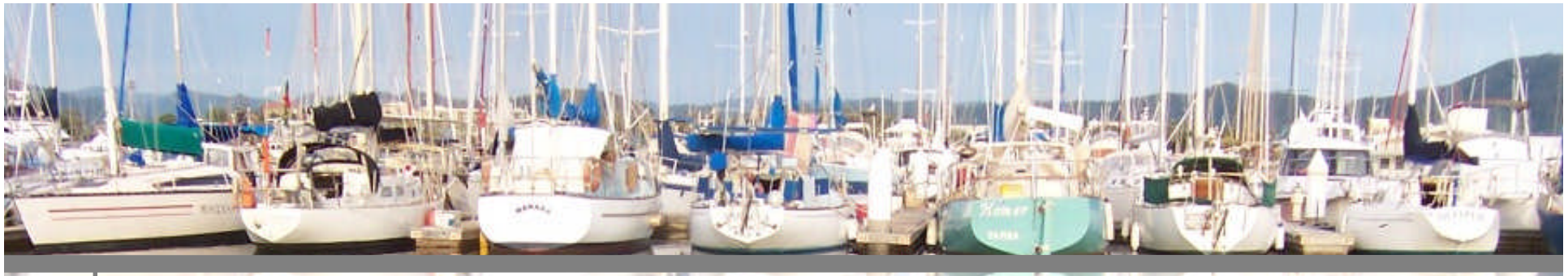
Hazard Definition Study

Project Objectives (BMT WBM):

- Technical assessment of processes
- Identify important processes / hazards
- Determine effects of Climate Change / Sea Level Rise



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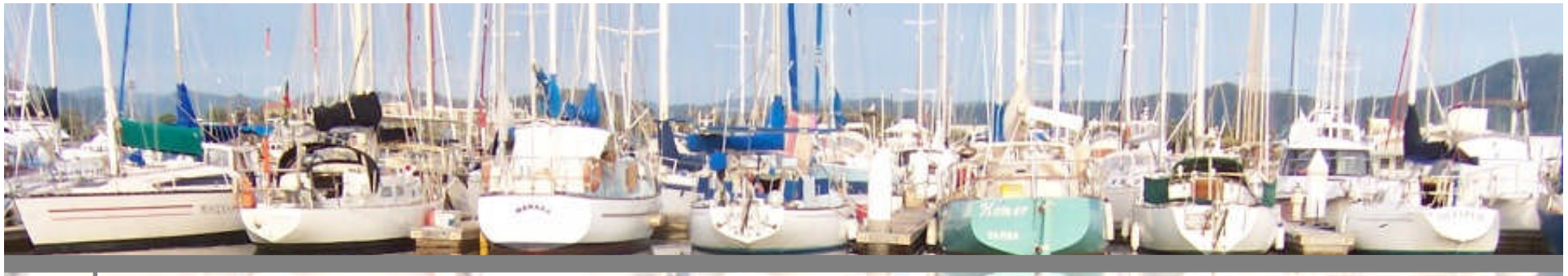
Hazard Definition Study

- Comprehensive Hazard Zone mapping
- Sensitive areas may require more detailed assessment
- Allow review of CHCC coastal policy
- Potential benchmark study for NSW and Australia



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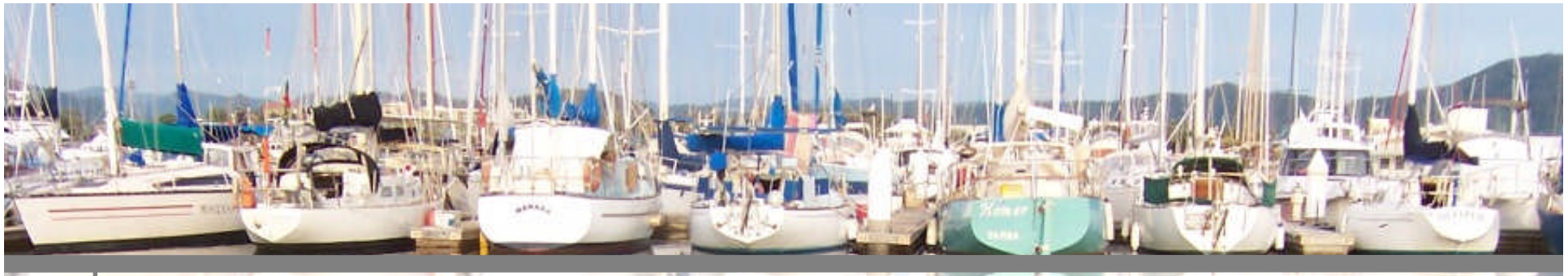
Adaptation Strategy project

- Grant application
- Use ALS / LIDAR survey data for three sea level rise scenarios
- Preliminary assessment of affected infrastructure and properties



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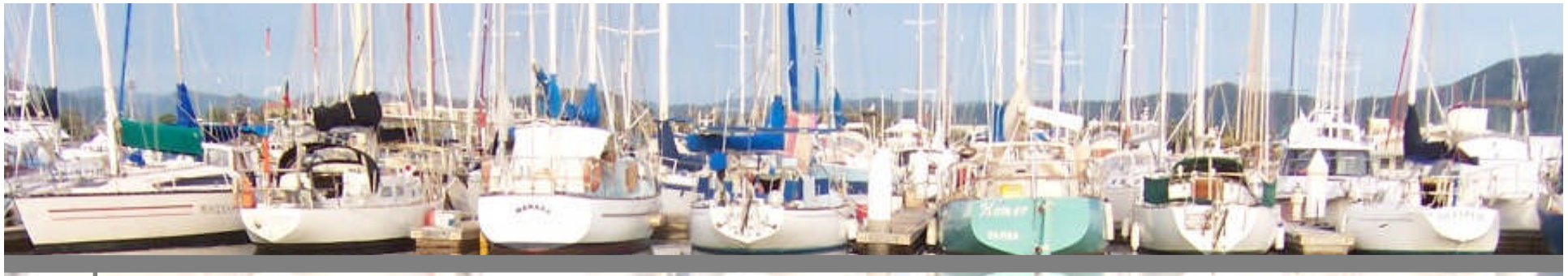
Council Business

- Incorporate Climate Change / Sea Level Rise impacts into Estuary Process Studies and Management Plans
- New Climate Change assessment requirements for developers
- Climate Change Strategic Working Group established



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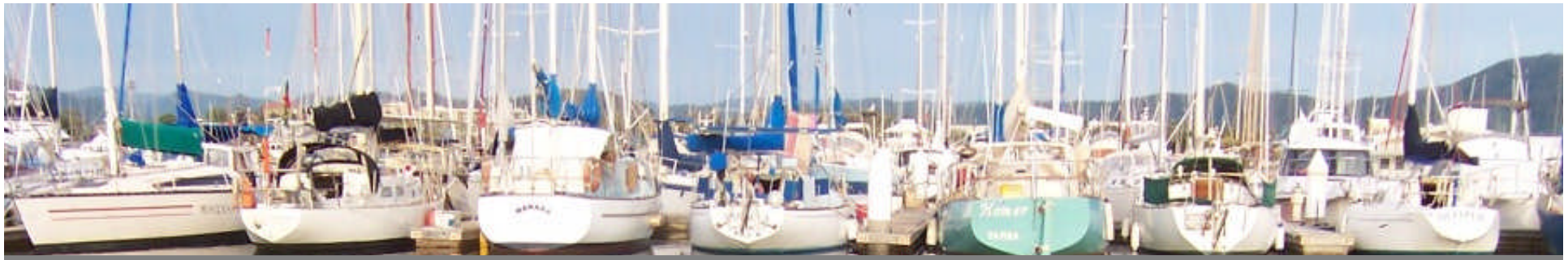
Data

