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# Murky waters running clearer? Monitoring, reporting and evaluation of the state of the Murray–Darling Basin after more than three decades of policy reform

Matthew J. Colloff, Kate Lanyon, Jamie Pittock, Milo Costanza-van den Belt, Sarah Wheeler, R. Quentin Grafton, John Williams, Fran Sheldon, Richard Kingsford, Gilad Bino, Luigi Renzullo and Brad Moggridge

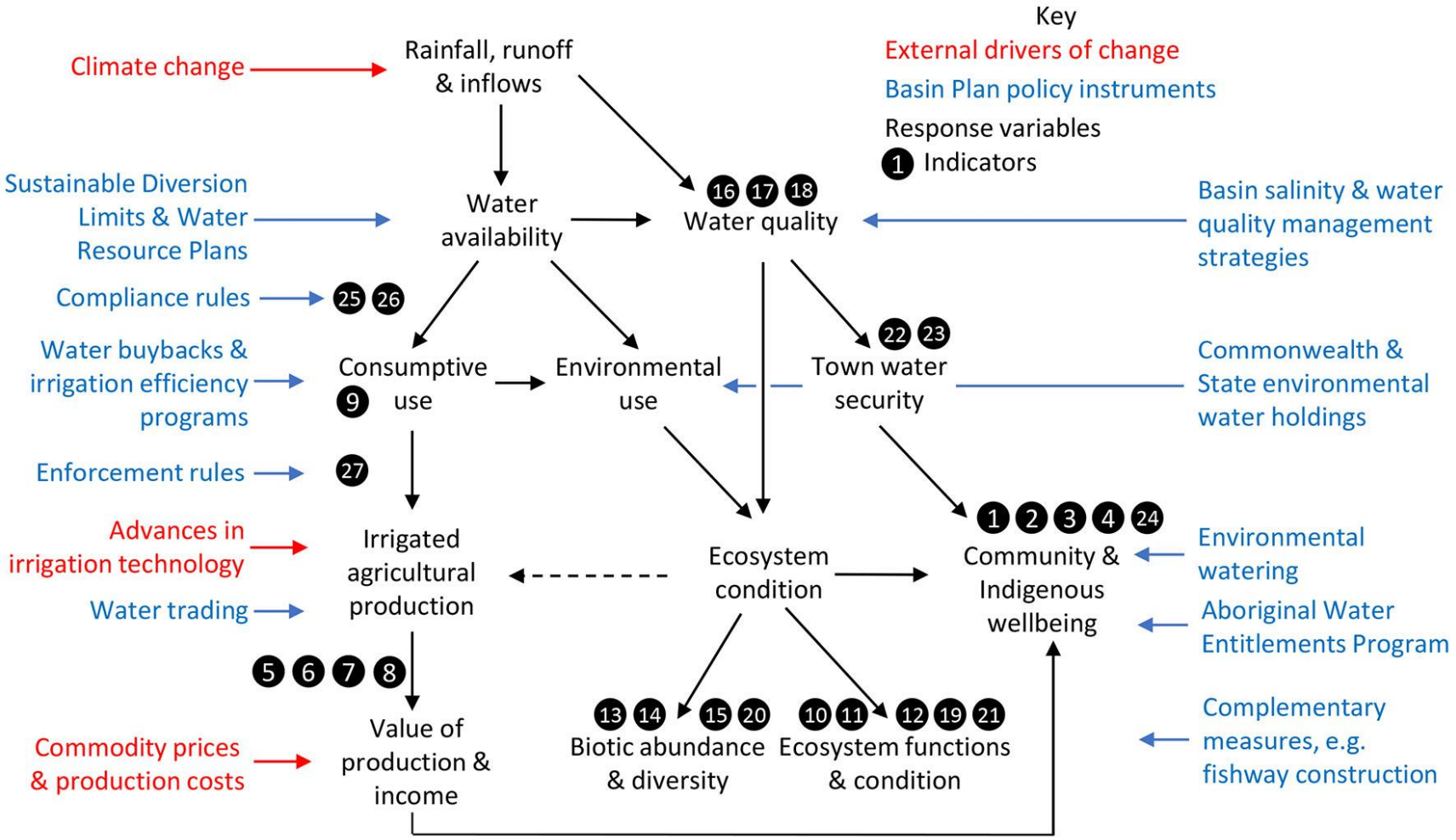
Matthew.Colloff@anu.edu.au

# State of the Basin report – methods

- An independent assessment of progress on the Basin Plan is needed. Otherwise it is MDBA marking its own homework;
- Model for State of the Basin was Australia's Environment Report by Albert van Dijk & colleagues;
- 27 indicators, with targets: 2 Indigenous; 7 economic; 12 environmental; 3 social, 3 compliance & enforcement;
- Main criteria for selection: 1) data publicly available; 2) indicators & targets relate objectives in the *Water Act* and Basin Plan; 3) provide evidence of progress towards desired outcomes; 4) data updated regularly; 5) indicators show increases or decreases over time;
- Indicators are in the form of time series, mostly pre-dating the implementation of the Basin Plan in 2012;
- Indicators were assessed as improving, declining or variable but showing no trend.

# State of the Basin report – methods

Drivers of change, policy instruments and response variables and the respective Indigenous, economic, environmental social and compliance indicators



