

Overview of the ecology of the aquatic ecosystems of Barossa PWRA

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Overview

- Mainly seasonal rivers – rivers that have a natural cease to flow period over the dry months
- Some isolated sections of permanently flowing water
- Permanent pools



What we know about the aquatic ecosystems of the Barossa Valley

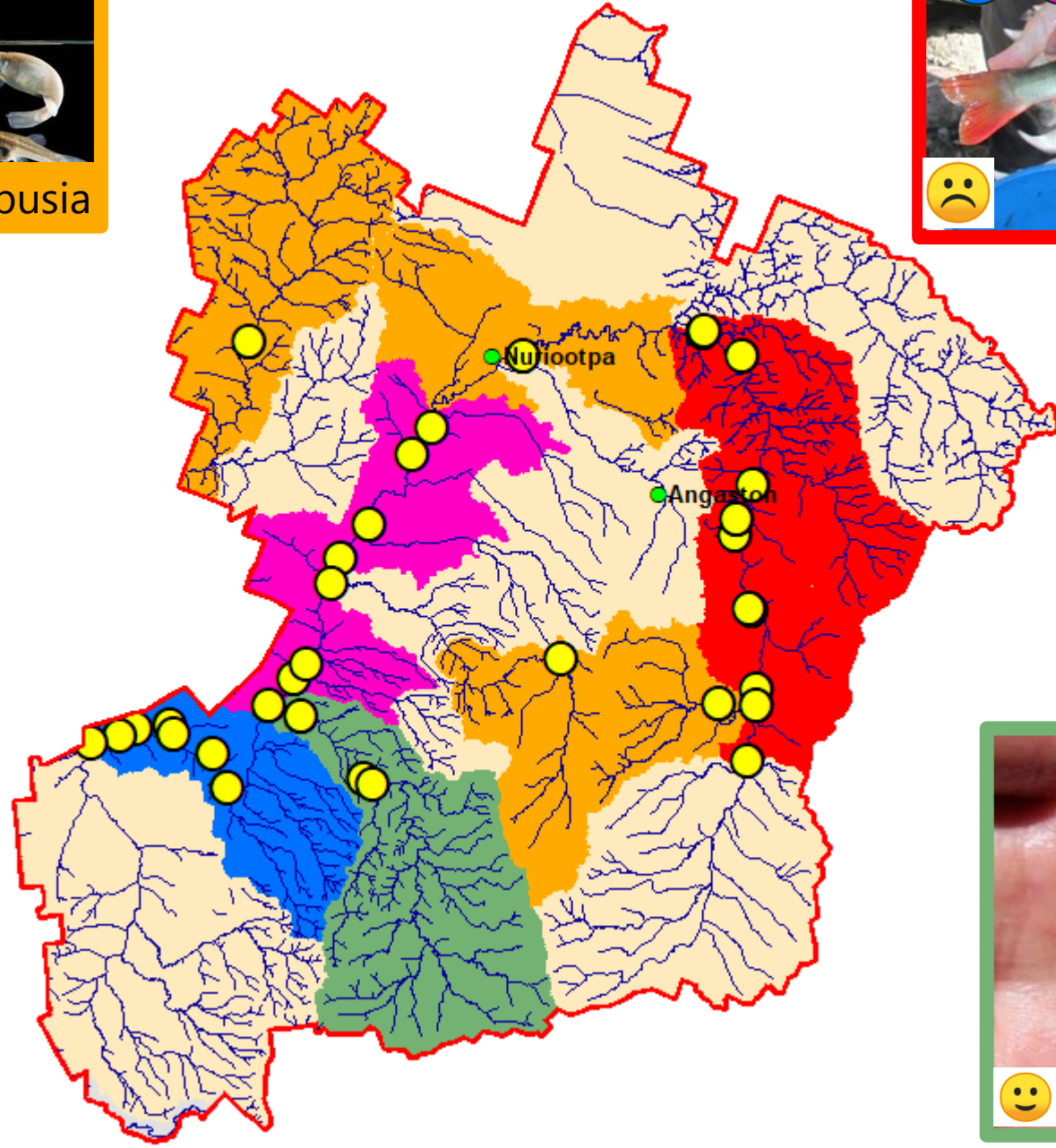
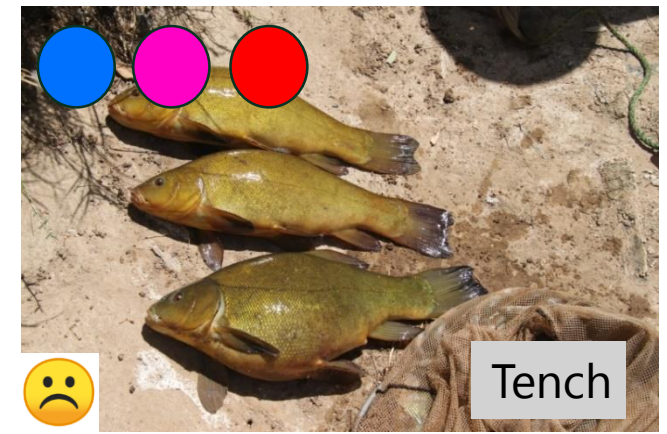
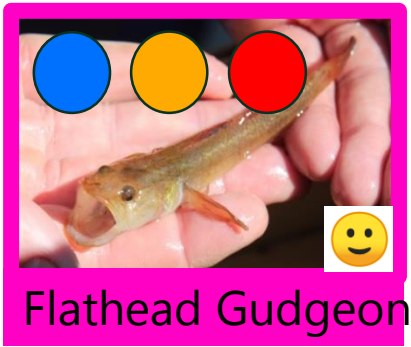
- Majority of sites are considered to be in a degraded state
 - Dominated by exotic species
 - Heavily impacted by land use change and water capture and extraction
- Isolated areas of good quality habitat
 - Jacob Creek – permanent flow



