Photo by Todd AW

Baroota Creek Tree Condition Surveys

December 2022 – October 2025

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Project Context

Data is collected and evaluated in the context of the Baroota Prescribed Water Resources Area draft Water Allocation Plan (WAP), which specifies an Ecological Objective of:

> ***the maintenance of existing river red gum trees along the watercourse, such that they provide the habitat structure, cultural outcomes and amenity to the watercourse corridor suitable for fauna and the community***

What: Visual assessment of River Red Gum condition

Where: 8 condition monitoring sites downstream of reservoir

When: Dec 2022, Nov 2023, Nov 2024, Oct 2025

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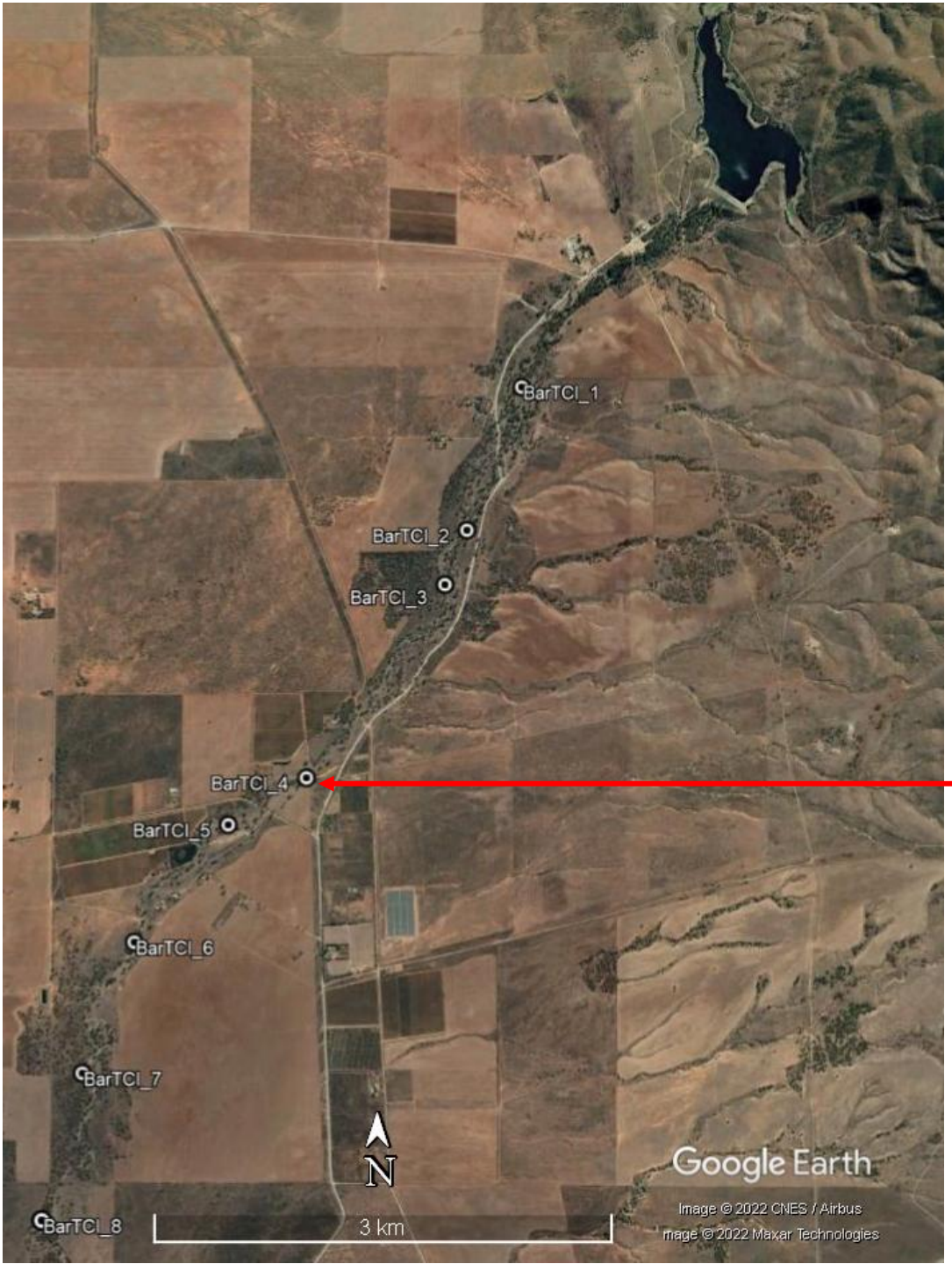

