

Comments on the Consultation Draft - Fitzroy–Derby Water Resources Management Plan

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Introduction

Douglas et al. (2019) constructed a Hydro-Socio-Ecological (HSE) model for the Fitzroy River catchment and from this recommended ten Principles and Key Considerations to underpin more integrated and inclusive approaches to water allocation planning in the region. The paper was co-authored by an interdisciplinary team of researchers from the NESP Northern Hub and DWER, based on a synthesis of research from the local, regional and international literature which outlined the pillars of good practice in inclusive and comprehensive water planning. Douglas et al. (2019) considered all aspects of water extraction but had a particular focus on surface water use, which was the primary water source for most plans and proposals for water resource development across northern Australia at the time. Many important aspects of the HSE Principles were reflected in the policy DWER position statement and the associated supporting technical documents.

As ecologists working on research in this catchment, below we comment on the Consultation Draft – Fitzroy–Derby Water Resources Management Plan: Policy and Guidance (April 2026) and its accompanying Methods Report. Our appraisal assesses the Plan against the five HSE Principles and Key Considerations for Water Planning in Douglas et al. (2019) that relate directly to our past research (Principles 5-10). For each Principle, we discuss gaps or weaknesses and for Key Considerations, we assess how well they are reflected in the draft plan.

Principle 5. The Knowledge of Impacts from Water Resource Development Is Incomplete and/or Contested

- *Key Consideration 5: Knowledge gaps and uncertainty should be made explicit, and limitations of transferability acknowledged. Planning should establish means of sourcing best available evidence and mechanisms to include both scientific and Indigenous knowledge.*

Strengths

The plan is generally transparent about the limits of current knowledge and acknowledges the inadequacy of the data. The Methods document acknowledges that 'in some locations, limited monitoring data and complex hydrogeology increase uncertainty about thresholds for impact. Climate change adds further uncertainty' (Methods, Section 3). For each aquifer, uncertainty is specifically described: for example, the Methods note 'uncertainty in how the aquifer supports groundwater-dependent ecosystems and sites of significance' and 'uncertainty about the impacts of climate change on future recharge' (Methods, aquifer risk assessments). Where data are insufficient for reliable allocation limits, no limit is set and

site-specific assessments are required (e.g., for the Broome, Liveringa, Noonkanbah and Fractured Rock aquifers).

The plan states that setting the groundwater allocation limit at 40% of estimated annual recharge reflects an acknowledgement of the uncertainty, as does the recognition that consecutive low-flow wet seasons can have cumulative impacts not predictable from average conditions (Methods, Section 3.3.1). The plan also notes 'limited understanding of the importance of flows to King Sound' (Methods, Section 6.4.1).

Weaknesses and Gaps

While knowledge gaps are acknowledged in the scientific domain, the plan does not commit to robust methods for monitoring, reviewing and sourcing new evidence or incorporating Indigenous knowledge alongside scientific evidence in an ongoing and systematic way.

Section 3 makes the definitive statement that the Department *will* monitor and evaluate, but later text does not reflect this commitment only stating that "The Department *may* use information from monitoring and evaluation to..." and "The Department *will consider the need* to report on implementation and its monitoring...". Table 9 makes similarly equivocal statements about important/critical indicators that only "may" be reviewed. We believe that transparency in monitoring and evaluation is critical for improving knowledge and addressing uncertainty. Monitoring collected by proponents or licensees should be made public and used to improve critical knowledge gaps and contribute to reviews of trends in key indicators. Commitments to monitoring should be more robust as failure to do so increases uncertainty in the evidence underpinning the plan and its implementation.

For example, the plan states that 'Traditional Owner knowledge will be considered alongside contemporary science' (Policy document, p. 4; Table 3) but does not describe how this consideration will occur in practice, who will facilitate it, or how conflicts between knowledge systems will be resolved. Cultural monitoring 'is not currently collected or provided to the Department' and may only occur 'during plan implementation' (Policy document, Table 9, footnote 4). This means a significant source of evidence about ecological and cultural impacts remains outside the formal monitoring and evaluation framework.