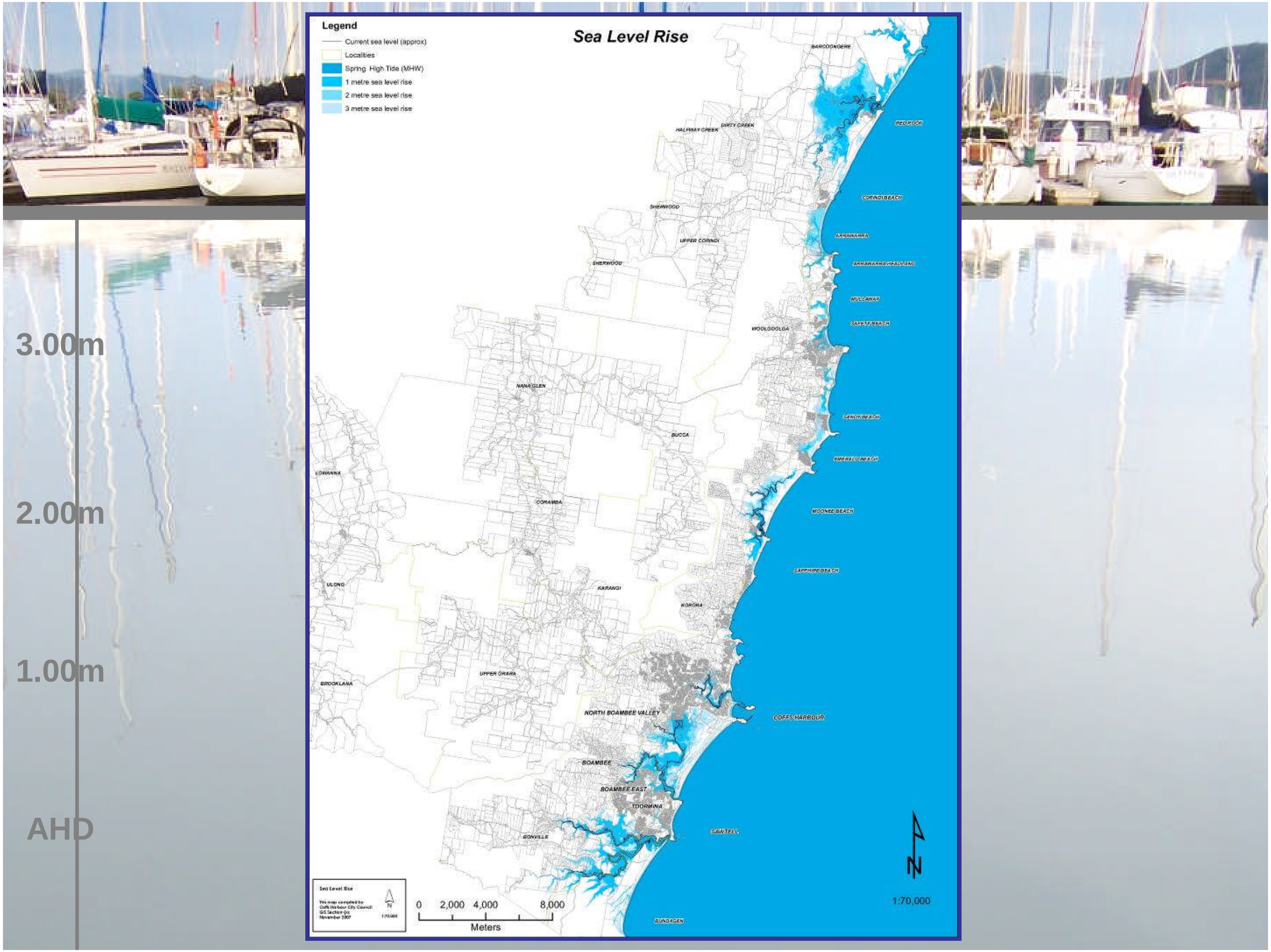
- GIS-based enquiry and analysis system
- Preliminary projections of three Sea Level Rise scenarios
- Identify impact on road network, water and sewerage infrastructure and property

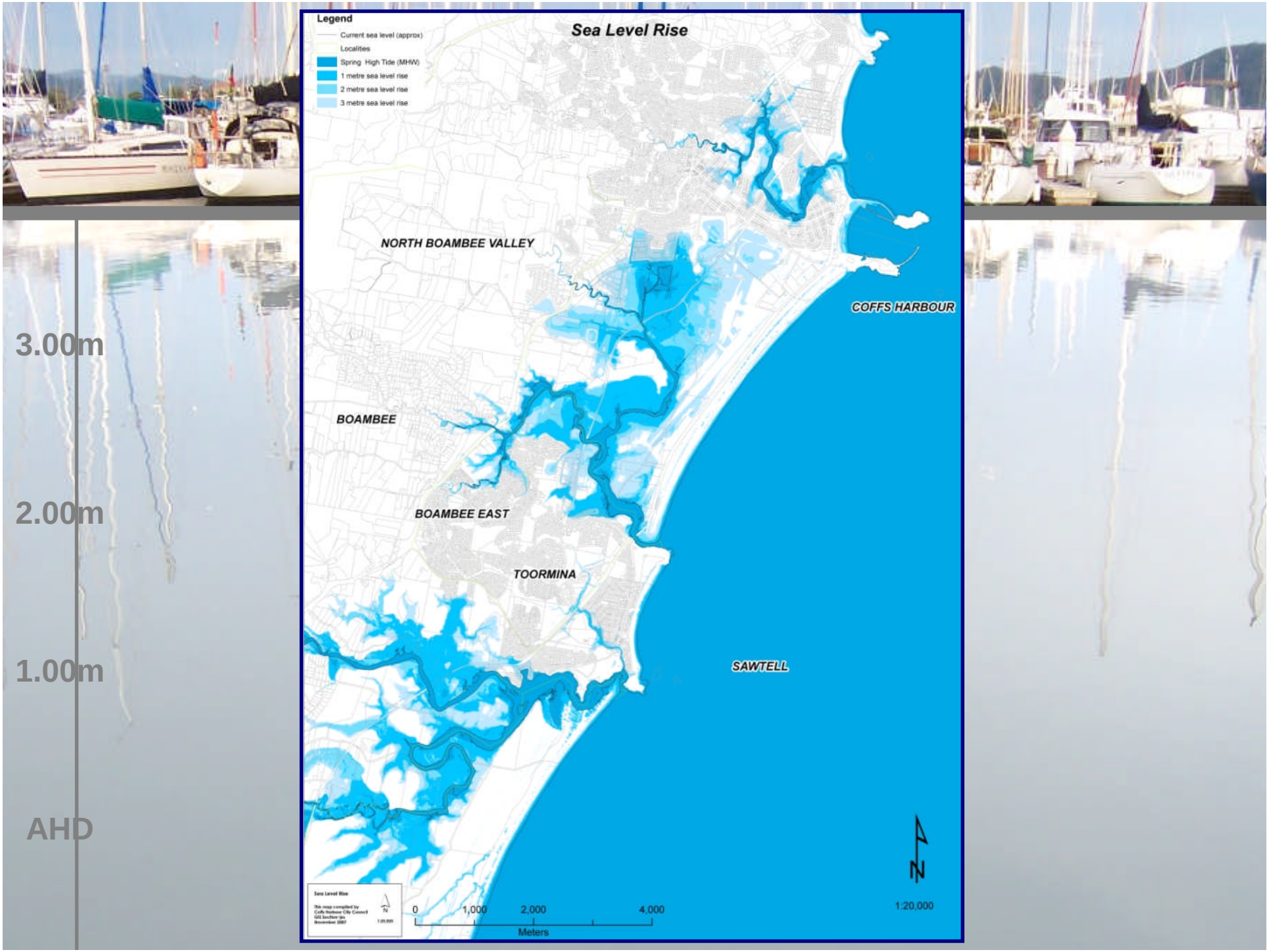


Estimated infrastructure affected by Sea Level Rise (Above AHD)

Sea Level Rise	Sewage Lines (m)	Sewage Pump Stations	Sewage Rising Mains (m)	Road Network	Properties	Water Lines (m)
1m	73.98	0	921	1 (2m)	382	530
2m	2,169	3	3,265	9 (1.44km)	736	3,049
3m	14,238	18	10,582	98 (17.1km)	1,517	15,537