# Indigenous theme

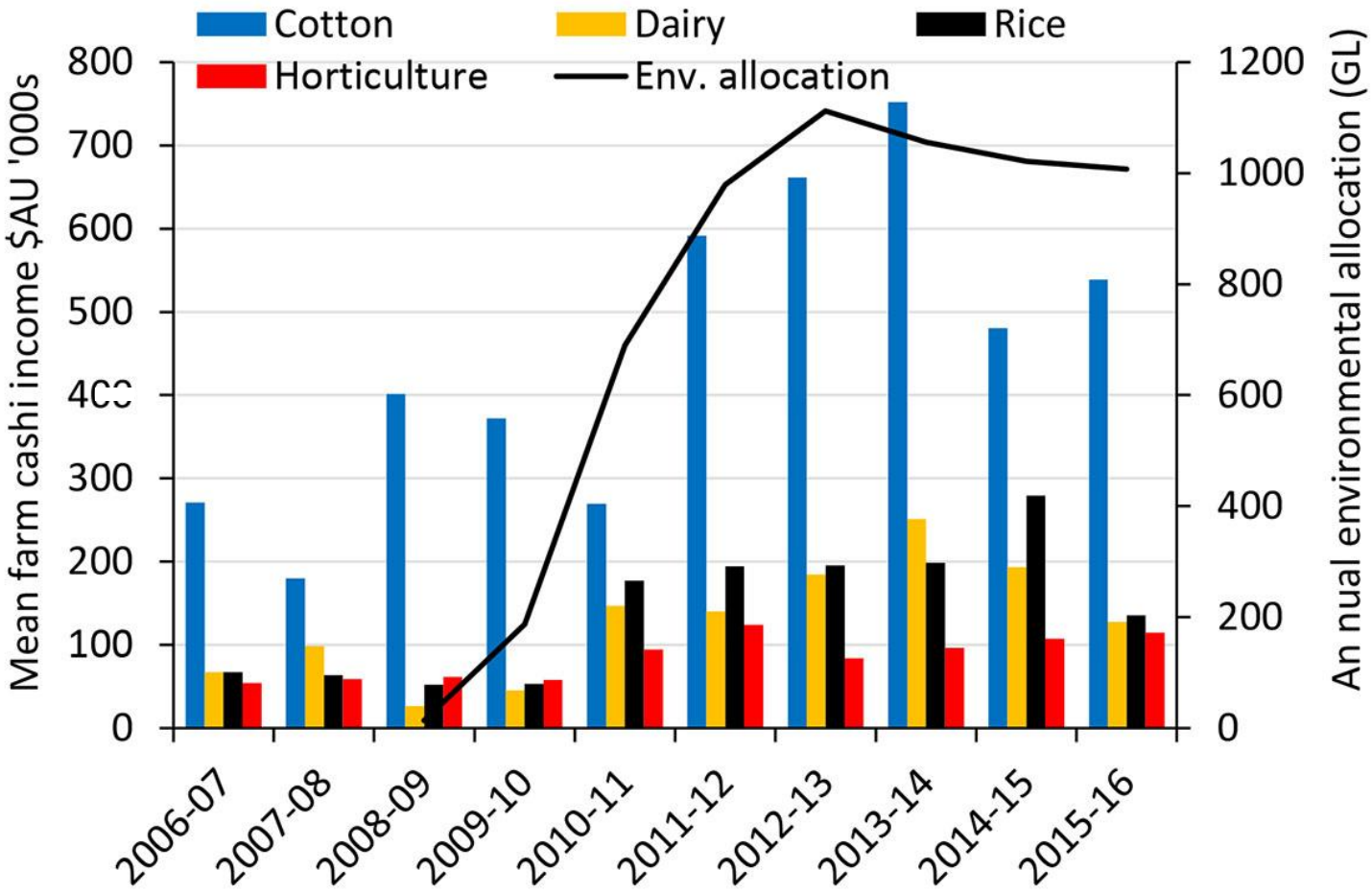
| Indicator target | Data can be used as reported publicly | Data is complete | Target status | Target trend |
|---|---|---|---|---|
| 1. Proportion of water held by Indigenous organisations is improving | Additional analysis required | Available for NSW Basin; only 3 annual data points | Poor | Declining |
| 2. Volume of water released to wetlands in areas of Indigenous organisations is increasing | Additional analysis required | Complete | Intermediate | No trend, variable |

# Economic theme

| Indicator target | Data can be used as reported publicly | Data is complete | Target status | Target trend |
|---|---|---|---|---|
| 3. Personal income of basin LGAs is steady or improving | Additional analysis required | Complete | Good | Improving |
| 4. Disparity between LGAs with lowest and highest median income is steady or improving | Additional analysis required | Complete | Good | Steady overall for irrigation LGAs |
| 5. Gross value of irrigated agricultural production (GVIAP) is steady or improving and the trend is =/> than national average | Yes | Most recent data 2018-19 | Good | Stable |
| 6. Value of production per unit of irrigation water used is steady or improving | Yes | Most recent data 2018-19 | Good | Improving |
| 7. Cash income and rate of return of irrigation farms is increasing | Yes | Most recent data 2015-16 | Good | Declines during drought, then recovery |
| 8. Farmland price is improving | Yes | Complete | Good | Improving |
| 9. Surface water diversions are declining | Yes | Complete | Intermediate | No trend, variable |

