

# Newham & District Landcare Group



# AGM



**Friday 21 July 2023**  
**6.30 for 7pm**

**Newham Mechanics Hall**



**Mark Bachmann**

**Nature  
Glenselg  
Trust**



*Regional, Focussed, On-ground*

# Presentation Outline

1. Introducing NGT and our approach
2. Why focus on ecological drivers and processes?
3. Tonight's focus: water and wetlands
  - How do we plan and implement wetland restoration projects?
  - What outcomes have these projects achieved?
  - What is so special about peatlands?
4. Questions and discussion

## Part 1 - Introducing NGT:

NGT's operating model, filling gaps and working across all land tenures in south-eastern Australia

Nature  
Glennelg  
Trust



*Regional, Focussed, On-ground*

## Nature Glennelg Trust

Not-for-profit

1. Grant  
funding

2. Fee-for-  
service  
contracts

3. Tax-  
deductible  
donations

# Introducing NGT: The geographic and thematic reach of our team



## Part 2: What are examples of ecological processes or drivers and why focus on them?



# Mt Vandyke, Victoria



## Part 2: What are examples of ecological processes or drivers and why focus on them?



**Part 3: Tonight's focus is water – triggering self-sustaining recovery by harnessing this ecological driver in wetlands**



**Exploring Eco-hydrology**

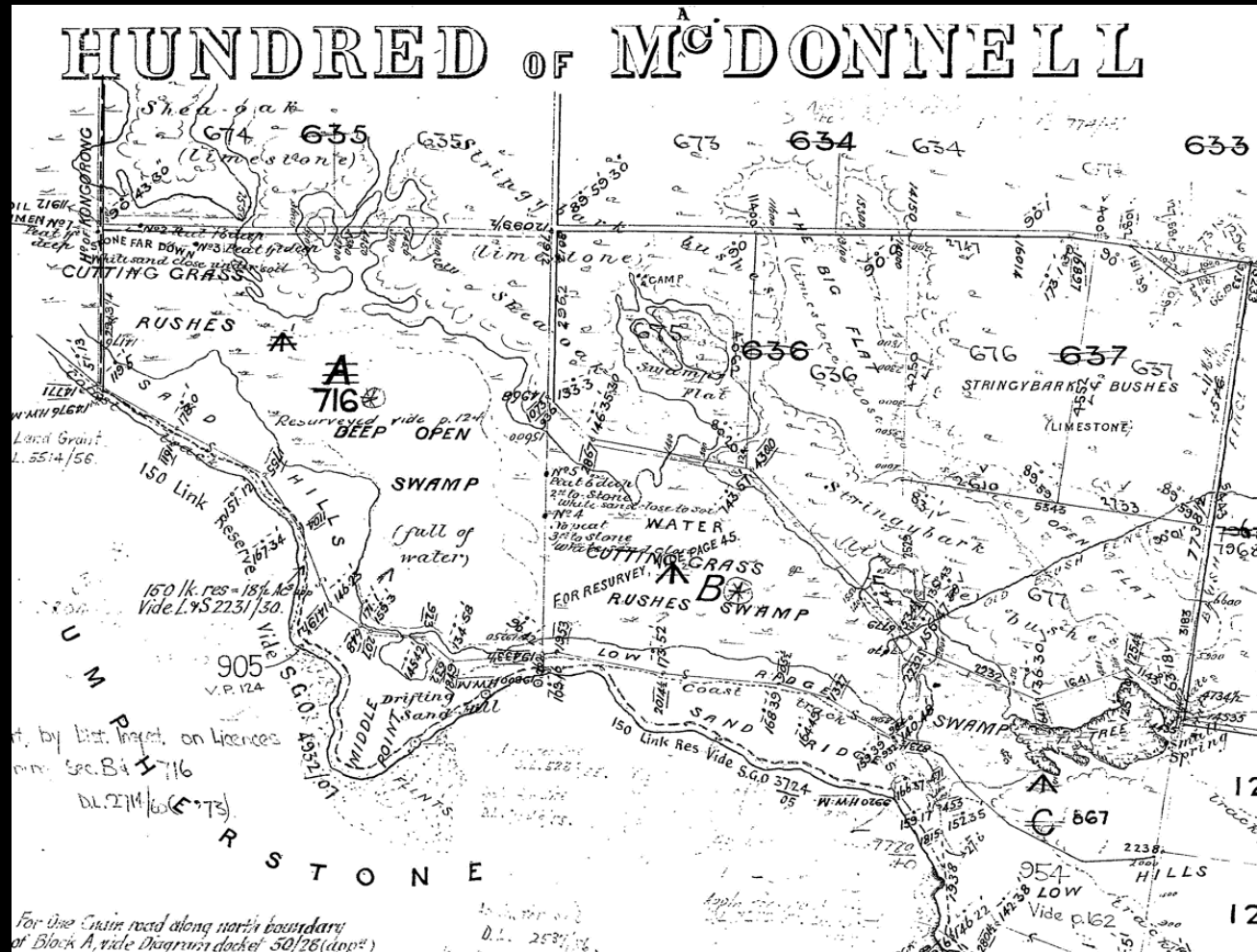


# Explaining NGT's approach to eco-hydrological investigations

1. Get to know a site:
  - from all angles and sources (modern and historical)
  - using modern technical tools (imagery, data layers, GIS, LiDAR)

**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**1880 survey**



# Explaining NGT's approach to eco-hydrological investigations

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  - from all angles and sources (modern and historical)
  - using modern technical tools (imagery, data layers, GIS, LiDAR)

**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**1958 aerial**

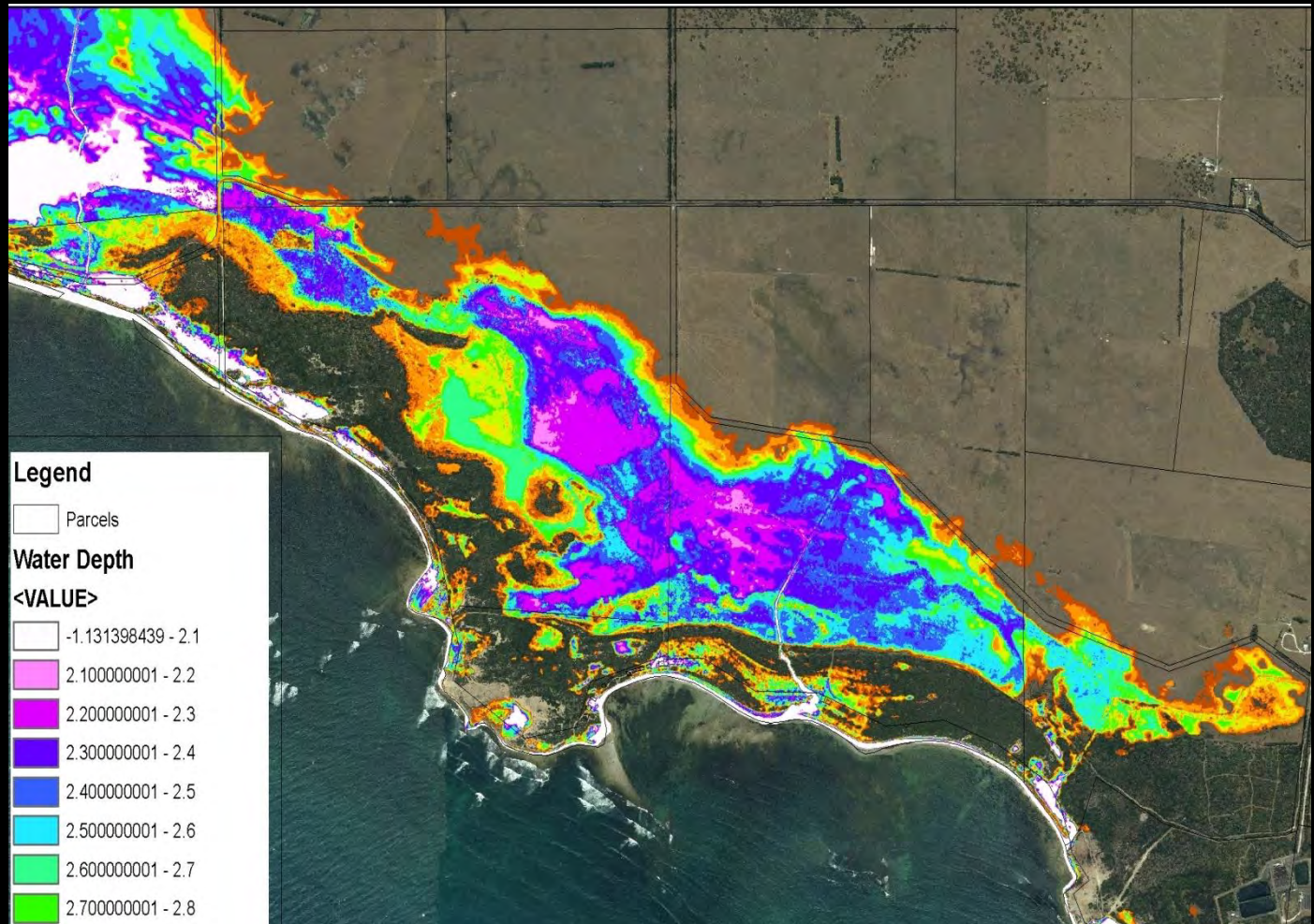


# Explaining NGT's approach to eco-hydrological investigations

1. Get to know a site:
  - from all angles and sources (modern and historical)
  - using modern technical tools (imagery, data layers, GIS, LiDAR)