Fish

- Surveyed in 2013 and 2018
- Native species
 - Mountain Galaxias
 - Blue Spot Goby
 - Flathead Gudgeon
- Non Native species
 - ☠☠☠ • Redfin Perch
 - ☠☠☠ • Gambusia (aka Plague minnow)
 - ☠☠☠ • Carp
 - Goldfish
 - Tench
- Translocated
 - Silver Perch (dam escapee)
 - Carp Gudgeon





Updated information based on Jacob Creek Survey in 2022

- Mountain Galaxias survived the 2018-19 dry period (just)
- Recruitment in 2021 and 2022
- Also detected the first redfin perch in lower Jacob Creek



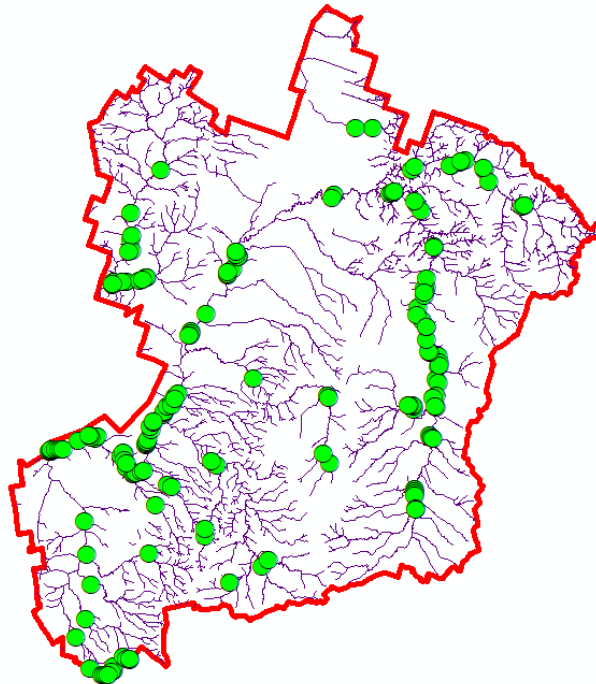
Waterbugs

- Limited survey effort across multiple years
 - Most recent 2021
 - 1 poor, 3 fair, 1 good
- Majority of bug community tolerant, common species
- Sites with flowing conditions for longer periods have more diverse communities (mayflies etc.)
- Jacob Creek (permanently flowing) contains very rare species (Water Pennies)



Vegetation

- Surveyed 2013
 - 163 sites across the area
- 99 species of plant recorded in the riparian zone
 - 55 exotic species
 - 44 native species
- Very little true riparian habitat left