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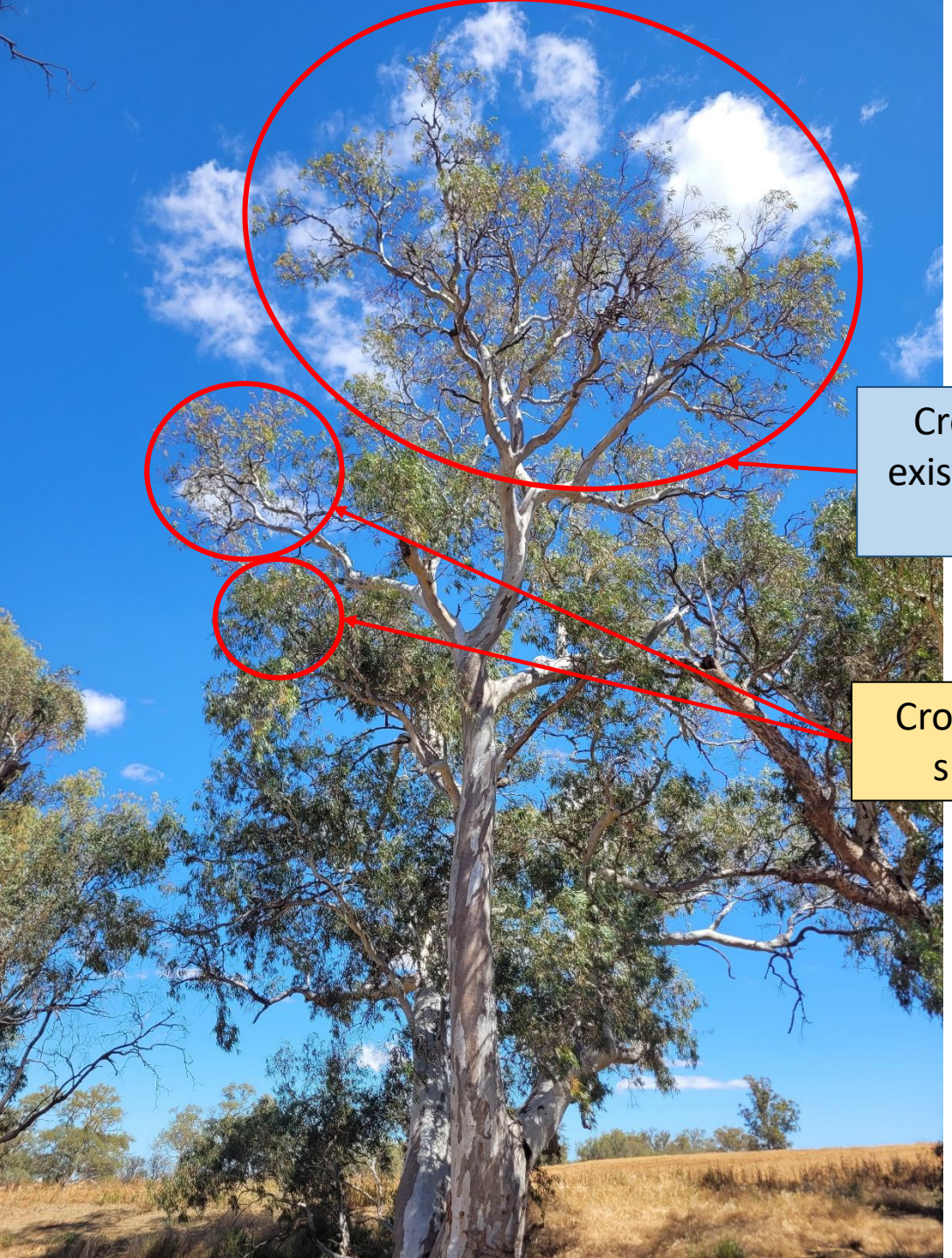
Visual assessment of River Red Gum condition



How:
- 30 trees per site
- assessment of Crown Extent and Crown Density
- indicator of tree vigour

Crown Extent (CE) = % of existing branching structure supporting foliage

Crown Density (CD) = % of sky blocked by foliage

→ Tree Condition Index (TCI = CE + CD)

Why: Assess and report condition (change over time) relative to:
- Ecological Target,
- Asset Condition Limit, and
- Management Threshold for delivery of environmental water

Conceptual model of stress-recovery (state transition model) for riverine eucalypts

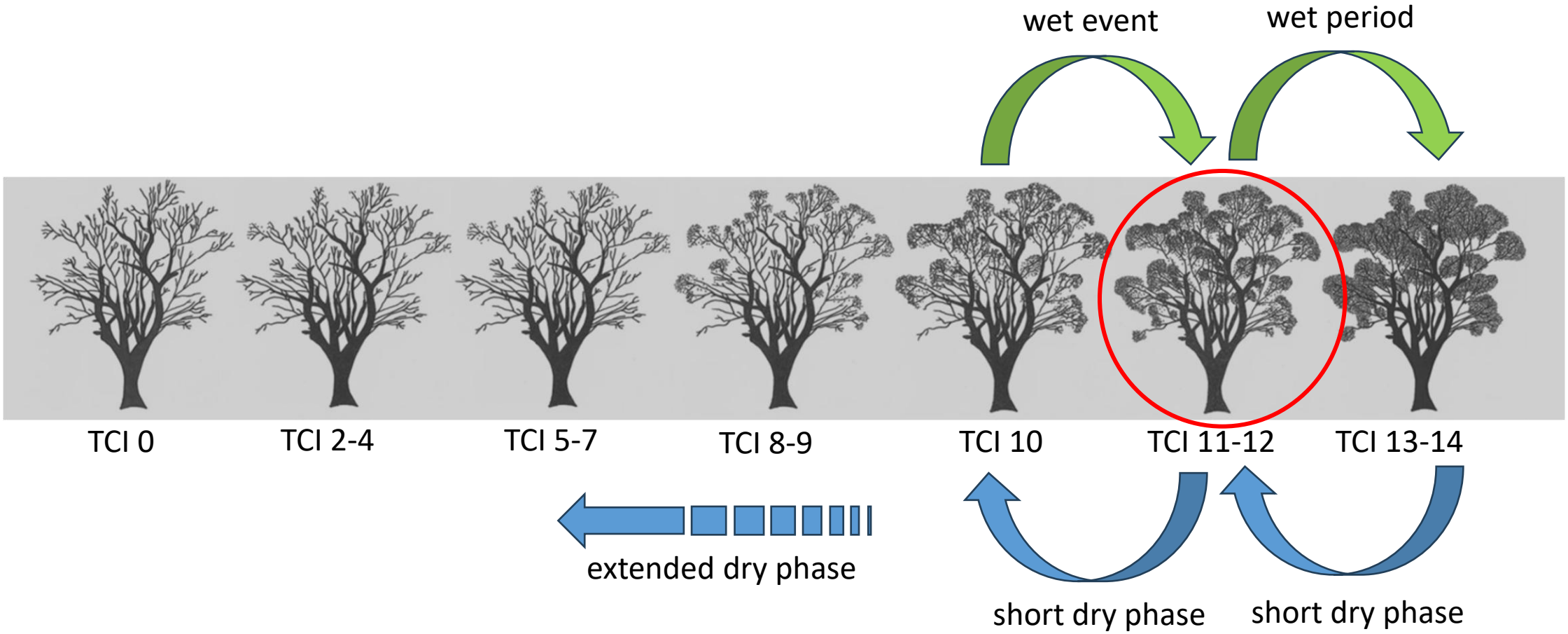
TCI 8-9 TCI 10 TCI 11-12 TCI 13-14

The benchmark condition for “desired” stable state is taken to be a TCI score of ≥12:

- a crown extent of ≥95% (CE score = 7)
- a crown density of ≥75% (CD score ≥5)

Tree images from Souter et al., (2010)

Conceptual model of stress-recovery (state transition model) for riverine eucalypts



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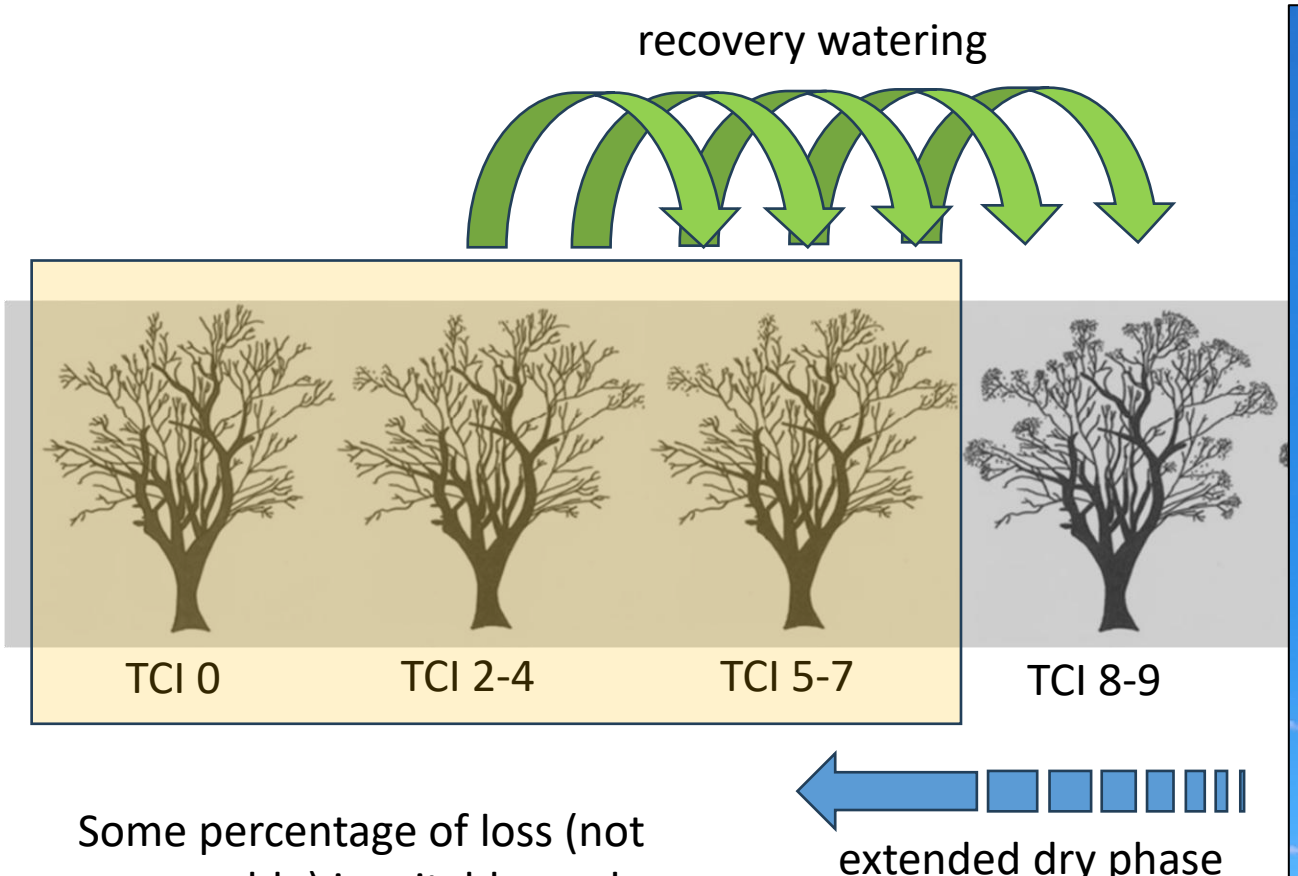
Conceptual model of stress-recovery (state transition model) for riverine eucalypts



Some percentage of loss (not recoverable) inevitable, and a decline in functional habitat; semi-permanent inability to achieve benchmark condition

Rating of condition of individual sites

Environmental Target: 90% of the river red gum trees need to maintain a TCI of ten or greater

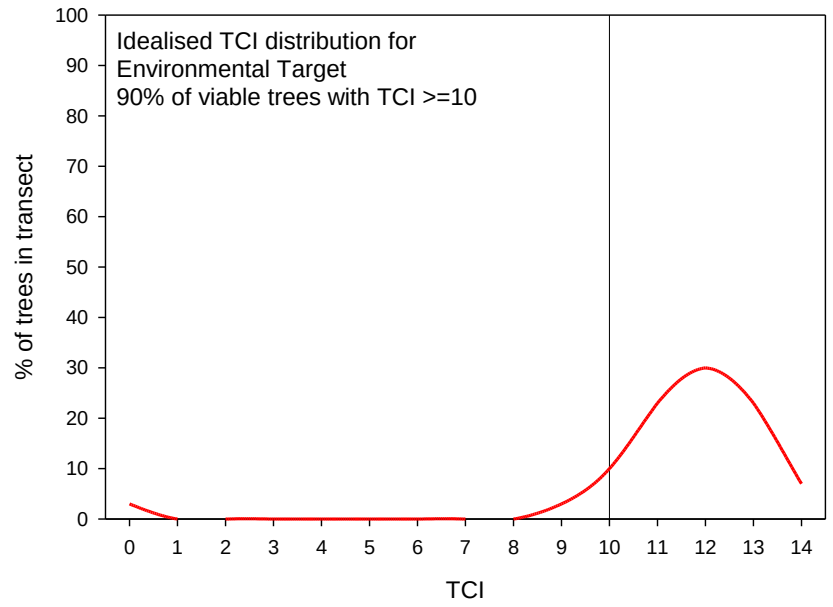
If the trees are failing the target, then additional watering should be considered