**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**DEM based  
on LiDAR**



# Explaining NGT's approach to eco-hydrological investigations

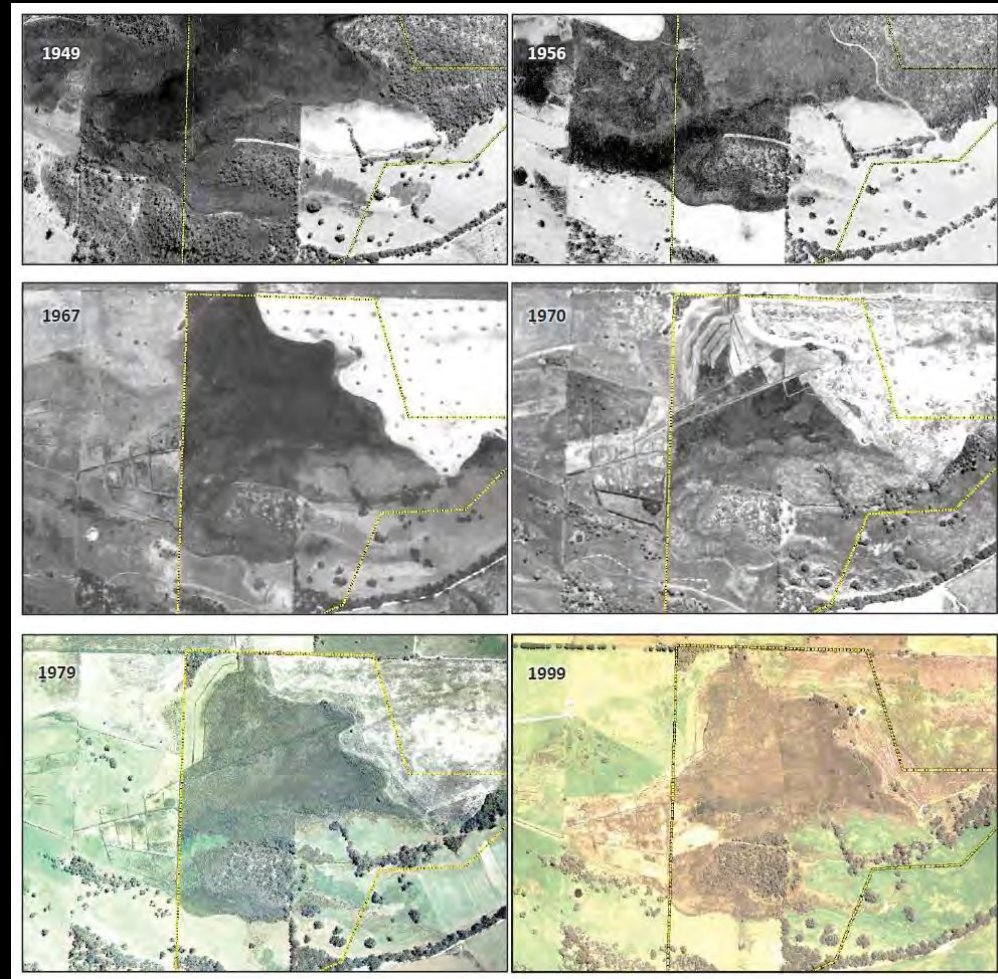
## 2. Get to know the people:

- determine what is possible based on the socio-political landscape
- share what we learn, and bring people on a journey to inform the discussion

### Example 2:

Glenshera Swamp

(Stipiturus Conservation Park) (SA)



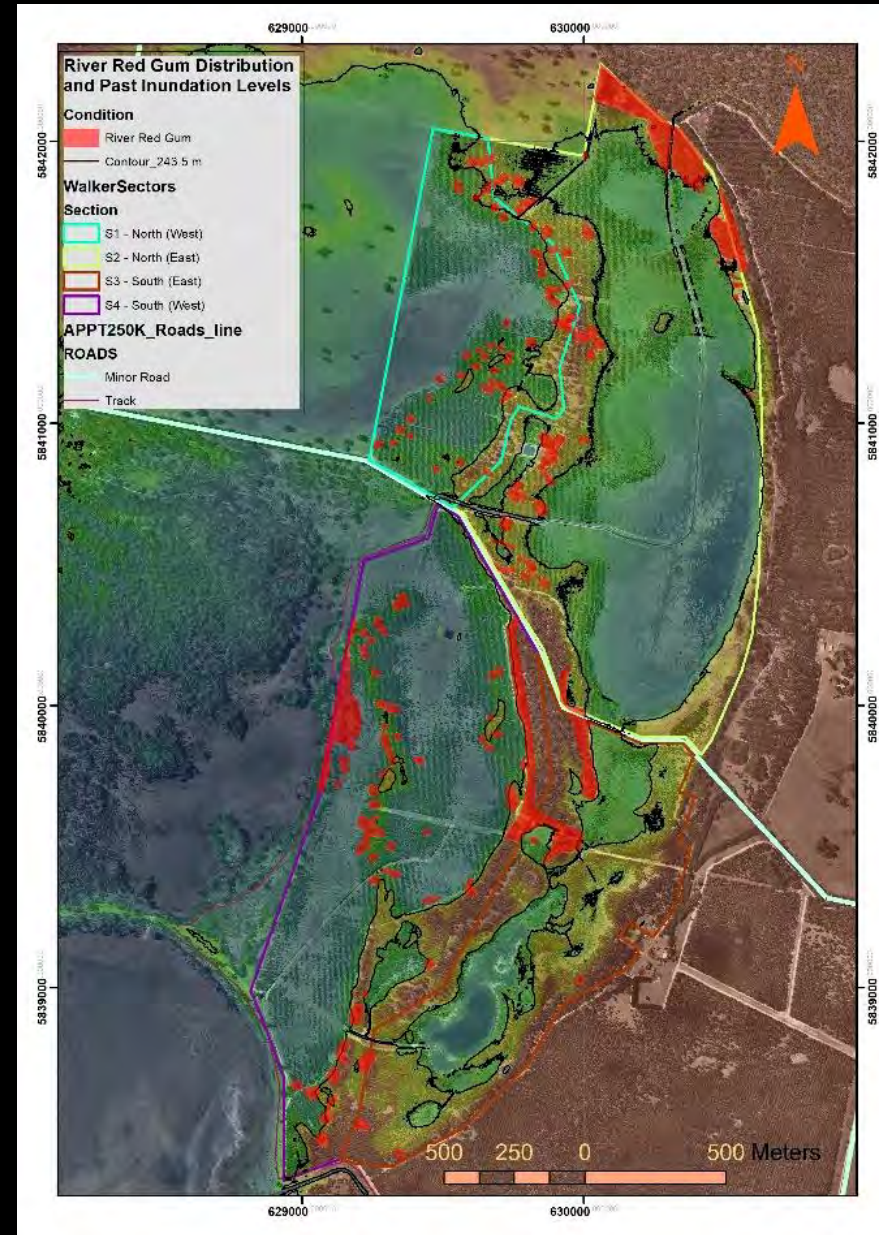
# Explaining NGT's approach to eco-hydrological investigations

- 3. Read and interpret the landscape:
  - spend time on site and look for clues to triangulate with other data sources

**Example 3:**  
Walker Swamp  
(NGT Reserve) (Vic)



**Long-lived species can tell us a lot about hydrology!**

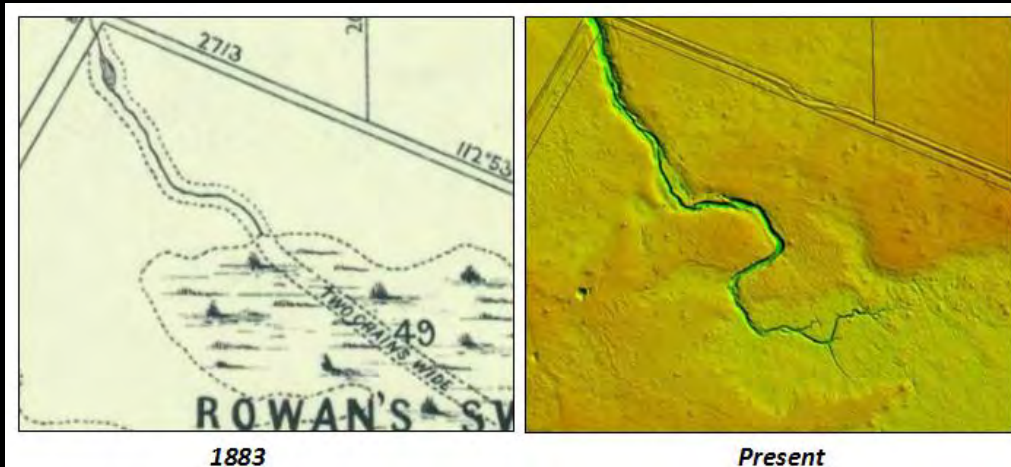


# Explaining NGT's approach to eco-hydrological investigations

3. Read and interpret the landscape:
- spend time on site and look for clues to triangulate with other data sources
  - define a timeline of eco-hydrological change based past human interventions

## Example 4:

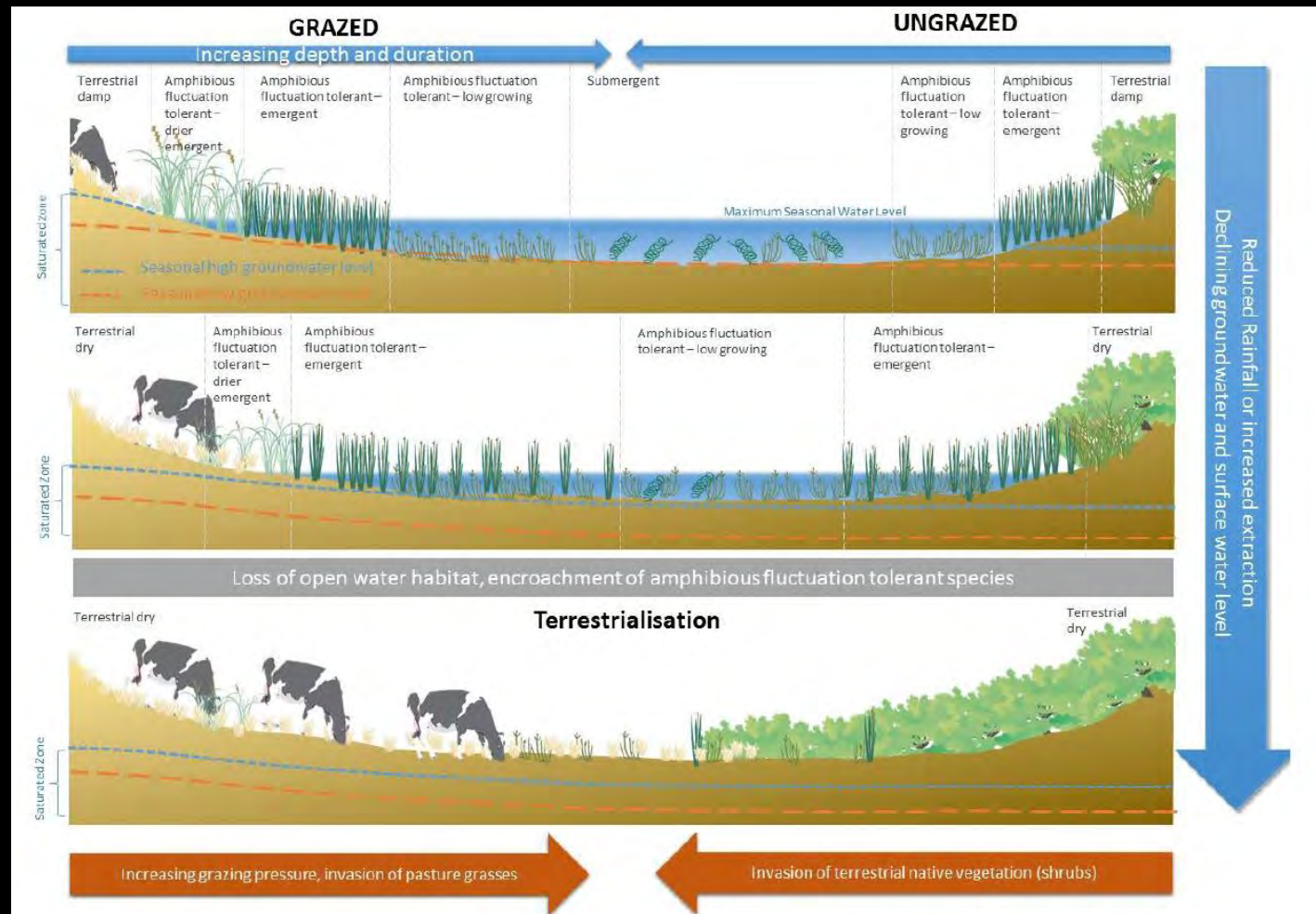
Rowan Swamp Wildlife Reserve  
(Vic)



# Explaining NGT's approach to eco-hydrological investigations

- 3. Read and interpret the landscape:
  - spend time on site and look for clues to triangulate with other data sources

Short-lived species that can move up and down slope are not so helpful...



