



Water Research Laboratory

Port & Wetland Restoration and Management in Australia

Never Stand Still

Faculty of Engineering

School of Civil and Environmental Engineering

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WRL UNSW, PIANC Australia, PIANC PTGCC, PIANC CoCom

Acknowledgement Dr William Glamore

WRL UNSW, Chair of PIANC Australia, recent CoChair PIANC YP

Water Research Laboratory (UNSW)



- UNSW remote Campus since 1959.
- 60+ Engineers & Scientists
- World Leading Research
 - Physical & Numerical Models
 - Field Work



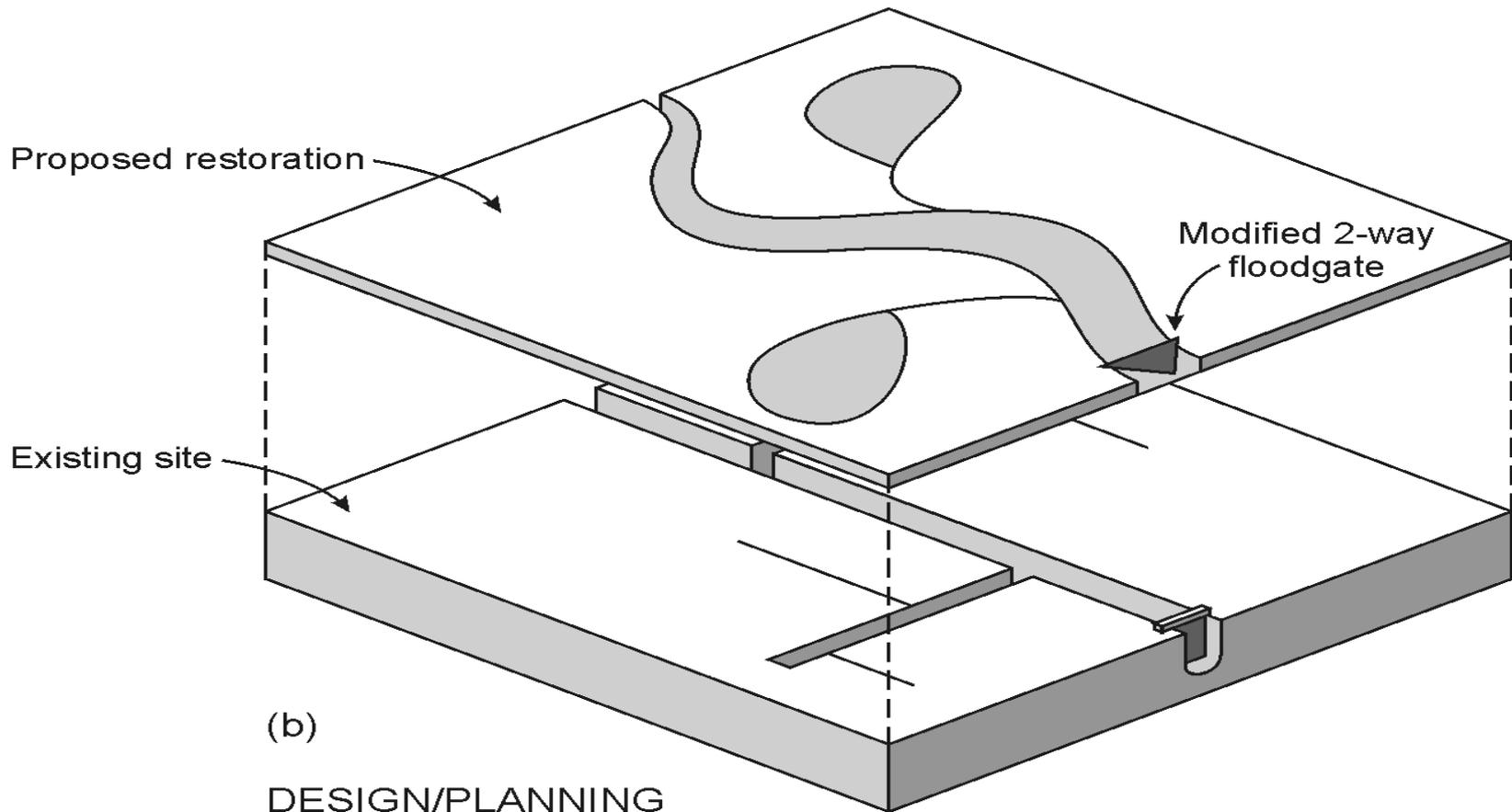
Port Development & Environmental Restoration

- Major Port Development on East and West Coasts.
 - Breakwater design
 - Port Circulation
 - Dredging
 - Hydrodynamics
 - Sediment transport
 - Contaminant dynamics
 - Offset and environmental restoration





**Active
Working with
Nature
Projects**



DESIGN/PLANNING

Applying conceptual design against site limitations and project restraints (floodgate design criteria)

Tomago Wetlands (500 ha)

2017 – Restored?

