

 **UNSW SYDNEY** | Australia's Global University

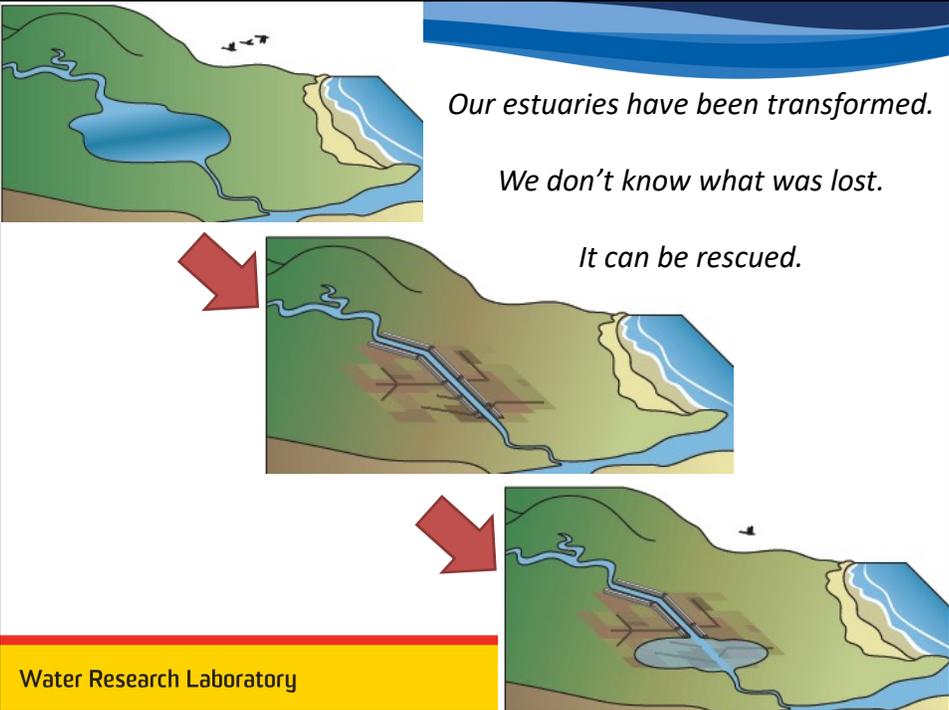
Restorative Engineering – Rebuilding the Environment

A/Professor Will Glamore



Micro estuary, 2002

Water Research Laboratory 



Our estuaries have been transformed.

We don't know what was lost.

It can be rescued.

