



WATER MONITORING REPORT

September 2020 – September 2021



ABSTRACT

This report contains the results of water quality monitoring conducted by Tasmanian Seafoods in accordance with EPL 276 in relation to a proposed sea cucumber aquaculture operation located at Berry Springs, NT, Australia.

Luke Turner

Tasmanian seafoods P/L

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Summary

Tasmanian seafoods obligations relating to the operation of a proposed sea cucumber nursery facility located at 160 William Rd Berry Springs, NT include reporting on the approved water monitoring plan associated with its environmental protection licence (EPL276). The sea cucumber nursery stage 1 development has been completed and the nursery operated during the reporting period from September 2020 to September 2021. The farm was operational (stocked with juvenile sea cucumber) between 1/06/2021 and 27/07/2021. The purpose of the sea cucumber Nursery facility is to rear juvenile sea cucumbers in an extractive and extensive aquaculture system. Juvenile sea cucumbers are transferred from an off-site hatchery to the nursery facility where they are on grown for a period of six weeks in a recirculating raceway system. There are no feed, nutrients, or other inputs to the production system. Saline water is pumped onto the farm under licence from Darwin River.

Monitoring was conducted in each month during the reporting period regardless of whether the sea cucumber farm was in operation. Monitoring occurred mainly at the farm intake and at the downstream monitoring point (compliance point) in the Darwin River. The farm discharge point was also monitored at times when rainfall events resulted in surface water flowing from the farm discharge channel. During normal operation during the dry season no farm discharge occurred.

The water monitoring plan results provided here are discussed in relation to the water quality objectives (trigger limits) for the Darwin Harbour region. The results, expectedly, indicate the water quality of the upper estuary environment of the Darwin River is highly variable and heavily influenced by rainfall and the tidal cycle. Recommendations are made regarding the water monitoring plan objectives to improve the ability of the monitoring plan to detect impacts from future use at the site.



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Monitoring Objectives

The objectives of the monitoring plan are to provide data to allow for the assessment of the water quality in the receiving environment and so that water quality objectives and declared beneficial uses of the Darwin Harbour environment may be maintained and protected. To achieve this, trigger limits have been set for some important parameters based on water quality objectives of the Darwin harbour region-Blackmore River. These trigger limits are described in the water monitoring plan (appendix 1).

Monitoring method

The monitoring plan is attached in appendix 1. The plan includes 4 sampling locations (Figure 1):

Bore: Ground water extraction point RN33415

AD1: authorised discharge point 1

CP1: Compliance point 1- 100m downstream of where the farm discharge meets the Darwin River receiving environment.

Intake1: The farm intake located on Darwin River.



Figure 1: Water quality monitoring plan sampling locations.

Each monitoring point was sampled monthly, and samples were sent to a NATA accredited laboratory (ALS Sydney) for analysis of the analytes as described in the water monitoring plan. The site AD1 was only sampled when water was available at the sampling point i.e. when wet season rainfall resulted in surface water flowing from the farm discharge outlet.

Water quality parameters of pH, DO, Temperature, Salinity (conductivity) and turbidity were measured *in-situ* using a YSI pro plus handheld water quality meter and a YSI 9500 photometer (Turbidity).

Monitoring results

Physico-chemical properties

Timestamp	Site	Salinity (ppt)	Dissolved Oxygen (%)	pH	Temperature (C)
23/09/2020 9:45	CP1	40.91	47.2	7.65	30.6
6/10/2020 8:38	CP1	39.96	69.7	7.1	31.1
4/11/2020 8:29	CP1	38	64.2	7.77	32.8
3/12/2020 7:35	CP1	37.26	55	7.83	32.1
30/12/2020 7:52	CP1	2	64	3.29	28.4
3/02/2021 9:59	CP1	0.57	67.7	7.92	29
22/03/2021 11:36	CP1	4.88	76.4	7.28	30.9
19/04/2021 11:00	CP1	16.5	64	7.4	30.2
19/05/2021 11:03	CP1	24.49	72.7	7.62	26.6
15/06/2021 9:34	CP1	29.24	61.8	7.61	26.2
28/07/2021 9:19	CP1	32.98	75.4	7.71	26.7
31/08/2021 9:47	CP1	32.32	77.1	7.55	27.3
23/09/2020 10:03	I1	39.91	52	7.73	30.4
2/10/2020 7:56	I1	42.08	67.6	7.74	30.7
6/10/2020 8:48	I1	39.74	64.3	7.76	31.1
13/10/2020 14:19	I1	39.32	69.6	5.37	31.7
19/10/2020 7:45	I1	38.46	42.5	7.72	30.1
27/10/2020 14:18	I1	35.13	52.8	7.7	32.1
4/11/2020 8:42	I1	37.81	60.3	7.78	32.8
4/11/2020 8:42	I1	37.93	60.3	7.78	32.8
24/11/2020 13:55	I1	22.32	50.2	8.03	31.5
27/11/2020 14:49	I1	36.17	87.4	7.77	32.4
3/12/2020 7:42	I1	36.71	56.4	7.82	32.1
22/12/2020 12:42	I1	18.47	53.1	8.26	29.8
30/12/2020 7:58	I1	2.19	63	4.16	28.4
3/02/2021 9:42	I1	0.49	68.9	8.49	28.8
4/02/2021 9:30	I1	0.51	72.8	9.31	29
8/02/2021 10:00	I1	1.18	223.5	9.24	4
8/02/2021 10:01	I1	0.64	58.8	8.98	27.6
12/02/2021 8:13	I1	2.28	70.8	8.77	29.9
15/02/2021 8:47	I1	0.25	77.2	9.42	28.3
8/03/2021 14:33	I1	4.28	81.7	8.83	28.9
22/03/2021 11:42	I1	5.13	76.8	7.16	29.9
12/04/2021 8:38	I1	13.69	59.4	7.39	30.1
19/04/2021 11:10	I1	15.4	64.4	7.41	30.1
19/04/2021 11:25	I1	3.02	82	6.57	29.6
6/05/2021 16:42	I1	17.54	87.2	7.57	30.3
15/05/2021 9:14	I1	25.34	64.1	7.58	26.7
19/05/2021 11:12	I1	24.12	69.8	7.56	26.5
25/05/2021 15:10	I1	25.45	84.4	7.6	27.8
11/06/2021 9:28	I1	27.03	62.8	7.68	25.8
15/06/2021 9:42	I1	28.6	59.8	7.64	26.2
22/06/2021 13:41	I1	26.38	68.1	7.71	25.9

28/07/2021 9:27	I1	32.26	72.8	7.72	26.7
31/08/2021 9:55	I1	31.94	75.4	7.51	27.3
4/11/2020 9:13	AD1	42.15	107.3	8.53	33.3
24/11/2020 14:02	AD1	22.94	64.4	7.76	31.3
3/12/2020 8:03	AD1	36.86	84.1	7.59	30.5
23/12/2020 10:40	AD1	26.51	86	8.13	30.6
29/12/2020 8:31	AD1	22.44	85.2	8.12	30.5
30/12/2020 8:46	AD1	22.02	88.6	0.81	30.5
3/02/2021 10:23	AD1	13.98	89.9	7.77	30.4
4/02/2021 9:14	AD1	8.85	81.7	8.32	29.7
8/02/2021 9:51	AD1	15.15	93.7	8.19	28.7
12/02/2021 8:17	AD1	10.04	71.5	7.87	29.8
15/02/2021 8:57	AD1	14.47	81	7.67	30.8
8/03/2021 14:54	AD1	1.53	76.5	8.27	29.8
22/03/2021 11:09	AD1	6.12	85.9	6.64	31.3
12/04/2021 8:46	AD1	3	81.2	6.65	28.9
19/04/2021 11:27	AD1	3.03	79.6	6.5	29.7

Table 1: Results of in-situ recorded physico-chemical water quality parameters for sites CP1 (Compliance Point), AD1 (authorized discharge) and I1 (Intake point). Readings outside water quality monitoring plan objectives are highlighted in red.

