Gwydir (SS22)

INITIAL SDL ASSESSMENT RESULT

It is **likely** that the SDL reflects an environmentally sustainable level of take for this unit.

The Authority's initial assessment has also **identified a risk** that environmental outcomes for *waterbirds* may not being met for this Unit. Pattern of flow is the likely leading driver of risk due to the limitations in the delivery of water to the Gwydir Wetlands.

The Authority is **proposing further work with the New South Wales government** through 2026 to consider the most appropriate response to address this risk. This will include an examination of flow drivers and constraints to flow to inform the Authority's recommendation on response.

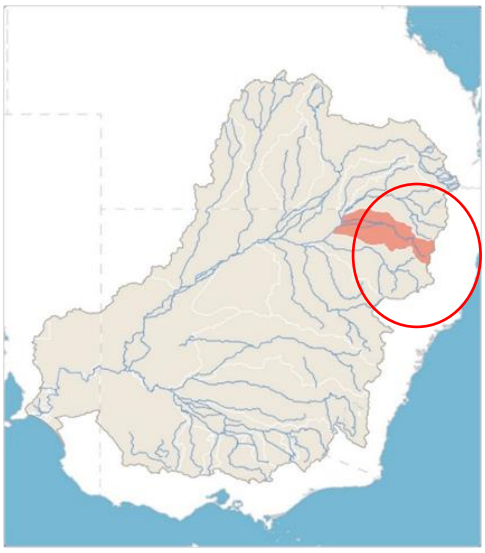

Figure 1: Gwydir SDL Resource Unit

The Authority is assessing whether the Sustainable Diversion Limit (SDL) for the Gwydir SDL Resource Unit (the **Unit**) continues to support environmental outcomes and reflect an environmentally sustainable level of take (ESLT). This initial assessment refers only to outcomes in this Unit.

This Assessment Summary provides an overview of the factors which are relevant to that work and the Authority's initial view. The summary draws on three 'Lines of Enquiry', engaging with the likelihood that flow regimes support environmental outcomes, the Authority's confidence in that assessment, and the consequence of an at-risk finding. Line of Enquiry 2 – full Basin Plan implementation – has been considered as the primary line of enquiry. Assumptions for each Line of Enquiry are documented in the *Summary of Assessment Approach* available on the MDBA website.

Information on the Lines of Enquiry and methodology used in this assessment is available in the *Summary of Assessment Approach* and the *SDL Assessment and Response Framework*. Information on the *Basin Plan Review Discussion Paper* and process for making a submission are also available on the MDBA website.

About this Unit (as at June 2024)

Ramsar sites	Gwydir Wetlands: Gingham and Lower Gwydir (Big Leather) Watercourses
Contribution to Basin water	3.4% of the total water available in the Murray-Darling Basin
Key waterways	Gwydir River (480km); Copes, Moredun, Georges and Laura creeks, Horton River, Mehi River, Carole–Gil Gil creeks, Gingham Watercourse (northern arm) and lower Gwydir or Big Leather Watercourse (southern arm)
Water storages	Copeton Dam (1,364 GL)
Significant groundwater connections	New England Fold Belt MDB (GS37) & Upper Gwydir Alluvium (GS43).

While an accredited Water Resource Plan (WRP) relating to this Unit is not yet in place, the SDL has applied since 1 July 2019. Water resource management is currently governed by existing rules and arrangements made under NSW state legislation, with SDL accounting undertaken through

transitional Basin Plan arrangements. Further information on water recovery for this SDL Resource Unit is available at the Department of Climate Change, Energy, the Environment and Water's surface water recovery factsheet.

Current condition

Figure 2 below summarises the observed environmental condition in the Unit (as at June 2024).

The Authority assessed all themes to be in **moderate** condition with a low level of confidence, with the exception of *waterbirds,* which was rated with a medium level confidence.

Theme	Flows and connectivity	Ecosystem functions	Waterbirds	Native fish	Native vegetation	Other species
Grade						
Confidence	●○○	●○○	●●○	●○○	●○○	●○○

Figure 2. Environmental condition assessment in the Unit. Across each theme environmental condition is graded as *Very Poor, Poor, Moderate, Good* or *Very Good* (as indicated by segments) and confidence in this grading is assessed as *Low, Medium* or *High* (as indicated by dots). 'Other species' refers to animals including frogs, platypuses and turtles.

Environmental outcomes under a fully implemented Basin Plan

Table 1 presents a compilation of:

- the *likelihood* that flows will support environmental outcomes for the six surface water themes for this Unit; and
- the Authority's *confidence* in that assessment, i.e. low (L), medium (M) or high (H) surety of the finding.

The findings in Table 1 consider condition monitoring, assessment of the relative achievement of Environmental Watering Requirements (EWRs) under river model scenarios, and other relevant evidence that provided additional information. Information on the methodology and EWRs used in this assessment is available in the *Summary of Assessment Approach* and the *SDL Assessment and Response Framework*.