# Explaining NGT's approach to eco-hydrological investigations

## 4. Define and explore the trend of change:

- place current conditions into an accurate historical context

### Example 5: Moulting Lagoon (Ramsar Site) (Tas)



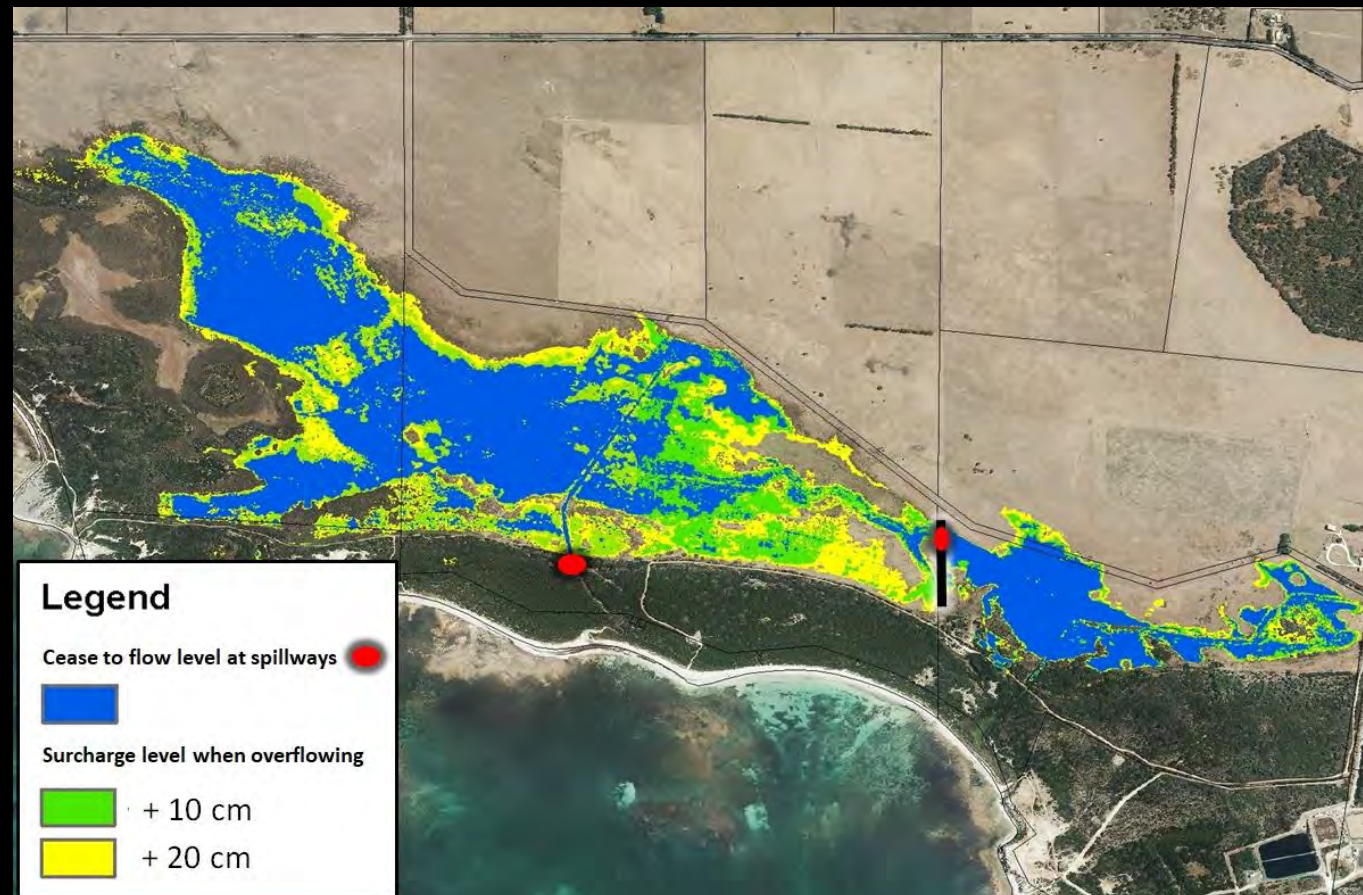


# Explaining NGT's approach to eco-hydrological investigations

4. Define and explore the trend of change:
  - place current conditions into an accurate historical context
  - determine if remedial works today can address legacy impacts

**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**Plan for remedial  
works, informed  
by previous steps**



# Explaining NGT's approach to eco-hydrological investigations

5. Articulate / implement a restoration plan:
  - where possible, initiate a positive trajectory of change through carefully considered and planned remedial works, where impacts can be reversed

## Example 2: Glenshera Swamp



# Explaining NGT's approach to eco-hydrological investigations

5. Articulate / implement a restoration plan:
  - where possible, initiate a positive trajectory of change through carefully considered and planned remedial works, where impacts can be reversed

The value of trials in some situations...



# Example of permanent works after a trial

# Example 6: Long Swamp (Vic)

2014 – after Phase 1 and 2, prior to full restoration trial



2015 - After Phase 3 restoration trial



2019 - After permanent works (dune recreation)



# Example of permanent works after a trial

# Example 6: Long Swamp (Vic)

2020 – 1 year after dune restoration



2021 – 2 years after dune restoration



2022 – 3 ½ years after dune restoration



# Explaining NGT's approach to eco-hydrological investigations

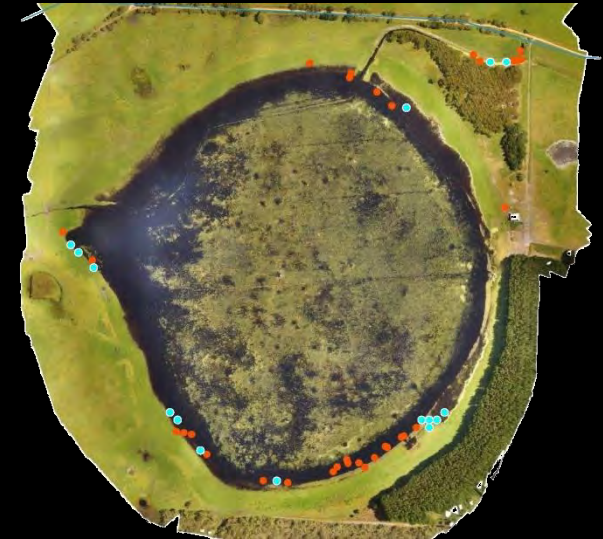
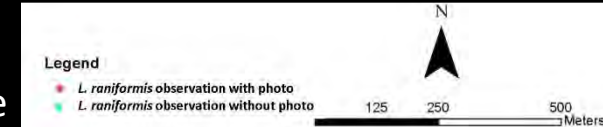


## 6. Monitor eco-hydrological response:

- monitor trajectory of change (i.e. direct/indirect/surrogate values over time)
- ecological values will respond to a restored hydrological regime



Example 7: Mt Burr Swamp (SA)



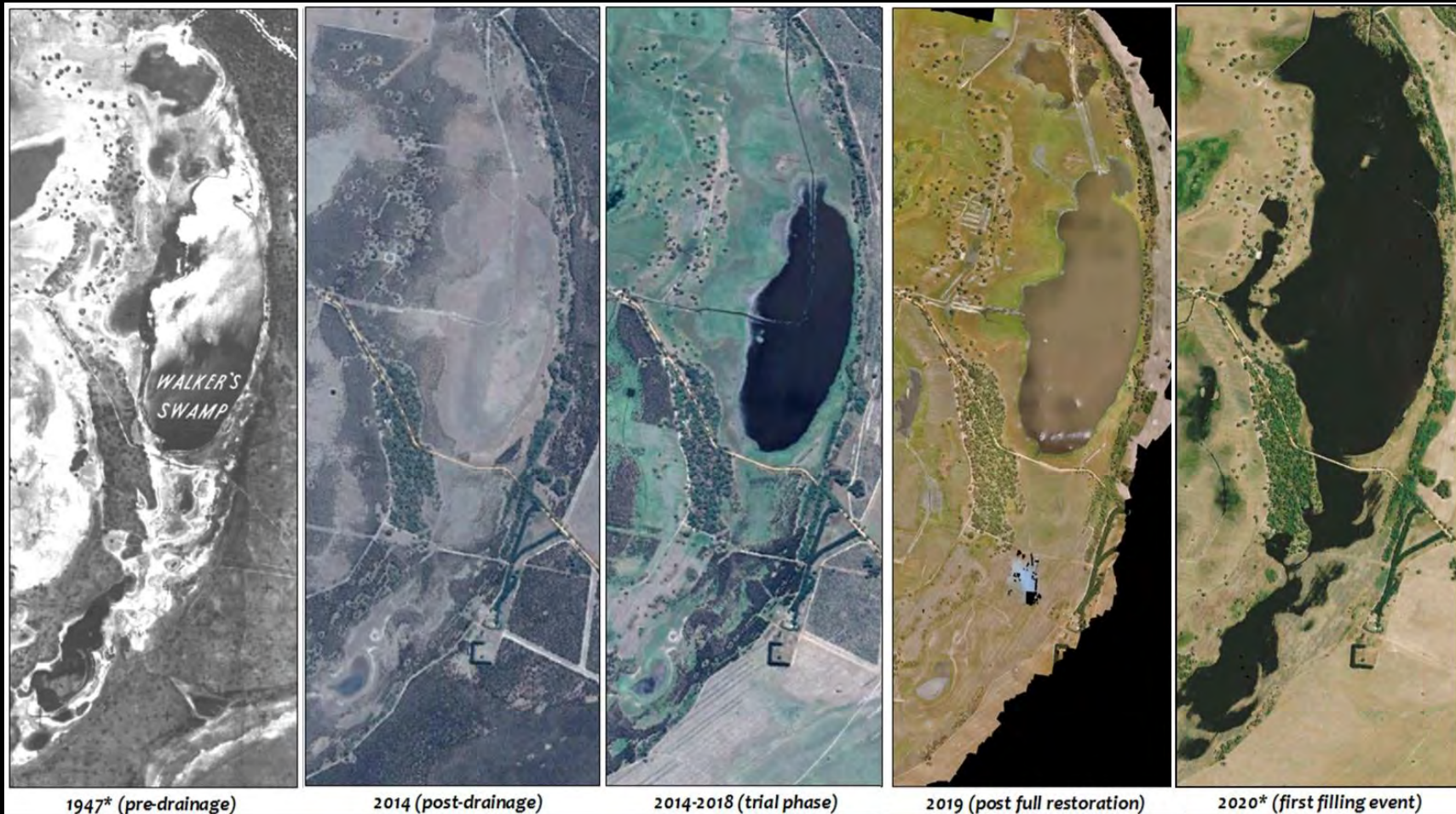
Example 6: Long Swamp (Vic)