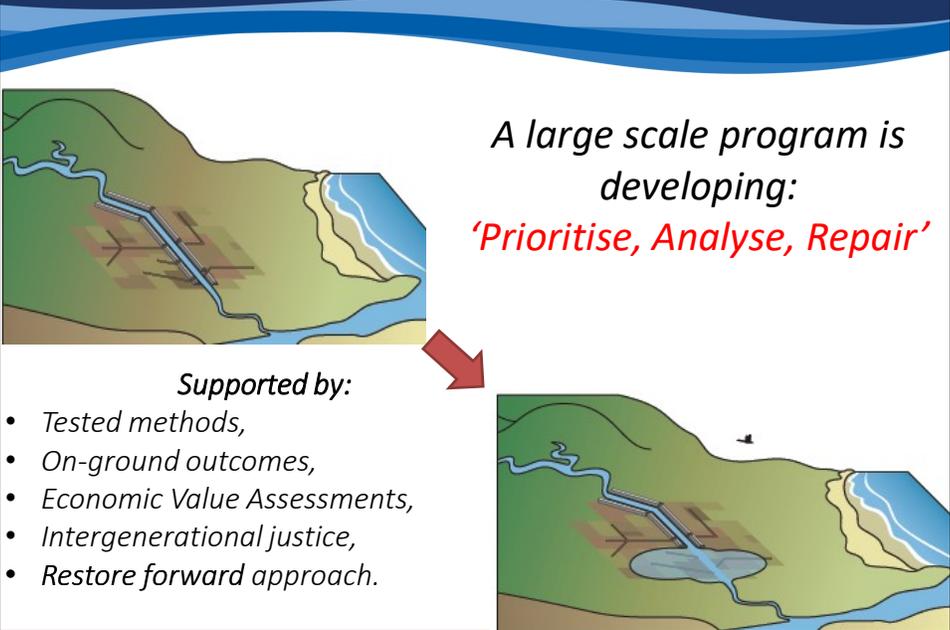
Water Research Laboratory

Richmond River Estuary



Richmond River Estuary





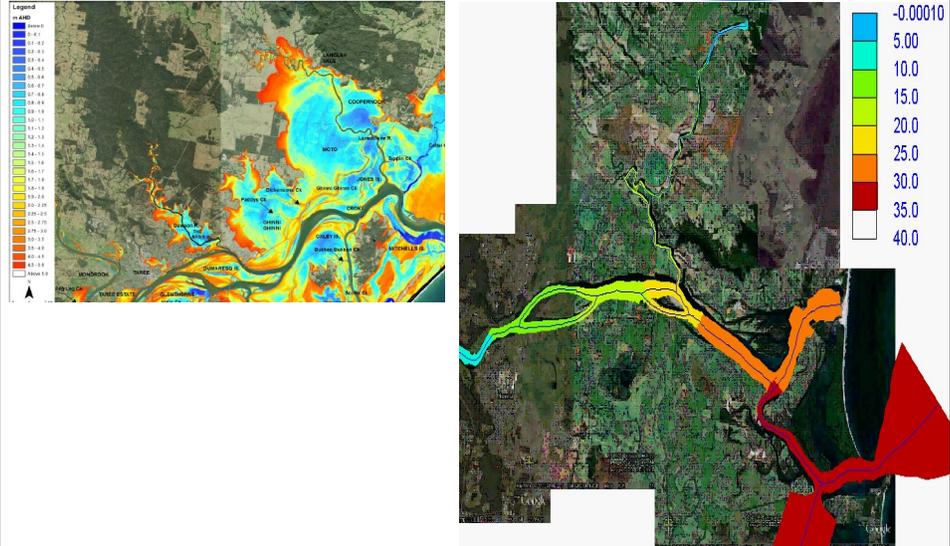
A large scale program is developing:
'Prioritise, Analyse, Repair'

Supported by:

- Tested methods,
- On-ground outcomes,
- Economic Value Assessments,
- Intergenerational justice,
- Restore forward approach.

"Life can only be understood backwards, but it must be lived forwards.", Soren Kierkegaard