Theme	The *likelihood* that the pattern and volume of flow will support the objectives for each ecological theme							
	Line of enquiry	Very unlikely	Unlikely	About as likely as not	More likely than not	Likely	Very likely	Confidence
Flows and connectivity	LoE 1				●			●●○
	LoE 2				●			●●○
Ecosystem functions	LoE 1				●			●●○
	LoE 2				●			●●○
Waterbirds	LoE 1			●				●○○
	LoE 2			●				●○○
Native fish	LoE 1				●			●○○
	LoE 2				●			●○○
Native vegetation	LoE 1				●			●●○
	LoE 2				●			●●○
Other species	LoE 1				●			●●○
	LoE 2				●			●●○

Table 1: Initial likelihood assessment of the flows supporting the objectives for ecological themes in Unit. Note: LoE 1 refers to Line of Enquiry 1 - current Basin Plan implementation and LoE 2 refers to Line of Enquiry 2 - full Basin Plan implementation. 'Other species' refers to animals including frogs, platypuses and turtles.

Under both Line of Enquiry 1 and Line of Enquiry 2 it is assessed as **about as likely as not** that the flow requirements are supporting objectives for *waterbirds*, with a low level of confidence in that assessment.

For those themes in which the likelihood assessment is rated **about as likely as not**, the MDBA have explored additional lines of evidence to determine whether a consequence assessment is warranted. This process drew on a broader suite of available information to further explore whether there is risk or compromise to the ESLT and the relative influence of the level of take or other identified drivers. This step applied Authority expertise and insight – based on a range of considerations, options, and trade-offs in light of the Basin's contextual operating environment – to determine the best available information.

Environmental water delivery in the Gwydir is impacted by river operating constraints which limit the rate at which environmental water can be delivered to the Lower Gwydir Wetlands, including the identified Ramsar-listed wetlands, especially during peak consumptive water delivery periods (generally spring–summer). The impacts of these constraints are captured in environmental monitoring findings from the Commonwealth Environmental Water Holder, and in the NSW Long-Term Watering Plan for the Gwydir.

The NSW Reconnecting River Country Program has identified enhanced environmental outcomes that can be achieved through a range of measures designed and implemented in partnership with watercourse landholders and the broader community. These measures are expected to provide greater flexibility for the use of environmental water, allowing flow duration and timing to better match wetlands requirements and provide greater volumes of water for Ramsar-listed wetlands. Specific aims include the improved maintenance of waterbird habitats, and greater support for waterbird-breeding events.

Based on this information, the *waterbirds* theme is considered 'at risk' and is taken through to a further consequence assessment step. Outcomes for all other themes have been identified as **more likely than not** to be supported by the pattern and volume of flow under Lines of Enquiry 1 and 2, with low or medium confidence, and are considered 'not at risk'.

Consequence assessment

Condition and likelihood assessments (Figure 2 and Table 1) indicate potential risks to *waterbirds*. A consequence assessment, primarily considering Line of Enquiry 2, has been undertaken for this theme (Table 2).

Theme	Nature of impact	Spatial scale of impact	Impact on key values	Final Rating
Waterbirds	Lack of wetland inundation and insufficient timing, extent and duration of flow to support refuge habitat and episodic breeding events.	**Low** – local or site scale	**Yes** – impact on one Ramsar site (across four locations) in the Lower Gwydir and Gingham systems and Basin-wide Environmental Watering Strategy outcomes for waterbird abundance and nesting are affected.	**MEDIUM**

Table 2: Consequence assessment results.

Drivers of impact

In this Unit, *waterbirds* have been identified to be at **medium** risk. The initial assessment has identified pattern of flow as a leading driver of this outcome, characterised by ongoing constraints to river-floodplain connectivity in the Lower Gwydir (including the Ramsar site).

While the Basin Plan is likely to benefit waterbird habitats across a range of wetland areas, operational constraints and the pause in environmental watering over spring and summer months restricts inundation of wetland habitats and remain a key driver limiting waterbird outcomes. Inundation levels required to trigger large-scale group-nesting waterbird breeding are typically only triggered through episodic larger natural flood events in the Gwydir, at which point the role of environmental water is to support waterbird habitat by maintaining water levels subject to operational constraints.

Other risks to waterbirds (such as water quality and habitat loss) are described in the *Discussion Paper* and will be further explored with stakeholders during the Basin Plan Review consultation process. The Authority will test this assessment and the relative contribution of different drivers to this result.

Environmental outcomes under a climate impacted future

For a description of anticipated climate impacts across the Basin see the *Summary of Assessment Approach* available on the MDBA website.

The future climate is uncertain. The MDBA has applied a set of climate model scenarios to explore the ecological effects of climate change against a plausible range of future climates. Table 3 presents a summary of the anticipated environmental impacts of climate change for the Unit by reference to the likelihood of flow regimes being met for the six environmental themes. The shaded bars represent the

plausible range of future climates, and the black dots represent the anticipated likelihood under a median (50th percentile) future climate scenario.

