



Platypus Conservation Queensland

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Wildlife Queensland PlatypusWatch Project Officer



Acknowledgment of Country

'I would like to acknowledge the First Nations people as the Traditional Owners of the lands on which this research is conducted. I recognise Country being home to many groups. I pay deep respects to all Elders past and present.'

Local platypus name 'Wajin' – Yugambah Language

The Guardian of Scrubby Creek:

by Uncle Reg Knox and Beverley Knox

Background

- The Wildlife Preservation Society of Queensland - PlatypusWatch Network
 - 2016
- Limited understanding of population/distribution
- Establishment of a longitudinal survey
 - Repeat measure, consistent survey locations, accessible data
- Comparisons of previous data – investigate contraction or expansion of platypus distribution



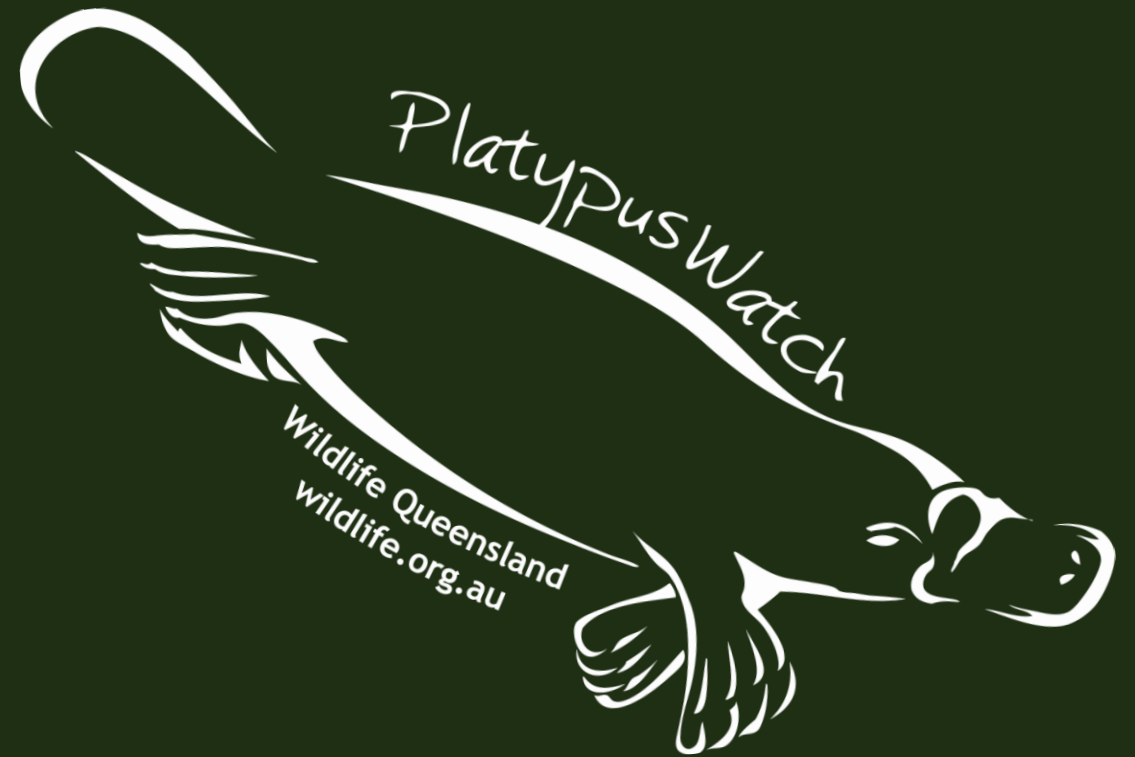
Observable
reduction in
reported
sightings
(WildNet data)

Losing platypus
or losing
interest?



Methods

- Observational surveys
- Environmental DNA (eDNA)
 - Presence / Absence
 - Species distribution
 - Abundance – estimate of the number of individuals
 - Occupancy – estimate of the proportion of sites where the species occurs
 - Model – probability of platypus occurring based upon the habitat



What is environmental DNA - eDNA

- “Genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material”
(Thomsen and Willerslev 2015).
- **Gouldian Finches**
(CDU 2019)
- **Marine vertebrate biodiversity studies**
(Closek et al .2019)
- **Monitor species presence or absence**
 - Cryptic
 - Invasive
 - Threatened or endangered





eDNA

- Non-invasive
- Species-specific primers
 - Target a small section gene
 - Platypus - mitochondrial gene cytochrome B
 - 57bp fragment
- PCR assays amplify the target DNA
- Sequenced DNA into database/library – Genebank
 - Multispecies analysis – DNA metabarcoding
- Sensitivity > 95% to detect platypus presence (Lugg et al. 2018).

The background image shows a lush forest scene with a stream flowing through it. Several bird nests are visible, perched on tree branches. The scene is bathed in natural light, creating a serene atmosphere. A large, semi-transparent white circle is overlaid on the left side of the image, containing the text and list.