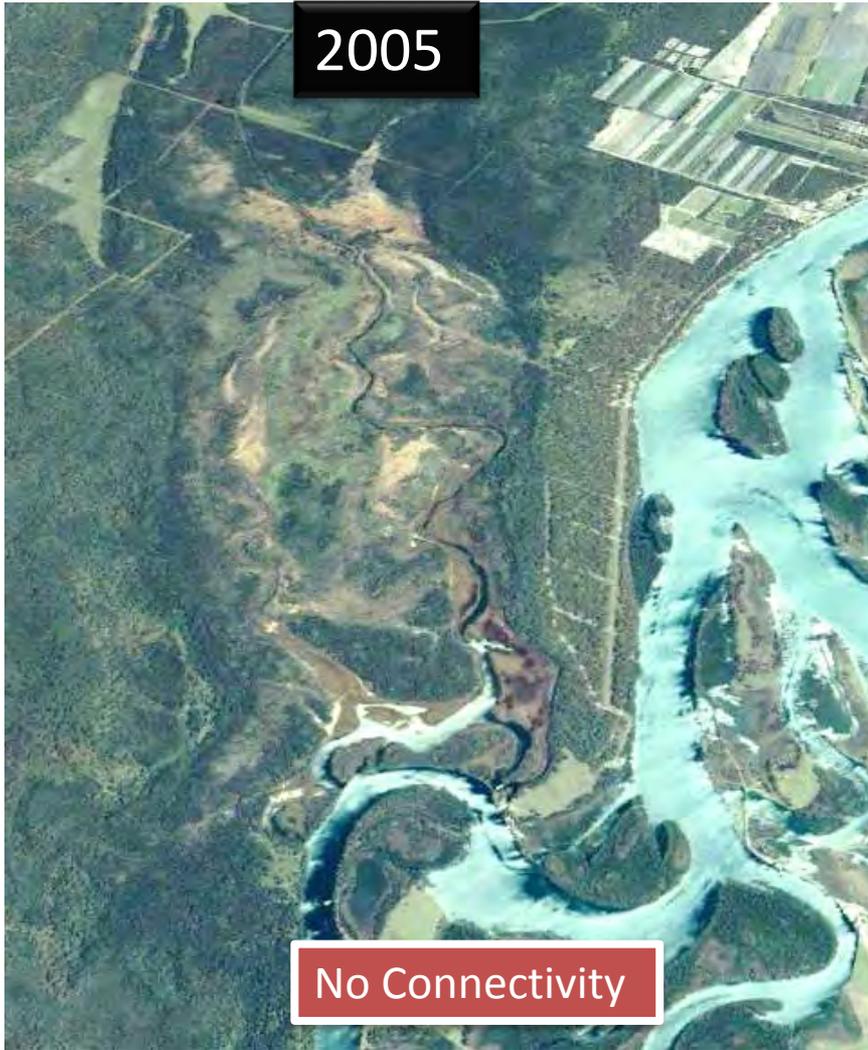
2007 - Existing





Yarrahapinni Wetlands

2005

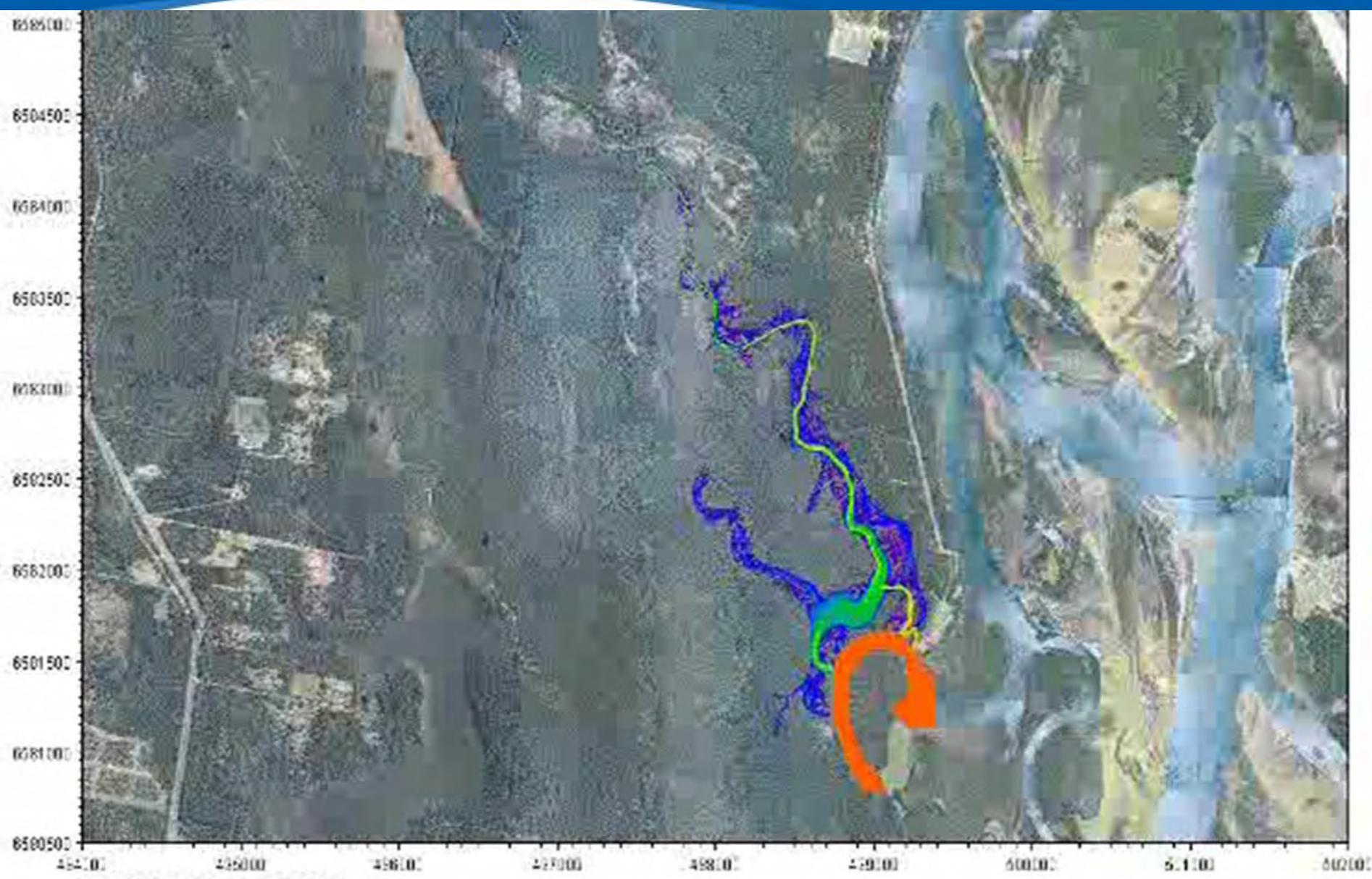


No Connectivity

2015



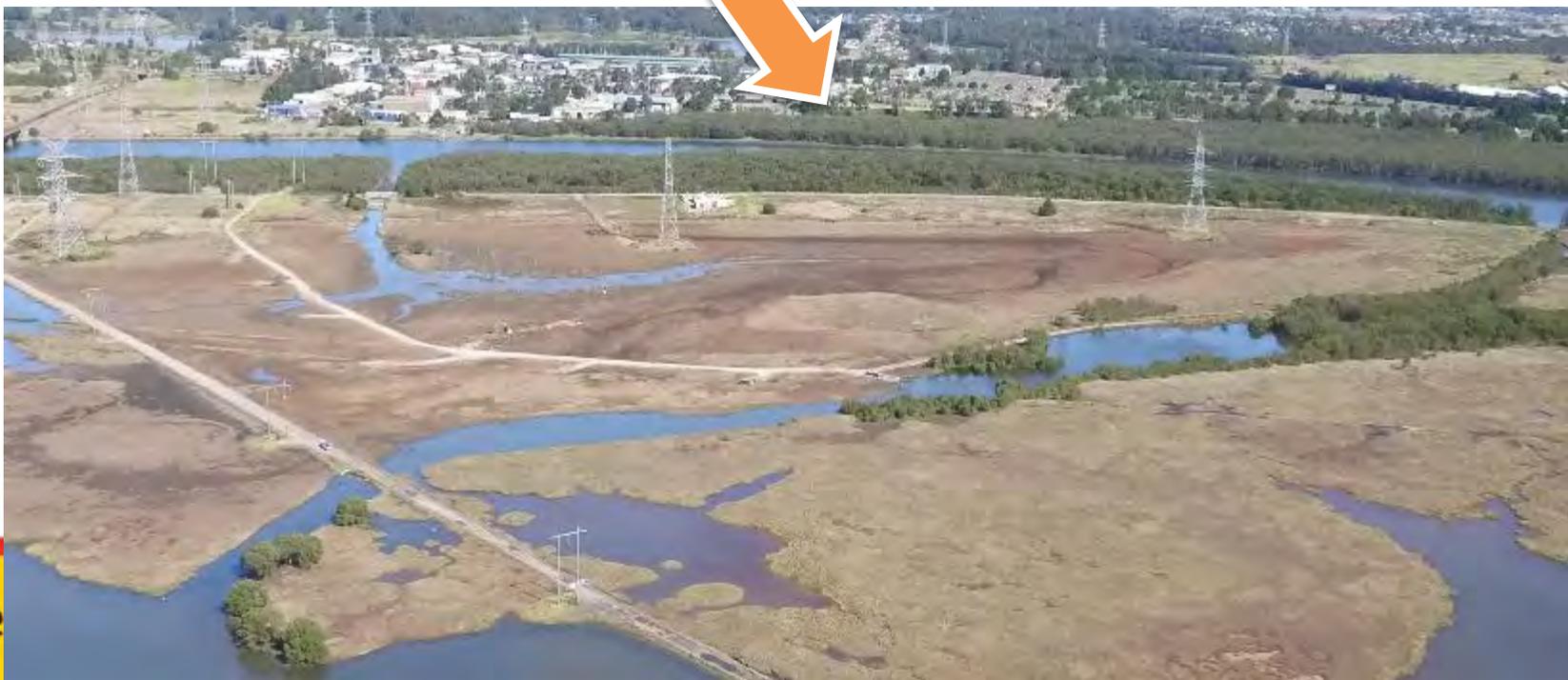
'Fish Safe' Access



20240122 01:50 Time step 150 of 300



Kooragang Island



Water Rese

Big Swamp, Manning River BEFORE



Big Swamp, Manning River AFTER



IMAGECATCHER
Unmanned aircraft systems

Pre-existing state



Pre-opening after construction



Post-remediation – low tide



Post-remediation – high tide



Everlasting Swamp (3500 ha)