Condition summary

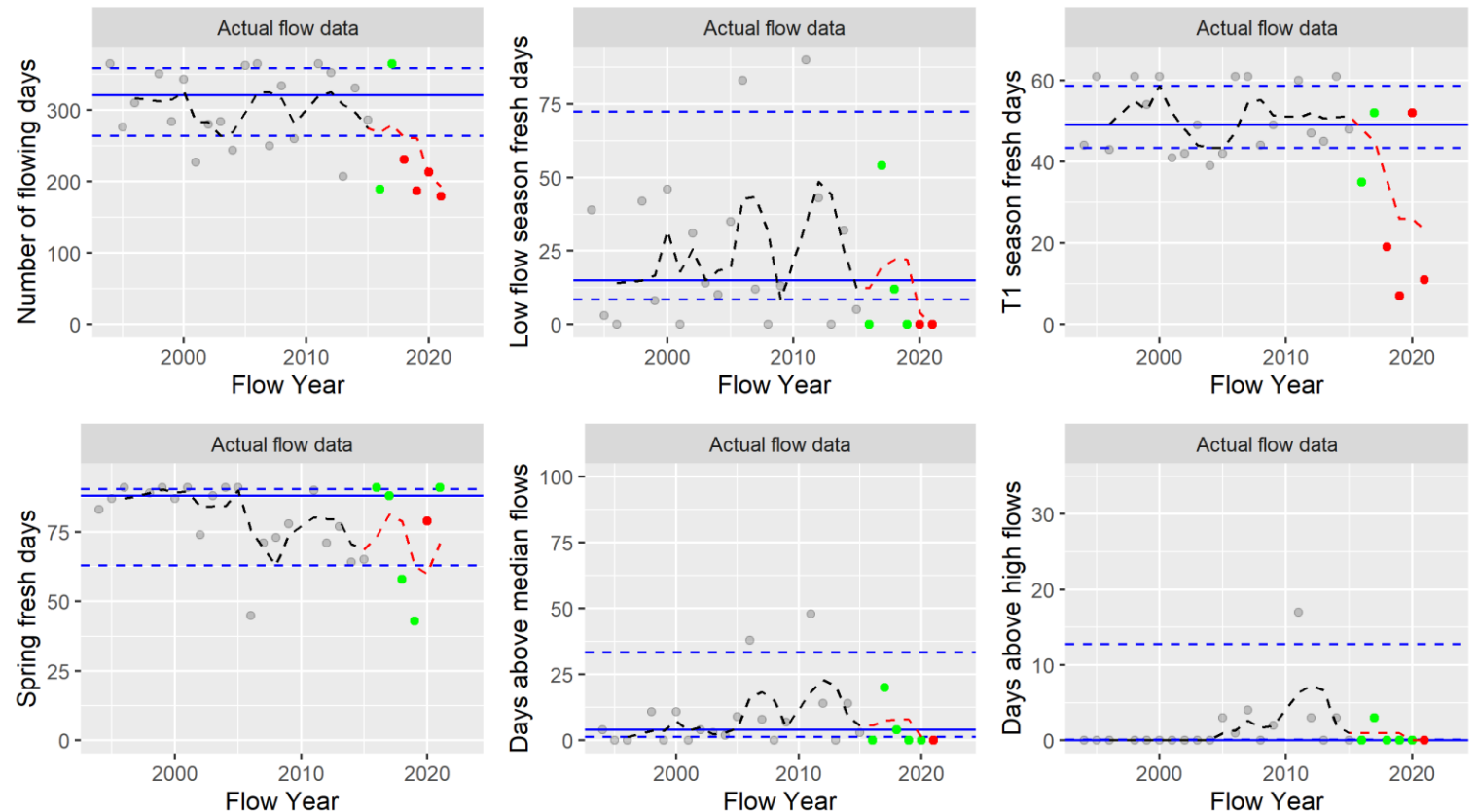
- Overall community condition is considered to be degraded
 - Due to multiple factors – considered principal among these is water resource development
- Areas with greater streamflow show better diversity and condition
- Little evidence as to how overall condition responded to the dry 2018/19 period
- Waterbug trend assessment shows a stable trend for three sites assessed
 - Tanunda Creek gauge, Jacob Creek Gauge, Yaldara Gauge
 - Against an increasing trend across the state since 2008