Limitations

- Cannot tell us.....
 - Number of individuals
 - Relatedness
 - Precise location of animals
- Environmental influences
 - Temperature
 - UV
 - Flow



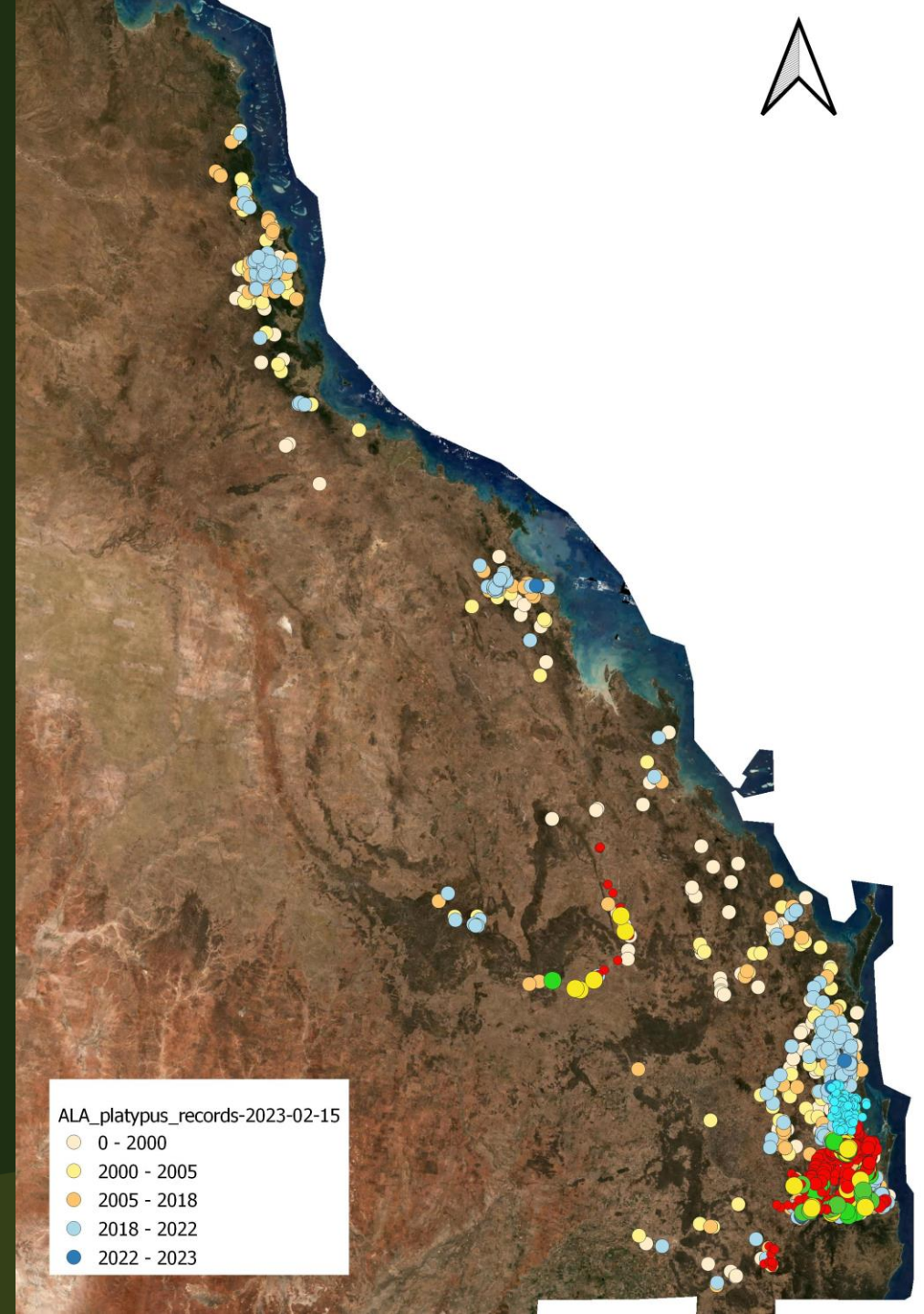
eDNA method

- Strict contamination avoidance protocol
- Collect 500ml creek water
- Pass through a specific filter 1.2 μ
- Discard filtered water, retain filter (becomes the 'sample')
- Maintain sample at approximately 4C°
- Transport to Melbourne within 48hrs for processing