Everlasting Swamp

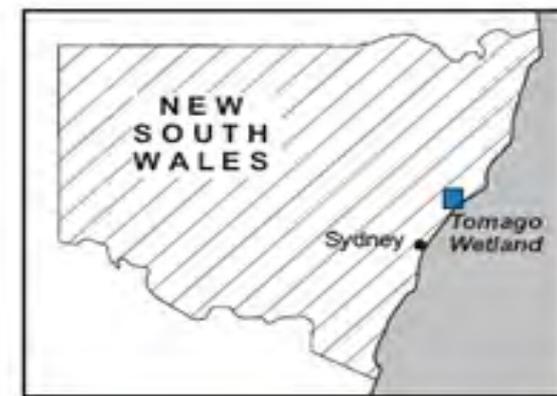


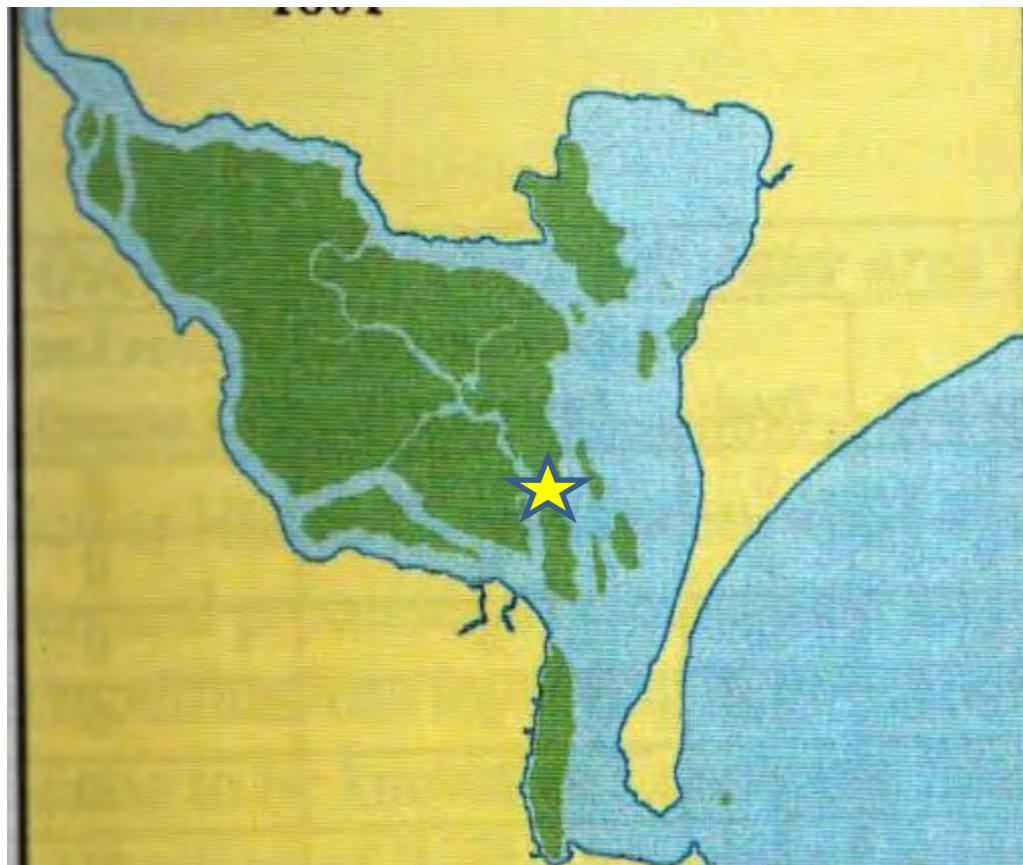
Case Study: Newcastle Port

Restoration of large coastal wetland as port expansion offset.

Includes:

- Eco-Engineering Design
- Staged Planning
- On-ground works
- Monitoring





Newcastle 1801



Newcastle 2015

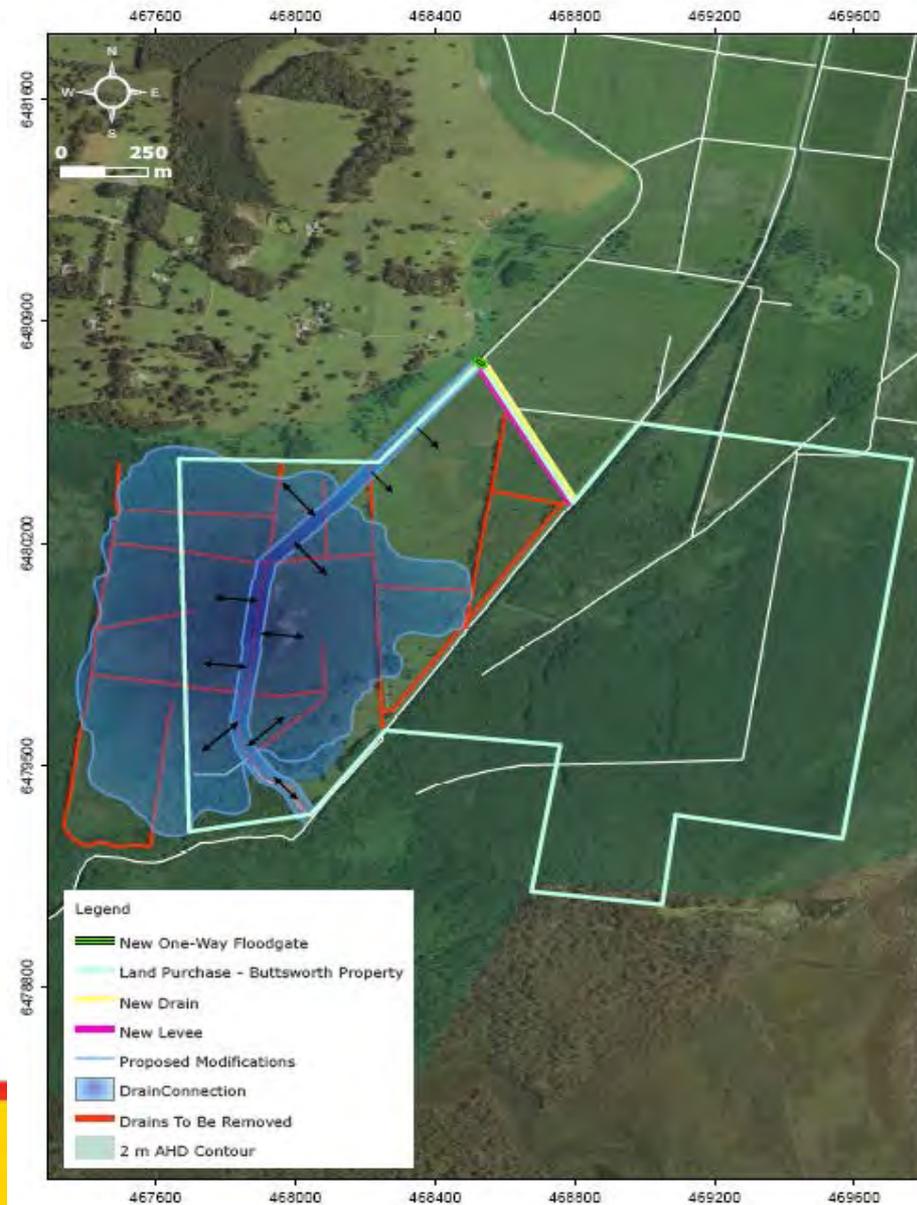
Eco-engineering Design

Eco-hydraulic models are developed to asses:

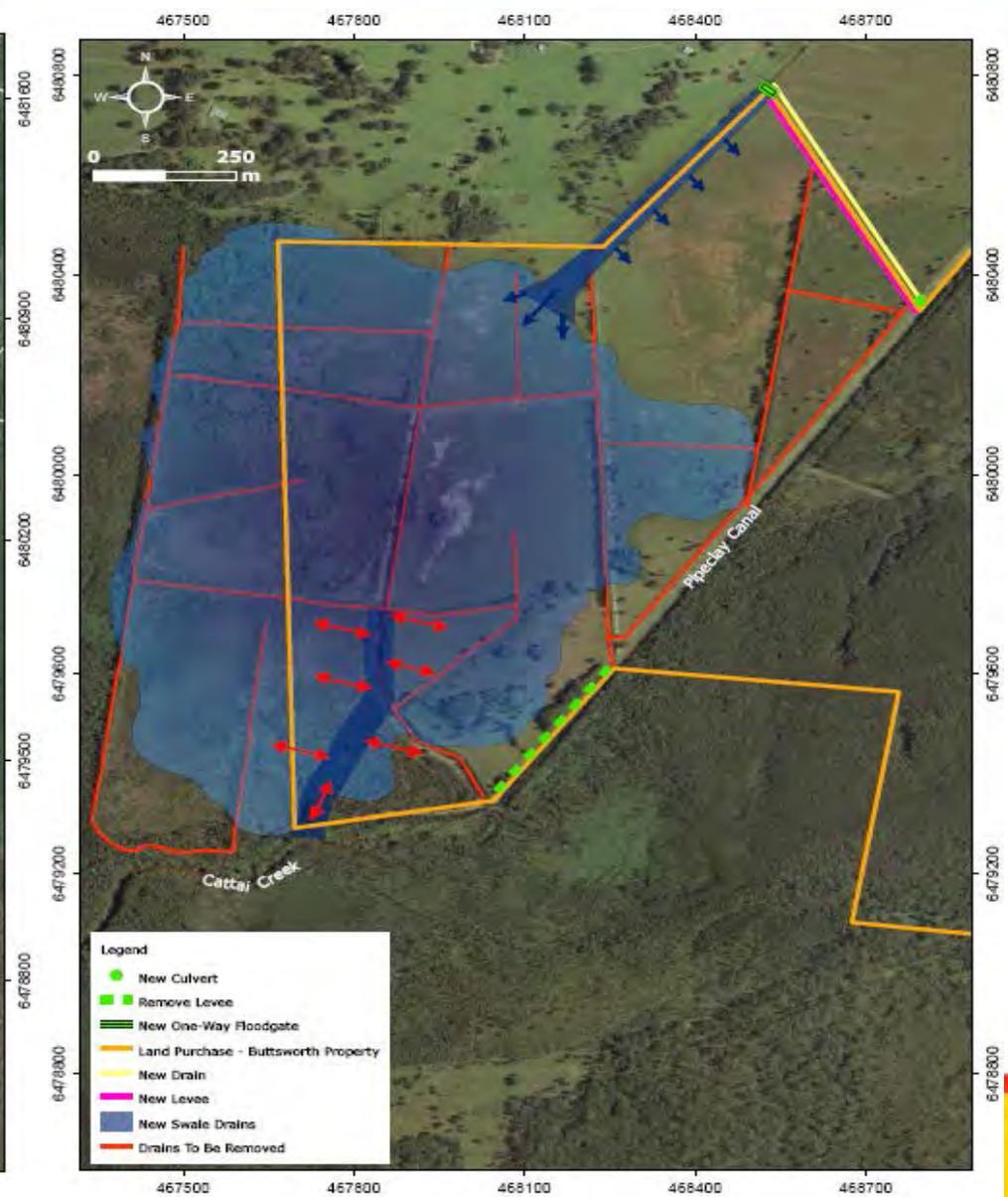
- Ecologic response to rewetting
- Risk
- Engineering Design



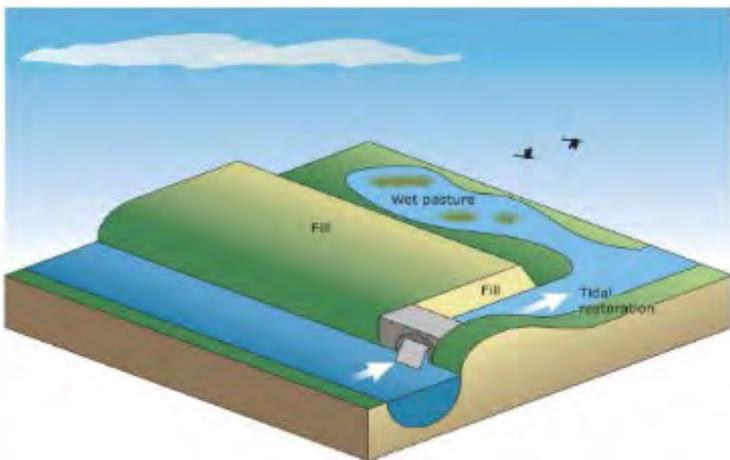
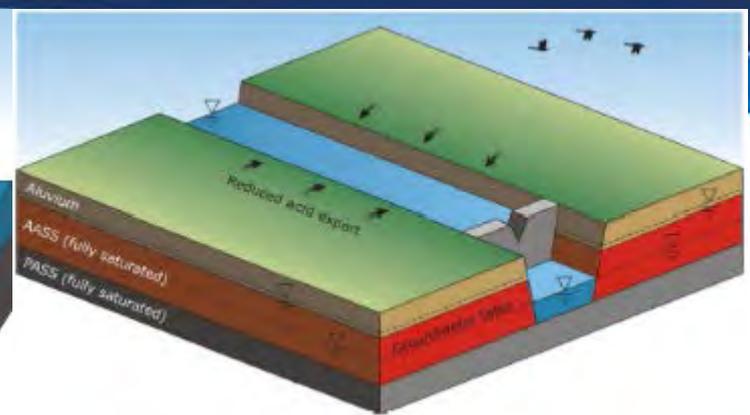
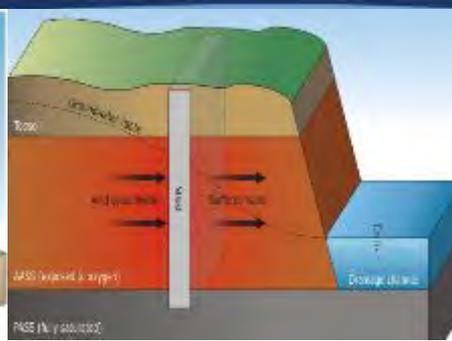
Restoration Options: Wetland Creation



