

Water Monitoring Report

February 2023 – February 2024

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Barramundi Adventures Darwin Pty Ltd

12/03/2024

Summary

This report contains the results of water quality monitoring conducted by Barramundi Adventures Darwin for the reporting period Feb2023-Feb2024. Barramundi Adventures Darwin operates as a recreational barramundi fishing park as well as a collaboration with CSIRO conducting trials for extensive tiger prawn farming. Due to the low intensity and small scale of operation, discharge levels into the Blackmore River are low and only occur either during the wet season when rainfall causes overflow of surface water from the ponds or when ponds are discharged during harvesting. In relation to EPL323, water sampling occurred mainly at Monitoring Points of the Blackmore River and during a discharge event from the authorized Discharge point's A & B. Results of these samples are discussed below.

Purpose

This Monitoring Report is prepared in accordance with the following EPL232 conditions:

Condition 41 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

Condition 42 The licensee must ensure that each Monitoring Report:

- *is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring'*
- *includes a tabulation of all monitoring data required as a condition of this licence*
- *includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available)*
- *includes an assessment of environmental impact from the activity*

Monitoring plan

The monitoring plan includes four sampling locations (Fig. 1). These locations are;

- Authorised Discharge Point A (DPA) – receives discharge from ponds 3, 4 and 5
- Authorised Discharge Point B (DPB) – receives discharge from ponds 1 and 2.
- G8155543 – Blackmore River approx. 1km upstream of Discharge Point A
- G8150369 – Blackmore River approx. 1km downstream of the intake point, also compliance point.

Water quality monitoring of the Blackmore River was carried out at two times throughout the year. Samples were sent to NATA accredited laboratories for analysis for all parameters listed according to the Water Quality Monitoring Program.

Sample from the DPA & DPB was only collected when water was available to sample, i.e. during the wet season when rainfall resulted in surface water overflowing from the pond outlets into the discharge channels or when ponds were completely discharged and harvested.

Field parameters, temperature, pH, dissolved oxygen, electrical conductivity and turbidity were measured in-situ using a YSI pro quatro handheld meter.

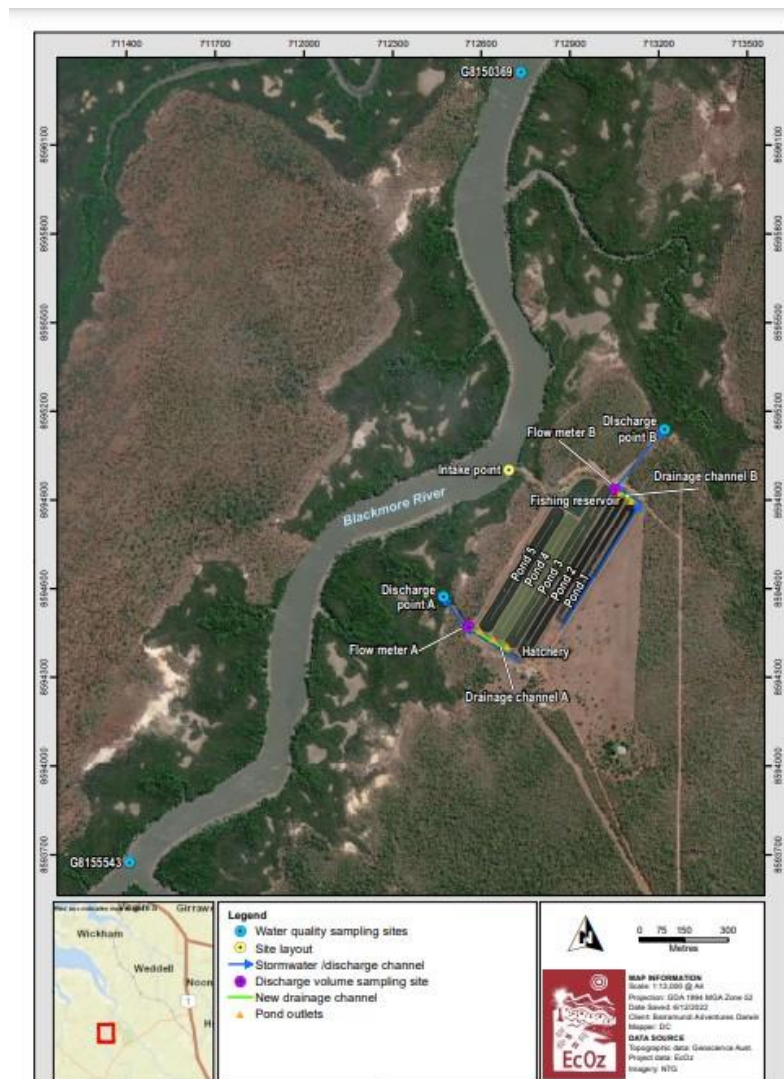


Figure 1. Monitoring Points

Field parameter results

Table 1: Monitoring data of field parameters

Site ID	Date Sampled	Temp	DO	pH	EC	Turbidity
		°C	%sat	pH units	μS/cm	NTU
		-	-	6.0-8.5	-	-
DPA	7/6/23	25.8	64.7	7.60	50740	20.2
DPB	7/6/23	25.8	65.1	7.66	51232	15.6
G8155543	7/6/23	26.0	64.1	7.89	48157	9.18
G8150369	7/6/23	25.9	67.8	7.70	51891	7.04
DPA	29/1/24	31.9	57.2	7.44	30684	10.6
DPB	29/1/24	32.4	40.3	7.22	14191	10
G8155543	29/1/24	28.7	55.1	6.52	532	25.3
G8150369	29/1/24	27.9	57.3	6.57	1105	36.7