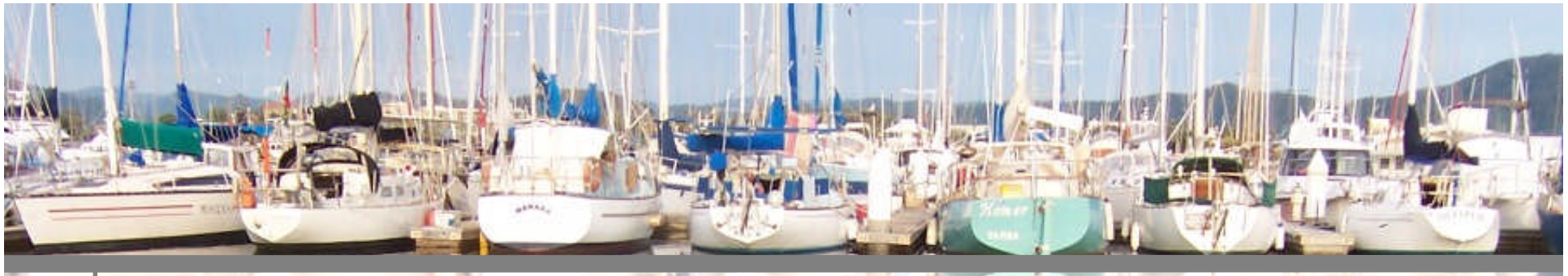
Note: 1 metre above AHD is about equal to a current 2 metre high Spring Tide


3.00m
2.00m
1.00m
AHD
Legend
Current sea level (approx)
Localities
Spring High Tide (MHW)
1 metre sea level rise
2 metre sea level rise
3 metre sea level rise
Sea Level Rise
NORTH BOAMBEE VALLEY
BOAMBEE
BOAMBEE EAST
TOORMINA
COFFS HARBOUR
SAWTELL
BONVILLE
BUNDAGEN
WOOLGOOLGA
0 2,000 4,000 8,000
Meters
N
1:70,000


Legend
Current sea level (approx)
Localities
Spring High Tide (MHW)
1 metre sea level rise
2 metre sea level rise
3 metre sea level rise
Sea Level Rise
NORTH BOAMBEE VALLEY
COFFS HARBOUR
BOAMBEE
BOAMBEE EAST
TOORMINA
SAWTELL
3.00m
2.00m
1.00m
AHD
0
1,000
2,000
4,000
Meters
1:20,000


2 Metre High Tide
PS14A
PS35
PS23
PS03
3.00m
2.00m
1.00m
AHD
Legend
Sewer Pump Stations
2 Metre High Tide


Sewer Pump Stations affected by Elevated Ocean Levels
PS14A
PS35
PS23
PS03
3.00m
2.00m
1.00m
AHD
Legend
Sewer Pump Stations
Elevated Ocean Levels - 2.5m AHD



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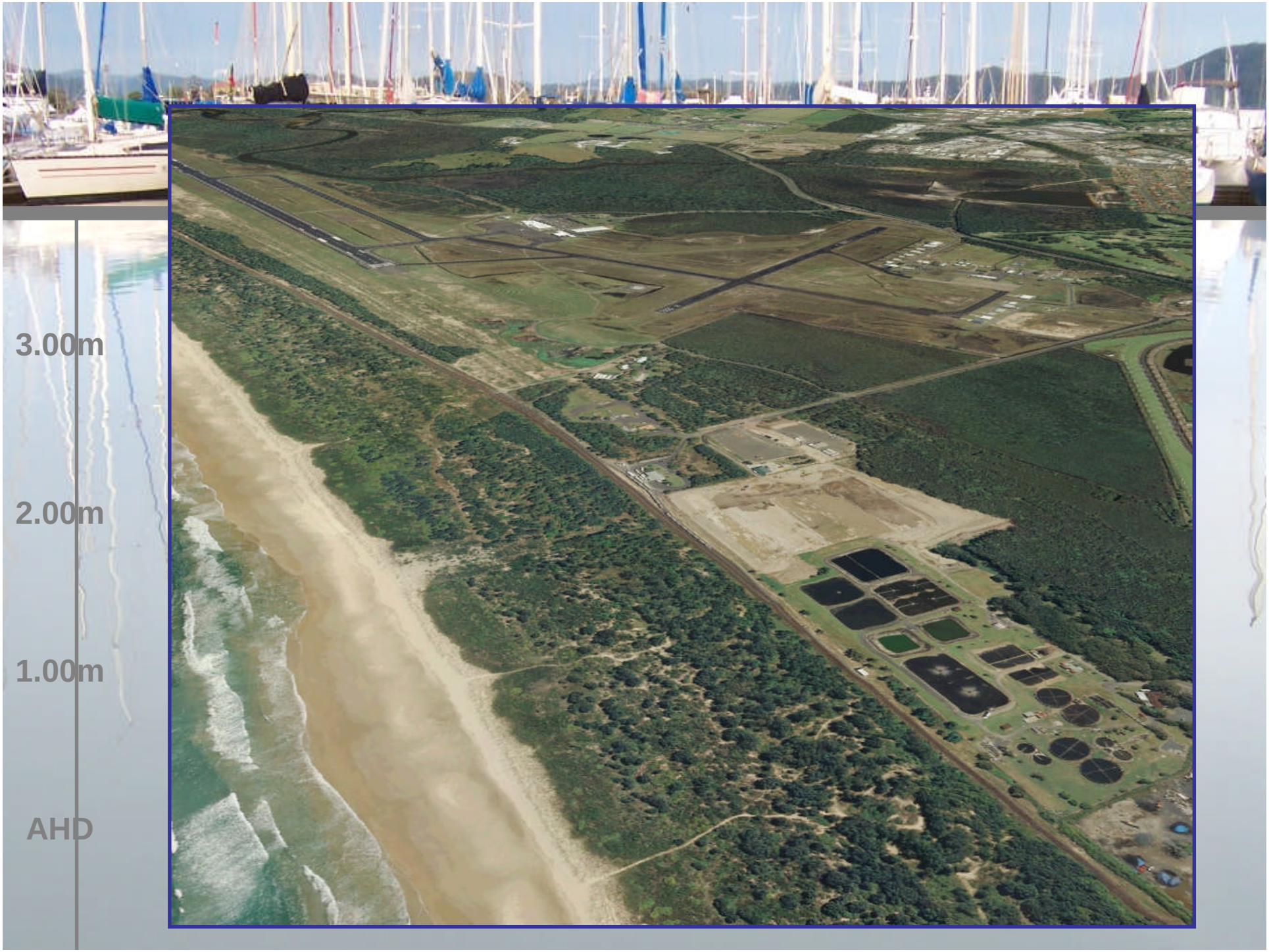
AHD

ALS / LIDAR

- Airborne Laser Scanning
- Light Detection and Ranging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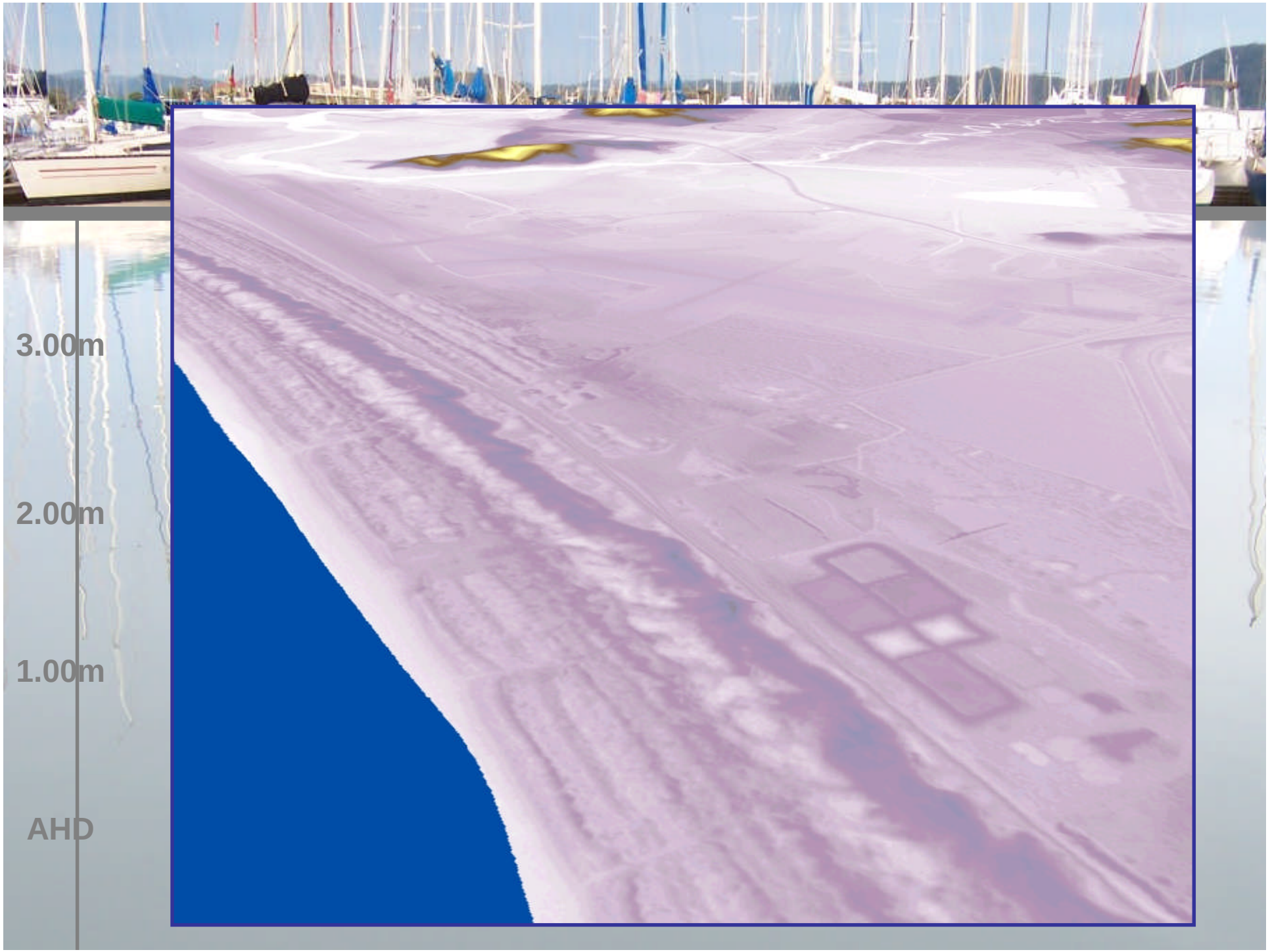
AHD