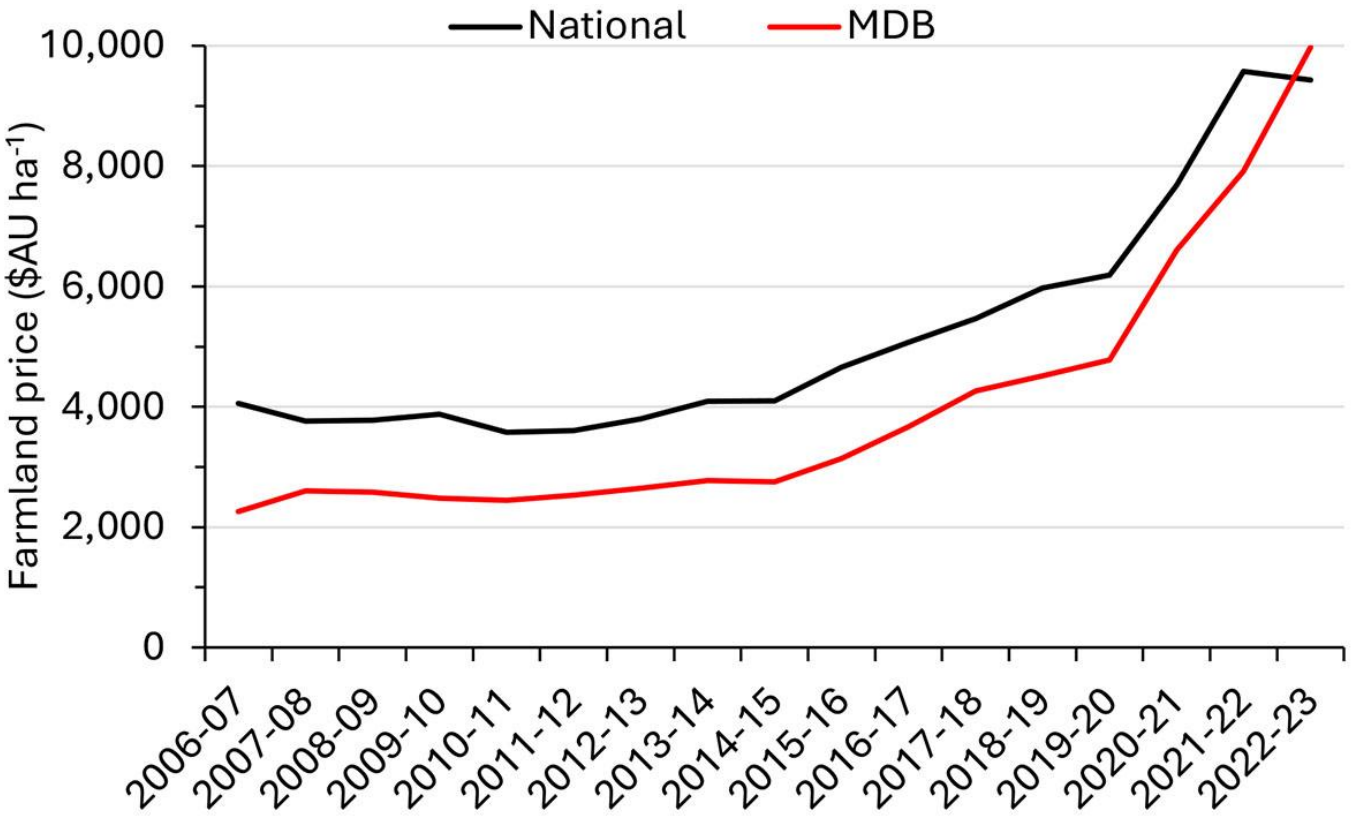
# Economic theme

Mean irrigation farm cash income (bars) and Commonwealth annual environmental water allocations (line)