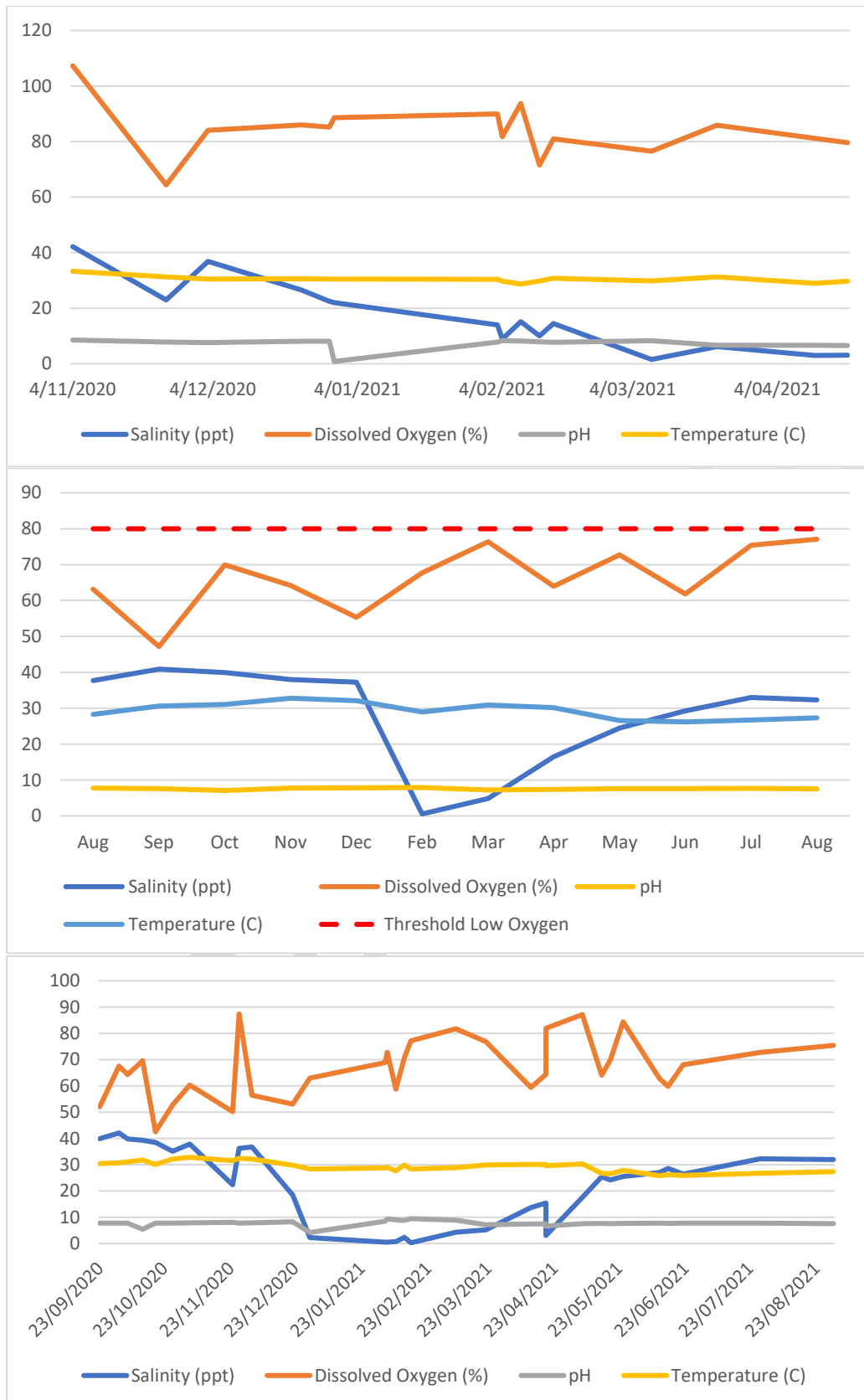


Figure 2: Dynamics of physico-chemical water quality parameters at sampling locations AD1 (top), CP1 (centre) and I1 (bottom) during the reporting period from September 2020 to August 2021. AD1 and I1 samples *ad libitum* and CP1 samples monthly.

Nutrients

Nitrogen

Month	Site	Total N	Nitrate	Nitrite	Ammonia	NOx
Nov	AD1	0.61	0.014	<0.002	<0.01	0.014
Dec	AD1	0.48	0.154	<0.002	<0.005	0.154
Feb	AD1	0.56	0.214	<0.002	0.011	0.214
Mar	AD1	0.89	0.539	<0.002	0.028	0.539
Apr	AD1	0.45	0.355	<0.002	0.019	0.355
Aug	CP1	0.26	0.016	0.004	<0.01	0.02
Sep	CP1	0.4	0.006	<0.002	0.01	0.006
Oct	CP1	0.28	0.002	<0.002	<0.01	0.002
Nov	CP1	0.19	0.003	<0.002	<0.01	0.003
Dec	CP1	0.15	0.006	<0.002	<0.005	0.006
Feb	CP1	0.17	0.004	<0.002	0.017	0.004
Mar	CP1	0.18	0.006	<0.002	0.013	0.006
Apr	CP1	0.22	0.014	<0.002	0.011	0.014
May	CP1	0.16	0.01	0.013	<0.005	0.023
Jun	CP1	0.18	0.014	<0.002	<0.005	0.014
Jul	CP1	0.15	0.012	<0.002	0.007	0.012
Aug	CP1	0.2	0.016	<0.002	<0.005	0.016
Aug	I1	0.12	0.02	0.004	<0.005	0.024
Sep	I1	0.21	0.017	0.005	<0.005	0.022
Oct	I1	0.15	<0.002	0.002	<0.01	0.002
Nov	I1	0.16	0.003	<0.002	<0.01	0.003
Dec	I1	0.16	0.007	0.002	<0.005	0.009
Feb	I1	0.18	0.005	<0.002	0.027	0.005
Mar	I1	0.18	0.01	<0.002	<0.005	0.01
Apr	I1	0.22	0.013	<0.002	0.009	0.013
May	I1	0.18	0.012	0.014	<0.005	0.026
Jun	I1	0.18	0.014	<0.002	<0.005	0.014
Jul	I1	0.14	0.01	0.002	0.012	0.012
Aug	I1	0.22	0.019	0.003	<0.005	0.019

Table 2: Concentrations of nitrogen analytes (mg/L) in water samples from sites CP1 (Compliance Point), AD1 (authorized discharge) and I1 (Intake point) collected during the reporting period from August 2020 to August 2021. Readings outside water quality monitoring plan objectives are highlighted in red.