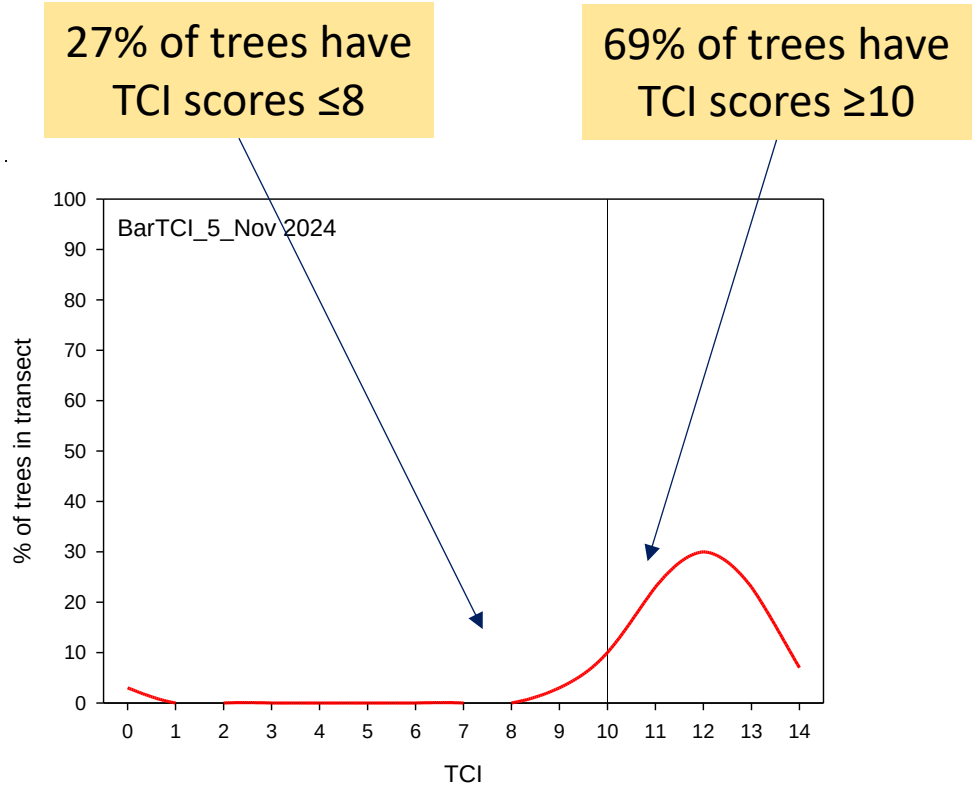
Asset condition limit: At least 80% of the trees to have a TCI of greater than eight

Should this limit be breached, the time since previous inundation or watering event is irrelevant and an EWP should occur by the end of the following winter (NYLB 2022).

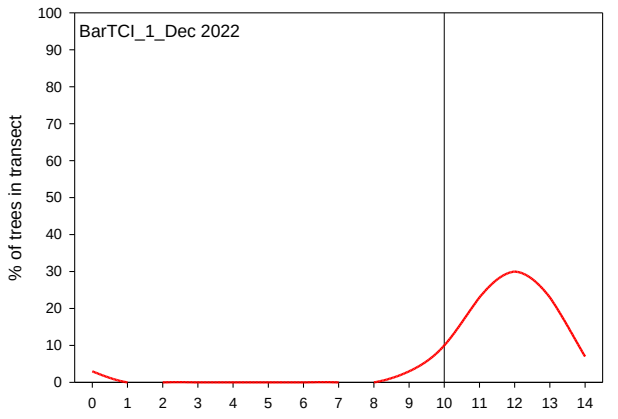
Management Threshold: More than 10% of established viable trees with DBH > 10 cm receive TCI scores ≤8

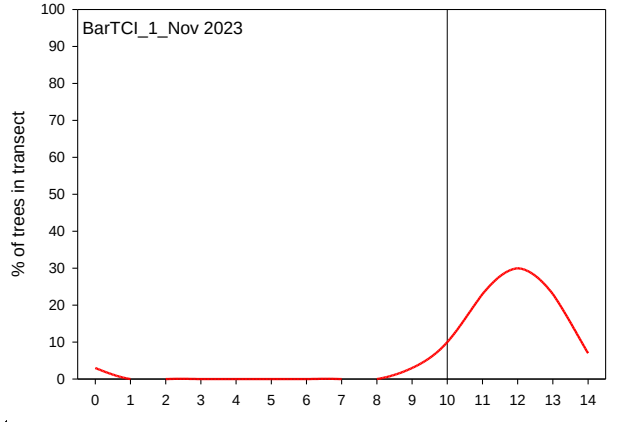
Threshold that triggers earlier action, to limit the potential for long-term or potentially irreversible damage, and improve the potential to achieve, and subsequently maintain the Ecological Objective