Principle 6. Within-Bank Flows Promote Longitudinal Connectivity and Are Important for the Ecology of the River and Its Estuary

- *Key Consideration 6: Water planning should consider how alteration of within-channel flows will affect: (a) longitudinal connectivity and passage of animals including to/from the estuary; (b) scouring flows that clean the river and maintain geomorphic complexity; (c) size and persistence of flood-runner pools; (d) productivity of the estuary.*

Strengths

Protection of within-bank flows is the plan's strongest environmental achievement. The State Government's commitment to 'not allow damming of the Fitzroy River or its tributaries' (Policy document, Section 2.2, Strategy A) is the most significant single measure for protecting longitudinal connectivity. Surface water allocation limits are set at existing licensed entitlement levels, meaning no further surface water abstraction is permitted unless

essential for the public interest – less than 1% of the lowest annual flow on record (1999–2020) is currently licensed (Methods, Section 3.3.2).

The plan explicitly recognises several critical flow components relevant to within-bank connectivity, including 'early wet-season flows that reconnect pools and flush the river' and the importance of protecting timing and volume of wet-season flows to meet environmental outcomes (Methods, Section 3.3.1). Existing licence conditions include protecting 'first flush flows, maintaining minimum water levels, and protecting late wet-season (recessional) flows' (Methods, Section 3.3.2). An Ecological Water Requirements (EWR) report (DWER 2023c) underpins the hydro-ecological outcomes framework.

Weaknesses and Gaps

The plan explicitly acknowledges 'limited understanding of the importance of flows to King Sound' (Methods, Section 3.3.2), leaving a significant gap in how well the estuary and nearshore marine ecosystems are considered. Flood-runner pools are not specifically addressed by name in the plan's policy or monitoring framework. The scouring function of high-velocity wet-season flows, which Indigenous knowledge describes as 'cleaning the river country' (Douglas et al. 2019), is not explicitly included among the plan's monitoring performance indicators. Specific flow targets or thresholds for protecting longitudinal connectivity are referred to the EWR report rather than being stated in the plan itself; this should be rectified.

Principle 7. Overbank (Flood) Flows Facilitate Lateral Connectivity, Maintaining the Health of the Riparian Zone, Floodplain, and Off-Channel Wetlands

- *Key Consideration 7: Water planning should consider how alteration of overbank flows will affect: (a) connectivity between river and floodplain, particularly high-value sites; (b) dispersal and recruitment of riparian vegetation; (c) size, persistence, and water quality of off-channel wetlands.*

Strengths

The plan recognises the ecological significance of overbank flows and flood-dependent processes. The Methods document states that 'wet-season flows and overbank flows provide hydrological connectivity between the river and its floodplain, supporting aquatic ecosystems, providing habitat, sustaining food-webs and maintaining biodiversity' and that 'seedlings for some riparian and floodplain plants start to germinate and establish when the floodplain becomes inundated' (Methods, Section 4.2.1). The no-damming policy protects the natural generation of overbank flows.

The Derby heritage and wetlands management zone (a specific water management zone) is designed to protect the Munkajarra wetlands and associated heritage place (Policy document, Section 2.4). Performance indicators include monitoring of 'water levels or stage heights in river pools, wetlands and springs' (Policy document, Table 9). The interdependence between overbank inundation and aquifer recharge – which then sustains dry-season wetlands and river pools – is acknowledged in the Methods document (Section 4.2.1).

Weaknesses and Gaps

The plan's management of overbank flows is protective but passive: it relies on restricting additional surface water take rather than actively managing flood flows. No specific targets are set for floodplain inundation frequency, duration, or spatial extent. The off-channel wetlands and billabongs that Douglas et al. (2019) describe as 'highly valued by traditional owners' are not quantitatively protected through flow requirements. Riparian vegetation dispersal and recruitment is not mentioned as a monitoring indicator in the plan's performance framework.

Principle 8. Recessional Flows Are Important for Maintaining Key Habitats, Particularly in the Dry Season

- *Key Consideration 8: Water planning should consider how alteration of recessional flows will affect: (a) longitudinal connectivity and passage of animals; (b) condition of riparian vegetation; (c) availability of shallow fast-flowing habitats (runs and riffles); (d) size, number, and quality of refugial dry-season pools; (e) hyporheic habitat.*

Strengths

Recessional flows receive explicit and direct protection in the draft plan. The plan's performance indicators specifically include monitoring of 'early wet-season flows and recessional flows' (Policy document, Table 9). Existing licence conditions are designed to protect 'late wet-season (recessional) flows' (Methods, Section 3.3.2). The Methods document recognises 'recessional flows that trigger migration of important species' as a key flow component (Methods, Section 3.3.2).