3.00m
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AHD


3.00m
2.00m
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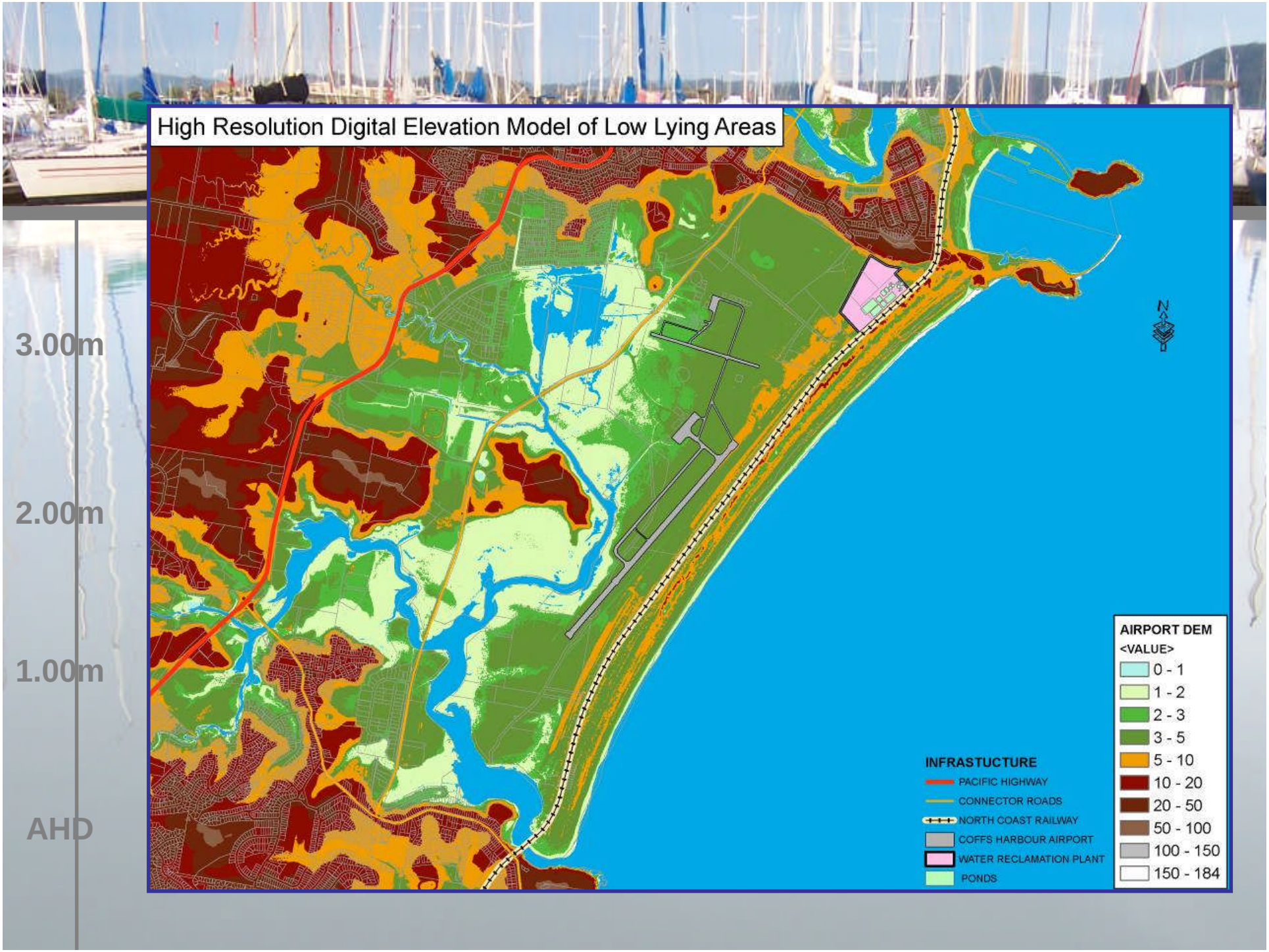
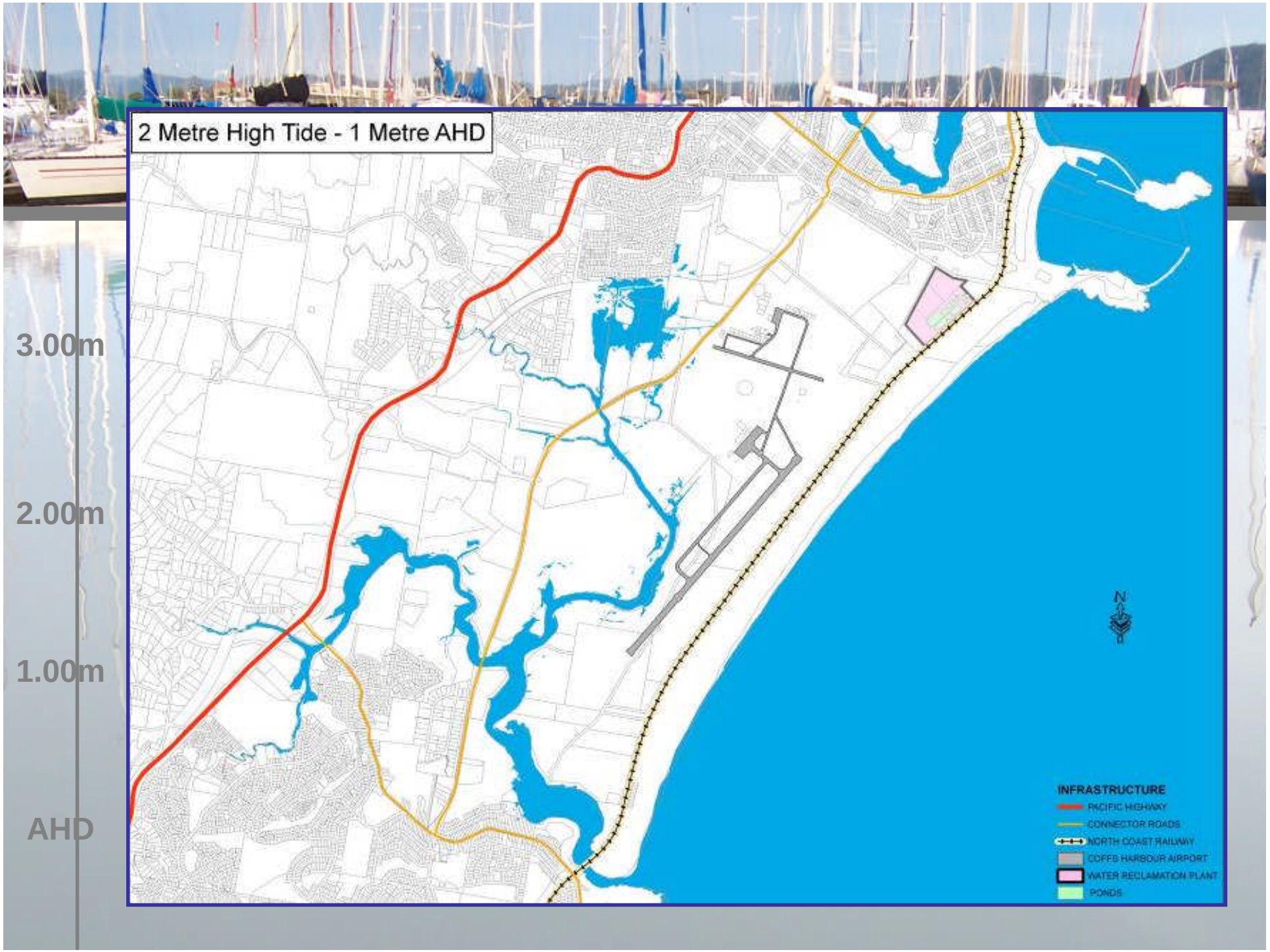
AHD


