

**SCALING UP COASTAL WETLAND REHABILITATION  
WITH RETURN OF THE TIDE**



Yullungu Balu  
(Saltwater Soon)  
Language of Dunghutti People – Lower Macleay

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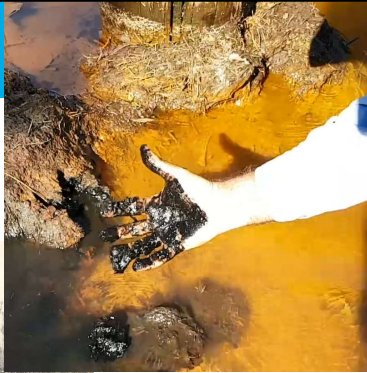
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**Marine Estate Management Strategy**

**Initiative 1:  
Improving Water Quality and Reducing Litter**


Monosulfidic black ooze (MBO) & Iron floc @ Clybucca Creek (and most NSW coastal drains) caused by floodplain drainage

**We will improve water quality and reduce marine litter by:**

- implement marine litter campaigns and establish a Marine Litter Working Group
- working with local councils to improve the quality of stormwater
- **restoring coastal habitats to reduce water pollution caused by erosion and land degradation**

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### Initiative 1B: Coastal Floodplains – Wetland Rehabilitation

**Objective:** Repair the biogeophysical condition of low elevation sections of coastal floodplains - to improve estuarine water quality and the health of the marine estate



*Macleay River Floodplain: Clybucca Wetlands 2019 – Acid Sulfate Soil Scald*

**Project short description:** To initiate projects that develop and deliver physical onground intervention actions on coastal floodplains to reinstate more natural hydrology, improve wetland health, and the quality of water discharging into estuaries




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**A Common NSW Coastal Floodplain Backswamp Scenario**



Highly modified landscape - cleared, drained, peat layer burnt, surface elevation subsided (dehydrated clays), loss of sequestered carbon	These properties are now highly acidified, impacted by Iron floc (red colour), Aluminium + other metals, MBO's on surface and in drains
Flood tolerant wetland vegetation is no longer dominant community & loss of biodiversity	Projected Sea Level Rise will further reduce the ability of low elevation sites to drain
Poor water quality discharging from these sites impacts adjacent estuarine aquatic ecosystem	Agricultural productivity (grazing/cropping) is limited due to poor soil health and low pH


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## The 2 Focus Water Quality Issues

### 1. Dissolved Oxygen - Blackwater & deoxygenated waterways

Macleay Estuary –Blackwater discharging from Kinchella Swamp 2021
Macleay Estuary Fish Kill -Belmore River (Mullet) 2021

**Action: Creating resilient wetlands that are less prone to blackwater production by reinstating more natural hydrology and reestablishment of wetland vegetation ecological communities**


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## 2. Acidity - Acidic water & dissolved metals



Acid Sulfate Soil Cores – note yellow Jarosite



Iron floc contamination

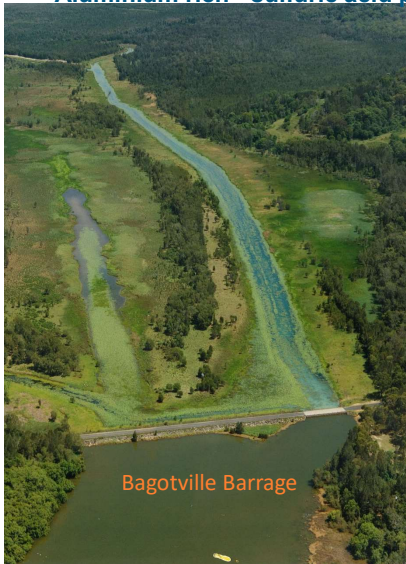
**Action: Ongoing works that reinstate groundwater levels to stop oxidisation of ASS, slow production of sulfuric acid and the release of metals from alluvial floodplain soils**