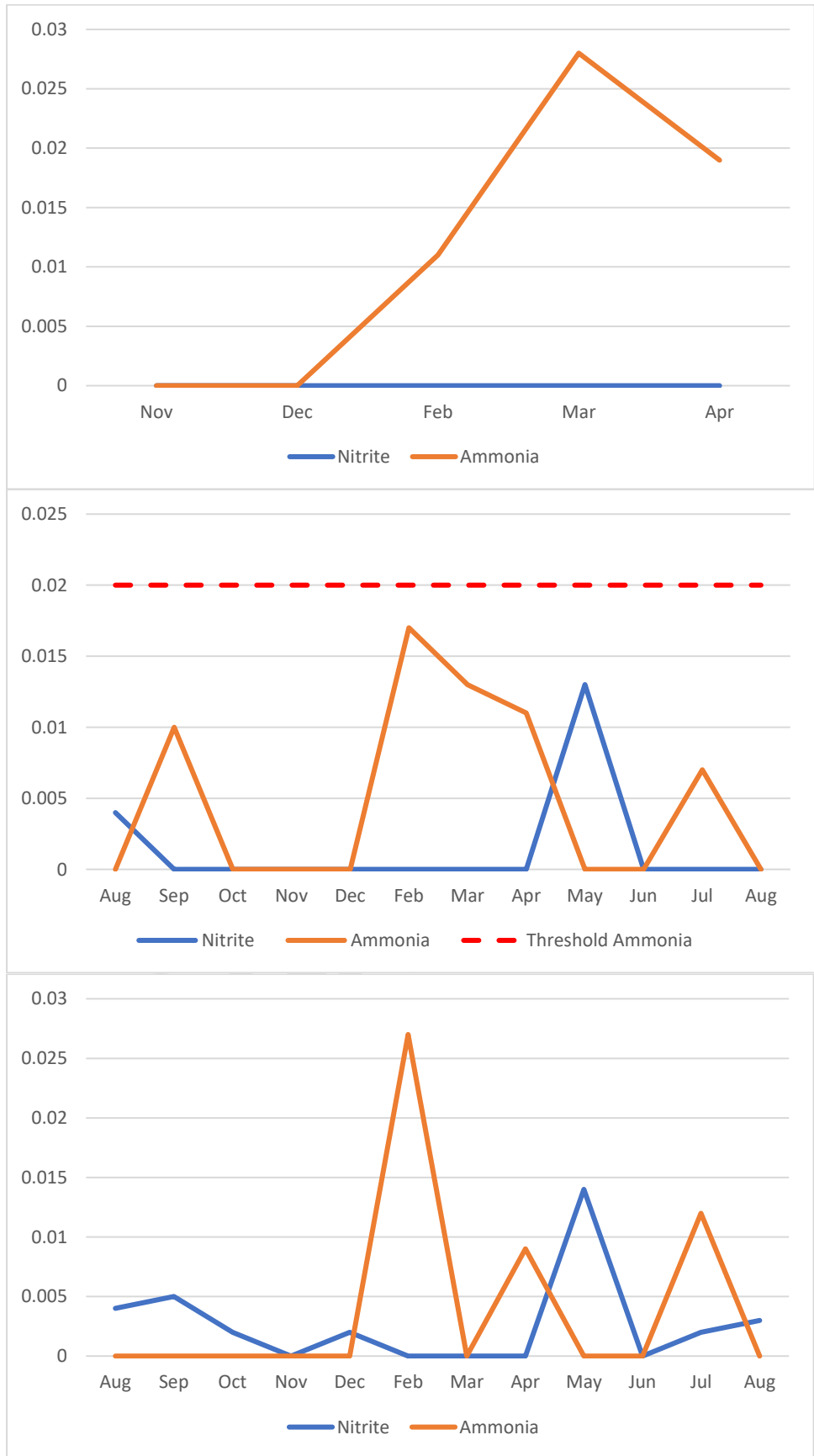


Figure 3: Nitrite and ammonia concentration recorded at the sampling locations AD1 (top), CP1 (centre) and I1 (bottom) during the reporting period from August 2020 to August 2021.