WELLERS
DIAMONDS, WATCHES AND GIFTS
"DIAMONDS & WATCHES R US"
3.00m
2.0
1.0
AH


3.00m
2.00m
1.00m
AHD


High Resolution Digital Elevation Model of Low Lying Areas
3.00m
2.00m
1.00m
AHD
N
AIRPORT DEM
<VALUE>
0 - 1
1 - 2
2 - 3
3 - 5
5 - 10
10 - 20
20 - 50
50 - 100
100 - 150
150 - 184
INFRASTUCTURE
PACIFIC HIGHWAY
CONNECTOR ROADS
NORTH COAST RAILWAY
COFFS HARBOUR AIRPORT
WATER RECLAMATION PLANT
PONDS


2 Metre High Tide - 1 Metre AHD
3.00m
2.00m
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AHD
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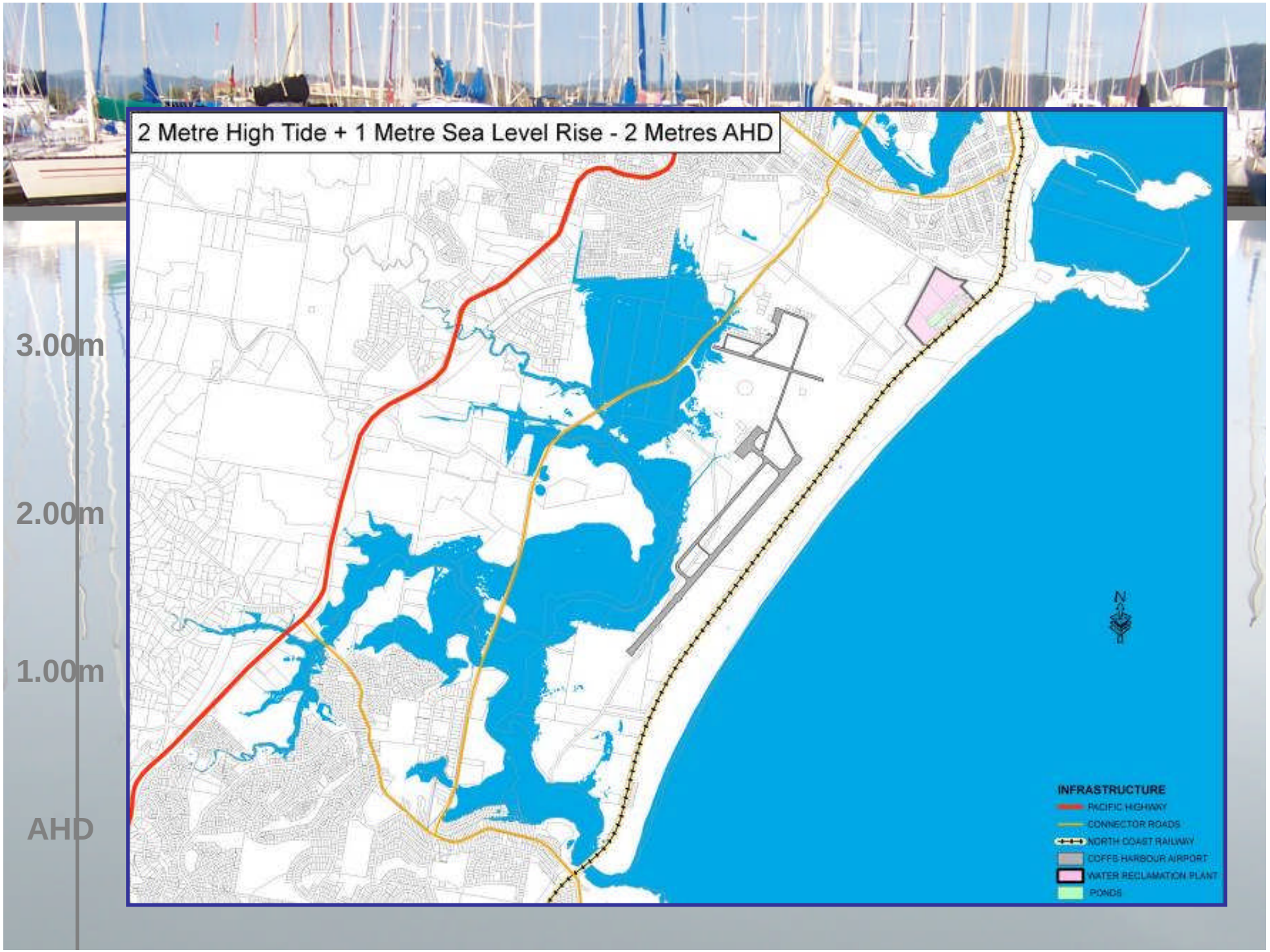
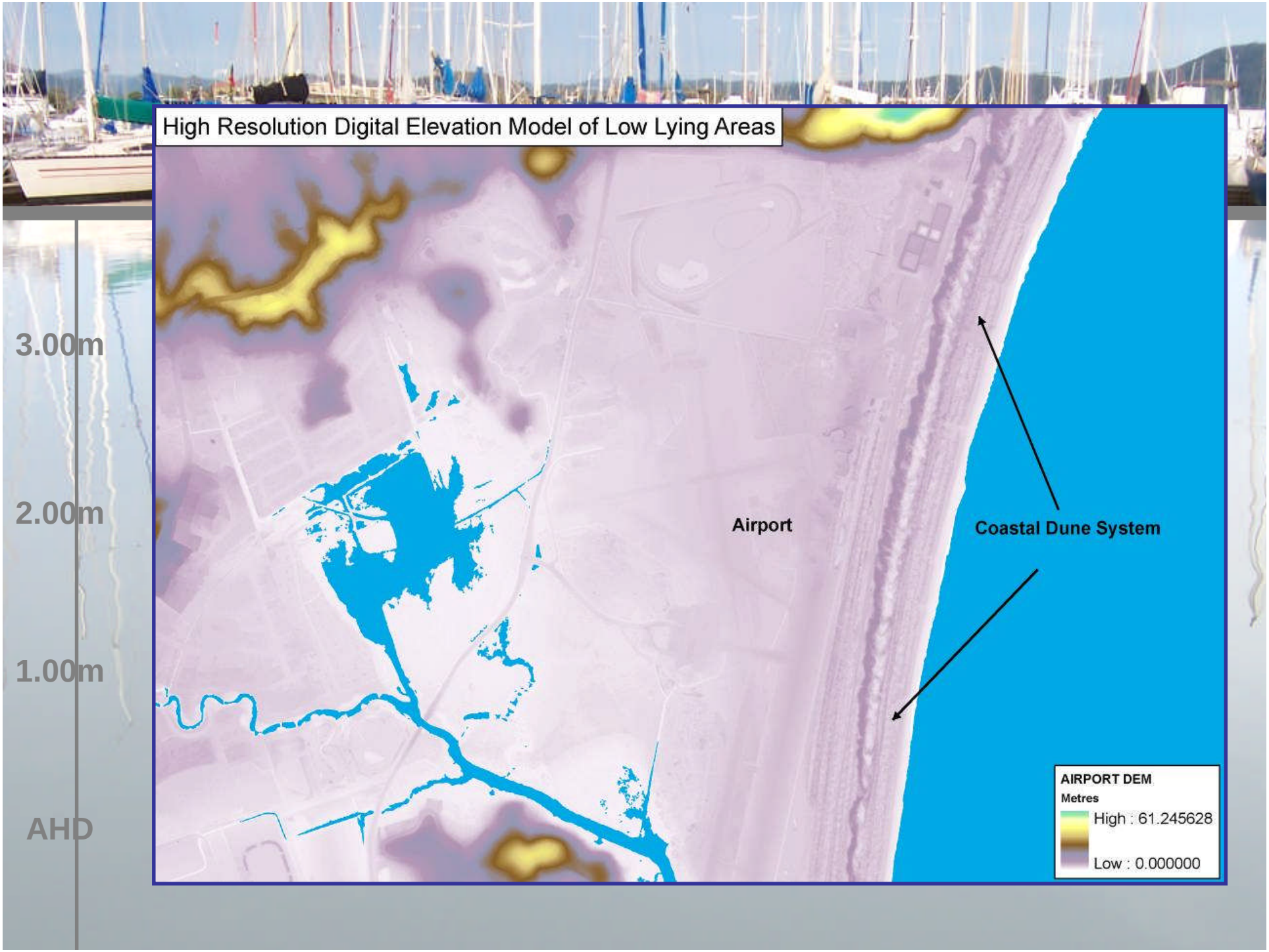
INFRASTRUCTURE
PACIFIC HIGHWAY
CONNECTOR ROADS
NORTH COAST RAILWAY
COFFS HARBOUR AIRPORT
WATER RECLAMATION PLANT
PONDS