Our Method – Setting Priorities

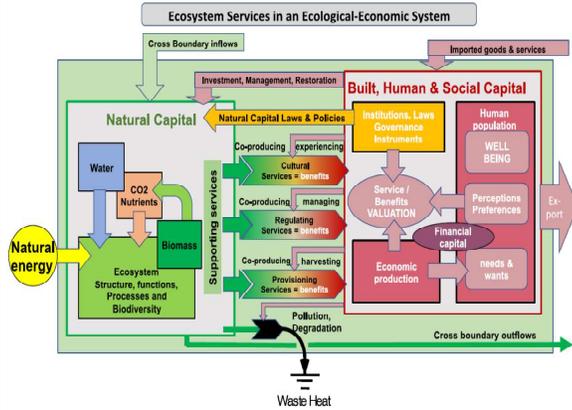


Water Research Laboratory

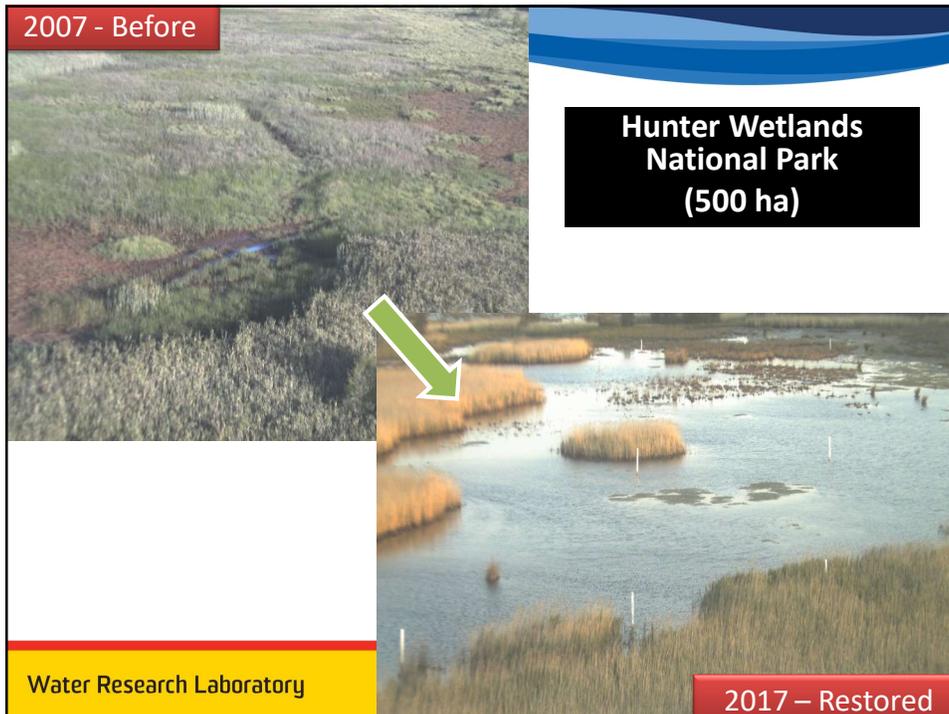


Economic Value Assessment

R. Costanza et al./Ecosystem Services 28 (2017) 1-16



Water Research Laboratory



Water Research Laboratory

2017 – Restored

Before...