eDNA Projects

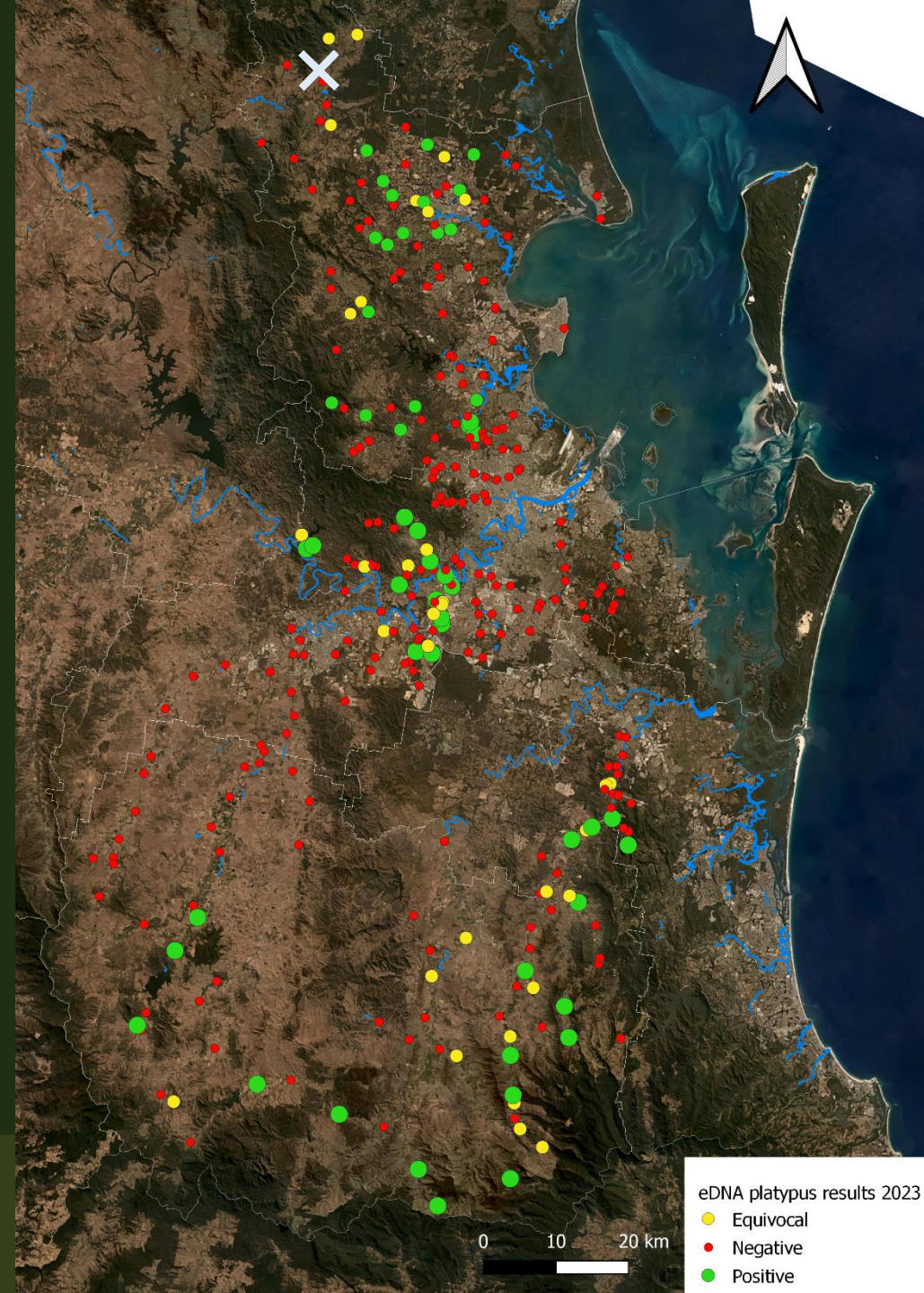
Greater Brisbane Environmental DNA (eDNA) 2016 – 2023

- 300 + sites
- 88 + waterways
- 6 LGA's
- Bushfire Recovery 2022
 - National Parks / lower catchments
 - 60 sites
- Upper Dawson River 2021/22
 - Central Qld
 - 20 sites



Results – eDNA Greater Brisbane

- 300 + sites
- 88 + waterways
- 6 LGA's
- 20 + waterways positive for platypus



Results - eDNA

Where are the platypuses (*Ornithorhynchus anatinus*) now? A snapshot in time of their distribution in the Greater Brisbane region

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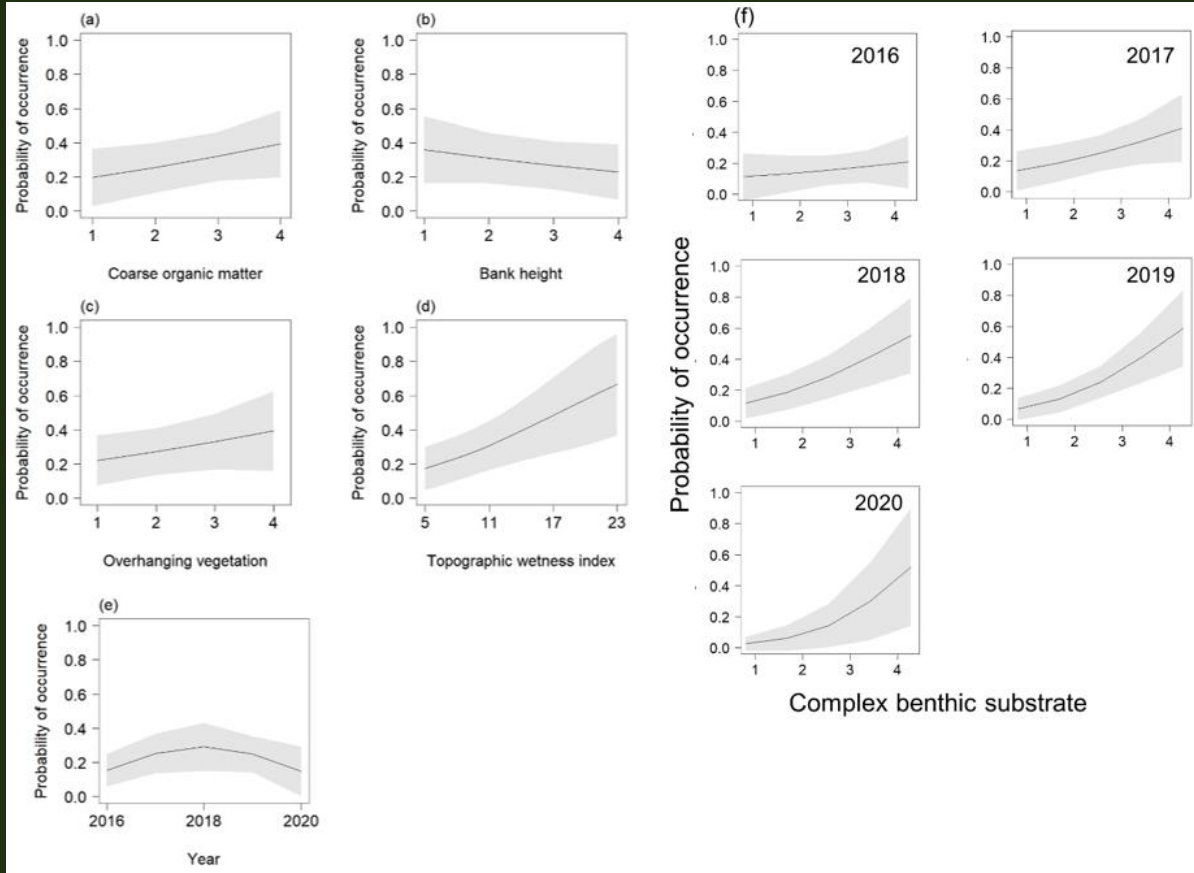
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Abstract