# Explaining NGT's approach to eco-hydrological investigations

- 6. Monitor eco-hydrological response:
  - Aerial imagery

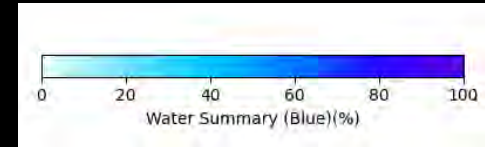
**Example 3:**  
Walker Swamp  
(NGT Reserve) (Vic)



6. Monitor eco-hydrological response:  
– Water observations from space (using Landsat data)

E.g. below is evidence of November – April Walker Swamp inundation:  
an indicator of wetland persistence and value as drought refuge habitat

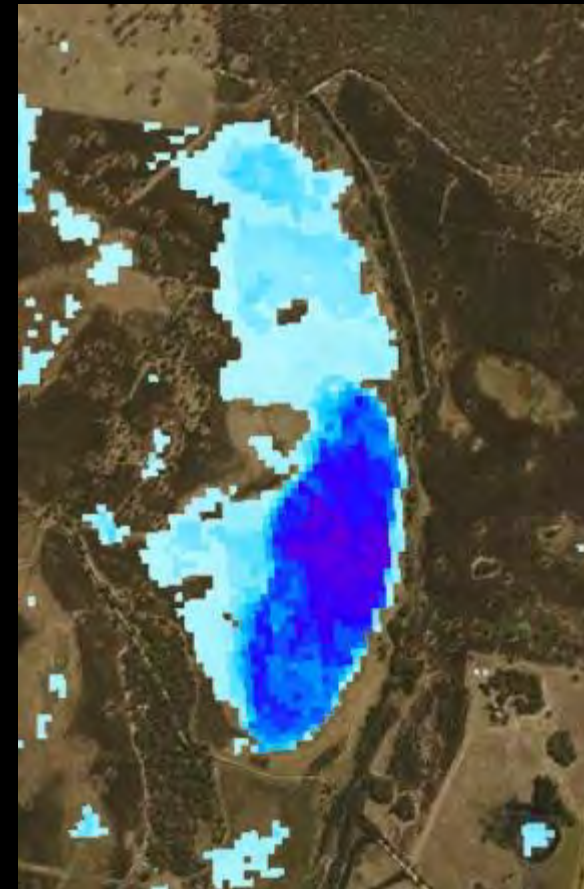
**Example 3:**  
Walker Swamp  
(NGT Reserve) (Vic)



2011 (drained)

2016 (with trial structure)

2020 (full restoration)





# Explaining NGT's approach to eco-hydrological investigations

## 7. Communication along the way, at every step:



Welcome to NGT Newsletter #95

JUNE 2023

### This is our mid-year issue - and it's a big one!

Welcome to new subscribers and hello again to our regular readers.

What an exciting issue we have for you this month!

Mark sums up a huge June for NGT in the first article, then read on for exciting updates on our



### Landholder and Community Update #10 – July 2023

#### Independent Eco-hydrological Assessment of Moulting Lagoon and Apsley Marshes Ramsar Sites

Bec Sheldon and Mark Bachmann, Nature Glenelg Trust (NGT)

Since our 9<sup>th</sup> landholder and community update on this project, which we shared back in January this year, we've been busy – so there is a lot to catch up on!

Although NGT will continue our involvement with the Moulting Lagoon and Apsley Marshes Ramsar sites into the future, this is the final update on outcomes achieved from the NRM South and Australian Government funded project which officially ended in June. A snapshot of the project activities we have delivered and the knowledge we have gained over the past six months is provided below.

#### Apsley Marshes Update

The quarterly download of water loggers continued at the Apsley Marshes in January and again in March 2023. This provided us with close to twelve months of data for the site and has enabled us to begin to untangle the modern hydrology of the Marshes complex, accounting for and interpreting the likely impact of convict-era artificial drainage across the site.

Baseline vegetation monitoring was also undertaken in March, targeting several sites on the eastern



**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**What outcomes have these projects achieved?**





April 2022 works summary: eastern springs oblique image looking west



April 2022 works summary: remediated eastern artificial drainage outlet, looking south



The same area in December 2022

**Example 1:**  
Hutt Bay Wetland  
(NGT Reserve) (SA)

**What outcomes have these projects achieved?**



**Example 2:  
Glenshera Swamp  
(SA)**

**Restoration works have  
occurred in 2017, 2020,  
2022 and 2023**

**Bypass drain backfilling in 2020**





## Example 2: Glenshera Swamp (SA)

Restoration works in 2017



**Example 3:**  
Walker Swamp  
(NGT Reserve) (Vic)

**What outcomes have these projects achieved?**





**Example 3:**  
Walker Swamp  
(NGT Reserve) (Vic)

**What outcomes have these projects achieved?**

...What began as a wetland project has now  
expanded to protect and restore adjacent woodlands



## Example 4:

Rowan Swamp Wildlife Reserve

(Vic)

# What outcomes have these projects achieved?

## Winter 2022 works



## Example 4:

Rowan Swamp Wildlife Reserve

(Vic)

**What outcomes have these projects achieved?**

**2022-23 outcomes**





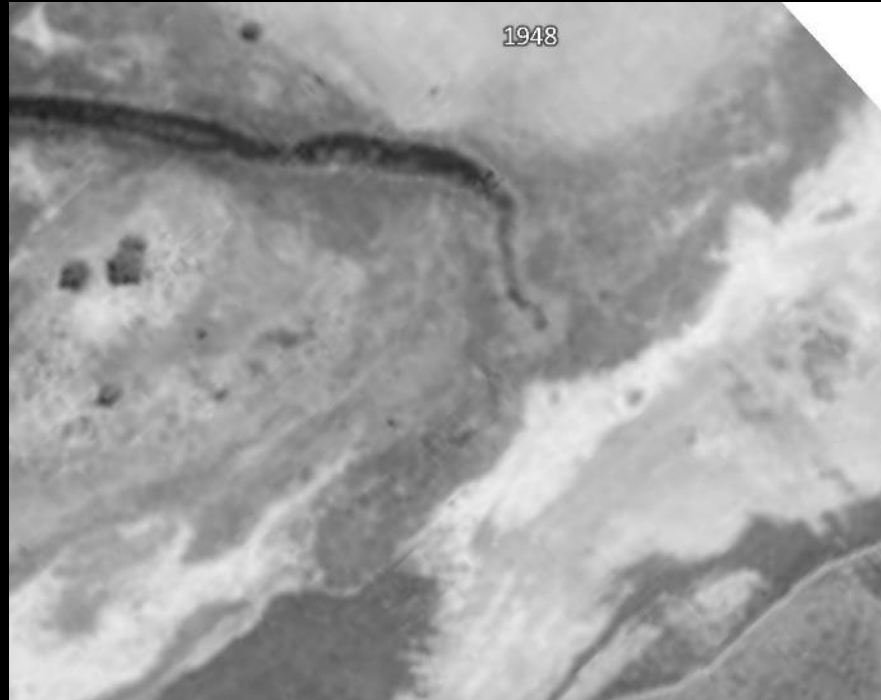
**Example 5:**  
Moulting Lagoon  
(Ramsar Site) (Tas)

# What outcomes have these projects achieved?

## Overview of works completed in 2022/23



# Yards Hole remedial works – autumn 2022





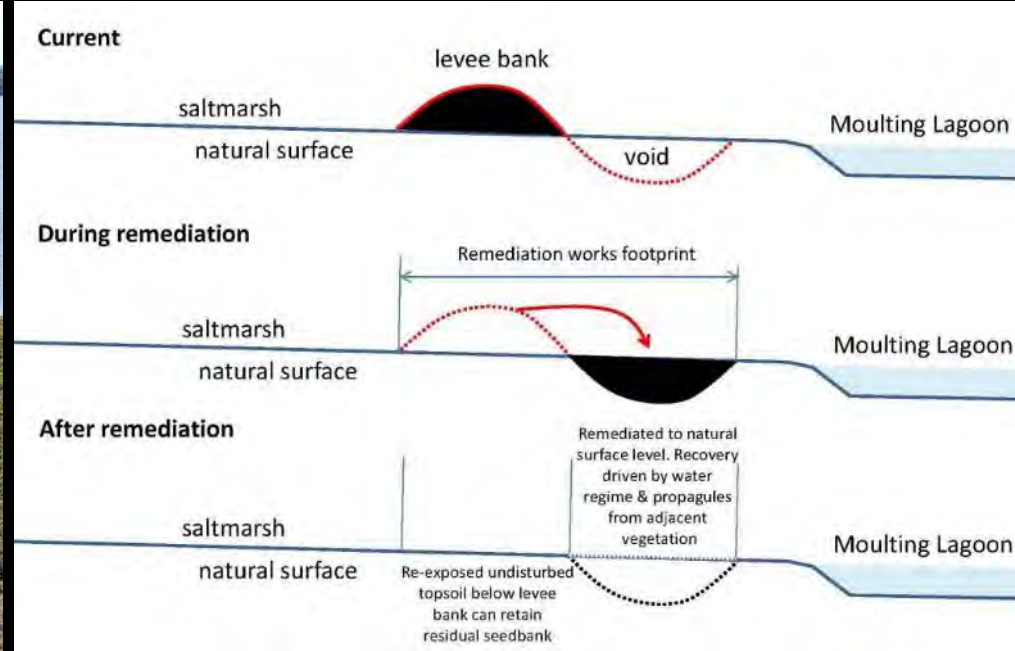
**Yards Hole outlet  
remedial works  
– autumn 2022**



