

## 2021 ANNOUNCED ALLOCATION - DALY RIVER REGION

Announced allocations are specified in the conditions of groundwater extraction licences granted to take water from bores in the Katherine Tindall Limestone Aquifer, Flora Tindall Limestone Aquifer and Oolloo Dolostone Aquifer in the Daly River Region, and are also in the conditions of surface water extraction licences granted to take water from the Katherine River.

Announced allocations are set annually and are the factors by which a licensed entitlement must be adjusted in order to maintain an appropriate level of environmental protection and water supply security in, or associated with, the water resource from which the licensed extraction occurs.

The Katherine Tindall Limestone Aquifer Water Allocation Plan describes the background and process for announced allocations for licences granted in the Katherine Tindall Limestone Aquifer and the Katherine River downstream of Ironwood Gauging Station G8140535. The background and process for announced allocations for licence granted in the Oolloo Dolostone Aquifer is described in the Oolloo Dolostone Aquifer Water Allocation Plan.

The Daly River Catchment integrated surface water – groundwater model (the model) has been used to assess the likely impacts on river flows and aquifer outflow discharges throughout the 2021/22 water allocation year.

The likely impacts have been assessed as the differences between modelled natural daily flows and modelled altered daily flows resulting from the combined effects of extractions from the Katherine River, the Katherine Tindall Limestone Aquifer, the Flora Tindall Limestone Aquifer and the Oolloo Dolostone Aquifer.

### Natural River Flows

Natural river flows predicted by the model for regional rainfall from 1 January 1980 to 31 March 2021 and no rainfall at all from 1 April 2021 to 30 April 2021 are shown below.

Date	Modelled Natural Flows (daily average cumecs)					
	Katherine River		Flora River	Daly River		
	Donkey Camp Weir	Wilden		Dorisvale Crossing	Oolloo Crossing	Mount Nancar
1 November 2021	0.955	2.806	2.136	9.646	14.111	21.588
31 December 2021	0.838	2.665	1.990	9.203	13.374	20.293

## **Natural Aquifer Discharges to Rivers**

Natural discharge from the Katherine Tindall Limestone Aquifer to the Katherine River and from the Ooloo Dolostone Aquifer to the Daly River were also modelled for regional rainfall from 1 January 1960 to 31 March 2021 and no rainfall at all from 1 April 2021 to 30 April 2021.

Predicted natural aquifer outflows between May 2021 and April 2022 from this modelling were:

- (a) 60,184ML from the Katherine Tindall Limestone Aquifer to the Katherine River;
- (b) 474,107 ML from the Ooloo Dolostone Aquifer to the Daly River:
  - (i) 165,728ML upstream from Dorisvale Crossing;
  - (ii) 162,112ML between Dorisvale Crossing and Ooloo Crossing; and
  - (iii) 146,267ML downstream of Ooloo Crossing

## **Environmental Flows to be Preserved**

### 1. Katherine River

Natural river flow predicted by the model at Wilden Gauging Station G8140536 on 1 November 2021 is 2.806 cumecs; which represents an Average River Flow Scenario according to Katherine Tindall Limestone Aquifer Water Allocation Plan.

The allowable level of impact provided for guidance in Katherine Tindall Limestone Aquifer Water Allocation Plan (p56) for an Average River Flow Scenario is that 70% of the annual groundwater discharge to the Katherine River from the Katherine Tindall Limestone Aquifer is reserved for non-consumptive use.

Also, Table 7 of this water allocation plan requires the modelled altered flow at Wilden Gauging Station G8140536 on 1 November 2021 to be at least 70% of the modelled natural flow.

There is no scientific research directly related to environmental water requirements available for the Katherine River upstream of Ironwood Gauging Station G8140535. This means that the Northern Territory Water Allocation Planning Framework applies to this reach of the Katherine River, and therefore modelled altered river flows should be at least 80% of the modelled natural river flows.

### 2. Flora River

Similarly, there is no directly related scientific research related to environmental water requirements available for the Flora River; so that modelled altered river flows should be at least 80% of the modelled natural river flows.

### 3. Daly River

Natural flows in the Daly River should not be less during the 2021/22 water accounting year (May 2021 to April 2022) should not be less than the modelled results that assume no rainfall at all from May to December 2021.

Natural flows on any day in the Daly River during the 2021/22 water accounting year should, therefore, be at least 9 cumecs at Dorisvale Crossing, 13 cumecs at Ooloo Crossing and 20 cumecs at Mount Nancar.

Therefore, in accordance with the Ooloo Dolostone Aquifer Water Allocation Plan (Fig 26), the combined effect of all groundwater and surface water extractions in the Daly River Region should not reduce natural flows in the Daly River by more than 20% on any day during the 2021/22 water accounting year.

This means that modelled altered flows at Dorisvale Crossing, Ooloo Crossing and Mount Nancar should be least 80% of modelled natural flows

### Altered River Flows - May to December 2021

Altered river flows were modelled using the following inputs:

- Reported and estimated usage from January 1980 to 31 March 2021 for licensed and stock & domestic extractions from the Daly River and Katherine River;
- reported and estimated usage from January 1980 to 31 March 2021 for licensed and stock & domestic extractions from the Katherine Tindall Limestone Aquifer, the Flora Tindall Limestone Aquifer and the Ooloo Dolostone Aquifer;
- all licensed and stock & domestic users in the Daly River and Katherine River extracting at 100% of maximum entitlements from 1 April 2021 to 30 April 2022;
- all licensed and stock & domestic users in the Katherine Tindall Limestone Aquifer, the Flora Tindall Limestone Aquifer and the Ooloo Dolostone Aquifer extracting at 100% of maximum entitlements from 1 April 2021 to 30 April 2022;
- regional climatic data from BoM from January 1980 to 31 March 2021; and
- no rainfall at all from April 2021 to April 2022.