Theme	The *likelihood* that the pattern and volume of flow will support the objectives for each ecological theme							
	Line of enquiry	Very unlikely	Unlikely	About as likely as not	More likely than not	Likely	Very likely	Confidence
Flows and connectivity	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○
Ecosystem functions	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○
Waterbirds	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○
Native fish	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○
Native vegetation	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○
Other species	LoE 3 (~2030s)							●○○
	LoE 3 (~2050s)							●○○

Table 3: Assessment of the flows supporting the objectives for ecological themes at 2030 and 2050 levels of global warming in the Unit. Note: LoE 3 (~2030s) refers to Line of Enquiry 3 - plausible future 2030s hydroclimate sequences and LoE 3 (~2050s) refers to Line of Enquiry 3 - plausible future 2050s hydroclimate sequences. Confidence in this grading is assessed as *Low, Medium* or *High*. 'Other species' refers to animals including frogs, platypuses and turtles.

The 2025 Sustainable Yields demonstrated that the northern Basin is virtually certain to be hotter in the future. It is uncertain if long-term average rainfall will increase or decrease, but it is very likely that annual rainfall will become more variable leading to more severe and more frequent extreme droughts and floods. The 2025 MDB Outlook demonstrated that the ecosystem impacts will vary from theme to theme — for example, at the Basin-scale some native plant communities will expand, while others will shrink; native fish and waterbirds could face increased challenges due to habitat decline.

For this Unit, a consistent finding across the plausible range is that the *flows and connectivity*, *ecosystem functions, native fish* and *other species* themes are anticipated to be more exposed to climate change. Higher temperatures are likely to reduce inflows, increase evaporation rates and reduce upstream-to-downstream connectivity flows. These conditions increase the risk of habitat contraction, loss of channel connectivity, and declining water quality. Flow-dependent ecosystems and species face heightened vulnerability due to reduced breeding opportunities, restricted migration, and shrinking refuge habitats during drought sequences.

Initial Assessment

On the balance of all three Lines of Enquiry, **the Authority's initial assessment is that there is a risk that environmental outcomes are not being met in this Unit**. *Waterbirds* has been identified as the

'at risk' theme, and it is anticipated that climate change will exacerbate the risks for other themes into the 2030s and beyond.

It is also anticipated that climate change will exacerbate the risks for themes into the 2030s and beyond. Flow pattern has been identified as a leading driver of these risks. Specifically, the inability to deliver water to important parts of the Gwydir Wetlands (including to the Ramsar site in this Unit). The SDL is one factor that determines the pattern of flow in the river and the extent to which it is supporting connectivity, but connecting rivers with their floodplains still requires addressing physical and operational constraints and implementing environmental works.

The NSW Gwydir Reconnecting Watercourse Country Program business case has demonstrated the increased effectiveness that can be achieved through held environmental water deliveries if they are matched with a range of constraint relaxation measures, and that this will have wide-ranging habitat benefits in this Unit, including for waterbirds.

It is likely that the SDL reflects an environmentally sustainable level of take, but additional investigation is warranted. The Authority is proposing further work is required to explore all contributing factors before a determination on the SDL can be made.

As Basin Plan implementation is still underway, the MDBA has made assumptions about water recovery under the 450GL program and how it will be implemented in the northern Basin (see the *Summary of Assessment Approach*). The analysis demonstrates that additional water recovery in the northern Basin (beyond the recovery status as of June 2024) would yield improved environmental benefits in this Unit.

Consideration of response

The Authority is proposing more work with the New South Wales government to further explore the specific flow drivers and the most appropriate response to this initial assessment. High-level response options currently under consideration for this Unit include:

- Addressing flow constraints
- An adjustment of the SDL for the Unit

The Authority intends to work with Basin governments to resolve commitments to support initiatives already underway, such as the NSW Northern Basin Connectivity program, the NSW Gwydir Reconnecting Watercourse Country Program, and the Constraints Relaxation Implementation Roadmap. The risks of a changing climate continue to be actively considered in the Basin.

Noting this finding, the Basin Plan settings in connection with monitoring, evaluation and assessment activities warrant review as they apply to this Unit. Other relevant factors include planning by the New South Wales government for the management of local and site-specific areas of concern to maintain environmental outcomes. The Authority supports the continuing efforts of environmental water managers and river operators to make the most of water delivery to support the Basin's environmental outcomes. These efforts continue to evolve in response to new techniques and emerging knowledge, and are often required to balance multiple (and sometimes competing) environmental objectives across a range of geographic scales.

As is the case at a sub-Basin scale, it will be important that water quality risks are managed.

Evidence summary

The standard evidence sources used for this assessment are described in the *Summary of Assessment Approach*, which is available on the MDBA website. This assessment has also drawn on:

- DCCEEW 2025, Northern Basin Toolkit – Evaluation of environmental outcomes, Department of Climate Change, Energy, the Environment and Water, Canberra
- Gwydir Reconnecting Watercourse Country Program: Gwydir Reconnecting Watercourse Country Program | Water for the environment | Environment and Heritage
- Commonwealth Environmental Water Holder: Gwydir River system annual reports: Gwydir River System annual reports - DCCEEW

The Authority utilised the best available evidence. Through the Basin Plan Review 12-week public consultation process, and the subsequent consideration of submissions and engagements over the course of the 2026 Basin Plan Review, the Authority will continue to build on the evidence used through the initial SDL Assessments to address uncertainties and knowledge gaps.