The plan's protection of dry-season refugial pools is substantially addressed through groundwater policy. The Methods document states that 'persistent river pools are essential dry-season refuges, which means it is important to maintain natural groundwater discharge to river pools, wetlands and springs' (Methods, Section 3.3.1). The Alluvial connectivity management zone is specifically designed to maintain aquifer-to-aquifer and surface water-groundwater connectivity 'particularly in the dry season' (Policy document, Table 3). The plan also recognises the cultural importance of these dry-season water places, noting that dry-season pools 'are expressions of the Rainbow Serpent, as recognised in The West Kimberley National Heritage listing' (Methods, Section 6.2).

Weaknesses and Gaps

Runs and riffles (shallow, fast-flowing habitats) are not explicitly identified as values requiring protection or monitoring. Specific trigger flows or minimum flow thresholds for recessional flows are not prescribed in the plan itself; these are deferred to the EWR report. The condition and composition of riparian vegetation as a metric of recessional flow adequacy is not included in the monitoring performance indicators.

Principle 9. Groundwater Aquifers Are Important in Maintaining Subterranean Habitats, Off-Channel Wetlands, Riparian Zones, Springs, and Dry-Season Low Flows

- *Key Consideration 9: Water planning should consider how alteration of groundwater resources will affect: (a) off-channel wetlands, springs, main channel*

runs/riffles/pools, aquifer habitat, and hyporheic zone; (b) riparian vegetation reliant on groundwater.

Strengths

Groundwater management is the most technically developed component of this plan and the area where the plan most fully addresses the relevant Key Considerations. The Alluvial aquifer and Devonian Reef aquifer are closed to further licensing – recognising their critical role in sustaining river pools, wetlands, springs and riparian vegetation that make up the dry-season environment (Policy document, p. 3). This decision is directly justified by the interconnectedness between the Alluvial aquifer and dry-season water values, including threatened species.

The plan identifies several groundwater-dependent threatened species supported by the Alluvial aquifer (Methods, Section 6.2). This evidence base directly informs the decision to restrict further Alluvial aquifer licensing. The Alluvial connectivity management zone provides spatial protection for areas where surface water-groundwater interaction is critical. Monitoring of 'water levels or stage heights in river pools, wetlands and springs, including indications of groundwater discharge' is included in the plan's performance indicators (Policy document, Table 9).

The 40% of recharge allocation limit applied to the Wallal, Erskine and Grant Poole aquifers is described as precautionary, acknowledging uncertainty in how these aquifers support groundwater-dependent ecosystems (Methods, aquifer risk assessments). The plan requires site-specific investigations including ecological surveys for any licence application within 500 metres of a site of ecological, cultural or social significance (Policy document, p. 30).

Weaknesses and Gaps

The plan acknowledges significant knowledge gaps about how each aquifer supports ecosystems and what abstraction thresholds would cause harm. The saltwater interface risk in coastal aquifers (Derby Peninsula) is addressed, but riparian vegetation dependence on groundwater is not included as a specific monitoring indicator. Limited baseline data and understanding of the complex surface-groundwater connections reinforces the need to take a precautionary approach. Feedback from stakeholders urged precaution and many recommended a lower level (25%) of offtake. Adopting this lower level would be more appropriate for a precautionary approach.

Currently, bores need to be a minimum of 500m from groundwater dependent ecological assets. Without good understanding of connections this may be too close. Justification for this distance would be useful.

The plan recognises the importance of permanent and near-permanent pools as critical dry season refuges, particularly during prolonged dry seasons and sequences of low flow years. The plan would be improved if it included a commitment to map these pools and other key dry season habitats (such as springs, damp areas and other groundwater-dependent ecosystems), assess their persistence, and monitor changes in water extent or condition over time to provide early-warning indicators and management triggers, such as substantial reductions in the area, number or persistence of priority refugial pools relative to baseline conditions.