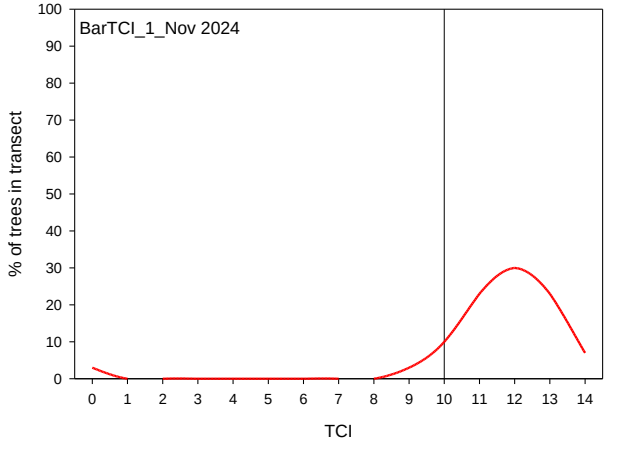




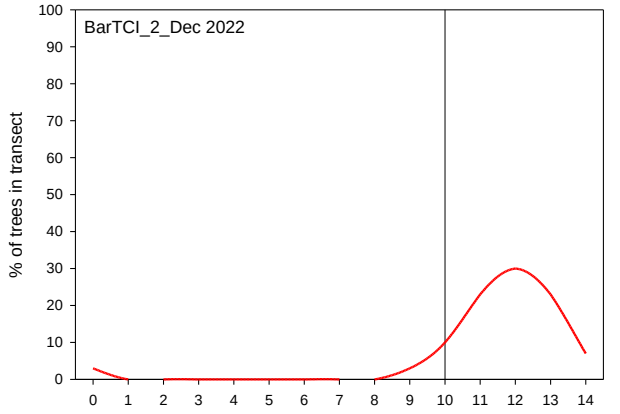
Baroota Creek Transect 1

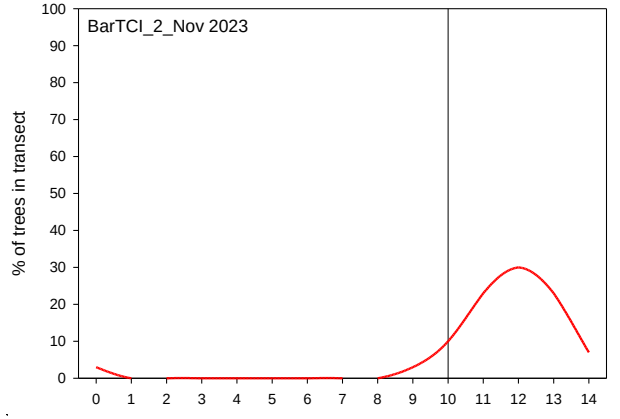


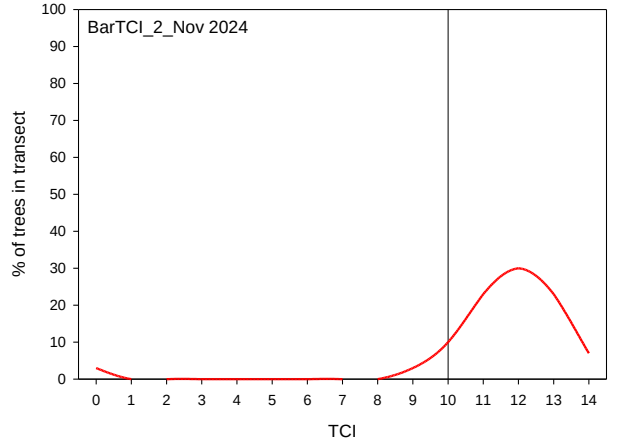




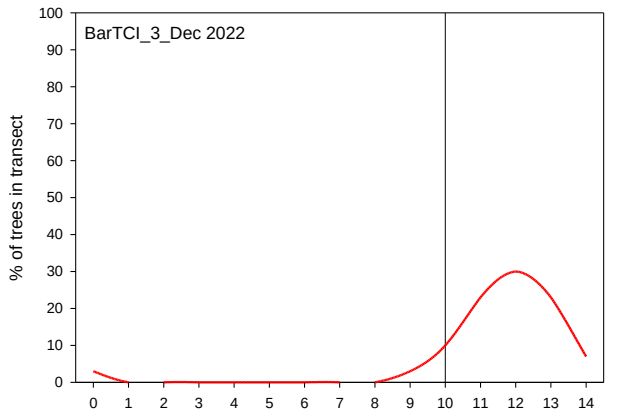
Baroota Creek Transect 2

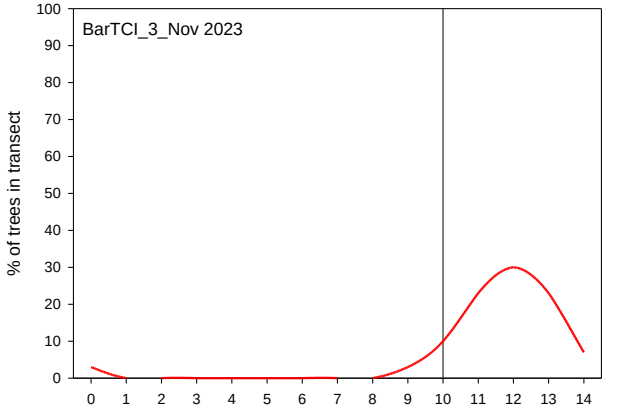


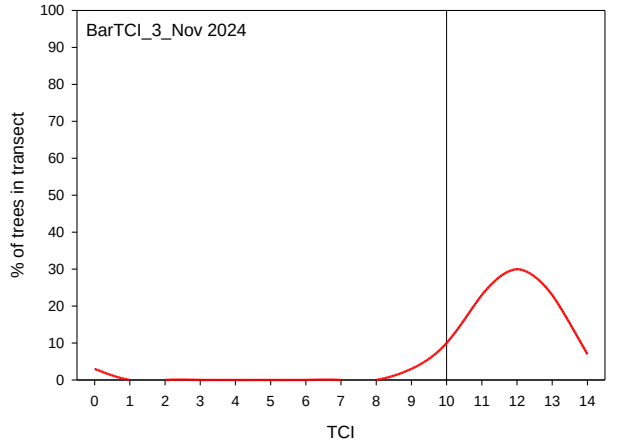