# Long Point levee remedial works completed – autumn 2023



# Long Point levee remedial works commence – autumn 2022



# Long Point levee remedial works completed – autumn 2023



**Long Point levee  
remedial works –  
autumn 2023**



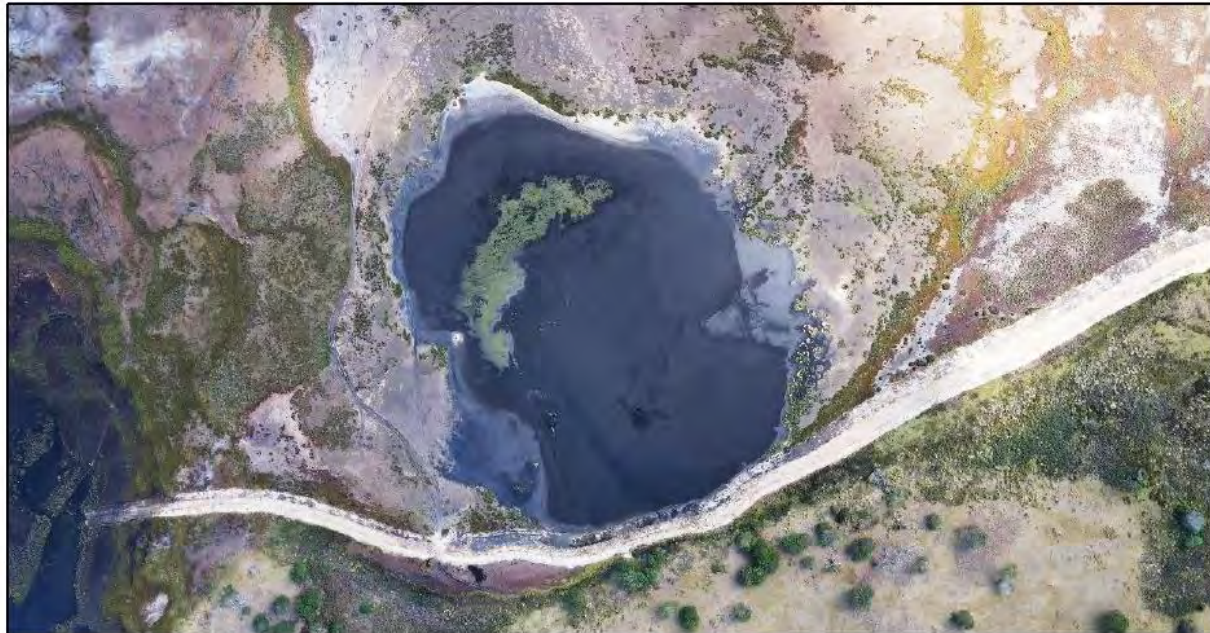
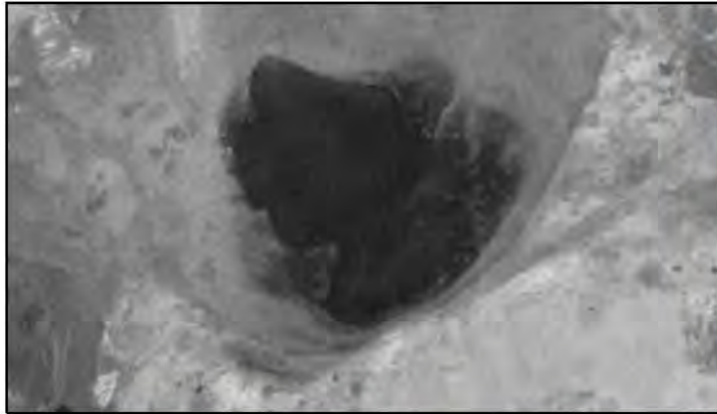
# Long Point – Barkstand Point artificial channel remedial works – autumn 2023



**Long Point – Barkstand Point  
artificial channel remedial works  
– autumn 2023**



# Long Point – Barkstand Point artificial channel remedial works – autumn 2023





**Long Point – Barkstand Point  
artificial channel remedial works  
– autumn 2023**



# Long Point minor flood event – March 2023



**Example 6: Long  
Swamp (Vic)  
(Discovery Bay CP)**

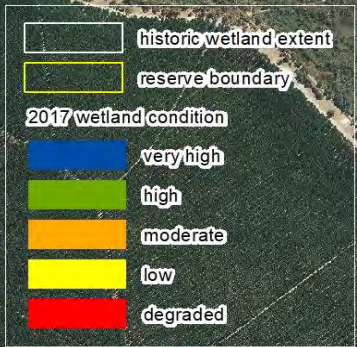
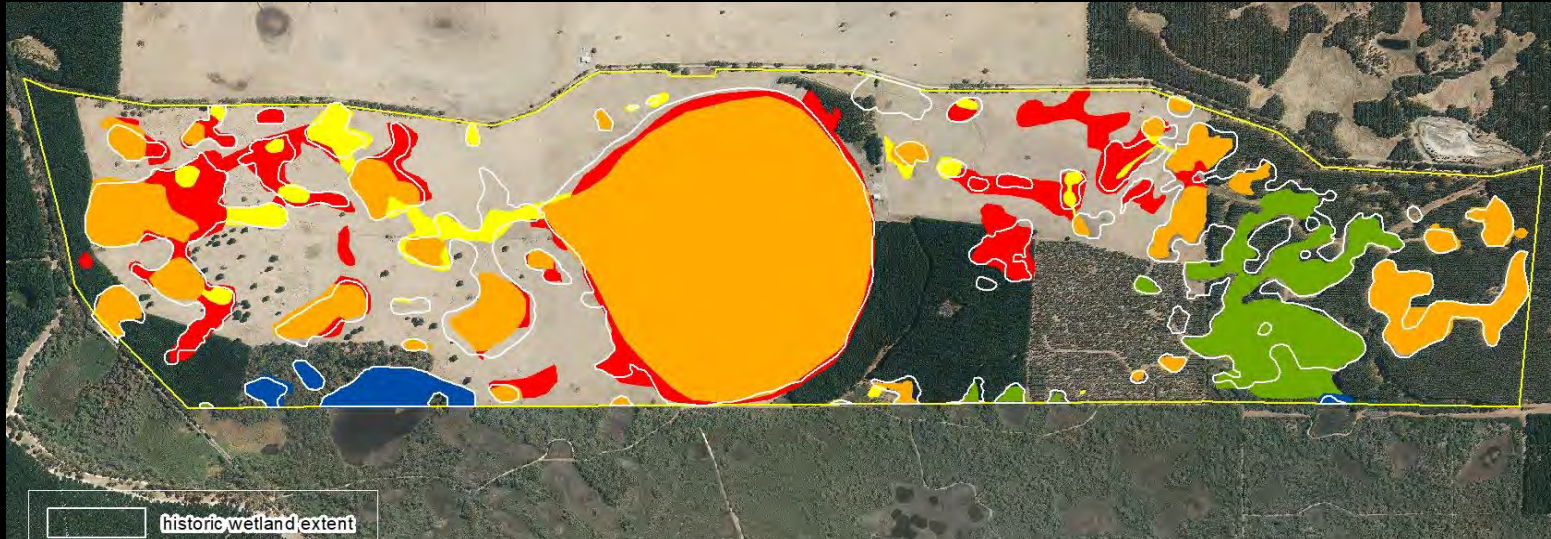
**What outcomes have these  
projects achieved?**



# Example 7: Mt Burr Swamp (NGT Reserve) (SA)

## What outcomes have these projects achieved?

May 2023



**Example 7: Mt Burr  
Swamp (NGT Reserve)  
(SA)**

**What outcomes have these  
projects achieved?**

1<sup>st</sup> May 2023



14<sup>th</sup> July 2023



**Example 7: Mt Burr  
Swamp (NGT Reserve)  
(SA)**

**Stage 2 area: Restoration works in  
autumn 2023**



**Example 7: Mt Burr  
Swamp (NGT Reserve)  
(SA)**

**Stage 2 area: Results in July 2023**





**Some of the sites we have touched  
on are peatlands...**

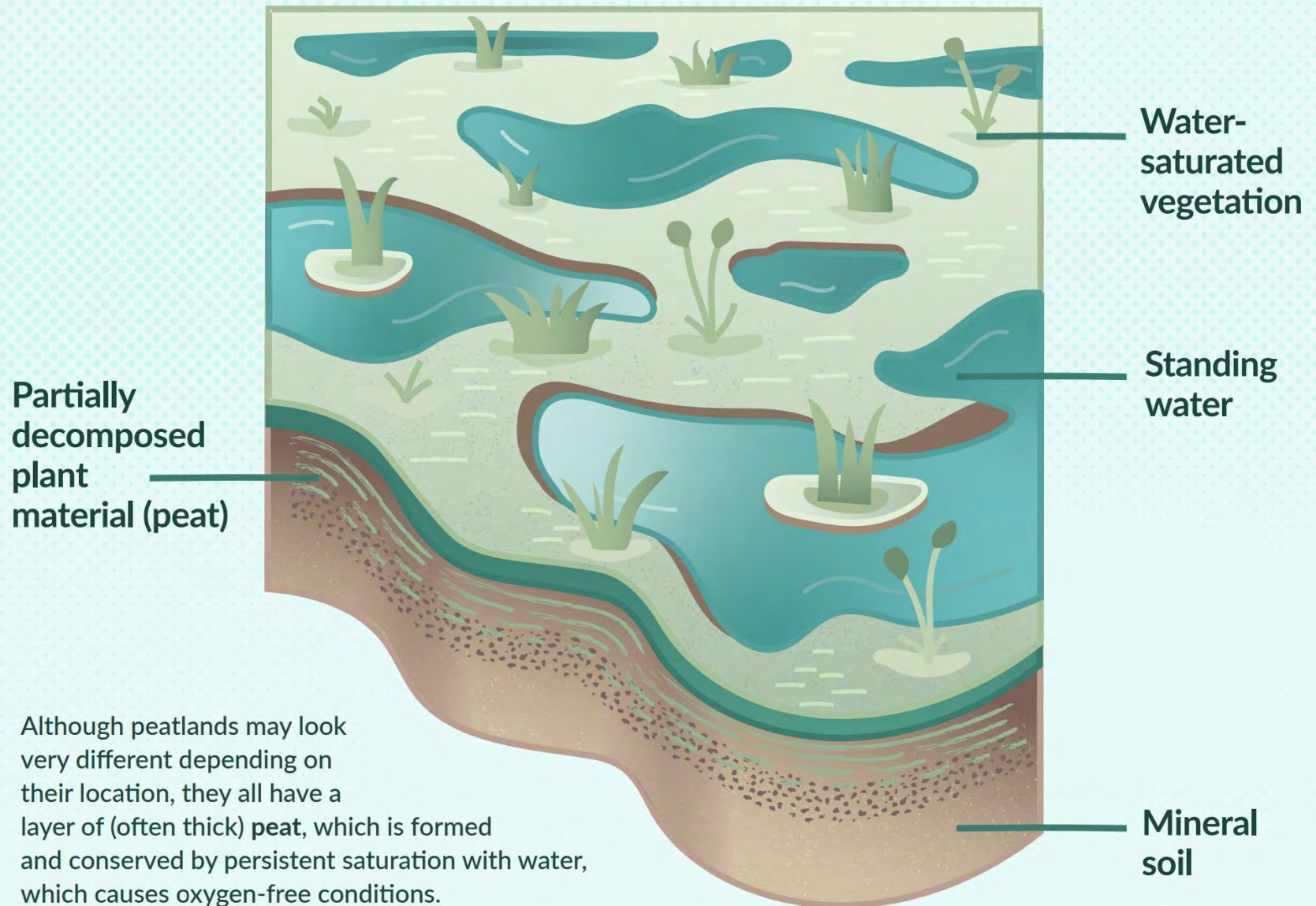
**What is so special about  
peatlands?**