Hydroecology

- We have strong evidence for connection between flow regime and ecological condition
 - Scientific literature
 - Previous modelling reports (Mt Lofty Range WAP science)
 - Barossa specific modelling (fish response models)
 - Conceptual understanding
 - On ground data
- More flow for longer periods = better for the aquatic ecosystems
 - More diverse, more sensitive species, less alien species

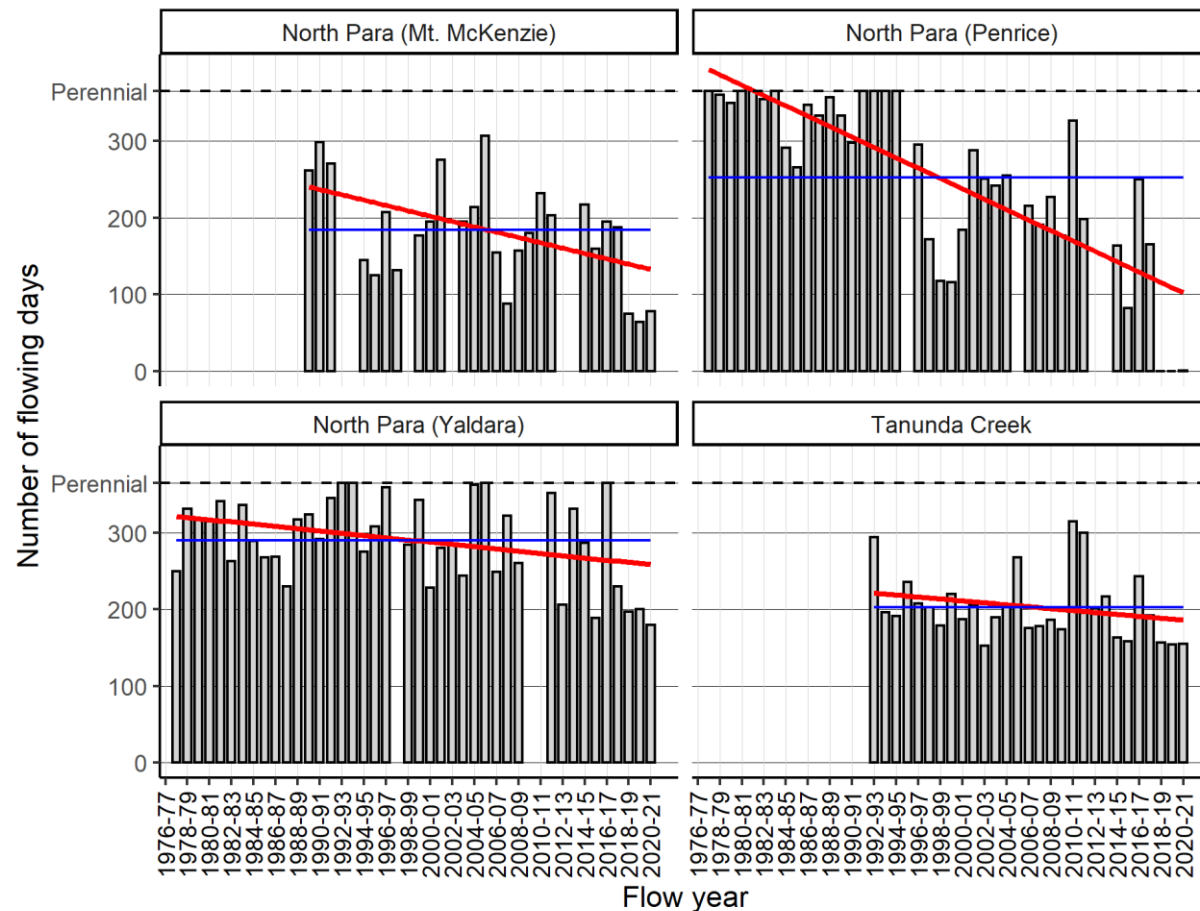
Using flow as a window into ecology

- Suitable flow regimes for current ecosystems
 - Break the flow regime down into key parts
 - Assess these using flow metrics