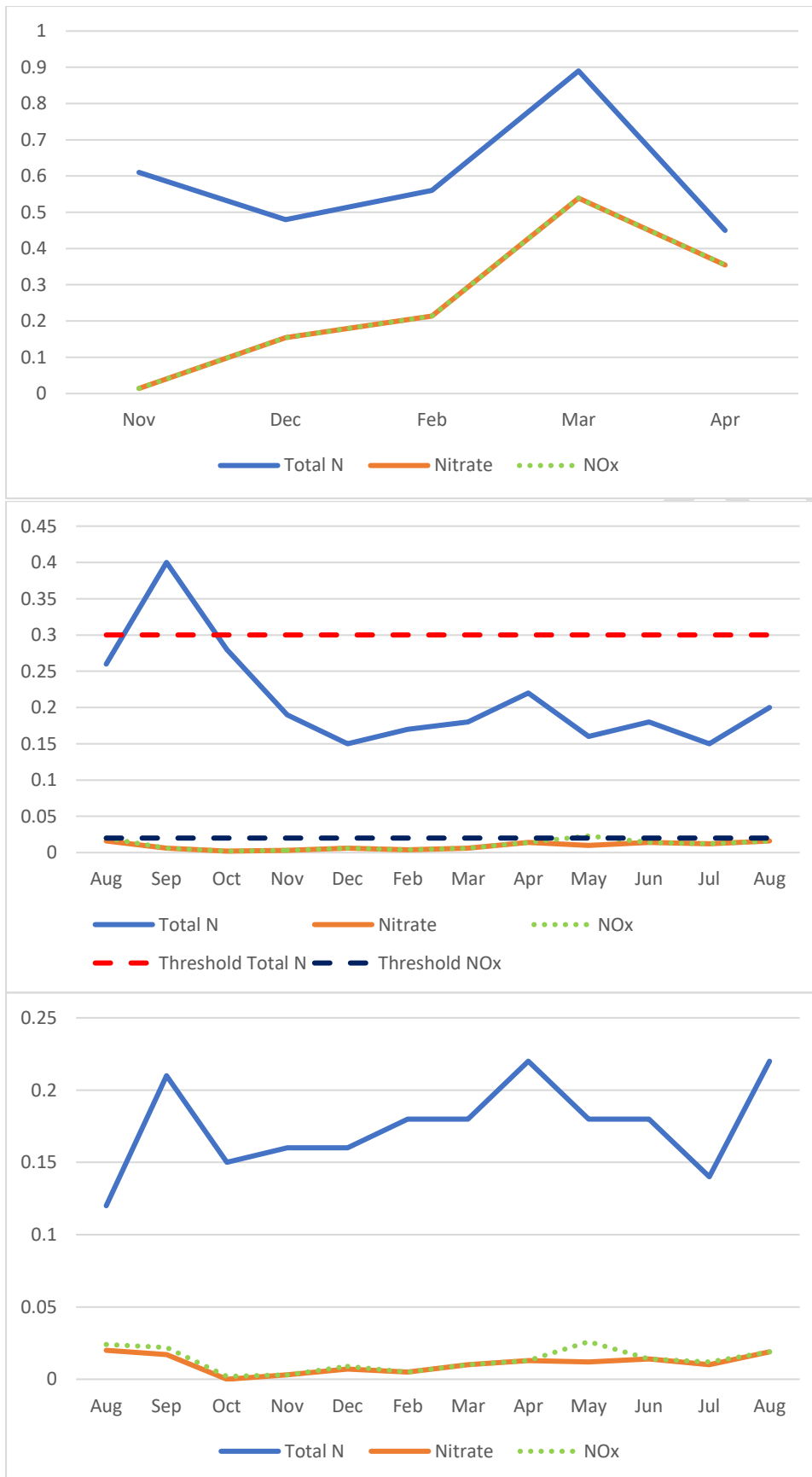


Figure 4: Total Nitrogen, Nitrate and Total oxidized nitrogen (NOx) concentration recorded at the sampling locations AD1 (top), CP1 (centre) and I1 (bottom) during the reporting period from August 2020 to August 2021.

Phosphorus

Month	Site	Total P	DRP
Nov	AD1	<0.005	<0.001
Dec	AD1	<0.005	<0.001
Feb	AD1	<0.005	<0.001
Mar	AD1	0.006	<0.001
Apr	AD1	0.006	<0.001
Aug	CP1	0.025	0.008
Sep	CP1	<0.01	0.002
Oct	CP1	<0.005	0.007
Nov	CP1	<0.005	0.003
Dec	CP1	<0.005	0.006
Feb	CP1	0.024	0.01
Mar	CP1	0.01	0.004
Apr	CP1	<0.005	0.004
May	CP1	0.014	0.008
Jun	CP1	0.017	0.015
Jul	CP1	0.02	0.002
Aug	CP1	0.023	0.006
Aug	I1	0.025	0.009
Sep	I1	0.032	0.015
Oct	I1	<0.005	0.007
Nov	I1	<0.005	0.004
Dec	I1	<0.005	0.008
Feb	I1	0.018	0.009
Mar	I1	0.007	0.006
Apr	I1	0.006	0.005
May	I1	0.016	0.008
Jun	I1	0.02	0.011
Jul	I1	0.019	0.007
Aug	I1	0.026	0.006

Table 3: Total phosphorus (Total P) and reactive phosphorus (DRP) concentrations (mg/L) in water samples from sites CP1 (Compliance Point), AD1 (authorized discharge) and I1 (Intake point) collected during the reporting period from August 2020 to August 2021. Readings outside water quality monitoring plan objectives are highlighted in red.

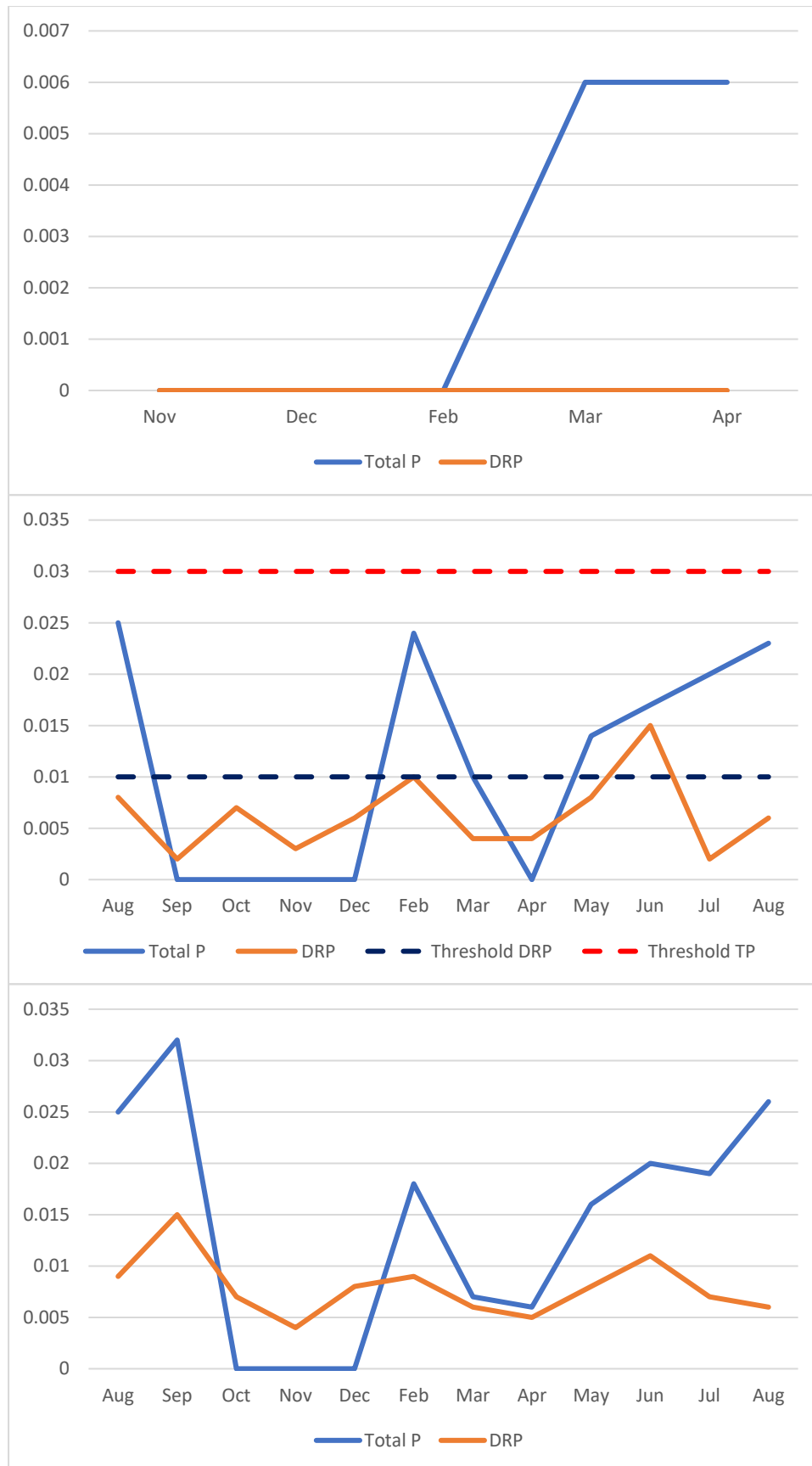


Figure 5: Changes in total phosphorus (Total P) and reactive phosphorus (RP) nutrients in water sampled from sites CP1 (top), AD1 (centre) and I1 (bottom) collected during the reporting period from September 2019 to August 2020.