Distribution data on platypus populations within the Greater Brisbane region is currently lacking, limiting our understanding of their population status. We report 4 years of platypus environmental DNA data from waterways in this region and compare them to historical observational records from 1990 to 2016 to determine any changes to their distribution. Twenty-one of the 54 eDNA sampled waterways were sampled multiple times and had records of previous platypus presence. Five of these 21 repeatedly sampled waterways (24%) did not have evidence of platypus presence, based on eDNA. This raises the concern that platypuses may no longer inhabit these waterways. We hope this study encourages further investigations on platypus to identify the extent of their decline within the region, along with possible broader state-wide review of their conservation status for future protection.

- Enoggera
- Kedron Brook/Creek
- Scrubby
- Slacks
- Lower Bremer

'Environmental DNA determines urban stream syndrome effects on platypus persistence'



- Coarse organic matter = food source
- Overhanging vegetation = shelter and food source
- Topographic wetness = water resource
- Complex benthic substrate = food source

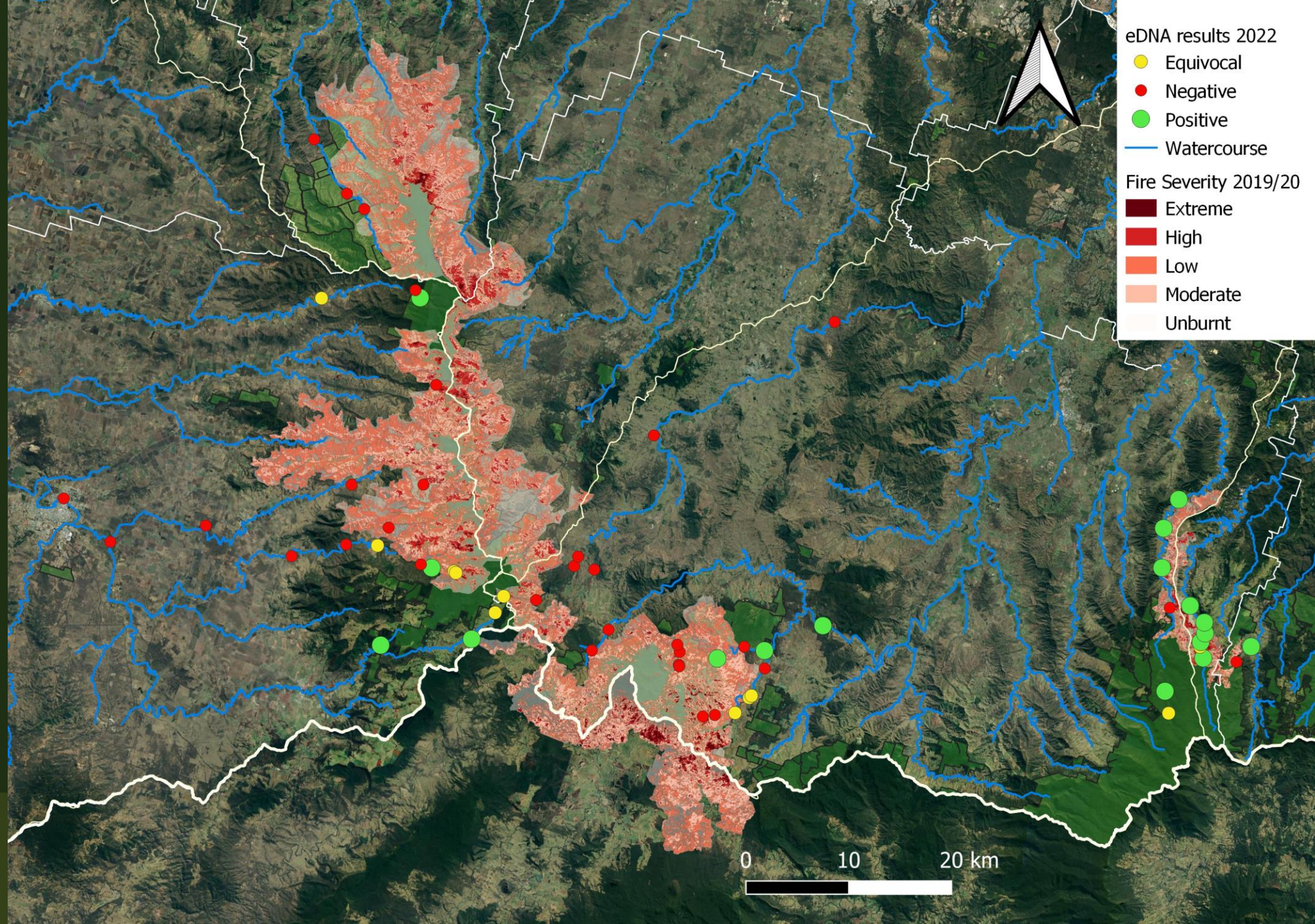
DO NOT DISTRIBUTE – NOT PUBLISHED

Further analysis

- 2023/2024 – Intensive eDNA surveys
- Determine abundance and occupancy modelling
 - % decline over time
 - Focused areas
- Understand what other habitat and environmental features are influencing platypus presence or absence in an area
 - Climate modelling
 - Flow regimes