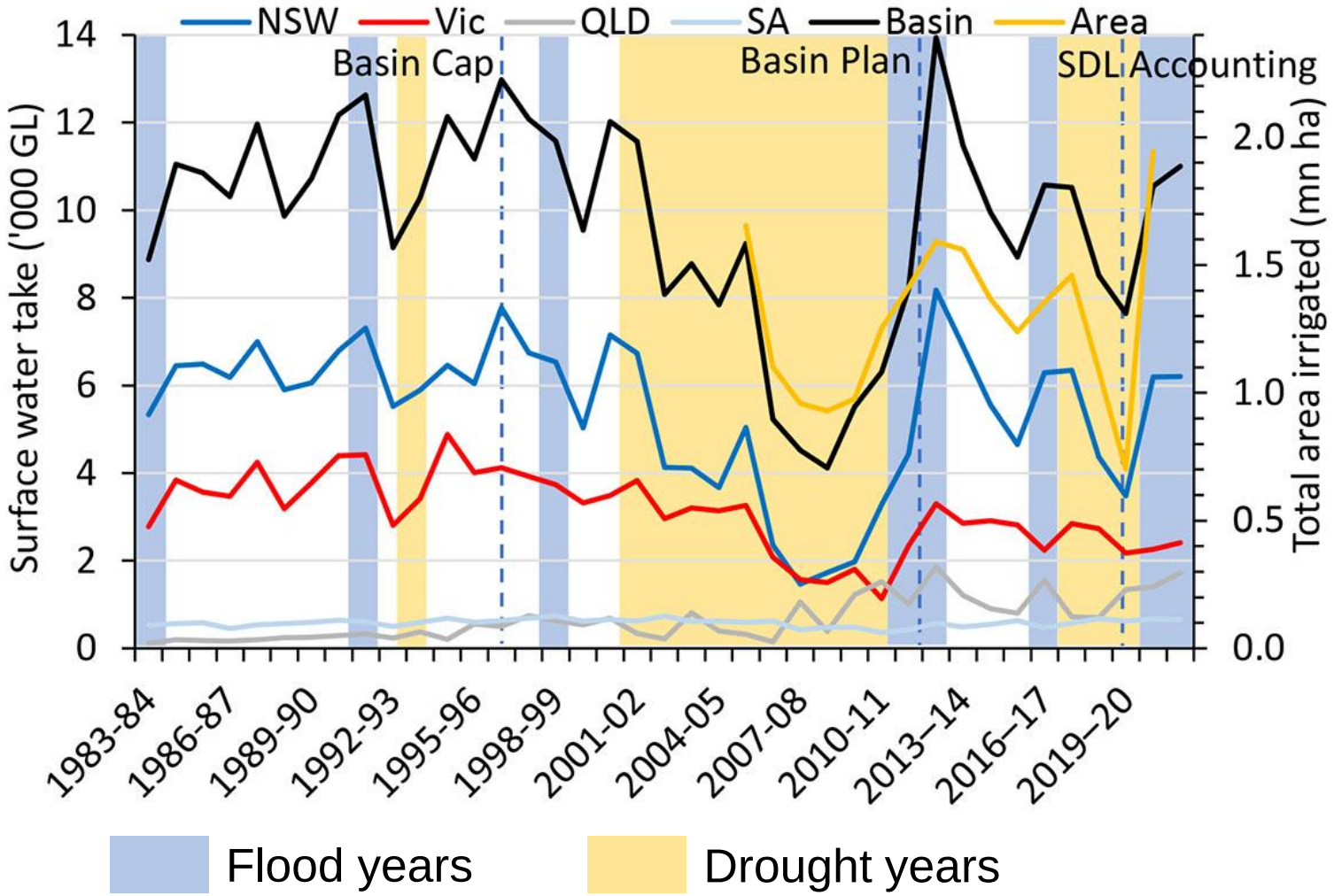
# Economic theme

Mean Basin farmland price compared with national mean



# Economic theme

Surface water diversions by Basin State and total area irrigated



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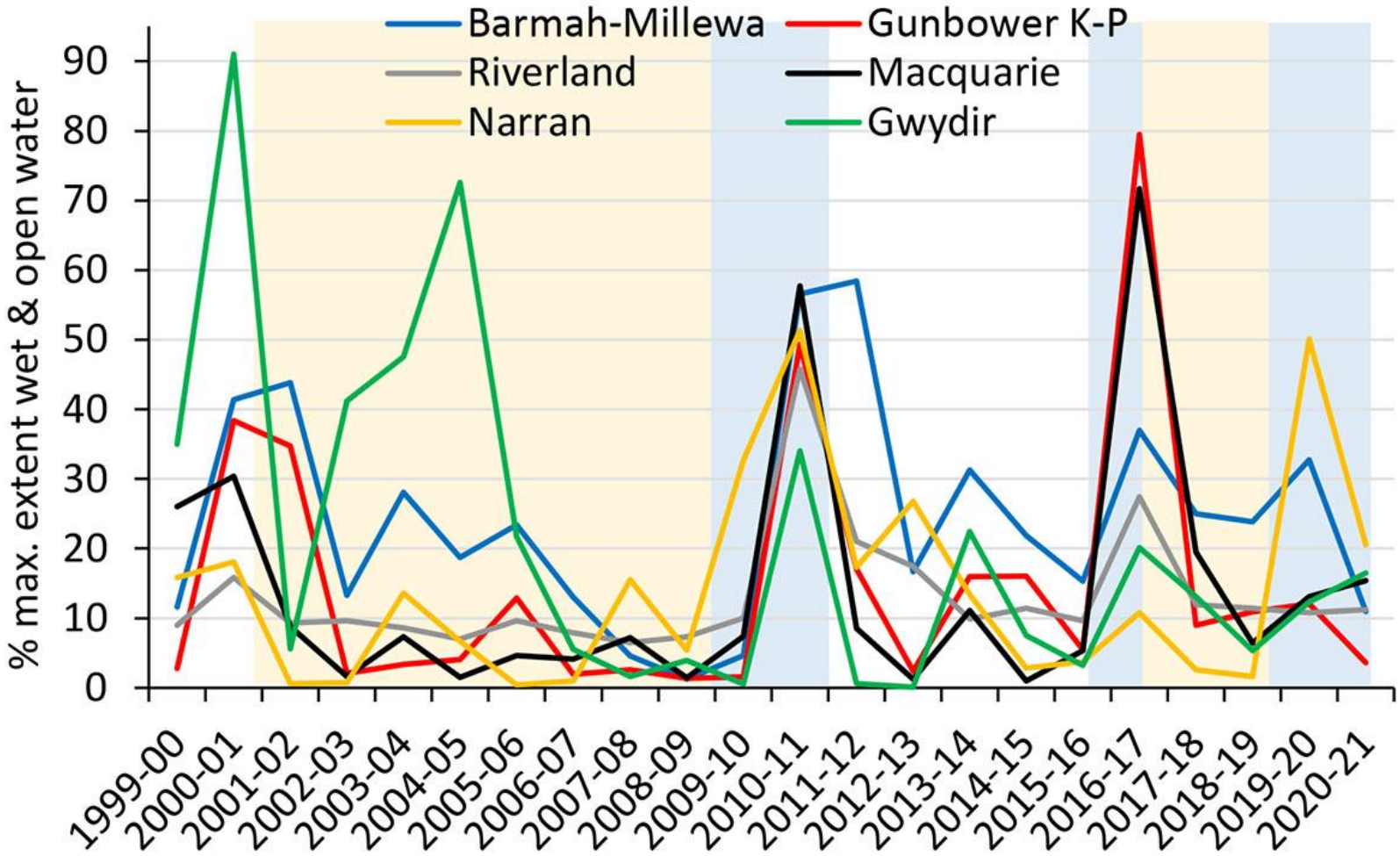
# Environmental theme

| Indicator target | Data can be used as reported publicly | Data is complete | Target status | Target trend |
|---|---|---|---|---|
| 10. Ramsar wetlands are flooded at an appropriate extent to meet their water requirements | Yes | Complete | Poor, targets not met | No trend, variable |
| 11. Condition of vegetation in Ramsar wetlands is maintained or improving | Yes | Complete | Poor, targets not met | No trend, variable |
| 12. River flows at hydrological indicator sites match projections and predictions by MDBA | Additional analysis required | Complete | Poor | Declining |
| 13. Waterbird abundance of key species is steady or improving | Additional analysis required | Complete | Poor | Declining |
| 14. Frequency of occurrence of selected threatened species is steady or improving | Additional analysis required | Only for 9 sites | Intermediate | No trend, variable |
| 15. Number of fish kills is falling | Additional analysis required | Only for NSW | Poor | Number of kills rising |
| 16. EC in River Murray below target levels >95% of the time | Yes | Complete | Intermediate | No trend, variable |
| 17. Discharge 2m tonnes salt/yr from Murray mouth | Yes | Complete | Poor | Declining |
| 18. Reduce nitrogen and phosphorus concentrations towards water quality standards | Additional analysis required | Only for Murray | Fair | Improving |
| 19. Cold water pollution is declining (installation of TPCDs) | Additional analysis required | Complete | Intermediate | No trend, TPCD installation sporadic |
| 20. Populations of large-bodied fishes are maintained or increasing | Yes | Only for NSW | Fair | Improving |
| 21. Murray mouth open >95% of time without dredging | Additional analysis required | Not reported regularly | Poor | Target unlikely to ever be met |