Chlorophyll- α

Month	Site	Chlorophyll α
Nov	AD1	4
Dec	AD1	3
Feb	AD1	<1
Mar	AD1	<1
Apr	AD1	<1
Aug	CP1	1
Sep	CP1	<1
Oct	CP1	2
Nov	CP1	3
Dec	CP1	<1
Feb	CP1	<1
Mar	CP1	3
Apr	CP1	2
May	CP1	2
Jun	CP1	1
Jul	CP1	2
Aug	CP1	2
Aug	I1	7
Sep	I1	1
Oct	I1	2
Nov	I1	3
Dec	I1	1
Feb	I1	<1
Mar	I1	<1
Apr	I1	2
May	I1	2
Jun	I1	1
Jul	I1	1
Aug	I1	2

Table 4: Chlorophyll α concentrations ($\mu\text{g/L}$) in water samples from sites CP1 (Compliance Point), AD1 (authorized discharge) and I1 (Intake point) sampled during the reporting period from August 2020 to August 2021. Readings outside water quality monitoring plan objectives are highlighted in red.

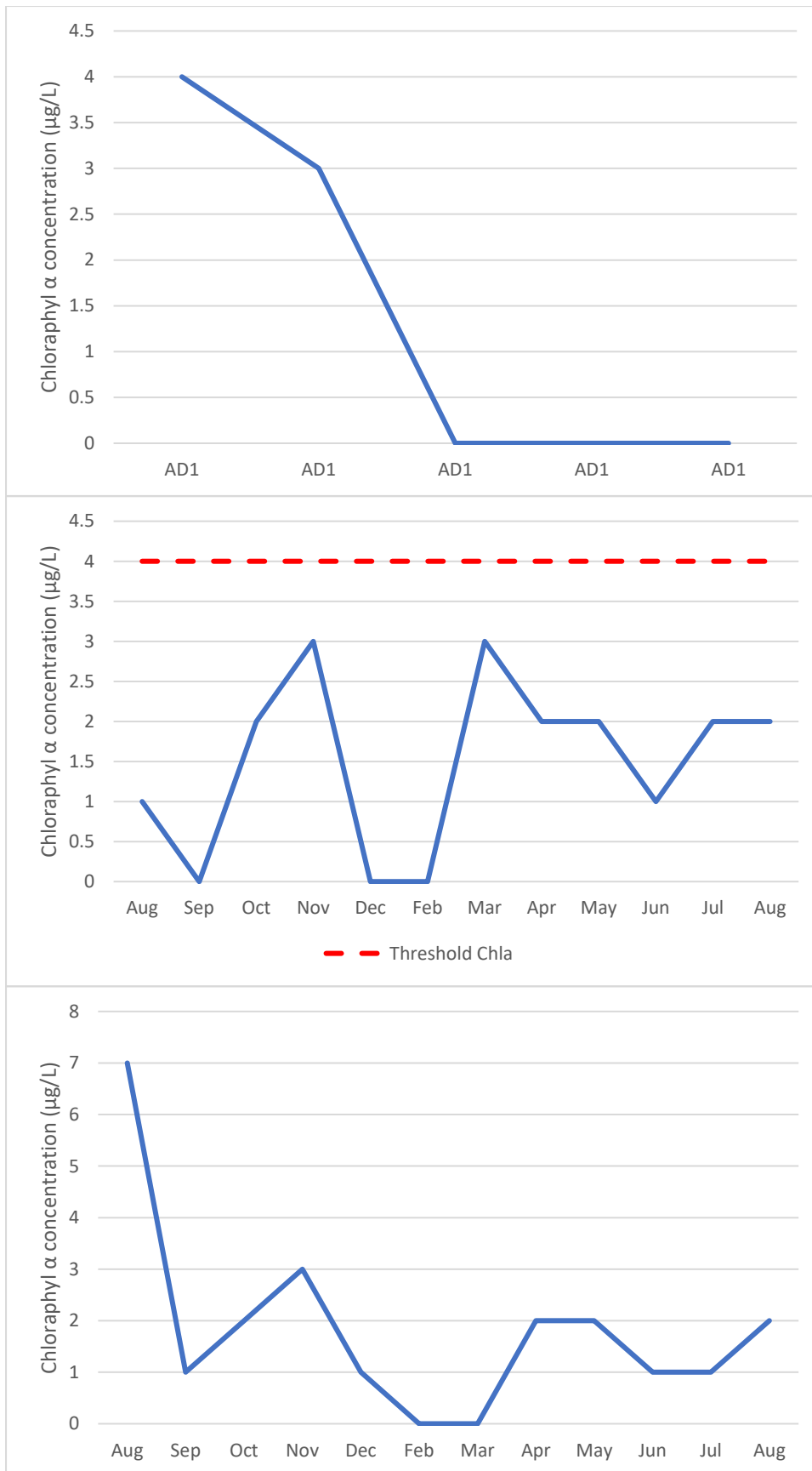


Figure 6: Changes in chlorophyll levels in water sampled from sites AD1 (top), CP1 (centre) and I1 (bottom) collected during the reporting period from September 2019 to August 2020.

Biochemical oxygen demand

Month	Site	BOD
Nov	AD1	<2
Dec	AD1	<2
Dec	AD1	<12
Feb	AD1	<2
Mar	AD1	<03
Apr	AD1	<2
Aug	CP1	<2
Sep	CP1	4
Oct	CP1	4
Nov	CP1	<2
Dec	CP1	<2
Dec	CP1	<12
Feb	CP1	<2
Mar	CP1	<03
Apr	CP1	<2
May	CP1	<2
Jun	CP1	<2
Jul	CP1	<2
Aug	CP1	<2
Aug	I1	<2
Sep	I1	3
Oct	I1	2
Nov	I1	<2
Dec	I1	<2
Dec	I1	<12
Feb	I1	2
Mar	I1	<03
Apr	I1	<2
May	I1	<2
Jun	I1	<2
Jul	I1	<2
Aug	I1	2

Table 5: Biochemical oxygen demand (BOD) of water samples collected during the reporting period from August 2020 to August 2021 for sites AD1, I1 and CP1.