Results – eDNA Bushfire Recovery



Platypus and bushfires

- Impact on habitat
- Lead up to potential bushfire event
 - Hot, dry conditions
 - Water, low to no flows
 - Refuge pools, shallow
- During a bushfire
 - Safe in burrows



Platypus and bushfires

- After bushfire
 - Runoff – ‘slugs’ of ash
 - Sediment
 - Erosion
 - Reduced vegetation coverage
 - no protection
- Impact food resources

Impacts of 2019/20 bushfires on platypus populations

Appendix 1. Photos of fire-affected sites.

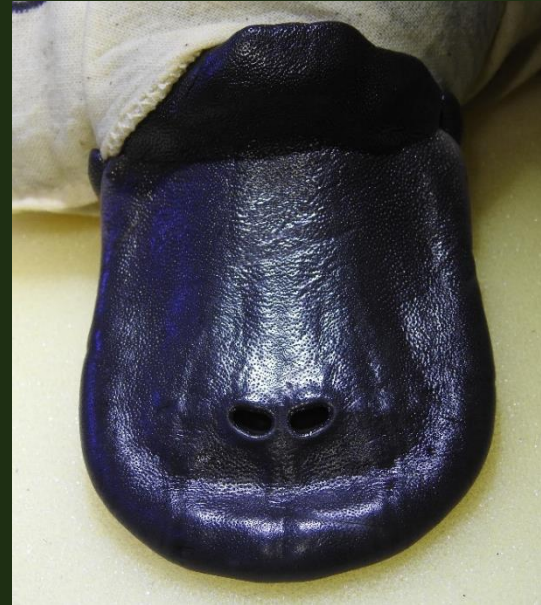


Griffiths et al. 2020

Waterbugs



Importance of Waterbugs!



Feeding

- Hearing and vision are of little use
- Rubbery bill to locate prey
- Electroreception – tiny pores
- Cheek pouches

Importance of Waterbugs!

- Sensitive to impact on waterways
- Determine Habitat Quality
- Different bugs
 - presence and number (count)
- SIGNAL rating
(Stream Invertebrate Grade Number
Average Level)
- Site SIGNAL score
- Order
 - Diptera – Mosquito
 - Odonata – Dragonfly
 - Ephemoptera – Mayflies
 - Trichoptera – Caddisfly
 - Decapoda – Crustaceans
 - Hemiptera – True bugs (water boatmen)

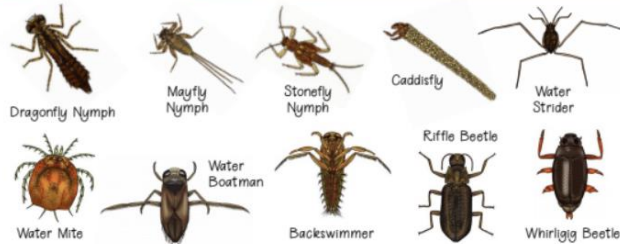
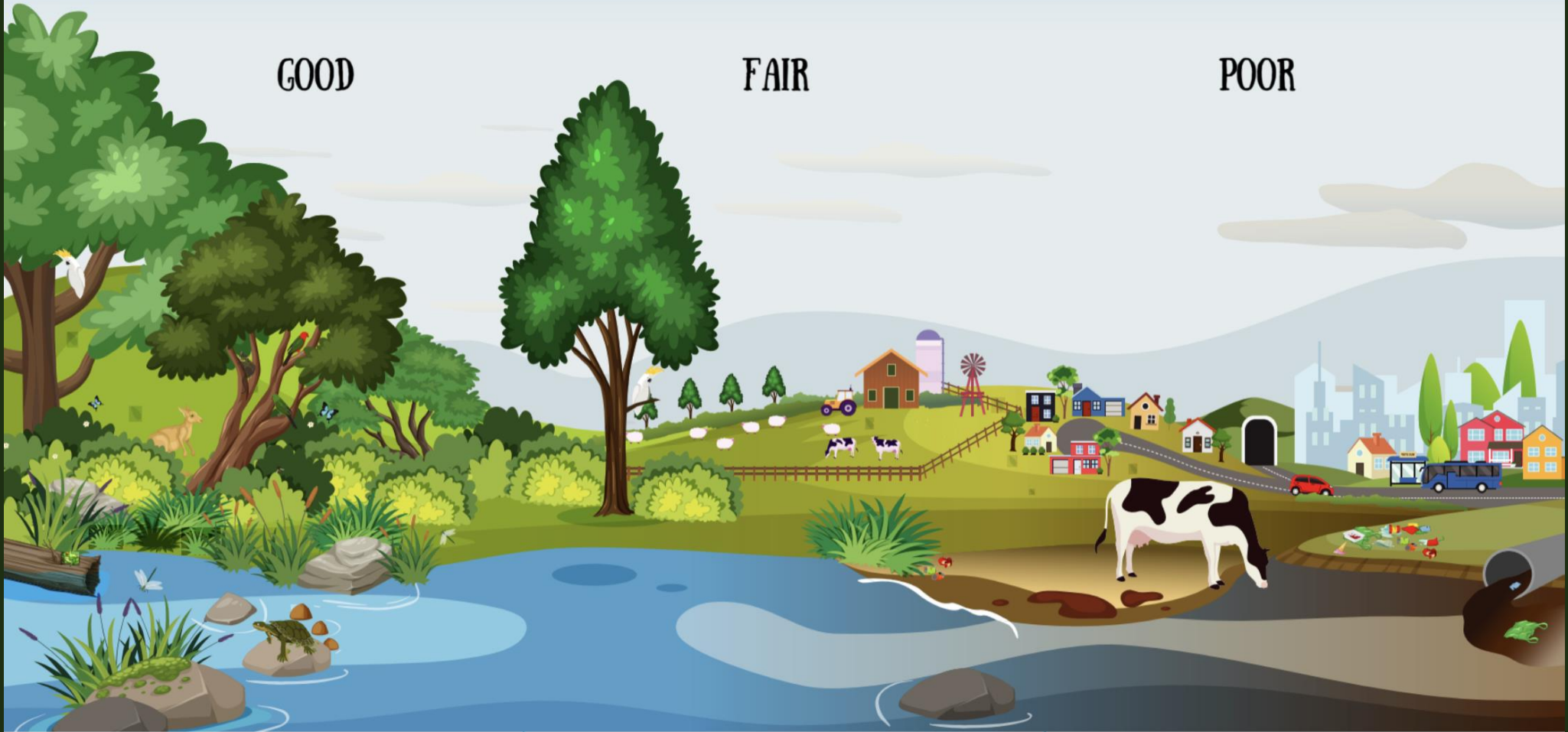