**Mt Burr Swamp – A  
peatland restored by  
NGT in 2016**

# What Are Peatlands?

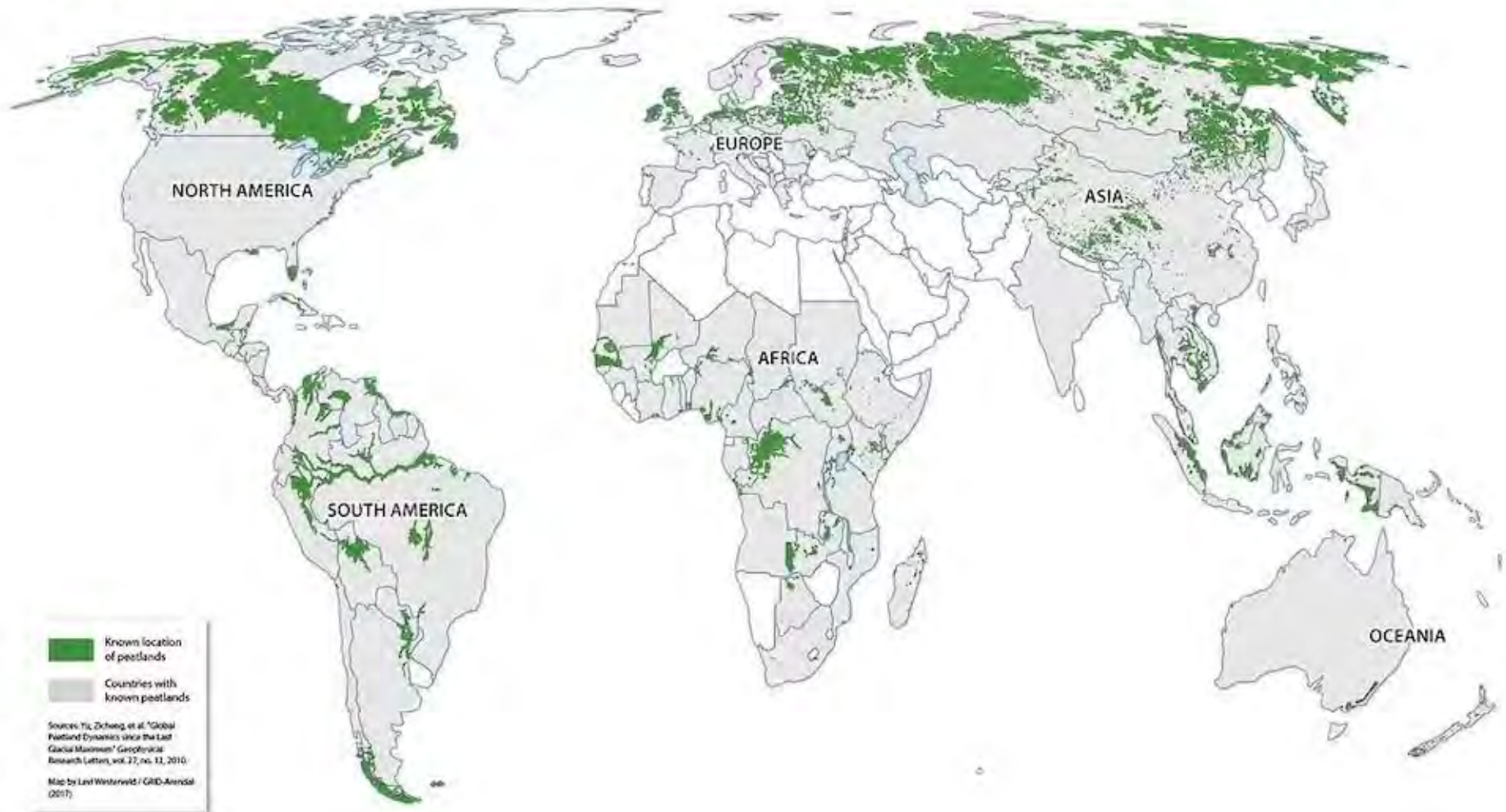
Peatlands are a type of wetland found in many parts of the world.



Although peatlands may look very different depending on their location, they all have a layer of (often thick) peat, which is formed and conserved by persistent saturation with water, which causes oxygen-free conditions.

**Global distribution of peat... Australia's mapping is incomplete, but – being rare here – you would have to zoom in to see most of it anyway!**

## **Global distribution of peatlands**



**Despite only covering around 3-4% of the planet's land surface, peatlands contain up to one-third of the world's soil carbon, which is twice the amount of carbon found in the world's forests.**

**Peatlands 'punch above their weight'**



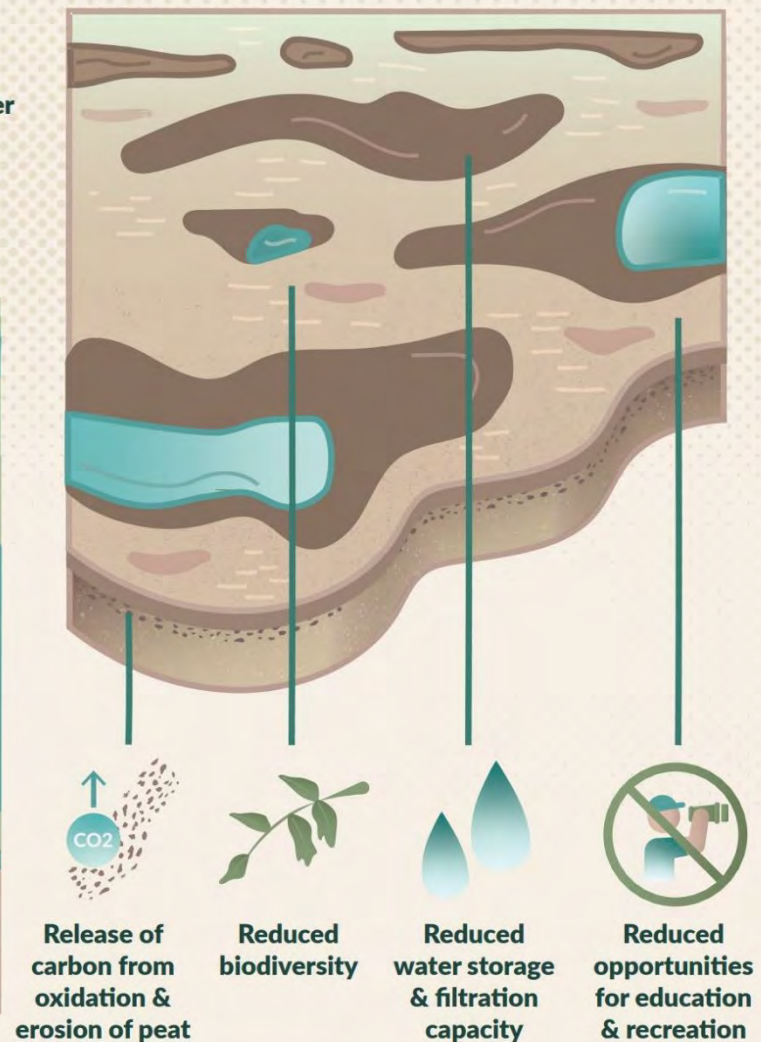
**Mt Burr Swamp – A  
peatland restored by  
NGT in 2016**

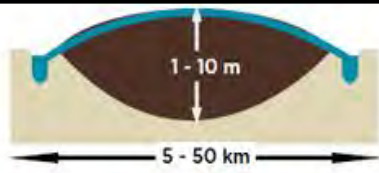
Peatlands provide important ecosystem services and support people and cultures worldwide. The degradation of peatlands, such as by drainage, can have far-reaching impacts.

## Benefits of healthy peatlands



## Impacts of degraded peatlands





**Natural situation:**

- Water table close to surface
- Peat accumulation from vegetation over thousands of years



**Drainage:**

- Water tables lowered
- Peat surface subsidence and CO<sub>2</sub> emission starts



**Continued drainage:**

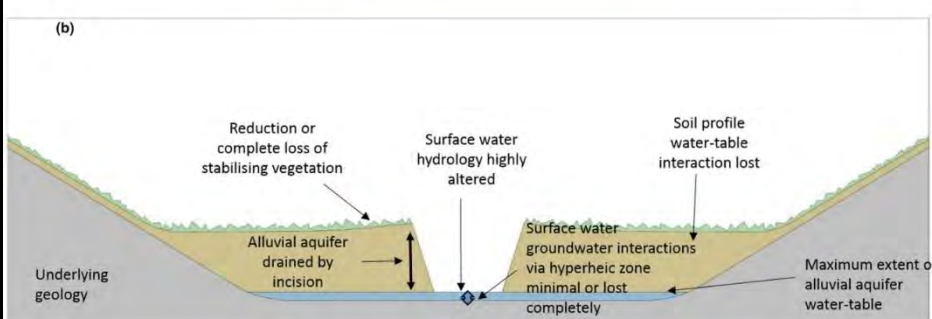
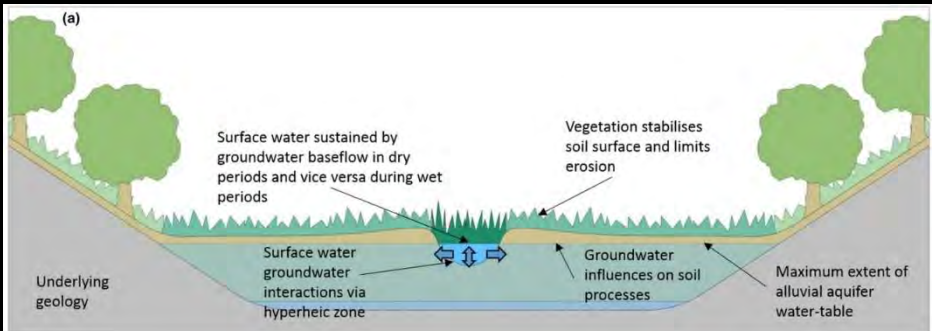
- Decomposition of dry peat: CO<sub>2</sub> emission
- High fire risk in dry peat: CO<sub>2</sub> emission
- Peat surface subsidence due to decomposition and shrinkage