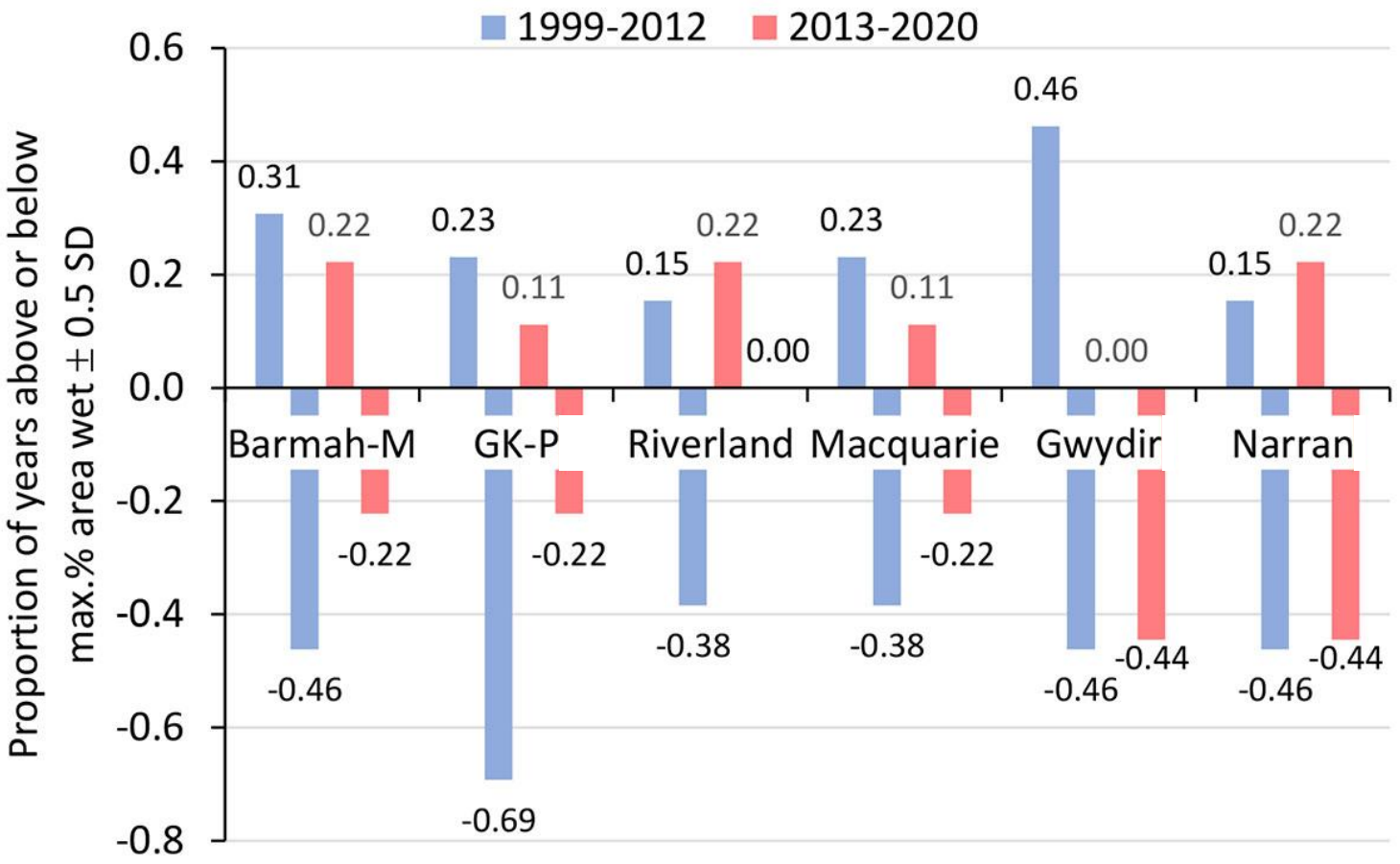
# Environmental theme

## Extent of Ramsar wetlands flooded



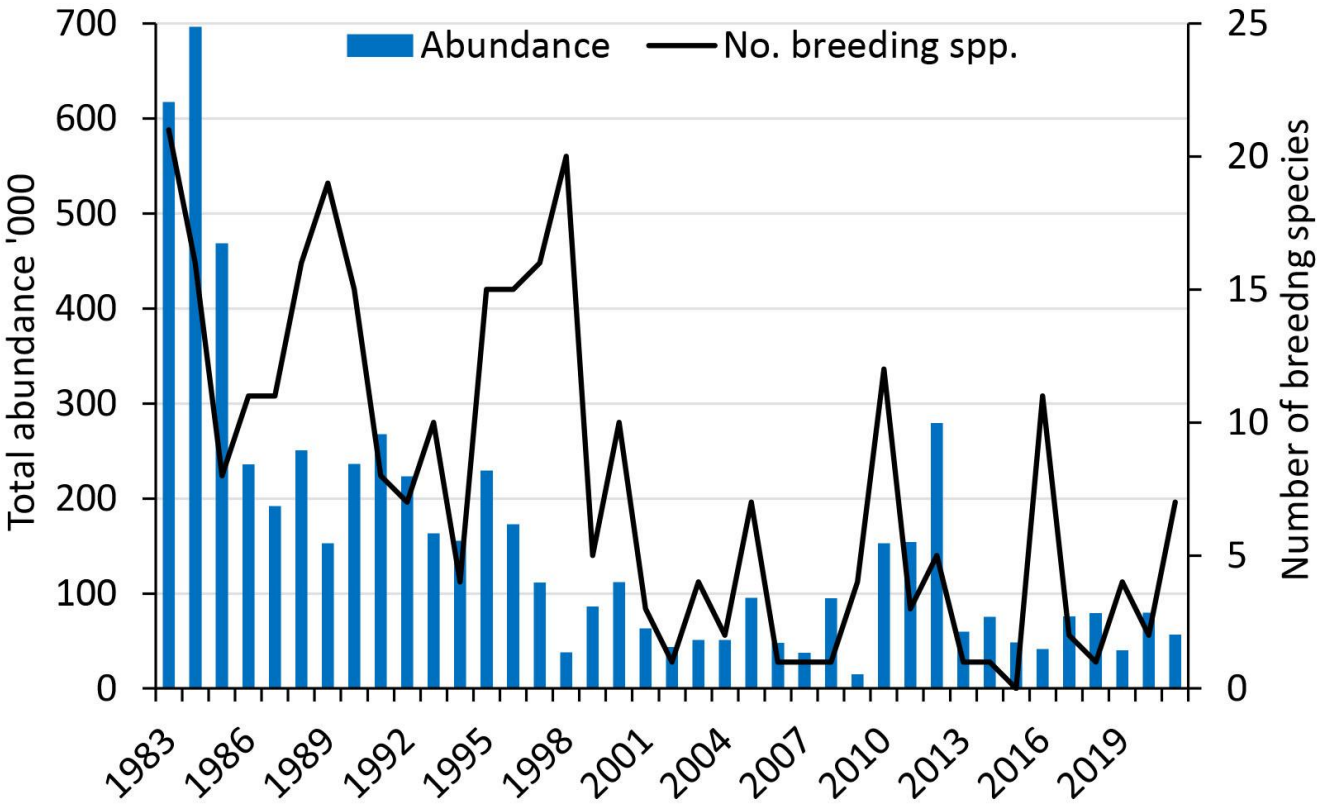
# Environmental theme

Extent of Ramsar wetlands flooded – high flood & low flood years before and after the Basin Plan