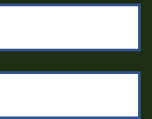
WATERBUGS ACROSS THE CATCHMENT

GOOD

FAIR

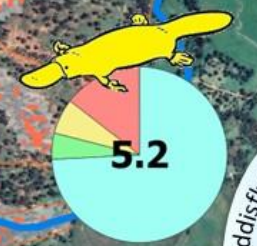
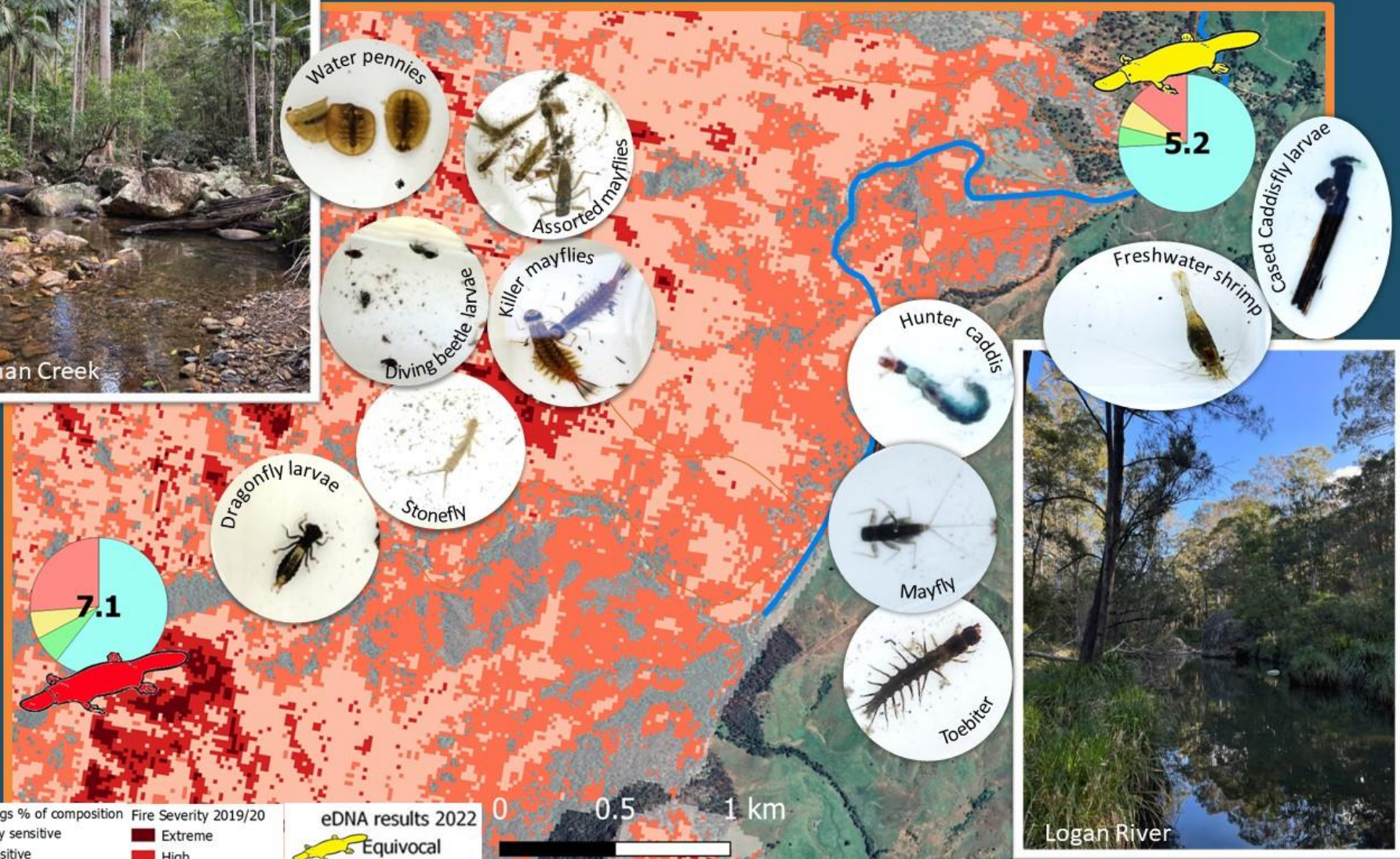
POOR