2 Metre High Tide + 1 Metre Sea Level Rise - 2 Metres AHD
3.00m
2.00m
1.00m
AHD
N
INFRASTRUCTURE
PACIFIC HIGHWAY
CONNECTOR ROADS
NORTH COAST RAILWAY
COFFS HARBOUR AIRPORT
WATER RECLAMATION PLANT
PONDS


2 Metre High Tide + 2 Metre Sea Level Rise - 3 Metres AHD
3.00m
2.00m
1.00m
AHD
N
INFRASTRUCTURE
PACIFIC HIGHWAY
CONNECTOR ROADS
NORTH COAST RAILWAY
COFFS HARBOUR AIRPORT
WATER RECLAMATION PLANT
PONDS


High Resolution Digital Elevation Model of Low Lying Areas
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AHD
Airport
Coastal Dune System
AIRPORT DEM
Metres
High : 61.245628
Low : 0.000000


2007 IMAGERY
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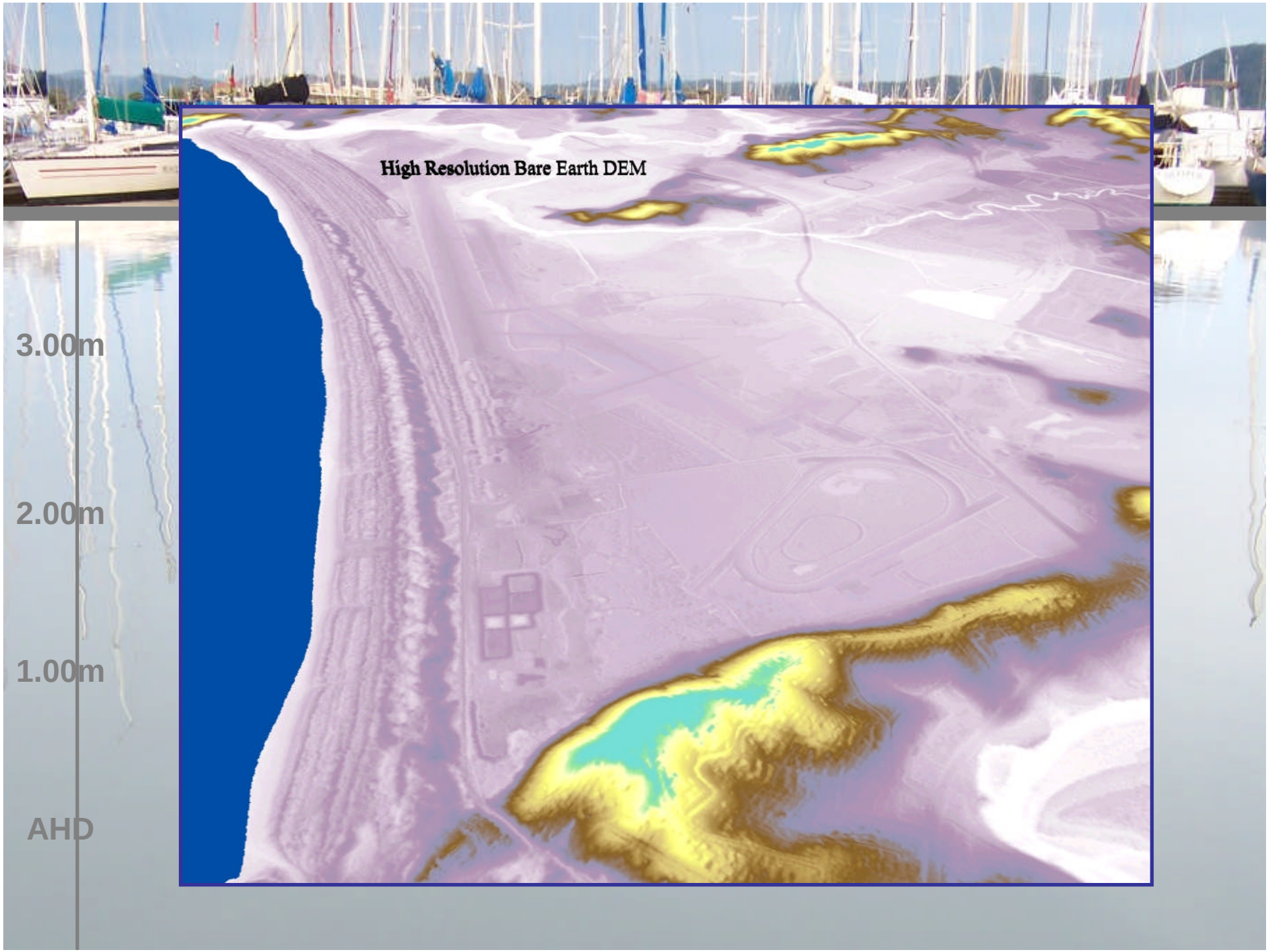
High Resolution Bare Earth DEM
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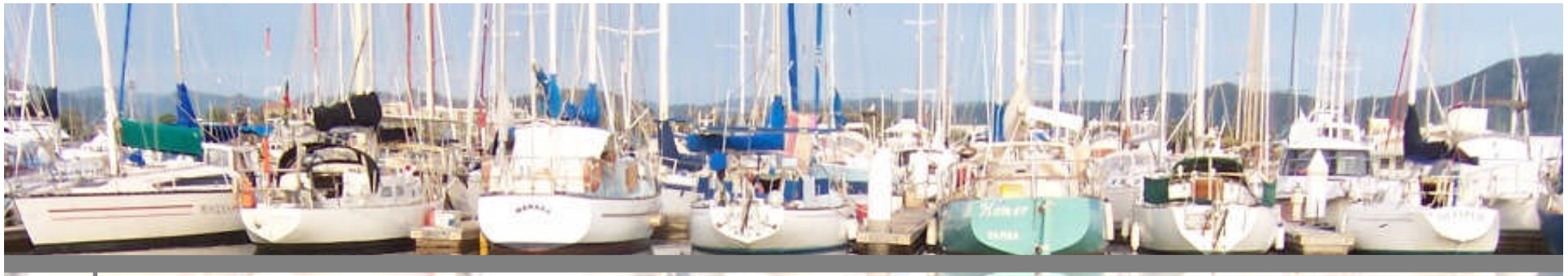