**End stage:**

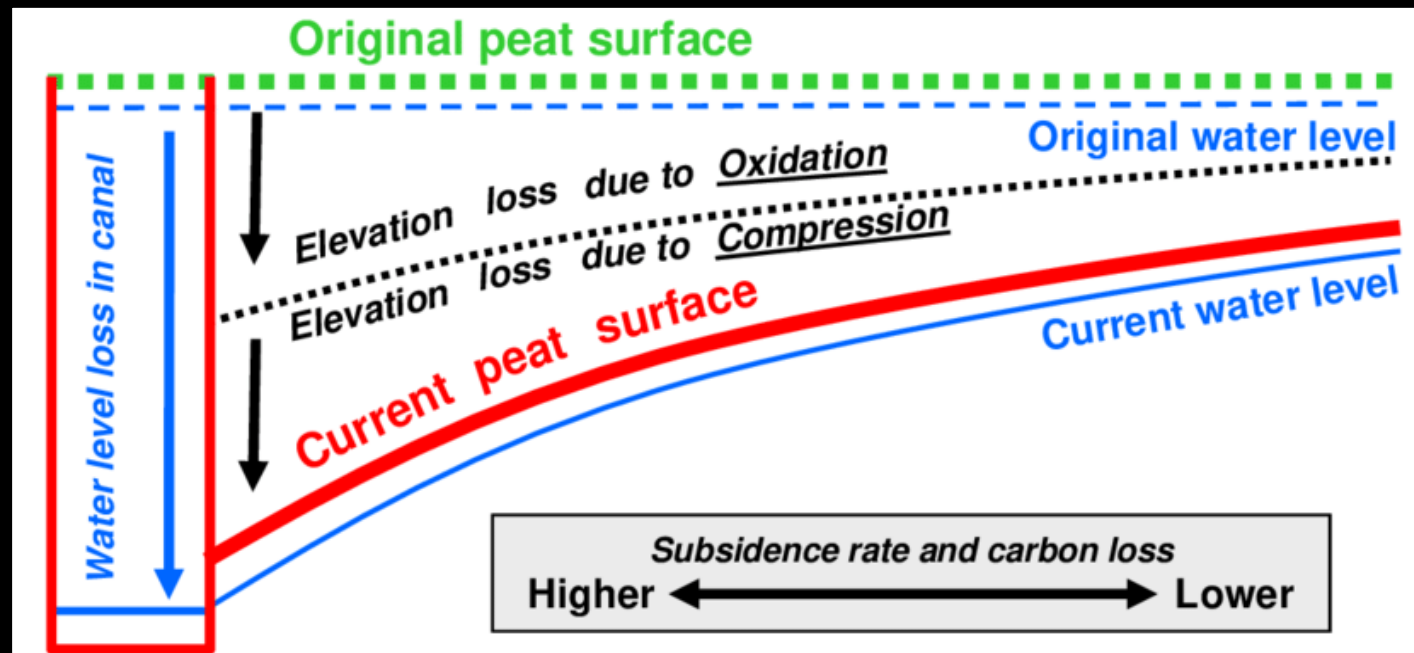
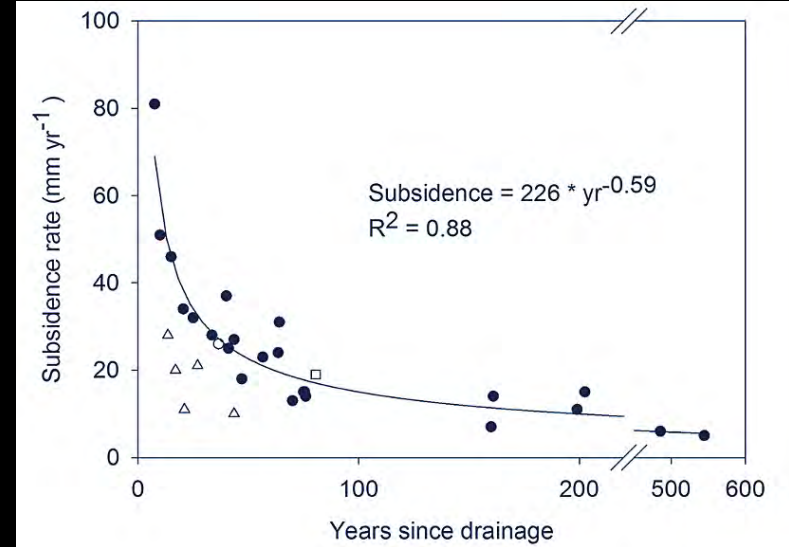
- Most peat carbon above drainage limit released to the atmosphere within decades,
- unless conservation / mitigation measures are taken

|   |                            |
|---|----------------------------|
|    | Water table                |
|   | Peat dome                  |
|  | Clay / sand                |
|  | Stream channels            |
|  | former extent of peat dome |



**What physical and chemical processes happen when peat is drained?**

What physical  
and chemical  
processes  
happen when  
peat is  
drained?



Deforestation and  
land use change

Drainage: lowering  
groundwater table

Compaction, consolidation  
and shrinkage; an increase  
in bulk density

Bio-chemical oxidation;  
a decrease in total organic  
carbon and C/N ratio

Peat subsidence

**What physical  
and chemical  
processes  
happen when  
peat is  
drained?**

From

Biodiverse carbon sink

to

Ongoing emission source of  
atmospheric carbon dioxide  
(while depleting biodiversity)



**Earth loses 500,000 hectares of peatlands a year, while already drained and degraded peatlands contribute around 4% of total annual global human-induced carbon emissions.**

**The bulk of mainland Australia's peatlands in Victoria and SA have been drained for agriculture.**



**Mt Burr Swamp – A peatland restored by NGT in 2016**



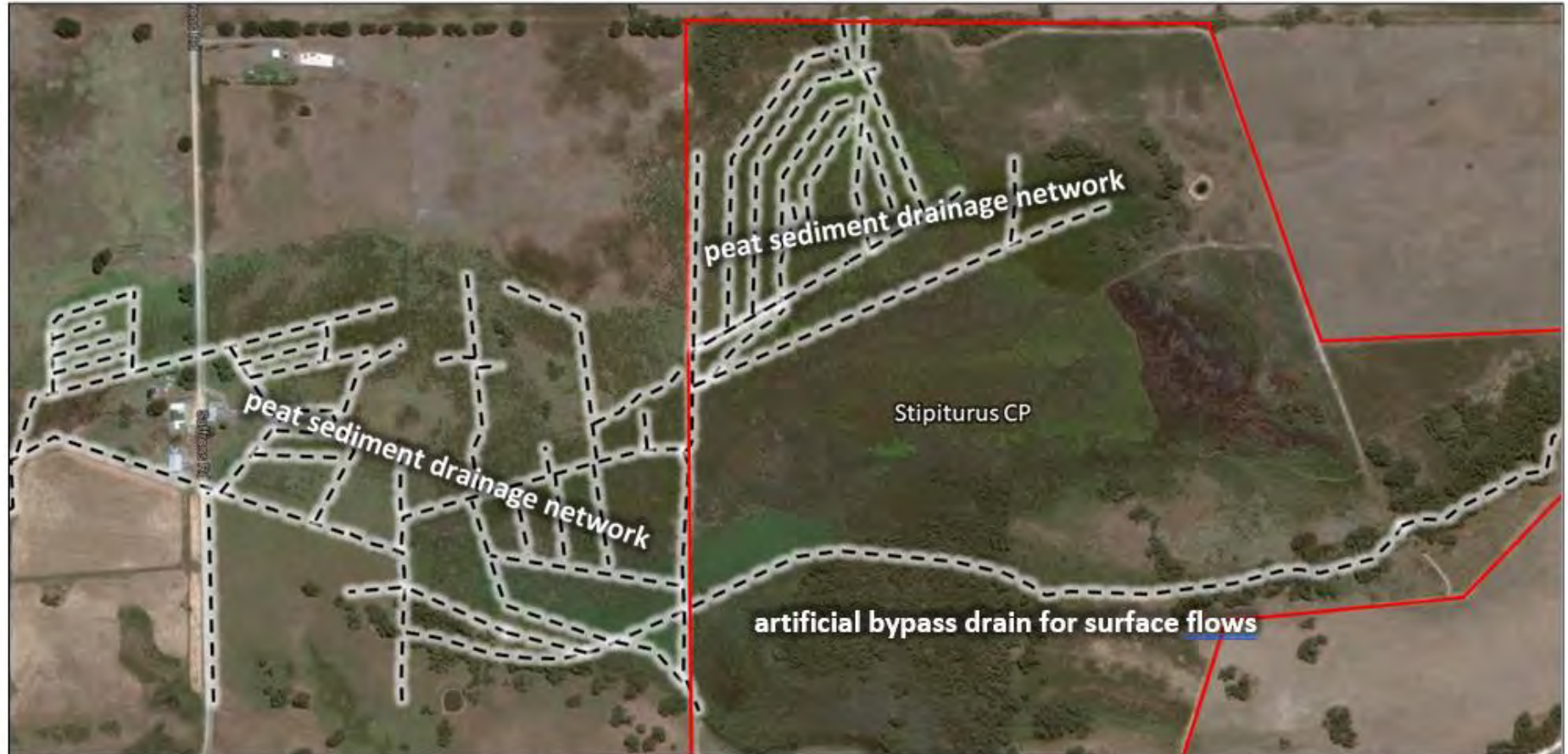
**NGT's peatland restoration principles:**

**Hydrological** - to slow the movement of water through a site and improve the capacity of the peat profile to retain moisture

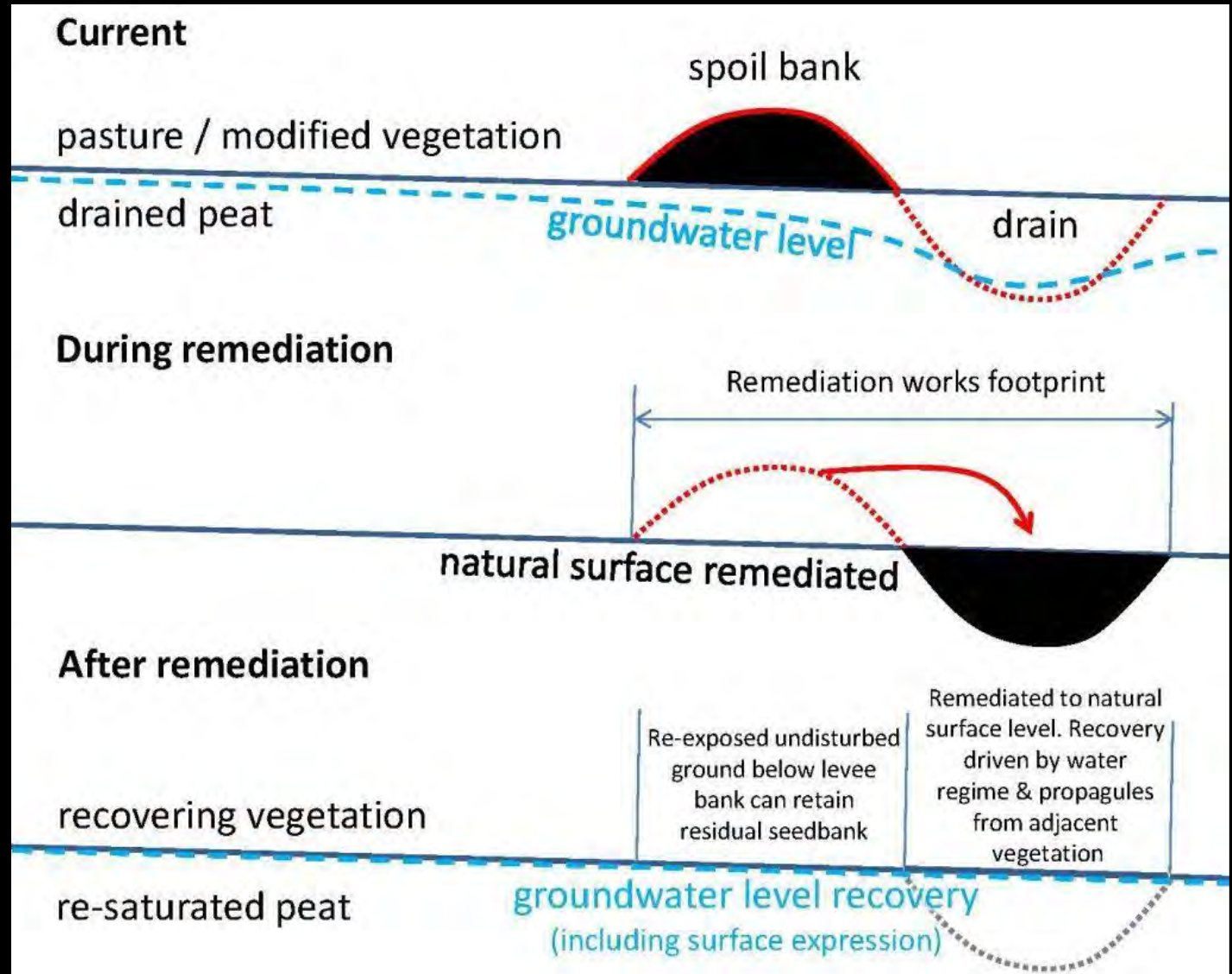
**Ecological** – to cause a positive trajectory of change in ecological attributes associated with an increased duration of peat saturation