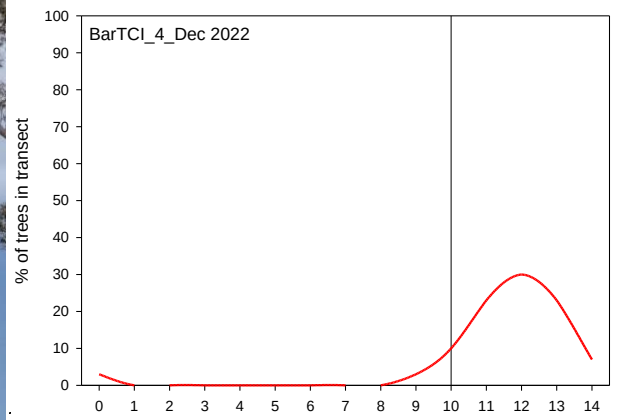
Baroota Creek Transect 3

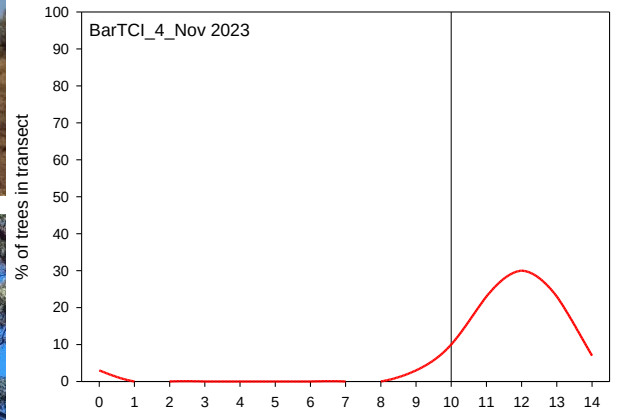


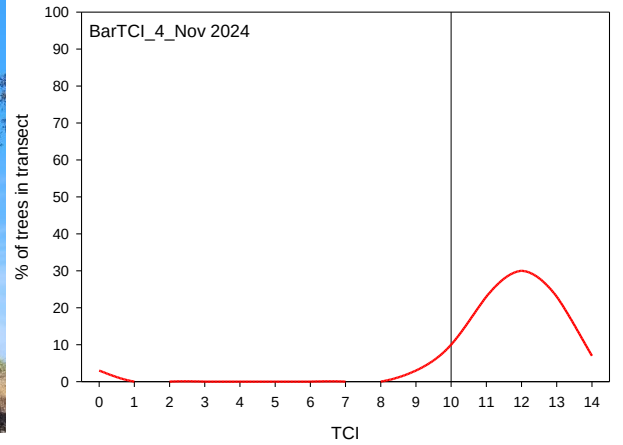




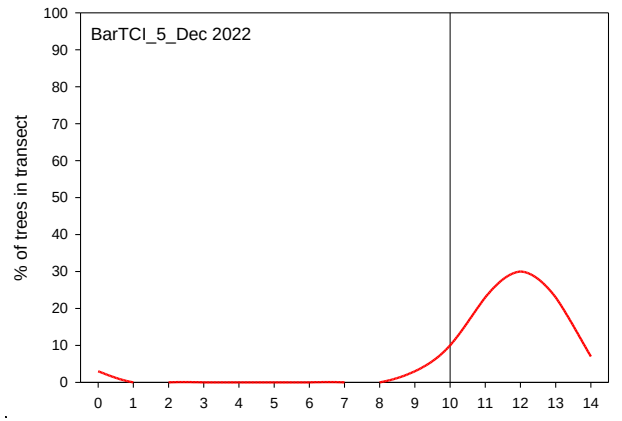
Baroota Creek Transect 4

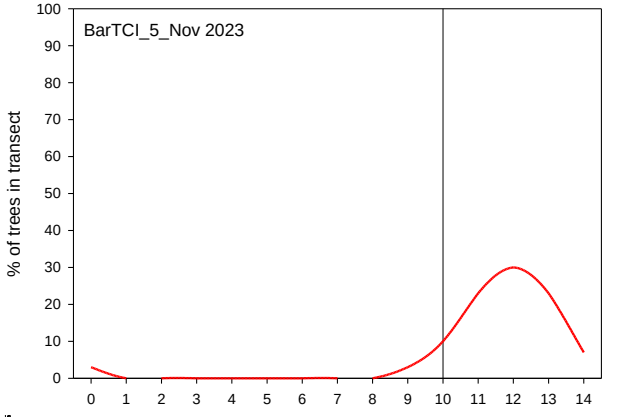


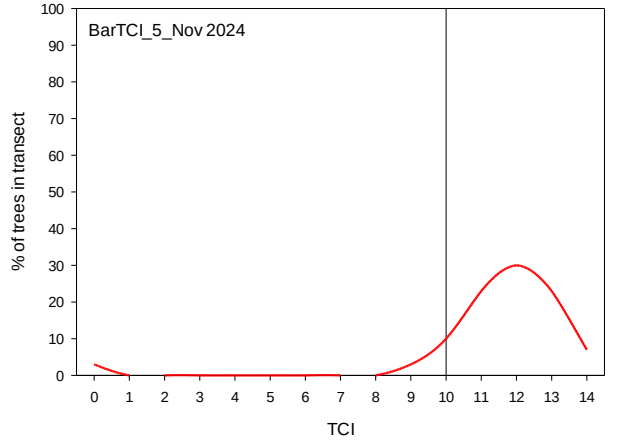




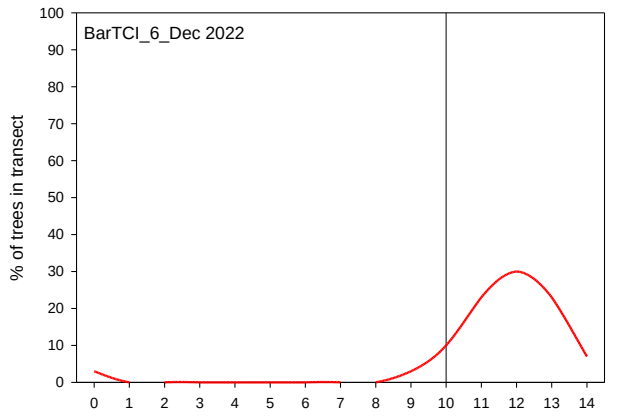
Baroota Creek Transect 5