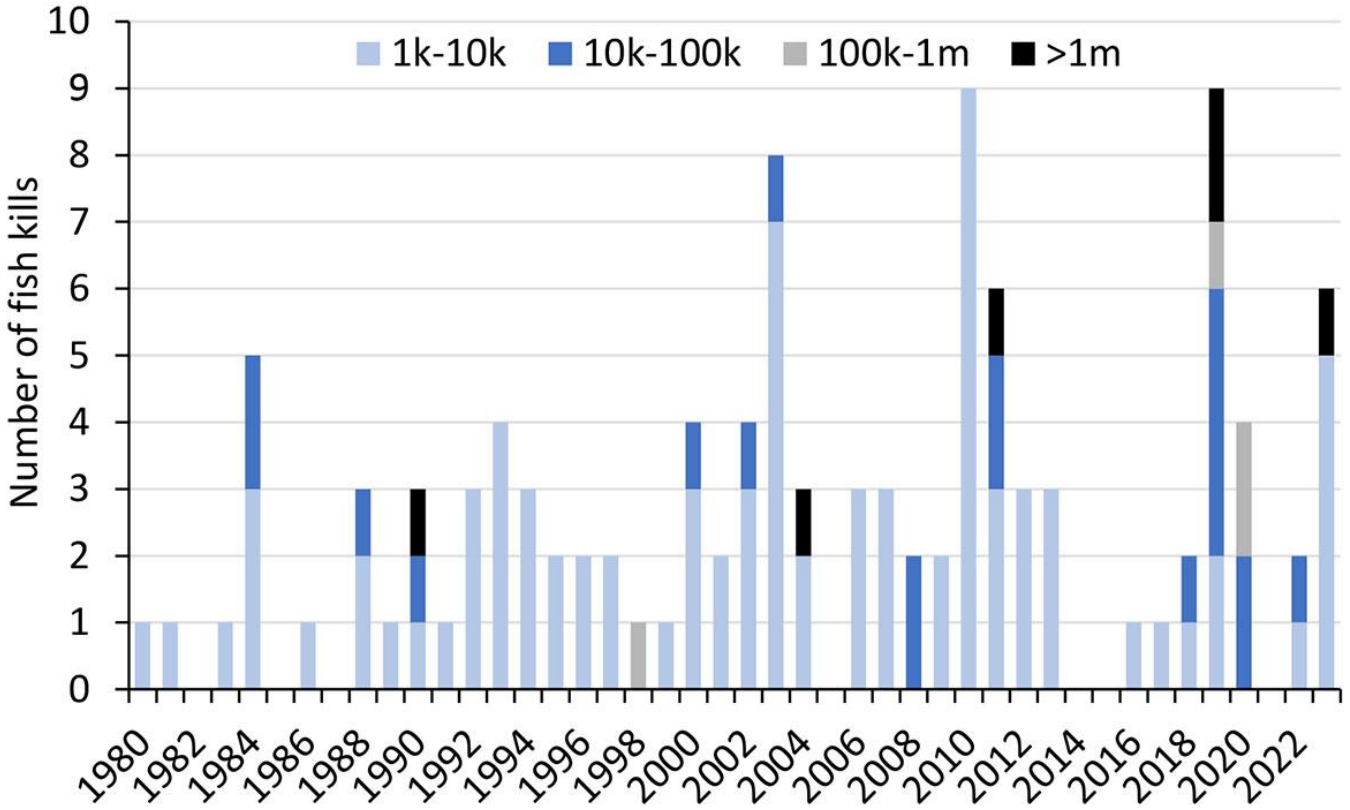
# Environmental theme

Abundance of waterbirds and number of breeding species



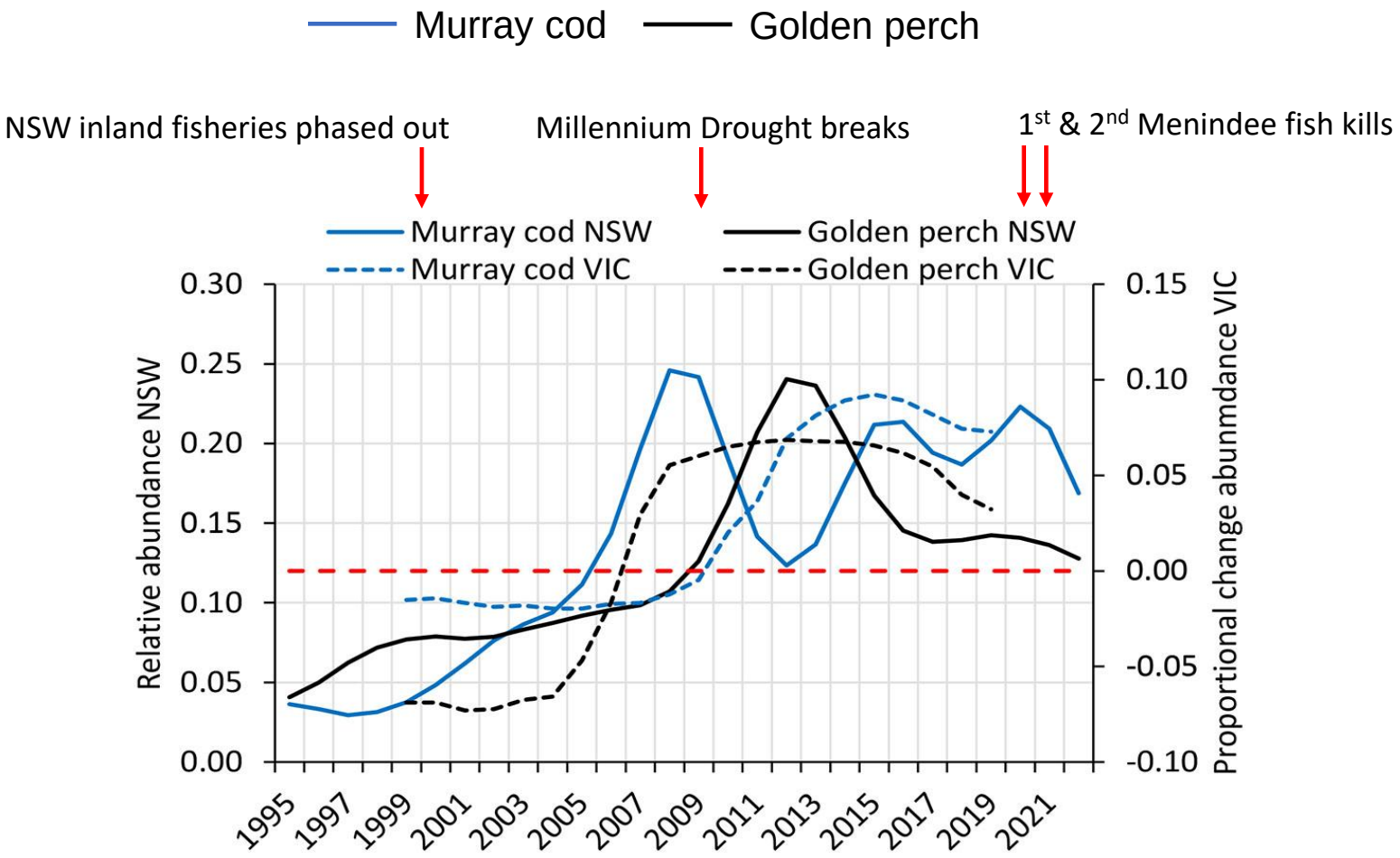
# Environmental theme

Number of fish kills and their magnitude in the NSW Basin



# Environmental theme

## Populations of large-bodied fishes, NSW Basin

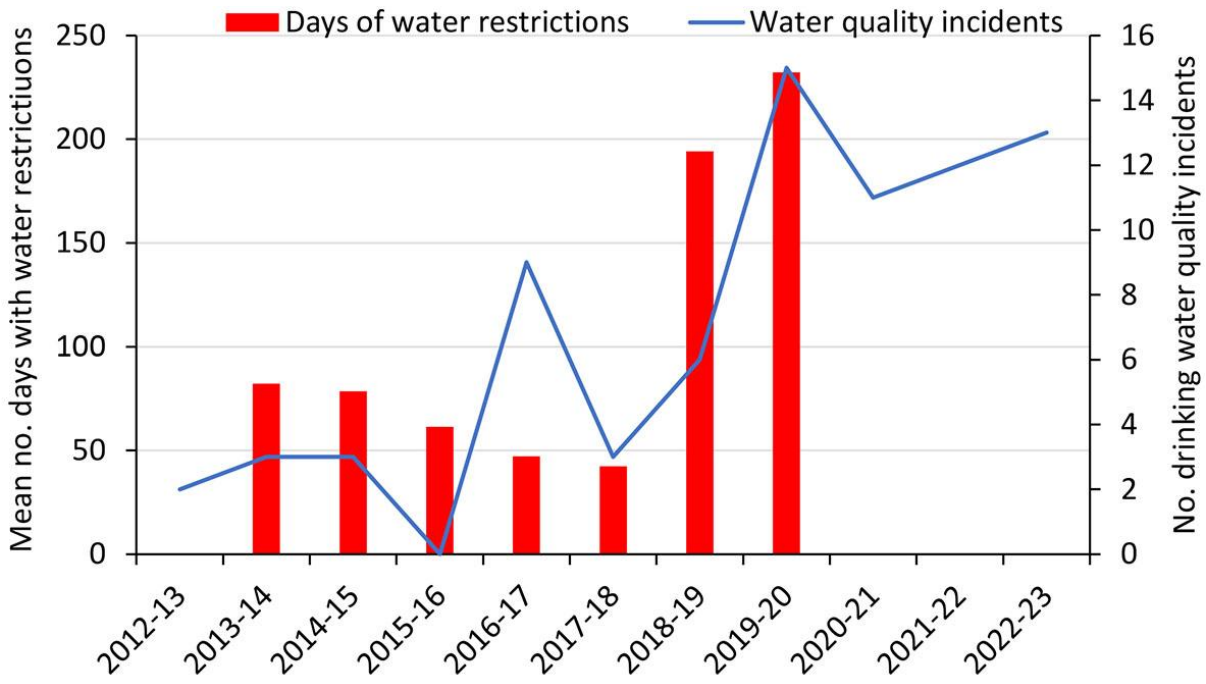


# Social theme

| Indicator target | Data can be used as reported publicly | Data is complete | Target status | Target trend |
|---|---|---|---|---|
| 22. Town water security (days/year of water restrictions declining) | No- full dataset no longer publicly available | Complete for NSW Basin LGAs only | Poor | Number of days/year of water restrictions increasing |
| 23. Number of drinking water quality incidents is declining | No- full dataset no longer publicly available | Complete for NSW Basin only | Poor | Number of boil water notices is increasing |
| 24. Number of water quality threat events to domestic, cultural and recreational water uses is declining | Data not publicly archived | Some reports missing | Intermediate | No trend, variable |

# Social theme

Town water security, NSW Basin: number of days of water restrictions (bars) and number of drinking water quality incidents (line)