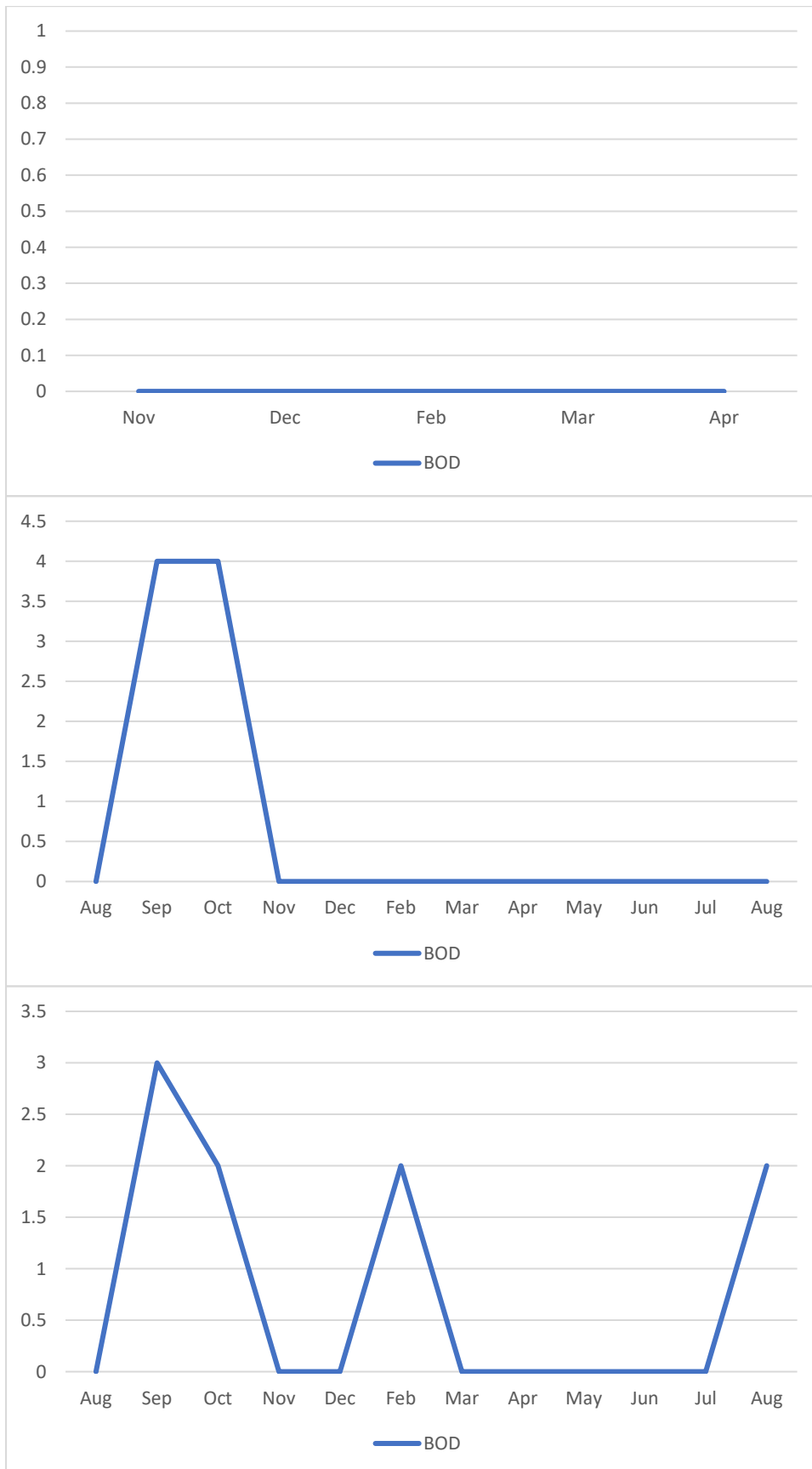


Figure 7: Changes in biochemical oxygen demand (mg/L) in water sampled from sites AD1 (top), CP1 (centre) and I1 (bottom) during the reporting period from August 2020 to August 2021.

Total suspended solids and turbidity

Month	Site	TSS	Turbidity (<i>In situ</i>)	Turbidity (NATA)
Nov	AD1	<5	8	4.2
Dec	AD1	<5	6	3.4
Feb	AD1	<5	6	1.8
Mar	AD1	<5	2	1
Apr	AD1	6	2	1.4
Aug	CP1	20		12.3
Sep	CP1	7	8	4.8
Oct	CP1	<5	10	4.4
Nov	CP1	12	14	5.3
Dec	CP1	8	14	5.6
Dec	CP1		54	
Feb	CP1	14	14	36.4
Mar	CP1	6	10	5
Apr	CP1	<5	10	4.8
May	CP1	12	14	5.9
Jun	CP1	18	10	7.8
Jul	CP1	<5	18	3.2
Aug	CP1	14		6
Aug	I1	16	32	8.5
Sep	I1	5	8	5.4
Oct	I1	<5	12	4.5
Nov	I1	8	24	4.4
Dec	I1	7	16	6.2
Dec	I1		64	
Feb	I1	14	16	36.9
Mar	I1	<5	12	4.7
Apr	I1	6	12	5.6
May	I1	20	16	6.5
Jun	I1	10	14	9.1
Jul	I1	10	18	2.5
Aug	I1	16		5.4

Table 6: Total suspended solids (mg/L) and turbidity recorded in water samples from sites CP1 (Compliance Point), AD1 (authorized discharge) and I1 (Intake point) sampled during the reporting period from August 2020 to August 2021. Readings outside water quality monitoring plan objectives are highlighted in red. Both *in-situ* (YSI 9500 photometer) and laboratory turbidity (NATA) are presented.