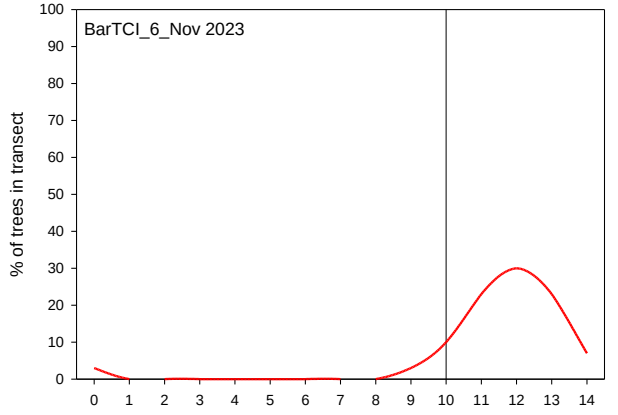


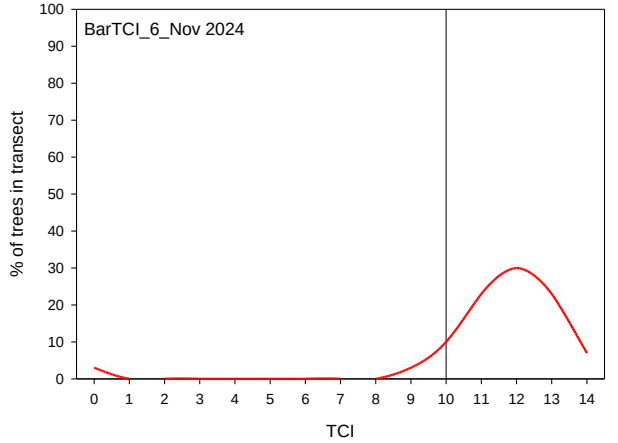




Baroota Creek Transect 6







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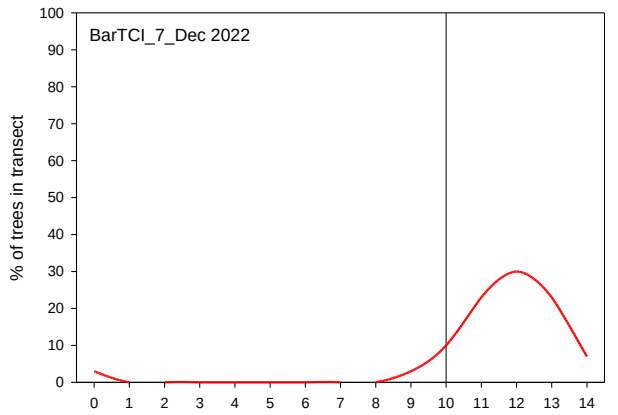

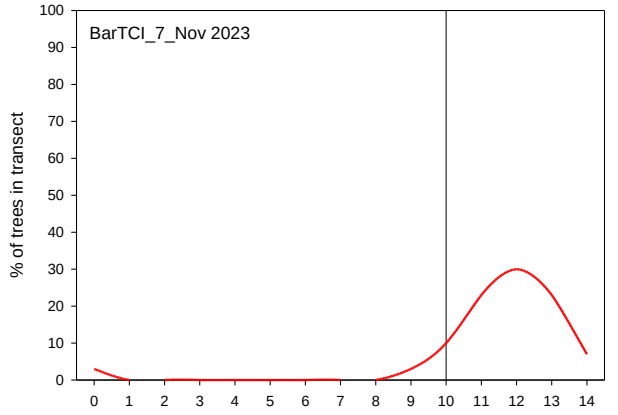

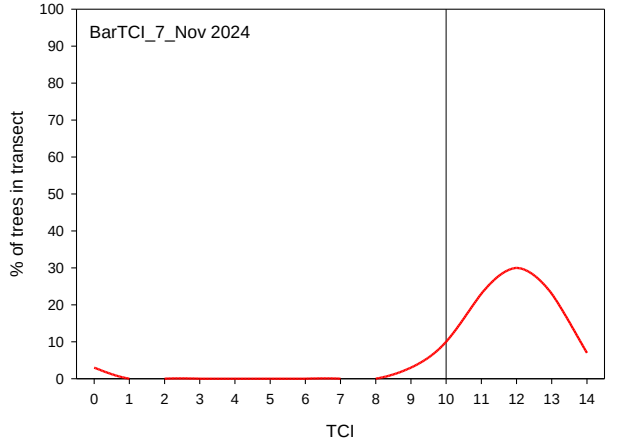

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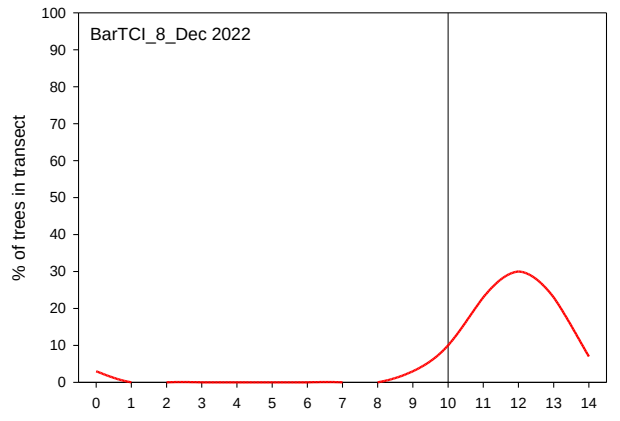