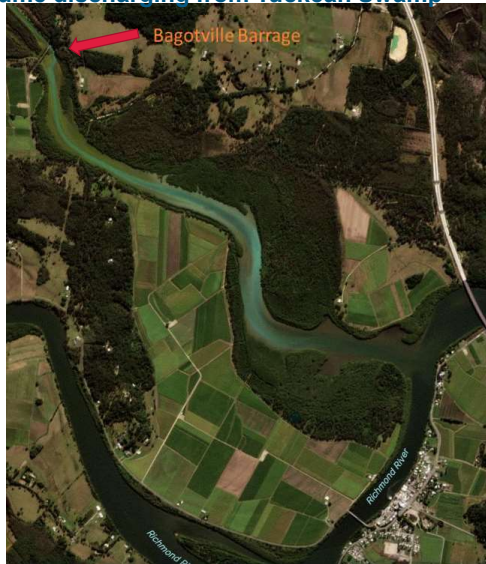
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## Aluminium rich - sulfuric acid plume discharging from Tuckean Swamp



Bagotville Barrage



Bagotville Barrage



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Acid plume discharging from Tuckean Swamp into Richmond River at Broadwater



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What are we doing?



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**Promoting co-investment**  
MEMS, LLS, EES, Planning (CLPS/PMC), Councils, TfNSW, NPWS, NGO's, DPIF, Recreational Fish Trust


**Aligning NSW agencies and Local Gov't objectives and strategies**

**Piloting Blue Carbon projects**

**Imbedding projects in Coastal Management Programs**

**Working with NGO's to achieve mutually beneficial outcomes**

**Working with landholders and industry to support changed landuse management**



Local council

EES

Planning

Existing data

Existing mapping

Scientific publications

} Expert advice and reports



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**Modifying drainage infrastructure to reinstate more natural hydrology including tidal flows:**  
i.e., Levee / Weir / Tidal Barrage & Floodgate (removal or construction), retrofitting auto-tidal flood gates, infilling drains, fabrication of hydrology management infrastructure e.g. Vinyl sheet piling & swing gates

**Capitalising on opportunities:**  
Highway development projects, Gov't tenure, Biodiversity Offset requirements, Blue Carbon market

**Commissioning reports & assessments to fill knowledge gaps and to help with decision making:**  
i.e., Cost Benefit Analysis, Hydrology Modelling, Remediation Options, Land Valuations, Risk Assessment, Report of Environmental Factors, Geotechnical studies

**Voluntary land acquisition**



UNSW | School of Civil and Environmental Engineering  
Water Research Laboratory

**Crookhaven River Floodgate Tidal Flushing Assessment**  
WRL TR 2020/19 | March 2021  
By O.S. Rayner



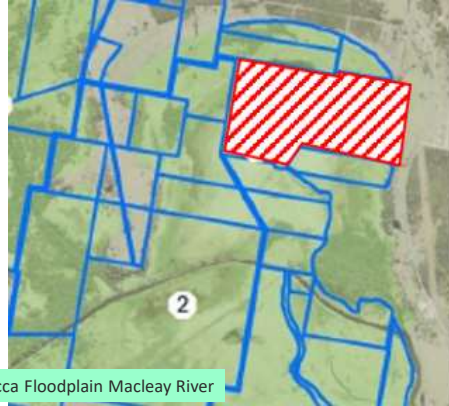
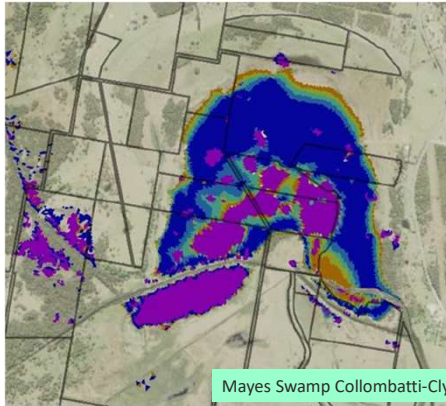



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## Voluntary Land Acquisition - Ownership of Hydrologic Units

Purchasing key 'missing pieces' of coastal wetlands and adding them to public land estates i.e. Reserved Estate (National Parks/State Conservation Areas), Council Reserves.