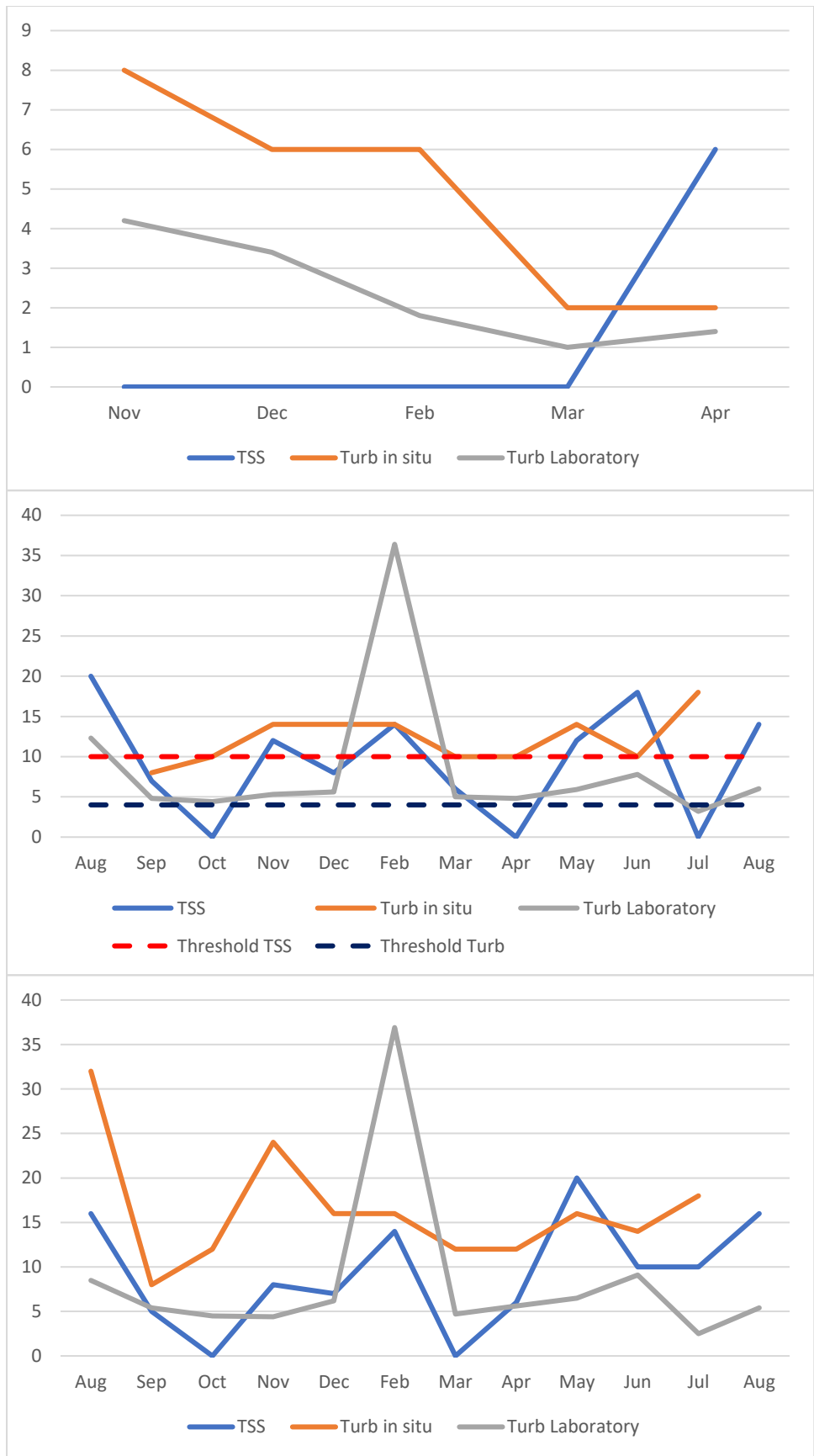


Figure 8: Variability of total suspended solids (TSS (mg/L)) and turbidity (FTU/NTU) in water sampled from sites AD1 (top), CP1 (centre) and I1 (bottom) collected during the reporting period from August 2020 to August 2021.

In-situ turbidity

Turb	AD1	I1	CP1
13/10/2020		18	
13/10/2020		18	
19/10/2020		12	
26/10/2020		34	
24/11/2020	6	16	
3/12/2020	6	16	14
23/12/2020	8		
29/12/2020	6		
8/02/2021	0	38	
12/02/2021	2	16	
15/02/2021	0	54	
12/04/2021	0	8	

Table 7: *In-situ* turbidity readings (sampled *ad libitum*) for AD1, I1, and CP1 (data reported previously; shown here for comparison).

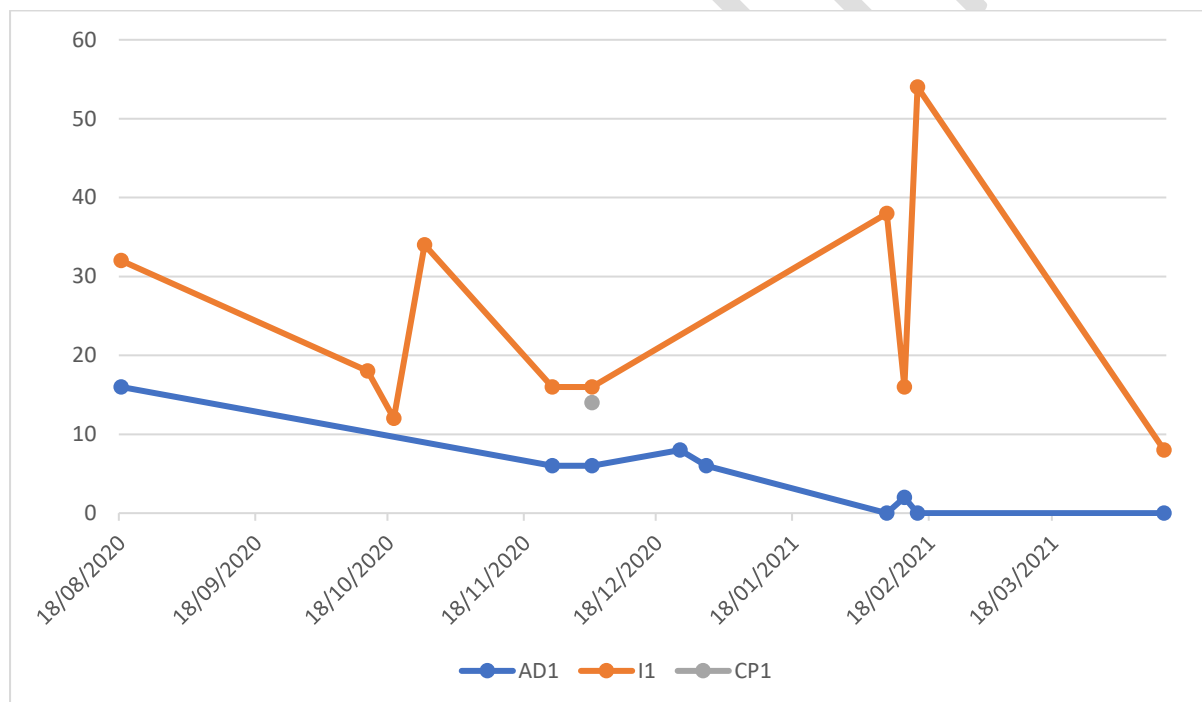


Figure 9: *In-situ* turbidity record for *ad libitum* sampling at CP1, AD1 and I1 during the reporting period of August 2020 – April 2021.

Groundwater supply water quality

Bore water quality

Analyte	mg/L		Analyte	Mg/L
Total Alkalinity	171	Dissolved Metals	Al	<0.01
Sulfate	2		As	<0.001
Chloride	16		Cu	<0.001
Calcium	24		Pb	<0.001
Magnesium	26		Ni	<0.001
Sodium	5		U	<0.001
Potassium	<1		Zn	<0.005
Nitrate + Nitrite	0.01	Total Metals	Al	<0.01
Total Kjeldahl Nitrogen	<0.1		As	<0.001
Total Nitrogen	<0.1		Cu	<0.001
Total Phosphorus	0.01		Pb	<0.001
Total anion (meq/L)	3.91		Ni	<0.001
Total Cation (meq/L)	3.56		U	<0.001
Ion Balance (%)	4.75		Zn	<0.005

Table 8: Water quality results from Bore RN033415 sampled on 24/08/2020.

Conductivity ($\mu\text{S/cm}$)	Salinity (ppt)	DO (%)	pH	Temperature ($^{\circ}\text{C}$)	Turbidity (FTU)
533	0.24	117.1	8.61	29	<<

Table 9: *In-situ* water quality of bore water sampled on 24/08/2021. (<=<=below test detection limits of YSI photometer 9500).