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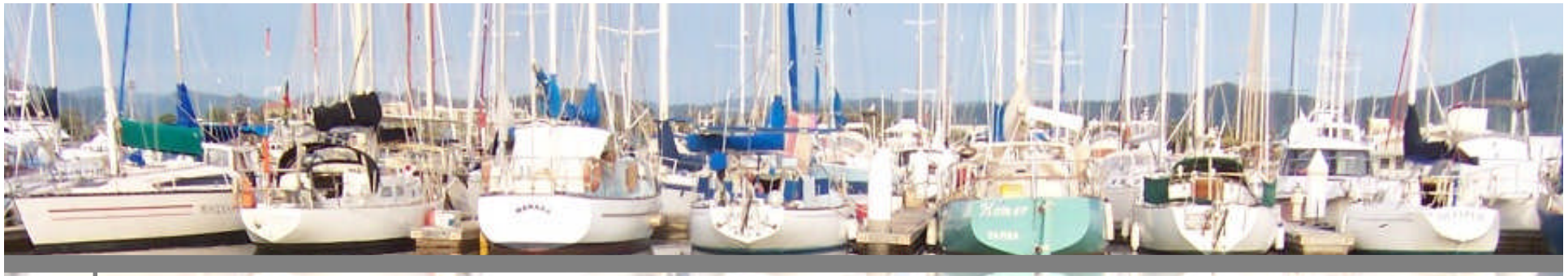
Climate Change (CSIRO)

- Sea Level Rise
- Increased Temperatures
- Increased Evaporation Rates
- Decreased Rainfall



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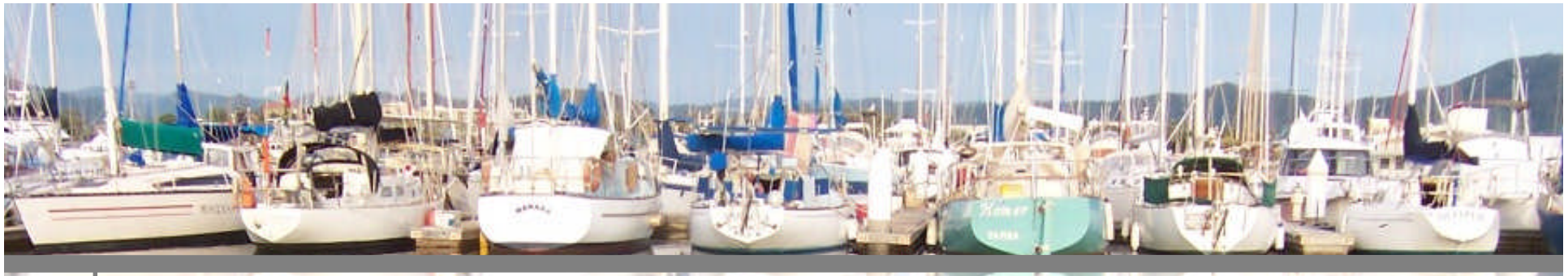
Climate Change (CSIRO)

Major Effects:

- Water Supply
- Inundation and Erosion
- Infrastructure
- Human Health
- Plants and Animals



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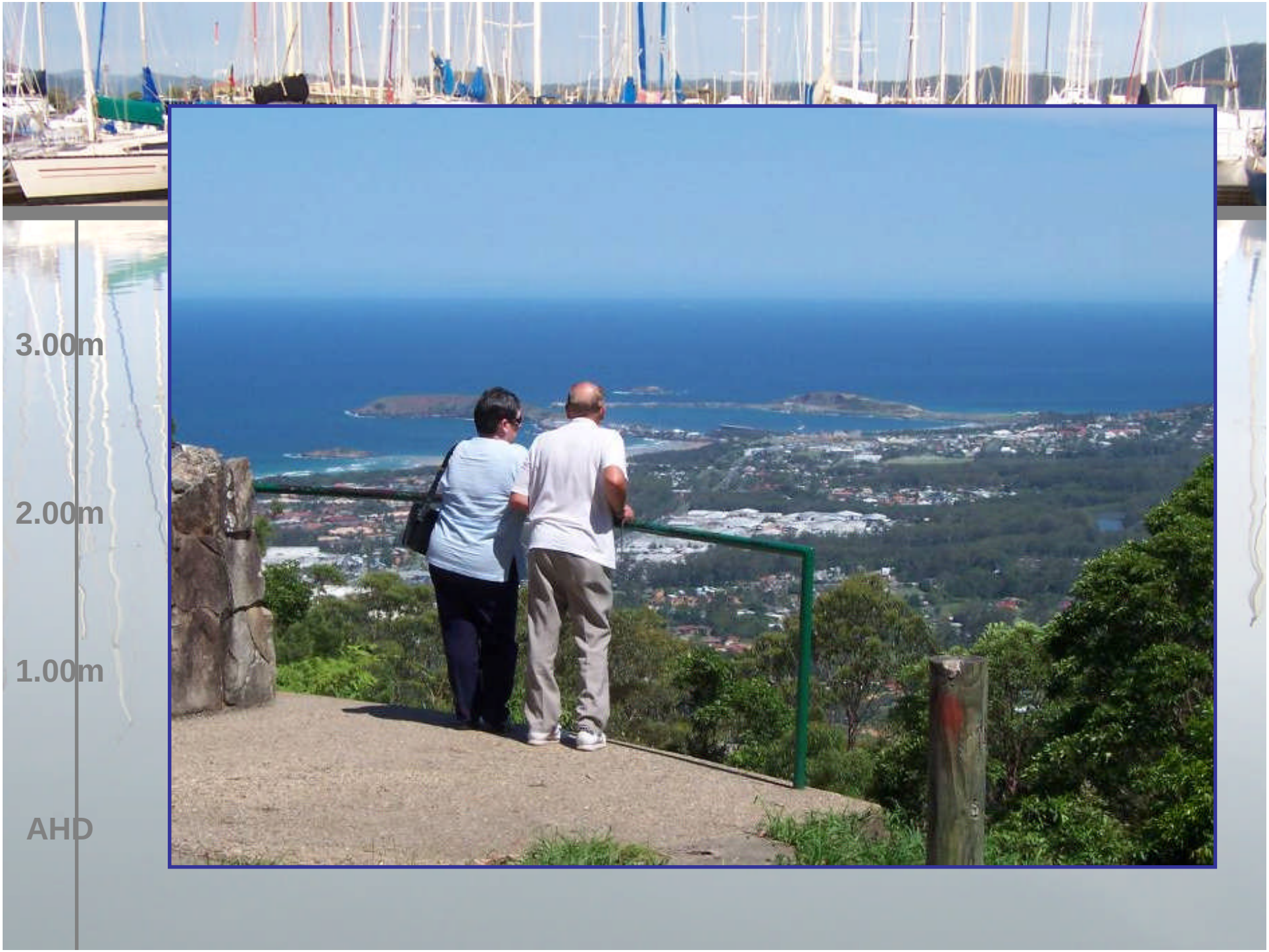
Biodiversity Risks