All surface water licences in the Katherine River and Daly River were set at 100% allocation from 1 January 1980 to 31 December 2021 for this modelling.

2021 altered flows in the Katherine River and Daly River predicted by this modelling were:

Date	Modelled Altered Flows (daily average cumecs)					
	Katherine River		Flora River	Daly River		
	Donkey Camp Weir	Wilden		Dorisvale Crossing	Ooloo Crossing	Mount Nancar
1 November 2021	0.824	2.312	2.126	8.779	13.007	19.948
31 December 2021	0.765	2.341	1.979	8.555	12.466	18.799

The reductions in natural flows in 2021 predicted by this modelling were:

Date	Modelled Change in Natural Flows					
	Katherine River		Flora River	Daly River		
	Donkey Camp Weir	Wilden		Dorisvale Crossing	Ooloo Crossing	Mount Nancar
1 November 2021	-14%	-18%	-0.48%	-9.0%	-7.8%	-7.6%
Maximum	-15%	-19%	-0.53%	-9.4%	-7.9%	-7.6%
Date	1 Oct	1 Oct	31 Dec	4 Oct	13 Oct	12 Nov

### **Altered Aquifer Discharges**

Altered discharges from the Katherine Tindall Limestone Aquifer to the Katherine River and from the Ooloo Dolostone Aquifer to the Daly River were modelled using the following inputs:

- (a) Reported and estimated usage from January 1980 to 31 March 2021 for licensed and stock & domestic extractions from the Daly River and Katherine River;
- (b) reported and estimated usage from January 1980 to 31 March 2021 for licensed and stock & domestic extractions from the Katherine Tindall Limestone Aquifer, the Flora Tindall Limestone Aquifer and the Ooloo Dolostone Aquifer;
- (c) all licensed and stock & domestic users in the Daly River and Katherine River extracting at 100% of maximum entitlements from 1 April 2021 to 30 April 2022;
- (d) all licensed and stock & domestic users in the Katherine Tindall Limestone Aquifer, the Flora Tindall Limestone Aquifer and the Ooloo Dolostone Aquifer extracting at 100% of maximum entitlements from 1 April 2021 to 30 April 2022;
- (e) regional climatic data from BoM from January 1980 to 31 March 2021; and
- (f) no rainfall at all from April 2021 to April 2022.

The total altered aquifer outflows between May 2021 and April 2022 predicted by this modelling

- (a) 53,901ML from Katherine Tindall Limestone Aquifer to the Katherine River;
- (b) 443,665 ML from Ooloo Dolostone Aquifer to the Daly River, made up of:
  - (i) 156,504ML upstream from Dorisvale Crossing;
  - (ii) 156,071ML between Dorisvale Crossing and Ooloo Crossing; and
  - (iii) 131,090ML downstream of Ooloo Crossing

The reductions in natural aquifer outflows in 2021 predicted by the modelling were:

- (a) 10.4% reduction in total annual discharge to the Katherine River from the Katherine Tindall Limestone Aquifer;
- (b) 6.4%% reduction in total annual discharge to the Daly River from the Ooloo Dolostone Aquifer, with:
  - (i) 5.6% reduction upstream from Dorisvale Crossing;
  - (ii) 3.7% reduction upstream between Dorisvale Crossing and Ooloo Crossing;
  - (iii) 10.4% reduction downstream of Ooloo Crossing;

### **Expected Effects of Extractions in 2021/22 Water Allocation Year**

Modelling the effects of extractions at 100% of their authorised or allowable maximum water entitlements, and with no rain at all from May to December in 2021, has shown that:

- (a) natural flow in the Katherine River at Wilden on 1 November 2021 would have been 2.806 cumecs, which is an Average River Flow Scenario under the Katherine Tindall Limestone Aquifer Water Allocation Plan.
- (b) Modelled change in flow on 1 November 2021 at Wilden was 18% reduction, which is less than the 30% allowable in the Katherine Tindall Limestone Aquifer Water Allocation Plan for an Average River Flow Scenario.
- (c) Modelled change in annual discharge from the Katherine Tindall Limestone Aquifer to the Katherine River was 10.4% reduction, which is less than the 30% limit set for guidance by the Katherine Tindall Limestone Aquifer Water Allocation Plan for an Average River Flow Scenario.

- (d) Maximum modelled change to daily average river flow in the Katherine River upstream from Ironwood Gauging Station was 15% reduction, which is less than the 20% limit under the Northern Territory Water Allocation Planning Framework.
- (e) Maximum modelled change to daily average river flow in the Flora River was 0.5% reduction, which is less than the 20% limit under the Northern Territory Water Allocation Planning Framework.
- (f) Maximum modelled changes to daily average river flows in the Daly River were reductions of 9.4% at Dorisvale Crossing, 7.9% at Ooloo Crossing and 7.6% at Mount Nancar, all of which are less than the 20% limit specified in the Ooloo Dolostone Aquifer Water Allocation Plan.

**Announced Allocations for Daly River Region - 2021/22 Water Accounting Year**

In consideration of the modelling results summarised above, I have decided that announced allocations of 100% for the 2021/22 water accounting year for the Katherine Tindall Limestone Aquifer, Katherine River, Flora Tindal Limestone Aquifer and Ooloo Dolostone Aquifer will maintain appropriate levels of environmental protection and water supply security.

The announced allocation for water extraction licences granted in the Katherine Tindall Limestone Aquifer, Katherine River, Flora Tindall Limestone Aquifer and Ooloo Dolostone Aquifer between 1 May 2021 and 30 April 2022 is 100%.



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