Principle 10. Antecedent Hydrological Conditions Have an Important Influence over the Ecology of the System

- *Key Consideration 10: Water planning should take into account previous hydrological conditions and possible lag effects, and be adaptive to long-term climatic cycles or changes.*

Strengths

The plan acknowledges hydrological variability and cumulative effects. The Methods document notes that 'consecutive low-flow wet seasons can occur – this may have cumulative impacts by reducing aquifer recharge, limiting replenishment of river pools and increasing pressure on water-dependent ecosystems during the following dry seasons' (Methods, Section 3.3.1). Climate change projections are incorporated from DWER (2021) Western Australian climate projections, including scenarios of more intense rainfall events and increasing temperatures (Methods, Section 3.2.2). Long-term historical rainfall records (rather than short-term averages) have been used to estimate groundwater recharge for allocation limits.

The plan's monitoring framework includes tracking 'rainfall and its relationship to surface water and groundwater regimes, recognising that this may shift over time due to climate change' (Policy document, Table 9). Adaptive management provisions allow licence conditions to be adjusted in response to monitoring results (Policy document, Strategy O). The plan explicitly acknowledges it 'may be amended, revoked or replaced by a new plan' in response to monitoring outcomes or at the Minister's direction (Policy document, Section 3).

Weaknesses and Gaps

Despite these provisions, the plan does not explicitly invoke the concept of antecedent hydrological conditions or lag effects as a planning principle. The specific challenge highlighted by Douglas et al. (2019) that ecological responses to flow alteration may be delayed by months or years is not reflected in monitoring trigger points or adaptive management thresholds in the plan. For example, no threshold for consecutive low-flow wet seasons is defined as a trigger for management intervention.

The plan considers reviewing implementation five years after the final plan is published (Policy document, Section 3), which is a relatively long cycle given the potential for rapid ecosystem change following a sequence of low-flow years. Climate change adaptation beyond monitoring is not operationalized. The plan does not, for instance, specify what would happen to allocation limits if rainfall recharge declines significantly. There is therefore a risk that adaptive management responses could lag behind hydrological changes with cumulative ecological costs. Over and above this are the concerns we raise regarding the lack of robust commitments regarding monitoring and evaluation.

Concluding Observations

The plan is precautionary reflecting the acknowledged scientific uncertainty (Principle 5). We reiterate that the precautionary approach outlined in the draft plan is contingent on effective monitoring and evaluation. The mechanisms for monitoring and evaluation (for example, who is responsible and what the triggers for management actions will be) are currently not clear, and are necessary for successful implementation of the plan. The draft plan most closely aligns with HSE Principles 6, 7, 8 and 9, where the commitment to protecting surface water

flows and restricting Alluvial aquifer abstraction provides substantive, enforceable protection for within-bank flows, recessional flows and groundwater-dependent ecosystems. Principle 10 represents a future challenge: as climate change alters the hydrological baseline that underpins the plan's allocation limits and environmental outcomes, the plan's adaptive management provisions will need to be operationalised with specific triggers and shorter review cycles than currently proposed.

Additional information

We note that on Pg 27 of the Methods document there is a reference to Douglas et al (2021) – this should be Douglas et al (2019)

References

- Department of Water and Environmental Regulation (DWER) 2026a. Consultation Draft – Fitzroy–Derby Water Resources Management Plan: Policy and Guidance (April 2026). Government of Western Australia, Perth.
- Department of Water and Environmental Regulation (DWER) 2026b. Consultation Draft – Fitzroy–Derby Water Resources Management Plan: Methods (April 2026). Government of Western Australia, Perth.
- Douglas, M. M., Jackson, S., Canham, C. A., Laborde, S., Beesley, L., Kennard, M. J., Pusey, B. J., Loomes, R. & Setterfield, S. A. (2019). Conceptualizing Hydro-socio-ecological Relationships to Enable More Integrated and Inclusive Water Allocation Planning. *One Earth*, 1, 361-373
- Government of Western Australia (2023). Water allocation planning in the Fitzroy – policy position paper. Department of Water and Environmental Regulation, Perth.