**Example 2:**  
Glenshera Swamp (SA)

**The peatland drainage network in  
Glenshera Swamp prior to restoration**



**What happens  
when drains  
are backfilled  
and peat is  
resaturated?**



**Example 2:**  
Glenshera Swamp (SA)

**Restoration works in 2022**



**Example 2:**  
**Glenshera Swamp (SA)**

**Peat re-saturation triggering wetland  
vegetation recovery**  
**May 2023 – one year later**



**Example 8:  
Square Waterhole  
Swamp (SA)**

**1920s drainage and 1940s comprehensive  
development of the present-day  
Conservation Park – for dairying**

**April 1949**



Re-saturation of the subsided peat has slowly driven vegetation recovery... but the landform has been altered and this is not true 'remnant' vegetation

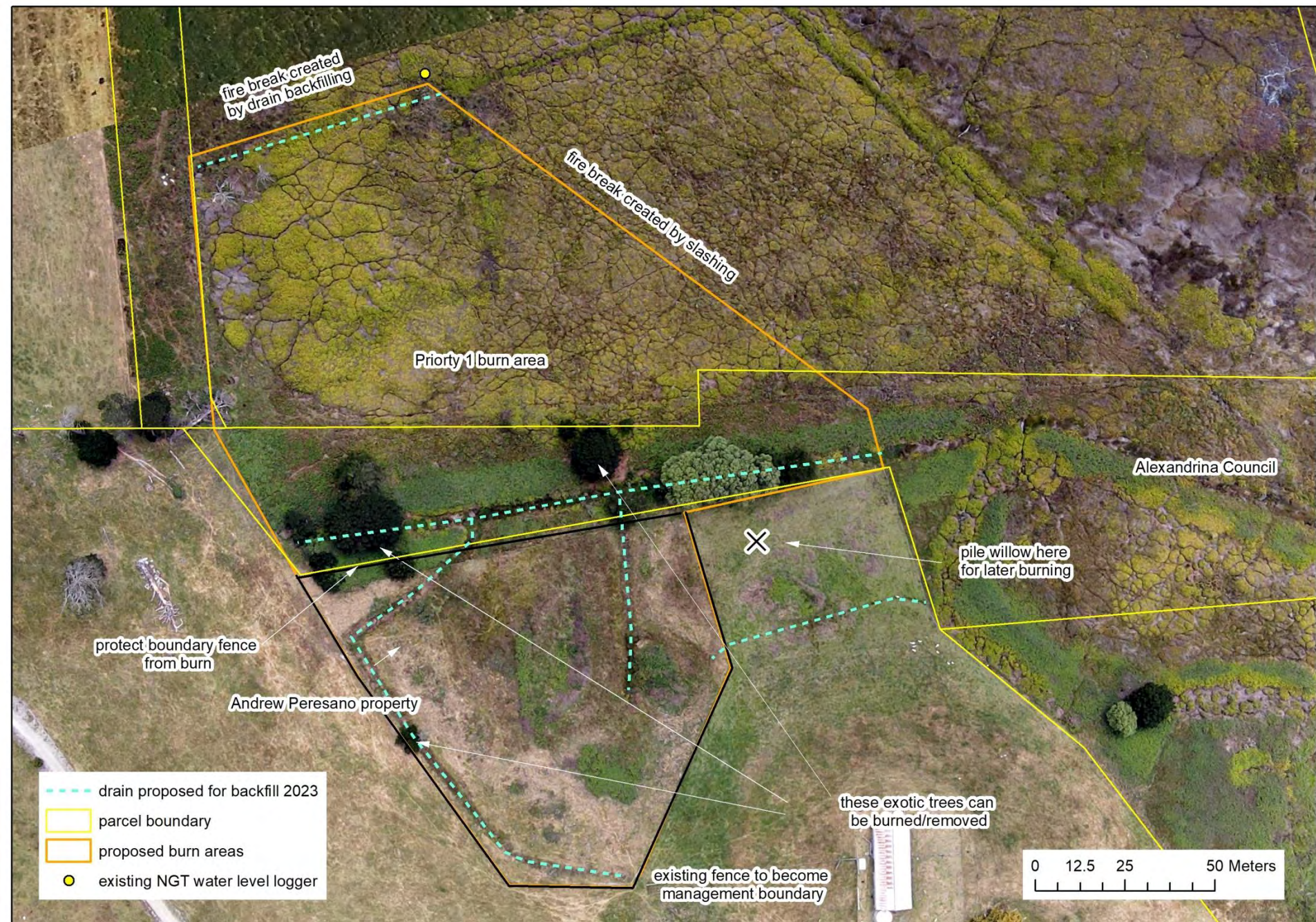


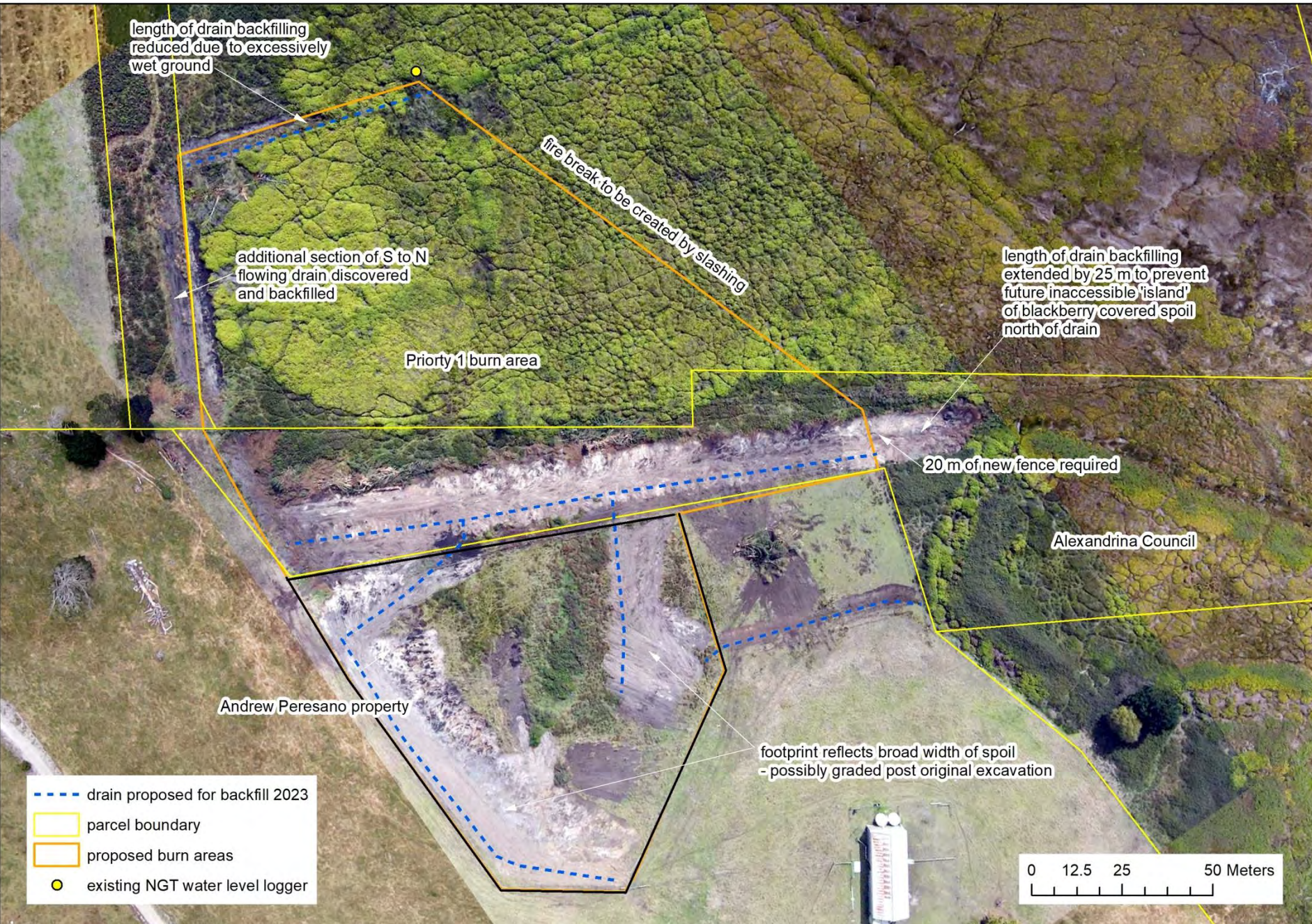
### Legend

#### Broad description

-  Dam and littoral zone
-  Gleichenia fernland over dense sedge understorey
-  Gleichenia fernland with emergent Baumea
-  Juncus open rushland with introduced understorey
-  Juncus sparse rushland with introduced understorey
-  Baumea sedgeland with Gahnia emergents over mixed fern/sedge/herb understorey
-  Juncus/carex rushland over mixed sedge and herb understorey
-  Closed Leptospermum shrubland
-  Leptospermum open shrubland with Gleichenia over Baumea
-  Leptospermum open shrubland with mixed sedge and fern layers
-  Leptospermum shrubland patch with introduced grass understorey
-  Blackberry with bracken/rushes/sedges
-  Pteridium closed fernland over introduced grasses
-  Pteridium fernland with sedges/rushes over introduced grass and herb understorey







Some before and after photos...



















**DEW completed the burn over 2 days in April 2023,  
tying in perfectly with the restoration work**



Before



After



# Questions and Discussion