- Stream Flow Reductions
- Stranded Species
- Droughts and Fires
- Freshwater inflows disrupted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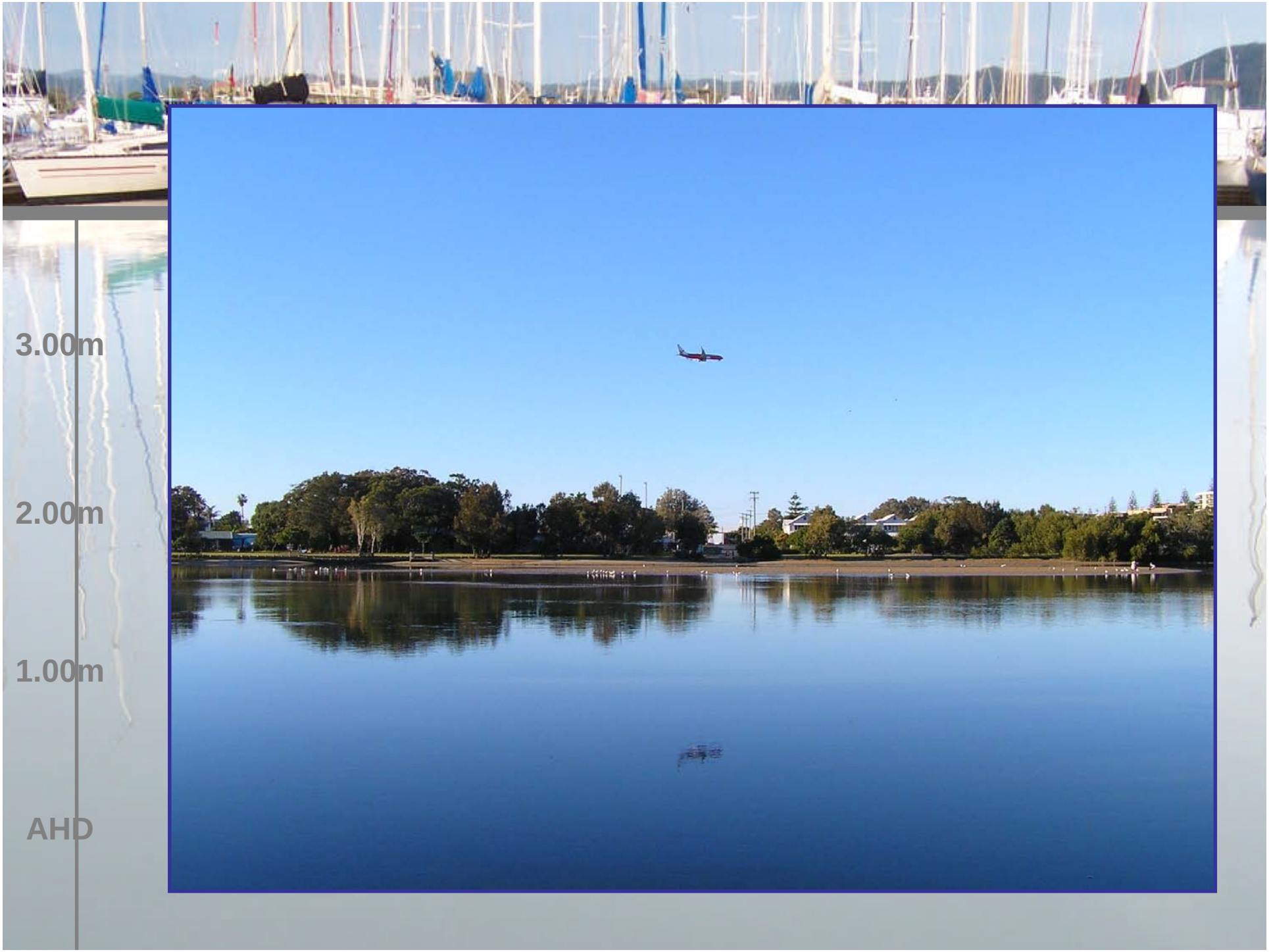
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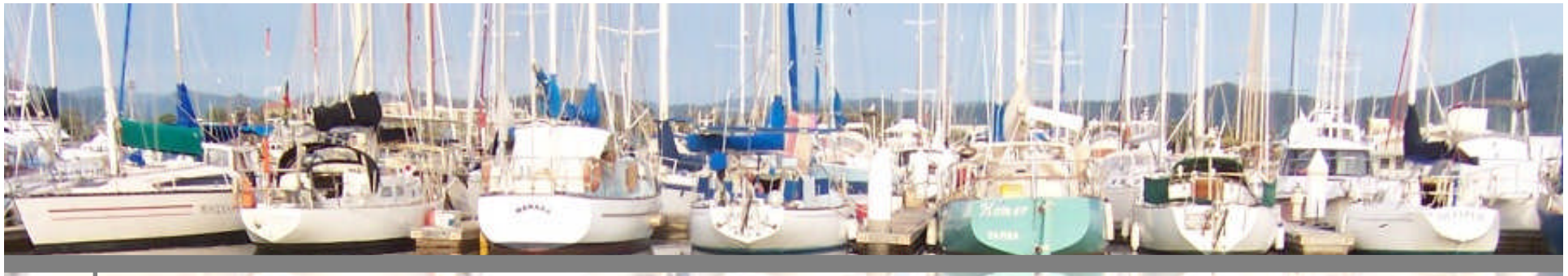

Government Direction Needed

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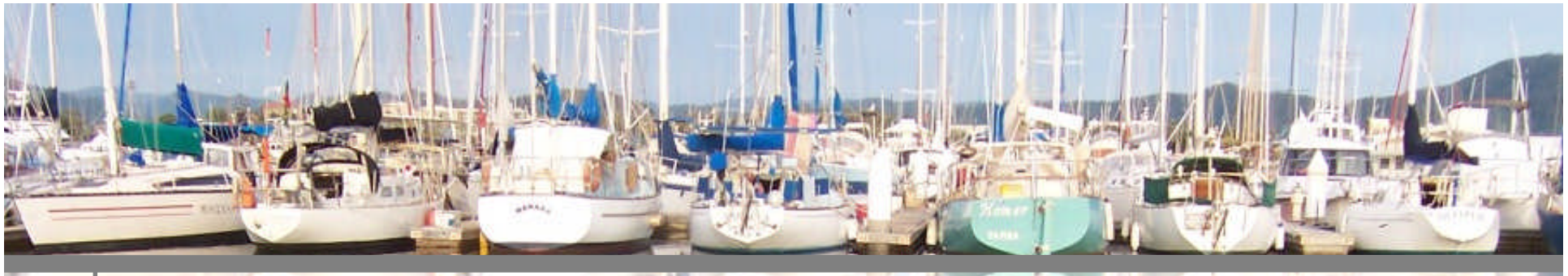

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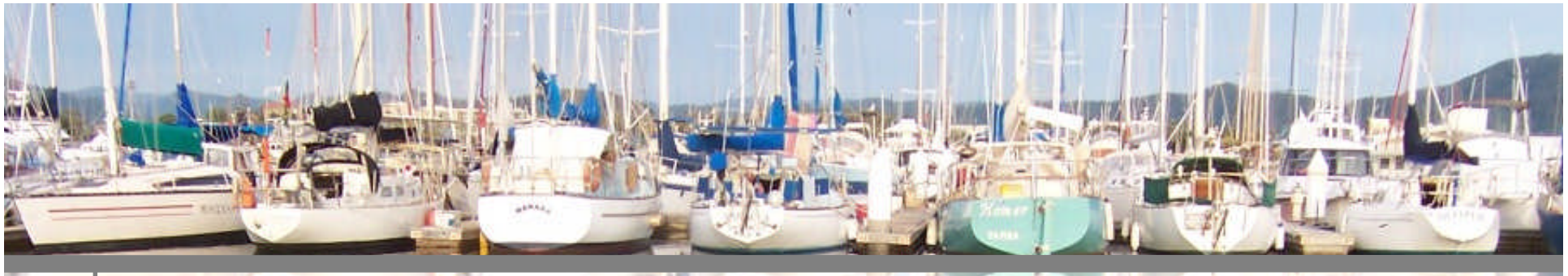
Government Direction Needed

Otherwise:

- LEPs inaccurate
- Infrastructure exposed
- Development exposed
- Insurance issues

Is the Data Valid?



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A Different Way

- Climate Change / Sea Level Rise
- Cause – Greenhouse Gas Emission
- Carbon Debate
- Push for Change for Remediation


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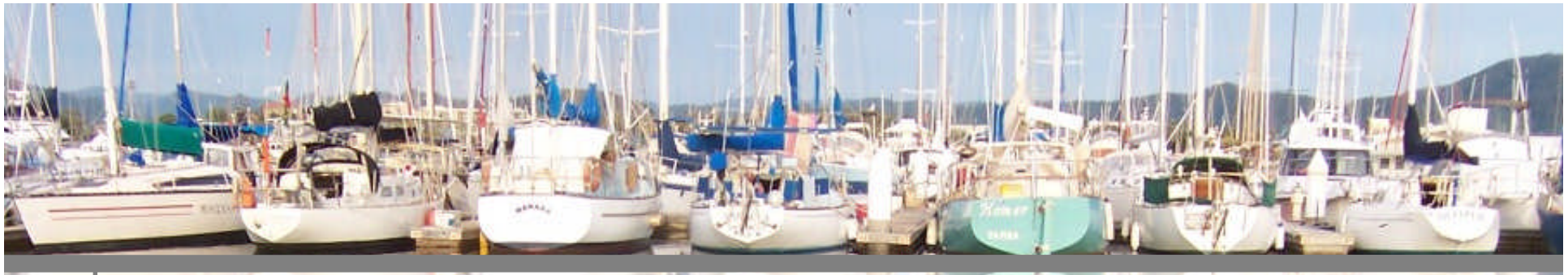

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COFFS HARBOUR
CITY COUNCIL