E.g. Everlasting Swamp (near Grafton/Lawrence) is one of the largest remaining coastal floodplain wetlands in NSW. Over 80 per cent of the wetland complex (2,179 hectares) is managed by NPWS (Everlasting Swamp NP)



Mayes Swamp Collombatti-Clybucca Floodplain Macleay River

Shaded areas = wetland hydrologic unit below 0 AHD  
Purple = 50cm below AHD (mean sea level)

Blue line NSW Gov't property. Green shading is wetland.  
Hatched area = private property for acquisition to complete unit



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How do we determine what to fund? Well ... we have a scoring/rating system to guide us

## Wetland Rehabilitation Prioritisation Matrix

- Does the site complete a hydrologic unit (wetland footprint)?
- Is the site adjacent to public lands?
- Are there partner funding opportunities?
- Is the property for sale or is the landholder willing to sell?
- Is there ability for it to be transferred to Gov't ownership and management?
- Will onground works facilitate permanent management changes to hydrology?
- Will the project be "shovel ready & deliverable" within funding cycle/financial year?
- Do actions improve habitat or addresses key threatening processes for threatened species?
- Is the project or site supported by evidence (reports) or identified in: CMP, CZMP, EMP, NPWS POM?
- Is poor WQ impacting downstream high priority/sensitive environments (i.e., marine reserves, oyster leases, high use recreation areas)?



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## Current or Completed Projects & Ongoing Opportunities

**Tweed:** Christies Creek -Hydrology & Remediation Options Assessment

**Richmond:** Tuckean Swamp -Hydrology modelling, CBA, Ecological Values Assessment  
Duck Creek -Hydrology & Remediation/Blue Carbon Assessment

**Clarence:** Everlasting Swamp -Land Purchases, eDNA Fish Monitoring

**Kalang:** Unnamed Wetland - Ecological Assessment, Remediation Design, Quote for Works

**Macleay:** Clybucca Wetland / Mayes and Doughboy Swamps -Geotechnical Assessments, Design/Fabricate weirs, Onground earthworks, CBA, Monitoring, REF.  
East Kinchella Swamp -Remediation Options Assessment

**Manning:** Big Swamp & Coopernook Swamp -Ongoing

**Hunter:** Tomago Wetland -Hydrology assessment/modelling/Swing Gate design/Swing gate fabrication and installation & flood damage repair

**Gerringong:** Werri Lagoon -Rehabilitation Options Assessment

**Shoalhaven:** Crookhaven River -Hydrology & Remediation Options Assessment, Onground works, Blue Carbon Opportunities Assessment

*Note: Many more projects have been identified and are waiting to be funded*



Please contact me to identify and develop new projects

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## Opportunities

- Biodiversity outcomes
- Creation of fish habitat
- Improving management of private property
- Planning for sea level rise & strategic retreat
- Public access to coastal wetlands for recreation
- Improved ecological management of public lands
- Reducing risk to landholders from prolonged inundation
- Improved oyster production, commercial and recreational fishing
- Addressing sustainable landuse change in sensitive environments
- Reconnecting Aboriginal community to country & creating employment
- Horizontal migration for marine and coastal freshwater wetland vegetation




Juvenile prawns unable to migrate upstream through floodgate into Clybucca wetlands

Black Necked Storks love healthy backswamps



Healthier floodplains and estuaries improves environmental, social, cultural and economic values for the people of NSW

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Photo: Penny Clarke

## Where to find out more

**Initiative lead: Kylie Russell**  
**Project lead: Patrick Dwyer**

**Max Osborne Manager – Marine Estate**  
**Coastal Floodplains - Wetland Rehabilitation**

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<https://www.marine.nsw.gov.au/strategy-implementation/water-quality-and-litter/coastal-wetland-rehabilitation>



 **Questions?** [www.marine.nsw.gov.au](http://www.marine.nsw.gov.au)