Mount Barney National Park

Mununjali, Wangerriburra and Ugurapul Country



Waterbugs % of composition

- Very sensitive
- Sensitive
- Tolerant
- Very tolerant
- Watercourse

Fire Severity 2019/20

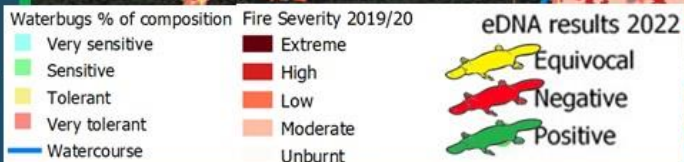
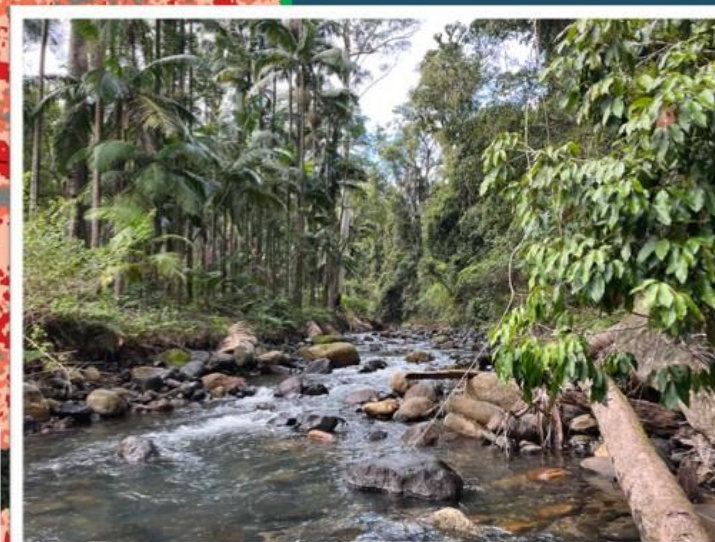
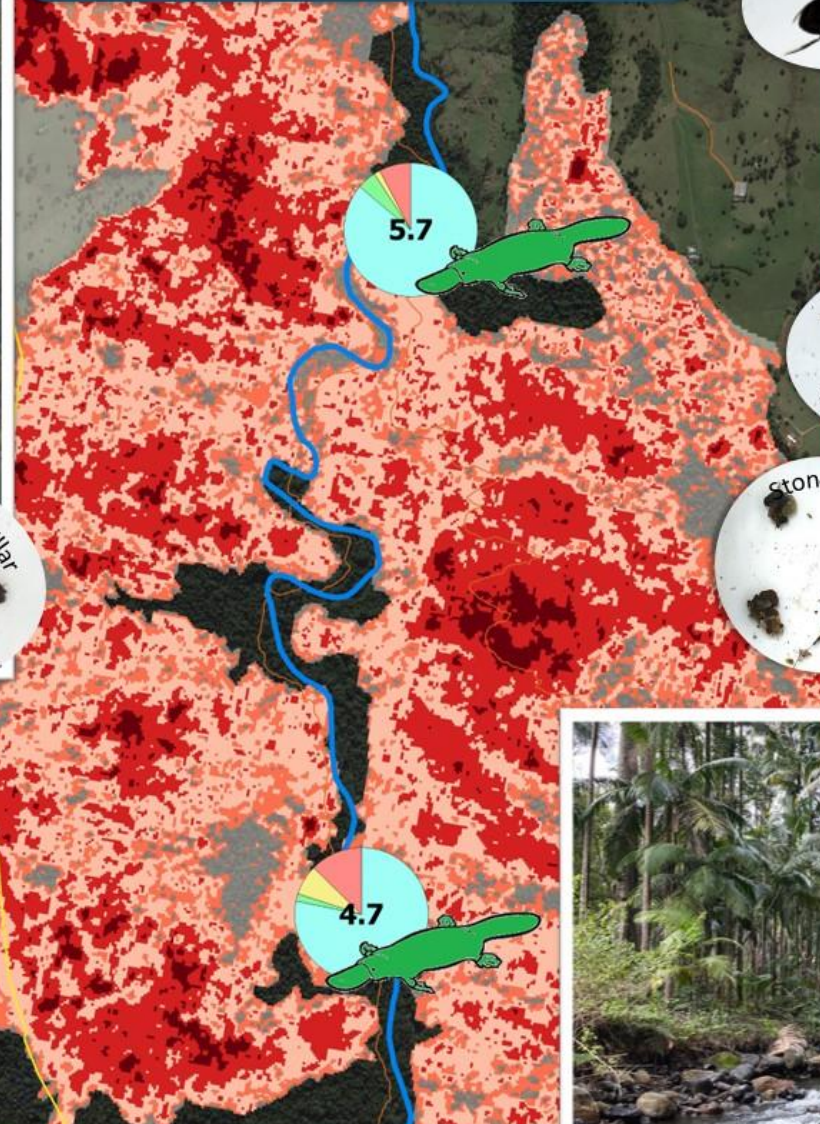
- Extreme
- High
- Low
- Moderate
- Unburnt