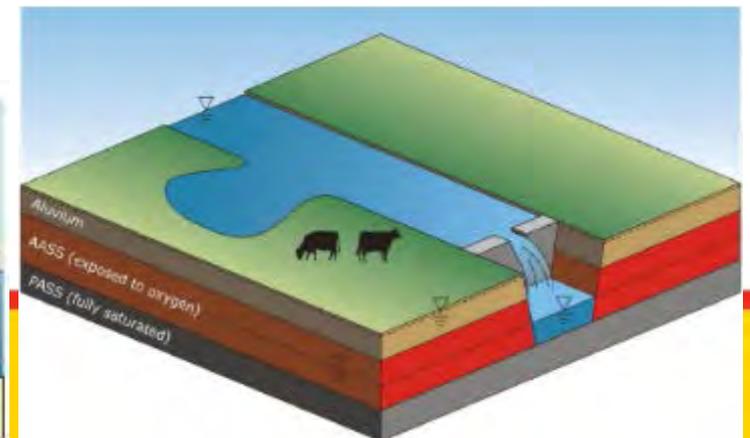
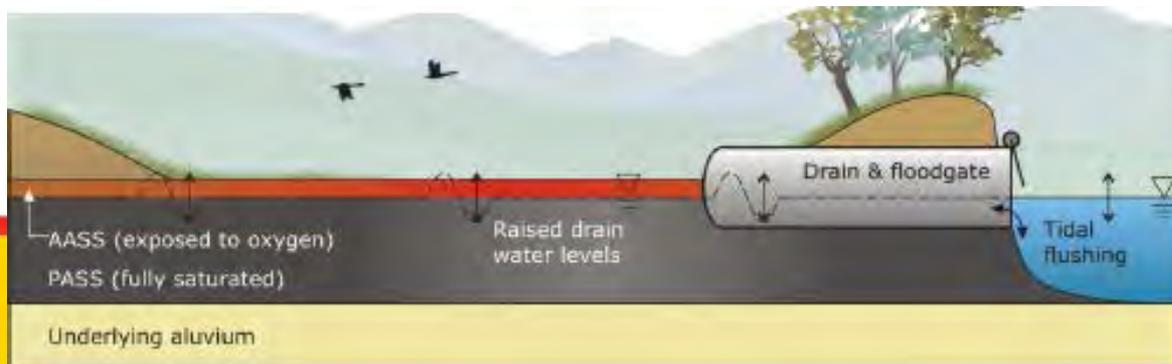
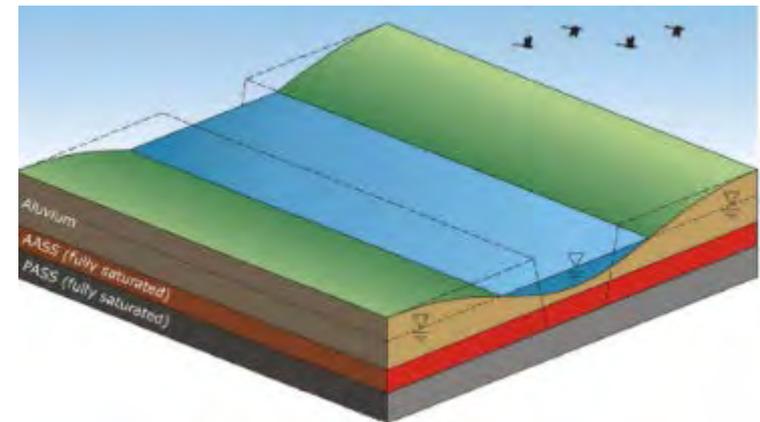
Conceptual Restoration Option 1 - South-West Property