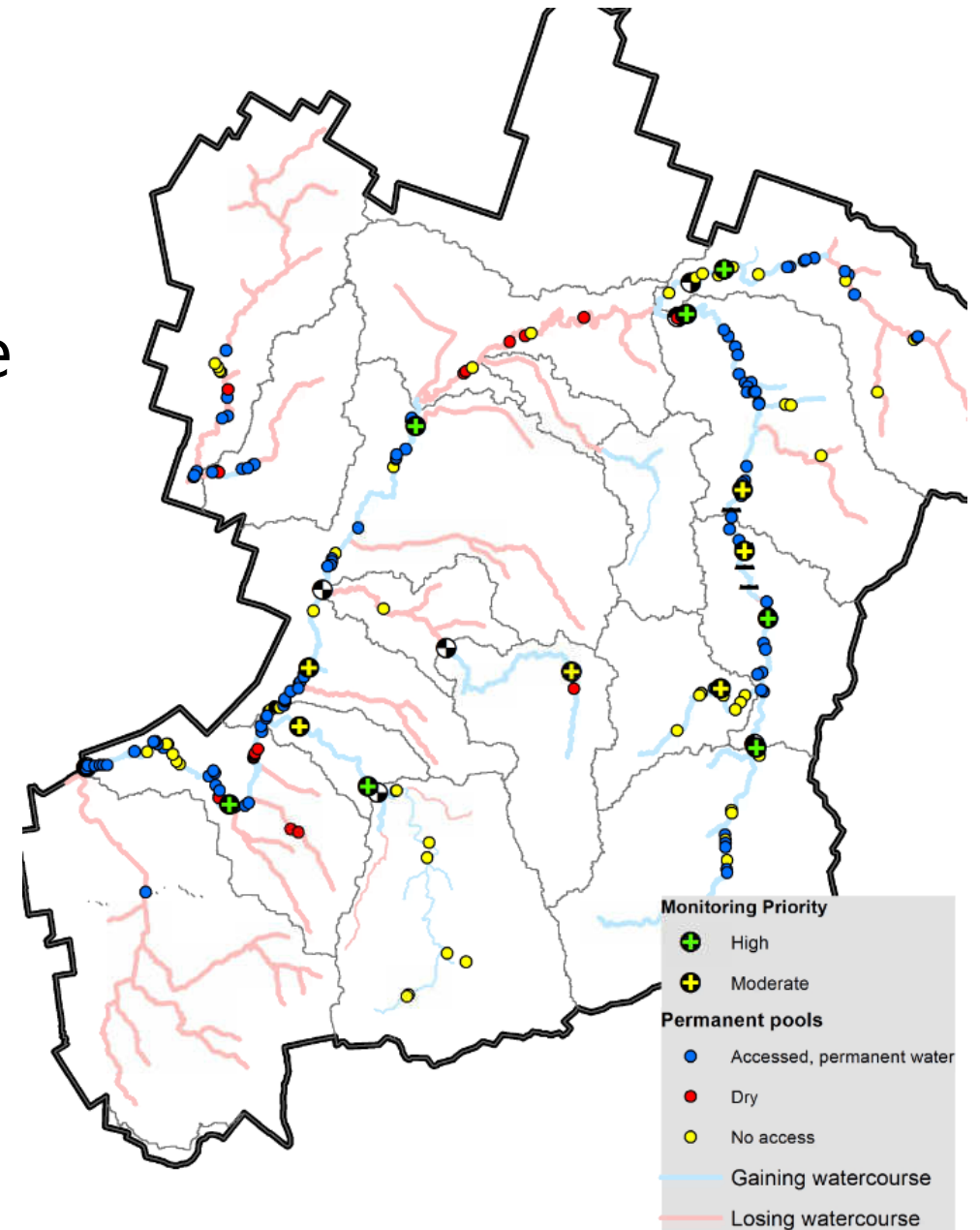
Focus on cease to flow periods

- Cease to flow periods is described as the master variable in driving aquatic ecosystem condition
- Heavily impacted by dam development
- Key interaction point between groundwater and surface water



Proposed monitoring

- There is a need to understand how the aquatic ecosystems respond to the high variability experienced over the last decade
- Monitoring both physical habitat and ecology
 - Permanent pools
 - Flow regime
 - Fish
 - waterbugs



Take home messages

- Aquatic ecosystems of the Barossa Valley are considered to be degraded with lower than expected species diversity, high numbers of alien plants and animals and impacted flow regimes
- Water resource development has a significant impact on the flow regime which drives ecosystem condition
- 2018-present highly variable period including driest years on record – unclear how the ecosystems will respond
- Managing water to improve the flow regime would reduce the risk of degradation of aquatic ecosystems



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