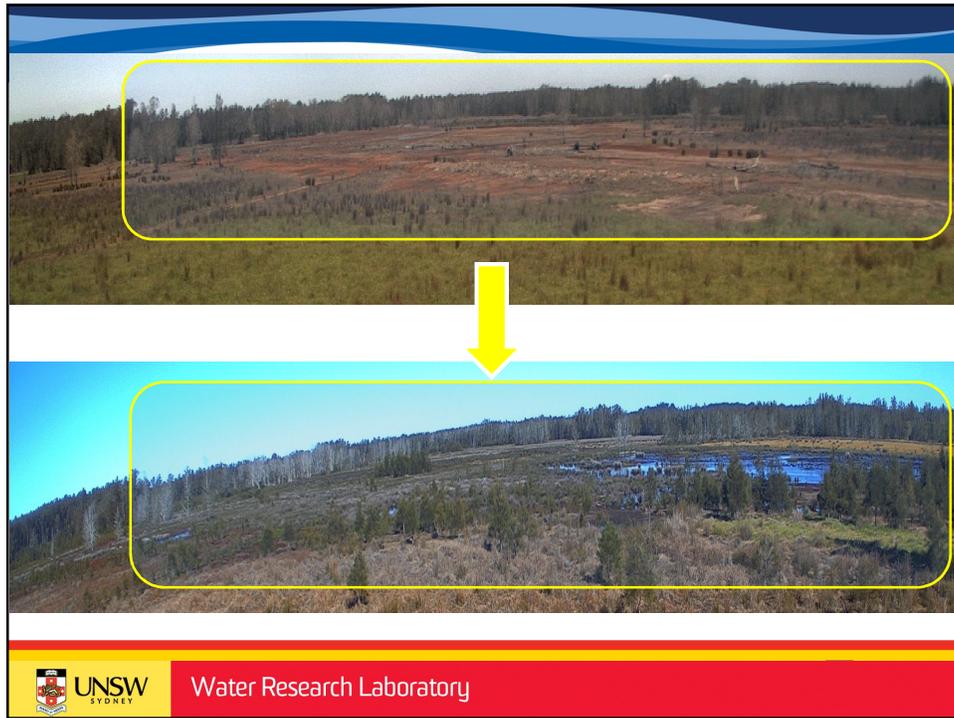


Water Research Laboratory

...After



Water Research Laboratory



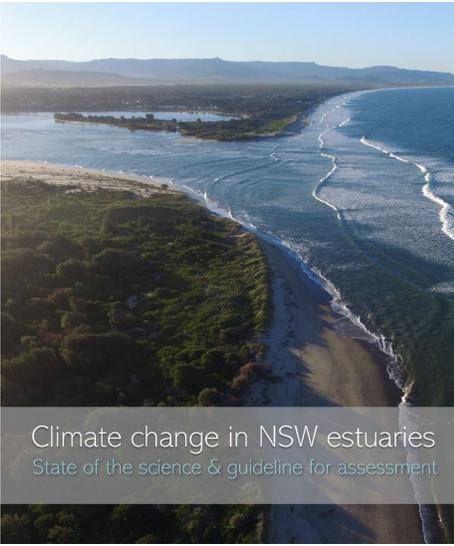
Success requires understanding of:

- System values (what is important and why).
- Legal impediments.
- Planning instruments.
- Climate Change impact.



Water Research Laboratory





8 Modules: Free, Online, Best Practice

1	Introduction	Introduction to estuaries, their eco-hydrological system, climate drivers and climate change & framework for assessment.	→	Framework for assessment The conceptual workflow for the risk assessment
2	Determining changes in climate boundary conditions	Guideline on how to project and prioritize changes in estuary climate boundary drivers & summary of relevant changes in NSW	↔	
3	Determining changes to the physical estuarine environment	Guideline on how to determine changes to the physical estuary environment resulting from changes in climate boundary conditions	↔	
4	Estuary ecosystems & climate change - introduction	Assessing climate change impacts to estuary ecosystems, the role of the physical environment and feedback loops	↔	
5	Existing stressors	Introduction to existing stressors to the eco-hydrological estuary system and interactions with climate change stressors	↔	
6	Conducting the assessment - case study	Step by step practical guideline on how to assess climate change impacts based on two "case-study" estuaries in NSW	←	
7	Estuarine species & climate change - Metadata Analysis	Review of climate change impacts in estuary ecosystems; metadata analysis on species-specific environmental thresholds & database		Collateral Modules
8	Knowledge gaps, limitations and next steps	Knowledge gaps, ongoing and future research; recommendations for monitoring, infrastructure and adaptation programs		



Water Research Laboratory

Interested?

3 PhD scholarships available now:

1. **Prioritising Wetland Restoration**
2. Integrating Ecology, Hydrology and Land use
3. Cost Benefit Analyses for Assessing Restoration Options

01 MAR 2019 | PRESS RELEASE | ECOSYSTEMS

New UN Decade on Ecos Restoration offers unparalleled opportunity for job creation, security and addressing climate change



- The United Nations General Assembly declared 2021 – 2030 the Decade of Ecosystem Restoration.
- Restoration could remove up to 26 gigatons of greenhouse gases from the atmosphere.



Water Research Laboratory

E: w.glamore@unsw.edu.au

LinkedIn & Twitter: [wglamore](#)

Acknowledge and Thank:

- NSW DPI Fisheries and DPI Water
- University of Newcastle, UTS, Macquarie Uni, UNSW BEES
- Office of Environment and Heritage
- National Parks and Wildlife Services
- Hunter Water Corporation
- Local Land Services
- Councils (Shoalhaven, MidCoast, Hornsby, Newcastle City Council, Clarence Valley, Tweed)
- Office of the Chief Scientist and Engineer
- UNSW's Water Research Laboratory staff and colleagues



Water Research

E: w.glamore@unsw.edu.au

LinkedIn & Twitter: [wglamore](#)