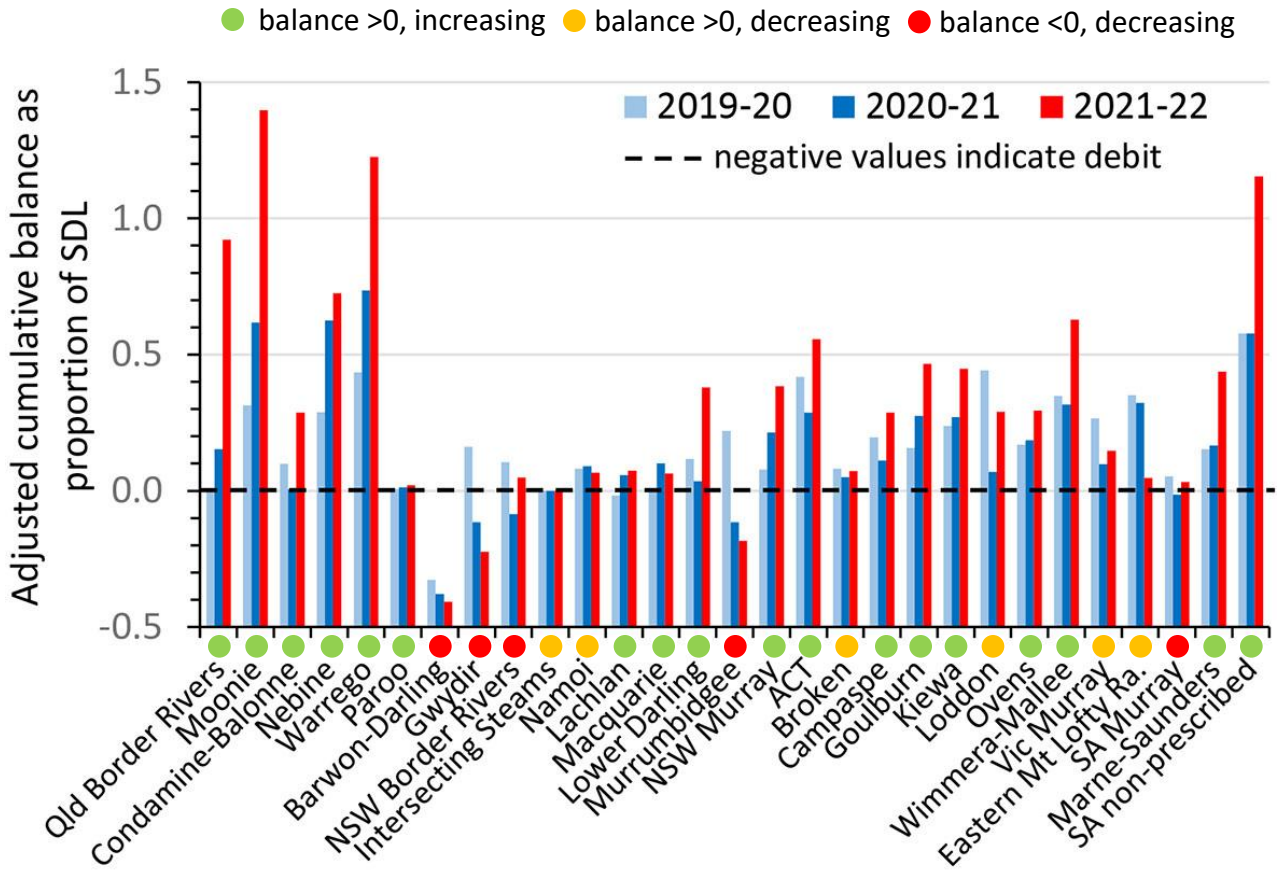


# Compliance & enforcement theme

| Indicator target | Data can be used as reported publicly | Data is complete | Target status | Target trend |
|---|---|---|---|---|
| 25. Sustainable Diversion Limit (SDL) for each surface water resource unit (SWRU) is met | Yes | Complete | SDL not met for 2 SWRUs | Trend towards increased exceedance of SDL compliance threshold |
| 26. Adjusted cumulative SDL balance for each SWRU is stable or increasing | Yes | Complete | Target not met | Balance has declined in 8/29 SWRUs |
| 27. Breaches of water laws (prosecutions and enforcement notices are declining in number) | Additional analysis required | Only for NSW Basin; data incomplete prior to establishment of Natural Resources Access Regulator | Intermediate | No trend, variable |

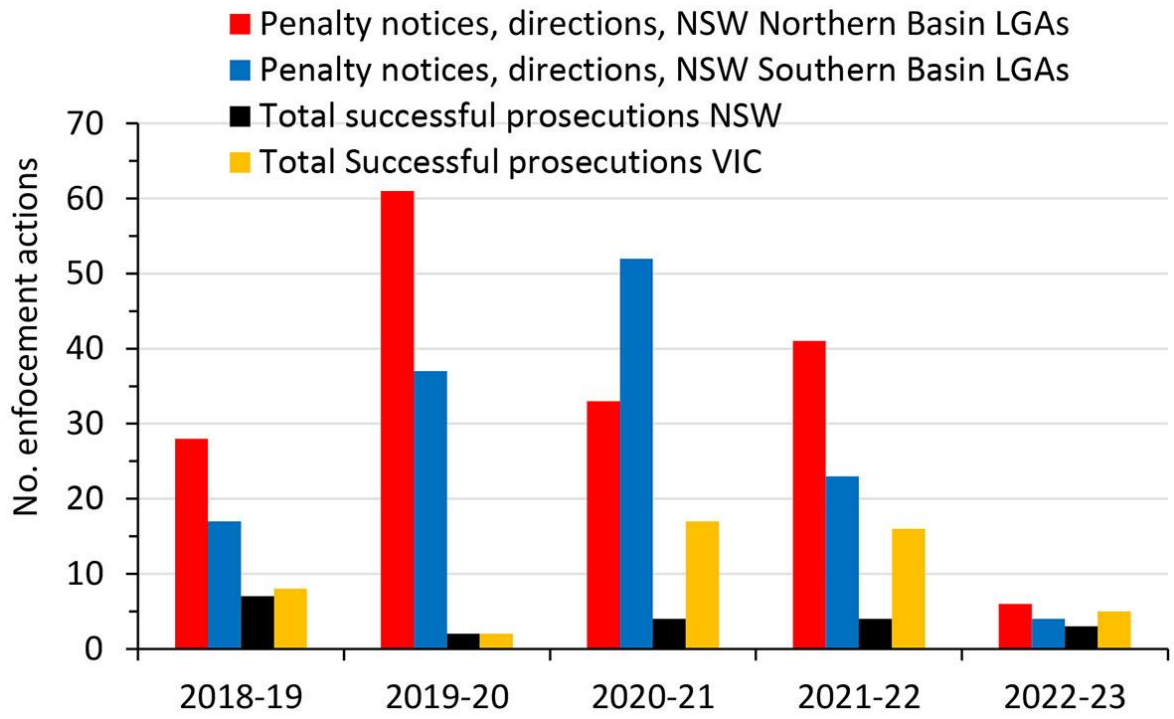
# Compliance & enforcement theme

## Adjusted cumulative SDL balance



# Compliance & enforcement theme

Breaches of water laws: number of penalty notices, directions & enforceable undertakings issued (NSW) and no. successful prosecutions (NSW & Vic)



# State of the Basin report – results

- Seven indicator targets were met (26%), ten were variable but showed no trend (37%) and ten were not met (37%);
- Five of seven economic targets, relating to irrigated agriculture and value of land as a capital asset, showed improvement;
- Of 20 Indigenous, environmental, social and compliance indicator targets, only two environmental ones were met (nutrient pollution & populations of large-bodied fishes).

# State of the Basin report – main findings

- Surface water take has declined by nearly 2,500 GL since 2012-13 but in Qld it has increased;
- Economic indicators: 1) improvement in personal income; 2) income disparity stable in irrigation LGAs; 3) stable value of irrigated agricultural production; 4) improved value of production from irrigation water use; 5) strong increase in capital value of farmland; 6) findings suggest irrigation communities are not experiencing severe economic hardship;
- Cash income of irrigation farms improved during the period when most environmental water was recovered, then declined due to drought
- Environmental indicators: overall, little or no indication that return of water to the environment has been adequate to sustain flow-dependent ecosystems.

# State of the Basin report – main findings

- Assessment of progress on implementation of Basin Plan is constrained by lack of publicly available data;
- Much of the data available is incomplete or does not cover the entire Basin;
- Since commending this research, data is no longer publicly available for water quality in NSW;
- Recommended: 1) archive of threats to water quality; 2) central register of fishway & thermal pollution control construction; 3) publicly-available water quality and water security data; 4) a central database of fish kills; 5) improved availability of annual flood maps; 6) public register of breaches of water laws in all Basin states & territory.