Laboratory parameters

Table 2: Monitoring data of nitrogen-based nutrients

Site ID	Date Sampled	Ammonia as N	Nitrate as N	Nitrite as N	TN
		mg/L	mg/L	mg/L	mg/L
		0.018	0.02	0.02	0.32
DPA	7/6/23	0.013	<0.005	<0.005	0.2
DPB	7/6/23	0.011	<0.005	<0.005	0.1
G8155543	7/6/23	0.021	<0.005	<0.005	0.2
G8150369	7/6/23	0.015	<0.005	<0.005	0.1
DPA	29/1/24	0.26	0.13	0.04	1.1
DPB	29/1/24	0.5	0.31	<0.01	1.1
G8155543	29/1/24	0.02	<0.01	<0.01	0.3
G8150369	29/1/24	0.02	<0.01	<0.01	0.3

Table 3: Monitoring data of other laboratory parameters

Site ID	Date Sampled	TSS	PO4 as P	TP	Chl-a
		mg/L	mg/L	mg/L	mg/m3
		10	0.01	0.027	4
DPA	7/6/23	33	0.01	0.06	2.81
DPB	7/6/23	30	0.006	0.03	2.6
G8155543	7/6/23	12	0.008	0.02	3.05
G8150369	7/6/23	8	0.006	0.04	2.38
DPA	29/1/24	11	<0.01	0.08	2
DPB	29/1/24	8	0.09	0.11	<1

G8155543	29/1/24	16	<0.01	0.03	<1
G8150369	29/1/24	17	<0.01	0.04	<1

Rainfall and discharge volumes

Table 4 outlines the methodology used for quantifying discharge volumes out of the ponds. Each pond is fitted with a standard 12-inch butterfly valve which operates as the outlet for each pond and allows for the control and rate of discharge.

Table 4: Methodology for quantifying discharge volumes from production ponds

Pond Valve Discharge Rates			
Valve Notch #	Valve Opening (%)	Discharge Rate (L/min)	Discharge Rate (KL/day)
Notch 1	10%	643.43	926.54
Notch 2	20%	1270.65	1829.73

Table 5 outlines the rainfall, evaporation, and discharge volumes across the February 2023 to February 2024 reporting period. During the wet season (December – April) the ponds are discharged to keep up with a rise in pond level resulting from rainfall. For the remainder of the year the evaporation rate results in a net water loss meaning the ponds do not need to be discharged unless harvesting of ponds is conducted. Discharge sampling for February 2023 has not been included in this report as it was conducted and included in the 2022 to 2023 report. Sufficient water was discharged in February 2023 to allow for additional rainfall in March and April 2023 meaning discharging was not required during these months. Three ponds were harvested between late May and June requiring the full discharging of each pond over this period. Rainfall related discharging for the 2023/2024 wet season did not commence until January due to insufficient rainfall in the preceding months.

Table 5: Rainfall, Evaporation, and discharge volumes

Time	Rainfall (mm)	Evaporation (mm)	Rainfall - Evaporation (mm)	DPA (ML)	DPB (ML)	Reason For Discharge
Feb-23	382.5	182.5	200	18.23	12.74	Rainwater Discharge
Mar-23	221.25	159.5	61.75	-	-	
Apr-23	189	175.6	13.4	-	-	
May-23	NR	189.1	-	12.96	30.11	1, 2 & 4 Pond harvesting
Jun-23	NR	209.6	-	16.20	37.63	1, 2 & 4 Pond harvesting
Jul-23	NR	201.7	-	-	-	
Aug-23	NR	211.9	-	-	-	
Sep-23	0	224.4	-224.4	-	-	
Oct-23	35.9	232.3	-196.4	-	-	
Nov-23	225.8	243.5	-17.7	-	-	
Dec-23	224	217.3	6.7	-	-	
Jan-24	736	197.8	538.2	15.22	10.64	Rainwater Discharge

Notes: Rainfall data was collected onsite using a rain gauge. At some timepoints during the dry season rainfall data was not collected (NR = No Record collected).

Discussion of water quality monitoring

Monthly sample collection from the Monitoring Points in the Blackmore River did not occur due to there being no discharge from the farm for the majority of the reporting period. Monthly sampling was conducted in the months where discharging was conducted except for May 2023 due to logistical restrictions. Note, water sampling opportunities from the Monitoring Points are limited by tide access, sample withholding periods and freight timelines. However, May discharging was related to pond harvesting which began in late May and continued into June in which period sampling was conducted.

Several parameters from the Monitoring Points during the reporting period exceeded the trigger values. All nitrogen-based nutrients exceeded the trigger values at some point during the reporting period, however, in all cases either the upstream testing levels already exceeded both the downstream point and the trigger value or there was no difference in levels between the upstream and downstream levels. The upstream sampling point exceeded the ammonia trigger value during both sampling events suggesting that the trigger value for ammonia should be increased.

Trigger values were similarly exceeded for total suspended solids (TSS), Phosphate (PO₄) and total phosphorus (TP). In all cases the value of the parameter was either higher upstream than downstream, non-detectable or the difference from upstream to downstream was non-significant enough to be attributed to discharge from B.A.D (due natural/sampling variation). TSS levels upstream greatly exceed the trigger value suggesting this value also needs to be increased.

Declaration

I Dorian Rondot of Barramundi Adventures Darwin Pty Ltd prepared this report and I confirm to the best of my knowledge and ability that all information provided in this report is true and accurate.



12/03/2023