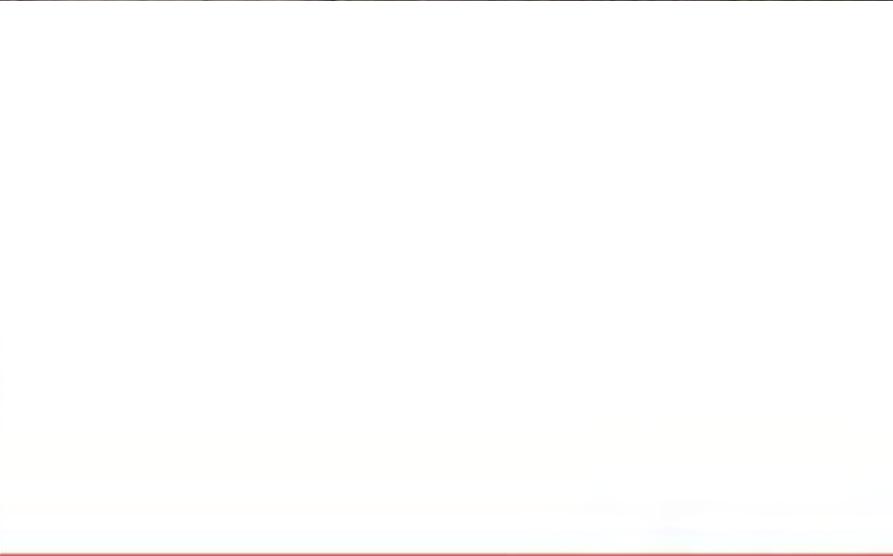


Conceptual Restoration Option 2 - South-West Property



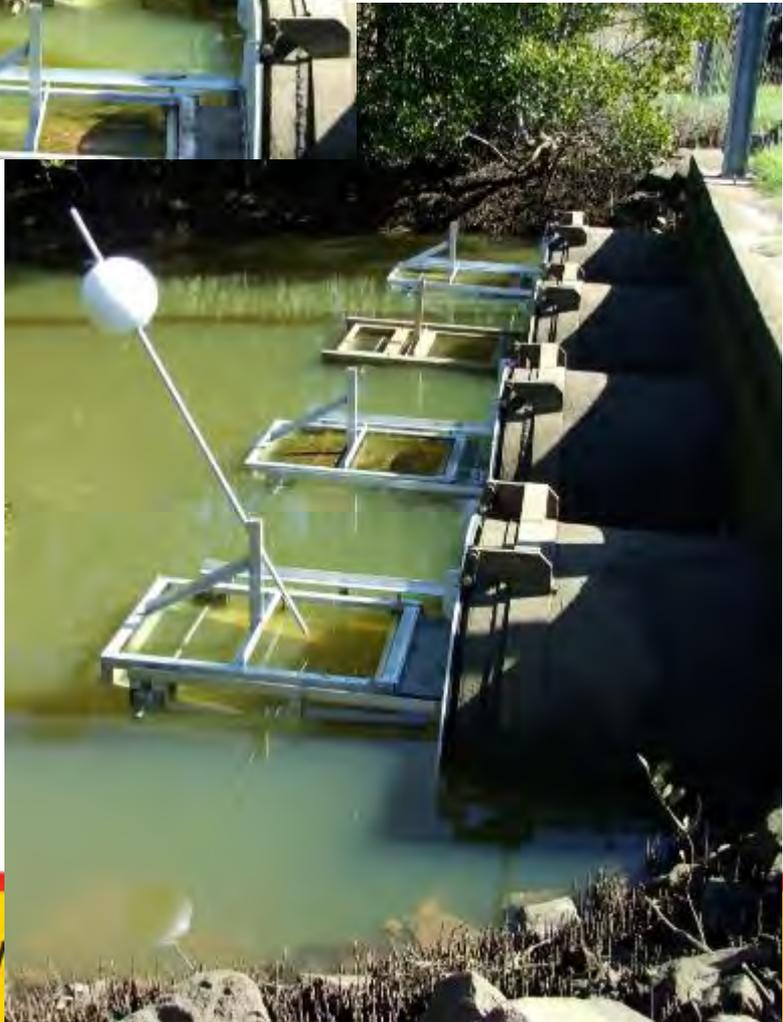
Restoration Options



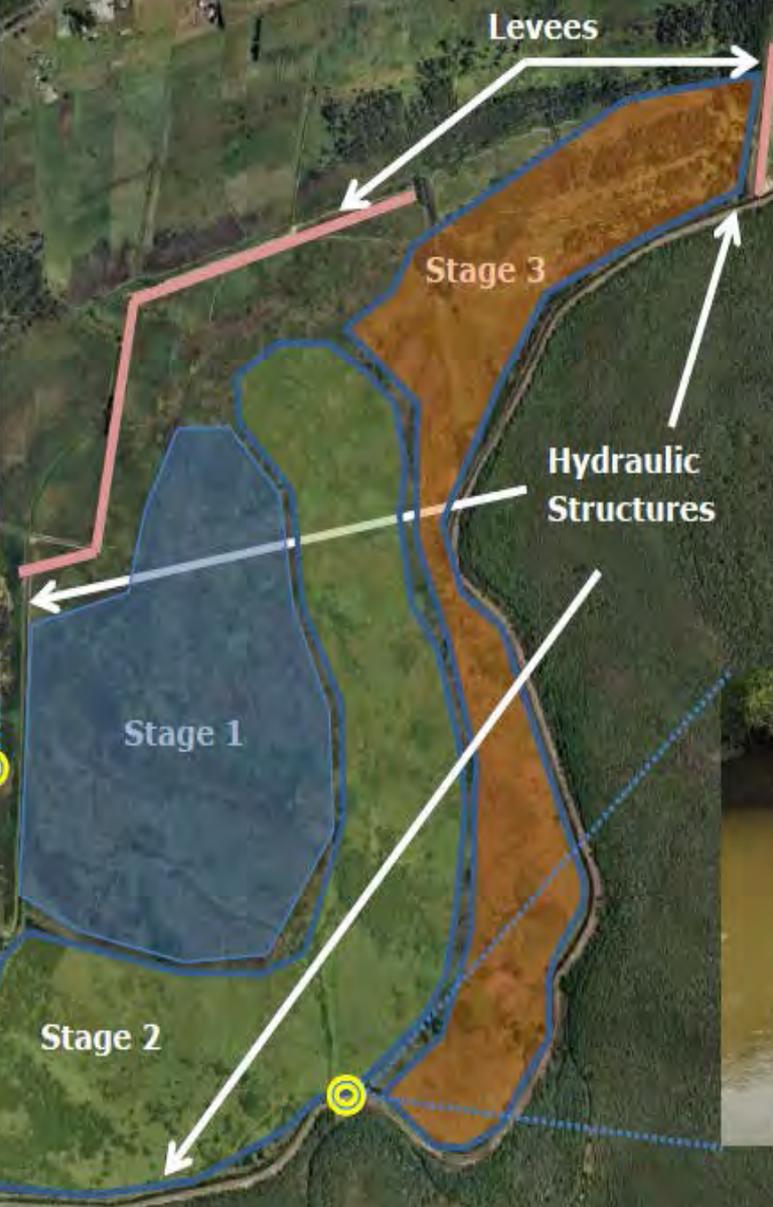


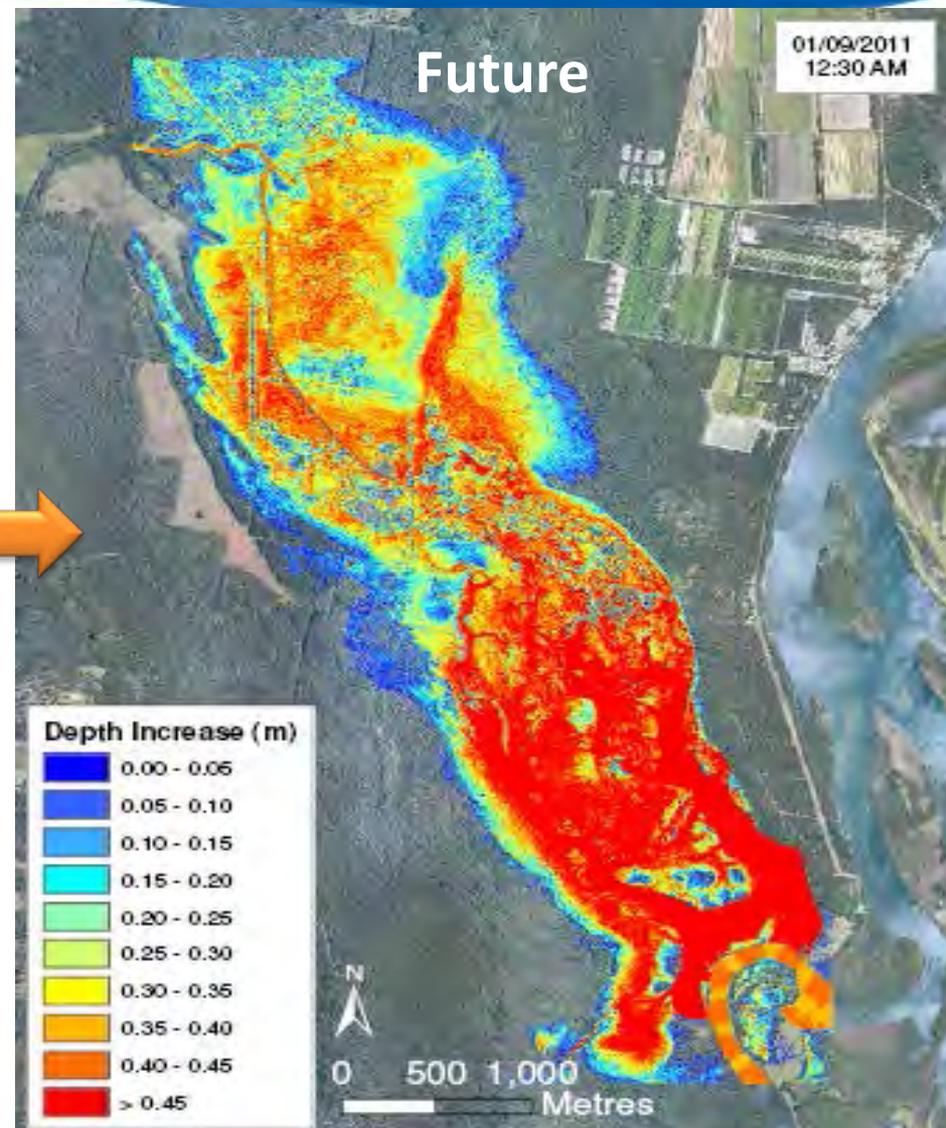
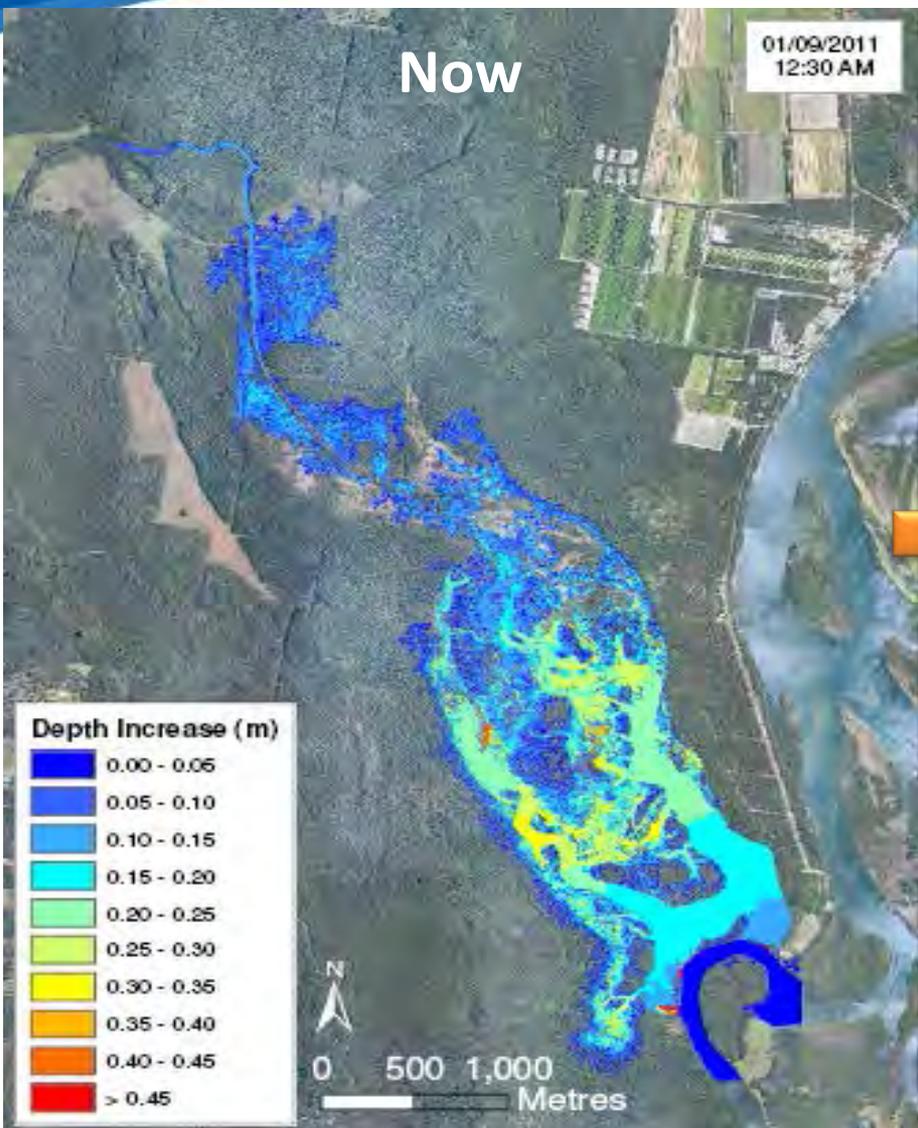


On-ground Controls



Tomago Wetland Restoration Project







NEWCASTLE – WORLD'S LARGEST COAL PORT

2016 – Restored

2007 - Existing



On-going Innovation

Significant recent advances
in:

- UAV usage in tidal environments
- Linking eco-hydro-geo regimes within numerical models
- Climate change predictions downscaled to local sites