Authorised discharge

A flow velocity meter installed at the farm discharge recorded flows from discharged from November 2020 to April 2021. Water flowed at the discharge only because of rainfall. Excess water from rain falling on the ponds caused pond drains to flow to the authorised discharge point. The Flow velocity meter recorded a total discharge of 0.015ML which is too low to be a true reading. An investigation into improving the performance of the flow velocity meter is being undertaken. As no discharge occurred outside the wet season the total rainfall hand pond catchment area has been used to estimate the discharge. As the calculation does not account for evaporation and seepage it is probably an overestimation. The property received 2300mm of rainfall during the 2020-2021 wet season with a total pond surface area catchment of 80,441m² the total discharge from the wet season rainfall can be calculated at 185ML. There was no sea cucumber production during the 2020-2021 wet season. No discharge from the farm occurred during the production period in June-July 2021. Water quality at the farm discharge point AD1 was very good and did not impact the water quality at the compliance point CP1. Water sampled at the farm discharge contained higher levels of dissolved oxygen, lower TSS, lower Turbidity, lower nitrite and lower Phosphorus when compared to water sampled from the farm intake point and compliance point. The water sampled from the farm discharge point did contain levels of total nitrogen and nitrate when compared to the farm intake so net nitrogen discharge was used to calculate the total amount of waste discharged by the farm. The source of the nitrates in the farm discharge may be related to natural productivity within the ponds at the farm but are not related to the activity as the elevated nitrates were present prior to any activity taking place. The net nitrogen discharged from the farm was calculated using the formula; mean total nitrogen at farm discharge (TN_{AD1}) minus mean total nitrogen at farm intake point in Darwin River (TN_{I1}) multiplied by the total volume discharged via the authorised discharge point (V_{AD1}).

$$(TN_{AD1} - TN_{I1}) \times V_{AD1}$$

$(TN_{AD1} = 0.598 - TN_{I1} = 0.211) \times V_{AD1} = 185\text{ML}$

Net N discharge = 0.387mg/l

Total Net Nitrogen discharged = 71.595kg Nitrogen

Monitoring results quality evaluation

Sampling was conducted in accordance with the conditions of EPL276.

Samples were collected at the locations listed in the WQMP. A scheduled analysis of samples in January was missed due to miscommunication between the testing laboratory and the sampler regarding a partial shutdown in the logistics chain due to a holiday shutdown in early January. Samples were collected but were unable to be shipped before samples exceeded specified holding times for some analytes.

Water sampling opportunities are limited by a combination of short withholding times of some of the analytes (24h), limitation of freight services to NATA accredited lab services (Mon-Thurs) and tidal access (>3.8m) to the sampling locations. These are usually restricted to about 2-3 days twice per month.

Analysis of all samples were conducted at ALS Sydney laboratory which has NATA accreditation for the required analysis. Chain of custody information for the samples and QA/QC documentation for the analysis conducted by the lab is kept on file and can be made available on request.

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Discussion

Objective	Result at compliance point (CP1)	Discussion	Recommendation
DO 80-100%	Not met - DO below 80% at CP1 on all occasions. Resulting in 11 non-compliance level events of three consecutive exceedances.	DO also low at I1 on all occasions. DO levels higher at AD1. Likely normal DO range for Darwin River estuary environment. No non-compliance during production.	Now that data are available from 2 years of monthly samples at the Darwin River upper estuary adjacent to the farm site specific trigger values will be proposed for DO to better reflect the receiving environment.
Turbidity <4NTU	Met on condition 35 that exceedance only if Turbidity not also high at I1.	As expected in the Darwin River estuary Turbidity levels were always above the objective limit of 4 (NTU/FTU). Turbidity was also high and at similar levels at I1 when high at CP1. Turbidity at AD1 was generally lower than CP1 and I1 but variable with rainfall.	Now that data are available from 2 years of monthly samples at the Darwin River upper estuary adjacent to the farm site specific trigger values will be proposed for turbidity to better reflect the receiving environment.
Ammonia <0.02 mg/L at CP1	Objective met- No Exceedances	Detectable levels during the wet season	No recommendation
NOx <0.02 mg/L at CP1	Objective met- One exceedance recorded in May 2021.	Also exceedance level NOx also recorded at farm intake point at same time.	No recommendation
TN <0.3 mg/L at CP1	Objective met- One exceedance recorded in Sept 2020	Objective met	No recommendation
Chlorophyll-a <4µg/L at CP1	Objective met- No exceedance	Objective met	No recommendation
TSS <10mg/L at CP1	Objective met- Six exceedances recorded in Aug, Nov, Feb and Sept, May, Jun, Aug.	TSS at similar or higher levels at farm intake at same time.	No recommendation
TP <0.03 mg/L at CP1	Objective met- No Exceedances	Objective met	No recommendation
RP <0.01mg/L at CP1	Objective met- One exceedance in June 2021	Also at exceedance level at the farm intake at the same time.	No recommendation
pH 6-8.5	Objective met- No exceedance	Objective met	No recommendation

Table 10: Water quality monitoring plan performance analysis and discussion.

Proposed Site-Specific Trigger Values

Non-compliance-level exceedances were recorded at the compliance point for DO less than 80% on consecutive sampling occasions. Mean DO% at the farm intake point was not significantly different from the mean DO at the compliance point ($t_{42}=0.142108$, $P=0.888$) over the period from September 2019 to August 2021. Water quality data from both the intake point and compliance point were pooled to calculate site

specific trigger limits which are more appropriate. Site specific guideline values are proposed based on the 80th and 20th percentiles from 2 years of monthly sampling data for in the Darwin River at sites I1 and CP1. ANZECC & ARMICANZ 2000, <https://www.waterquality.gov.au/anz-guidelines>.

	Dissolved Oxygen (%)	Total N	Ammonia	NOx	DRP	TSS	In-situ Turbidity
Calculated SSTL	>60%	0.27	0.016	0.022	0.011	16	17.2
Current TL	>80% <100	0.3	0.02	0.02	0.01	10	4
Difference %	25	10	20	-10	-10	-60	-330
Proposed New SSTL	>60% no upper TL	0.3	0.016	0.02	0.01	16	17.2

Table 11: Comparison of current trigger limits (TL) and proposed new site-specific trigger limits (SSTL) based on reference data collected from the farm intake point (I1) and the Compliance point (CP1).

Calculations for site-specific guideline values for TN, NOx and DRP were very close to the existing trigger limits ($\pm 10\%$) and these values should remain unchanged.

An application to amend the water quality monitoring plan associated with the EPL to reflect the proposed SSTVs for DO%, Turbidity, TSS and Ammonia will be made to the NTEPA.

Conclusion

Even with very little activity taking place the water quality objectives were not completely achieved despite the high quality and low volume of water that is discharged by the activity. Although exceedances and non-compliance level events were recorded these cannot be attributed to discharges or emissions resulting from the activity as there was no discharge during or after the period that the farm was stocked with juvenile sea cucumber. Now that two years of monthly water monitoring data are available, more appropriate site-specific trigger limits can be proposed in accordance with the [ANZ water quality guidelines](#). These new site-specific trigger limits will improve the water monitoring plan by ensuring guideline values are based on real data from the immediate receiving environment and thus more appropriate.

Certification

I Luke Turner of Tasmanian Seafoods 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.

16/09/2021