eDNA results 2022

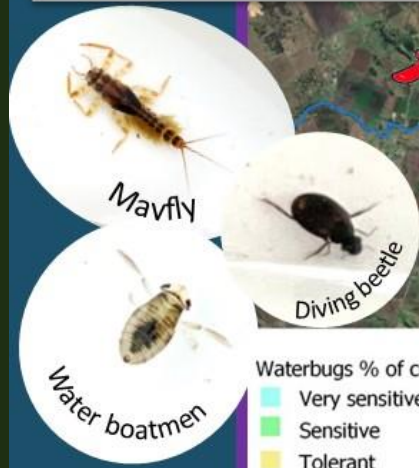
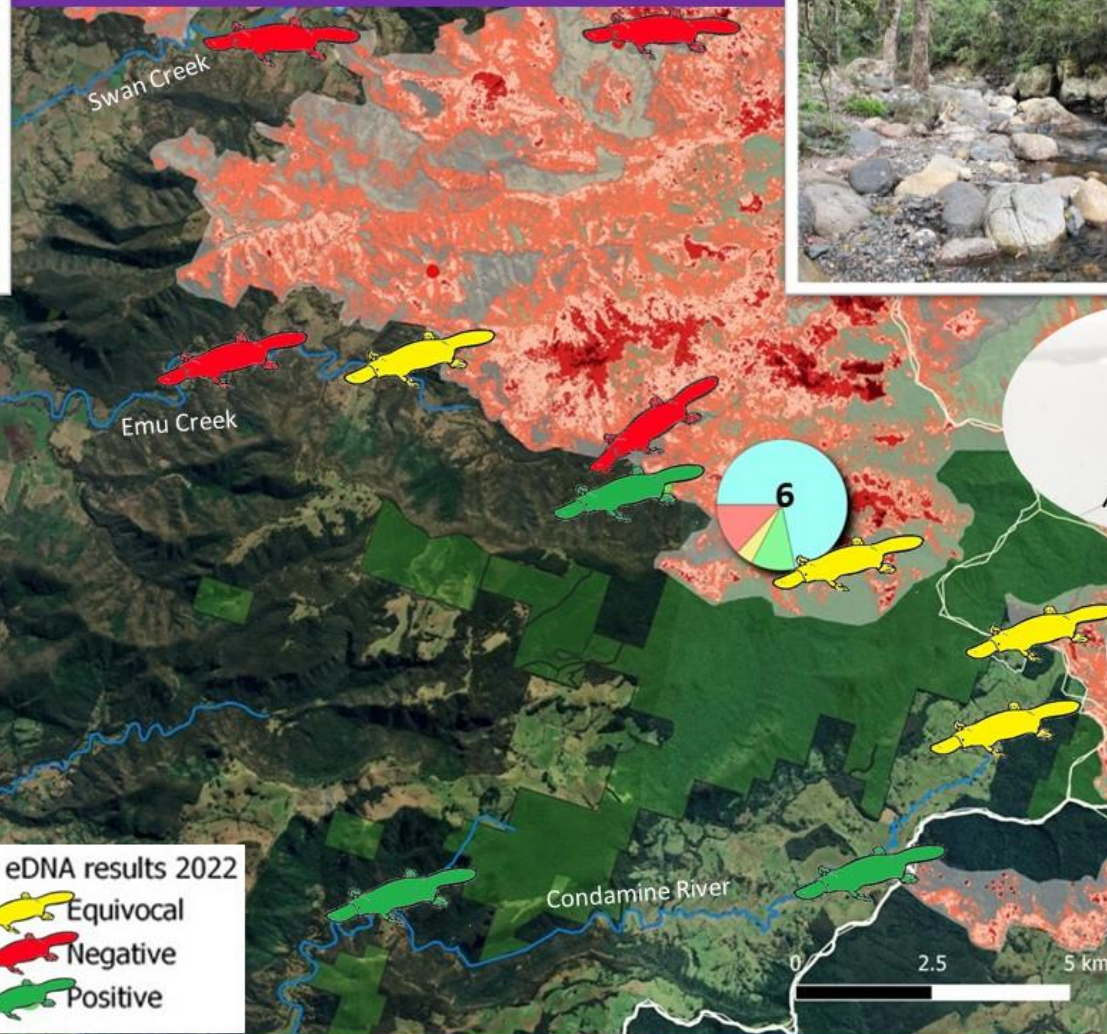
- Equivocal
- Negative
- Positive



Coomera River Lamington National Park
Woonoongoora
Yugambah Country



Emu Creek Main Range National Park Githabul Country



Waterbugs % of composition

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Fire Severity 2019/20

- Extreme
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- Moderate
- Unburnt

eDNA results 2022

- Equivocal
- Negative
- Positive





Looking to the future

- The data
 - Local management and rehabilitation
 - National database
- Ongoing monitoring and management
 - eDNA, observational
 - Rehabilitation
 - Innovations for future protection



Waterbug Blitz

1. Download App
2. Quick survey method
3. Creek site
 - Set up for sorting
 - Sweep net
4. Log waterbugs!
 - Look up the Order
5. Photos

Acknowledgements

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- Local Councils
 - Brisbane City Council
 - Ipswich City Council
 - Logan City Council
 - Gold Coast City Council
 - Redland City Council
 - Moreton Bay Regional Council
- Members, supporters, volunteers of WPSQ
- Brisbane Airport Community Fund
- Australian Geographic
- AMP Foundation, Tomorrow Maker 2020
- Queensland Government Bushfire Recovery 2022



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