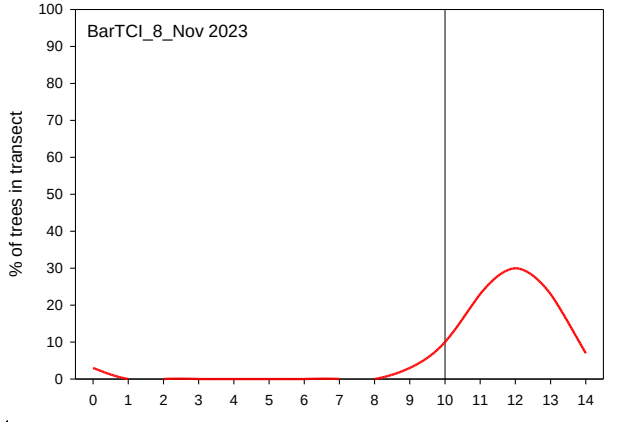

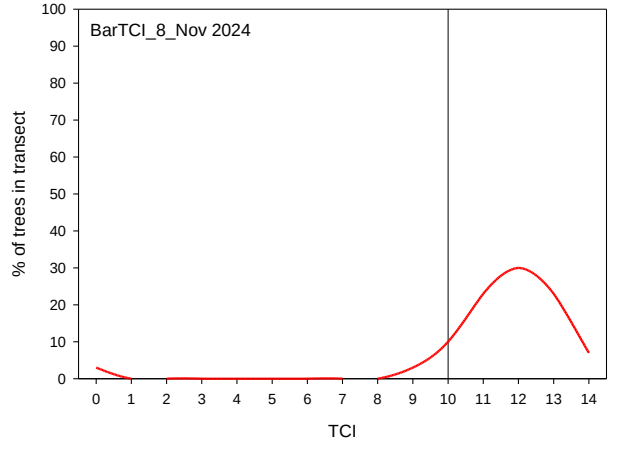

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If the trees are failing the target, then additional watering should be considered

Transect	Dec-22	Nov-23	Nov-24	Oct-25
BarTCI_1	81	85	**93**	**93**
BarTCI_2	81	85	88	88
BarTCI_3	89	89	**93**	**93**
BarTCI_4	64	56	78	77
BarTCI_5	62	65	69	54
BarTCI_6	89	82	**96**	79
BarTCI_7	**90**	**90**	**90**	**90**
BarTCI_8	66	62	66	66

Asset condition limit: At least 80% of the trees to have a TCI of greater than eight

Should this limit be breached, the time since previous inundation or watering event is irrelevant and an EWP should occur by the end of the following winter (NYLB 2022).

Transect	Dec-22	Nov-23	Nov-24	Oct-25
BarTCI_1	96	96	96	96
BarTCI_2	100	100	100	100
BarTCI_3	93	93	93	96
BarTCI_4	86	81	89	92
BarTCI_5	92	92	92	85
BarTCI_6	96	96	96	96
BarTCI_7	100	100	100	100
BarTCI_8	93	93	93	93

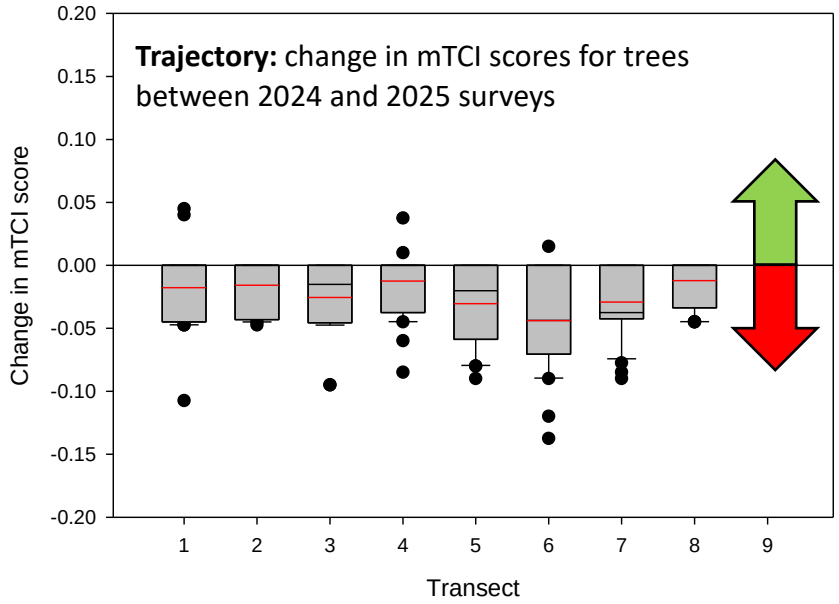
Management Threshold: More than 10% of established viable trees with DBH > 10 cm receive TCI scores ≤8

Threshold that triggers earlier action, to limit the potential for long-term or potentially irreversible damage, and improve the potential to achieve, and subsequently maintain the Ecological Objective

Transect	Dec-22	Nov-23	Nov-24	Oct-25
BarTCI_1	11	11	4	4
BarTCI_2	4	4	4	4
BarTCI_3	7	7	4	4
BarTCI_4	25	22	11	8
BarTCI_5	27	31	27	27
BarTCI_6	7	7	4	4
BarTCI_7	0	0	0	0
BarTCI_8	17	17	14	14

Next steps

- Flows have been effective
- Evidence of tree growth (diameter)
- Note crown “thinning” between 2024 and 2025
- Push flows to site 6
- Why is site 7 different – accessible groundwater?
- Support recruitment flows:
  - no trees <20cm DBH at sites 2, 4, 6 and 7.
  - flowering noted in November 2024
  - bud formation in October 2025



Acknowledgments

"I acknowledge First Nations people as Australia's first ecologists. They made observations, formed theories, and experimented to understand the relationships between climate, chemistry and biology, and found ways to care for our unique country for thousands of generations. I respect elders past and present and appreciate the deep value of their knowledge."

Nukunu people – care of country, site access, participation in training workshops
Landholders - site access
Jennifer Munro – Project Management
Dr Eddie Banks – project cross-over and collaboration

LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

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