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Darryl Cook
Director Finfish Compliance
Environment Protection Authority
GPO Box 1550
HOBART TAS 7001

Dear Darryl,

In reference to correspondence from the EPA to Tassal dated 12 January 2023, I wish to provide you with Tassal's DO Consumption Report for Environmental Licence Nos. 9893/3, 9912/3 and 9930/3. Specifically, this report relates to condition DO1 on each of these licences.

Background

The following conditions were placed on as additional conditions (DO1) for Tassal's Environmental Licences in Macquarie Harbour.

DO1 Dissolved Oxygen Consumption Report

1 By 31 January 2024, or a date otherwise advised by the Director in writing, the licence holder must submit a Dissolved Oxygen Consumption Report for the Director's approval.

2 The Dissolved Oxygen Consumption Report must include the following information:

2.1 The estimated overall dissolved oxygen demand resulting from the activity, including a detailed estimate of the following elements:

2.1.1 respiratory demand of farmed finfish; and

2.1.2 pelagic demand generated within the water column; and

2.1.3 benthic demand generated within the sediment.

2.2 Calculations must be provided for the following periods:

2.2.1 the 12-month period from 1 December 2022 to 30 November 2023 and separately for each season within this period, based on actual feed input and dissolved nitrogen outputs; and

2.2.2 the 12-month period from 1 December 2023 to 30 November 2024 and separately for each season within this period, based on predicted feed and dissolved nitrogen outputs.

3 The Dissolved Oxygen Consumption Report must include a description of the scientific methods and assumptions underlying the calculations, and the degree of confidence in their accuracy.

4 By 1 January 2025, or a date otherwise advised by the Director in writing, the licence holder must submit a report containing revised dissolved oxygen consumption calculations for the 12-month period from 1 December 2023 to 30 November 2024, based on actual feed and dissolved nitrogen outputs.

This report details the requirements for Tassal's operations in Macquarie Harbour.

Methodology for Dissolved Oxygen Consumption Report Macquarie Harbour

The methods used conform with the letter issued on the 12 January 2024 as detailed below.

The total dissolved oxygen demand is to be determined for a 12-month period, and seasonal periods within it as specified in the licence condition, on the basis of feed input/biomass grown during the corresponding periods.

Calculations are to be based on a mass balance approach regarding the fate of carbon (C) and nitrogen (N). According to research by Wang et al. (2012), up to 70% of the total C and 62 % of the total N contained in feed are released to the receiving environment.

Calculations must consist of, and clearly identify, the following elements:

1. The carbon components contributing to DO demand:

a. Respiratory demand based on the Respiratory Quotient (RC);

b. Demand associated with the release of dissolved organic carbon (DOC) to the environment;

c. Demand associated with the release of particulate organic carbon (POC) to the environment.

2. The nitrogen components contributing to DO demand:

a. Demand associated with the release of Dissolved Inorganic Nitrogen (DIN), (such as Total Ammonia Nitrogen and urea), from finfish pens to the environment;

b. Demand associated with the release of dissolved organic nitrogen (DON) to the environment;

c. Demand associated with the release of particulate organic nitrogen (PON) to the environment.

3. The overall dissolved oxygen consumption: Amounts of N and C released to the receiving environment over a time period of approximately 12 months, and the resulting carbon and nitrogen components, are to be considered.

Results and discussion

The following results were calculated using Wang et al 2012.

Assumptions used for calculations:

Carbon Calculations:

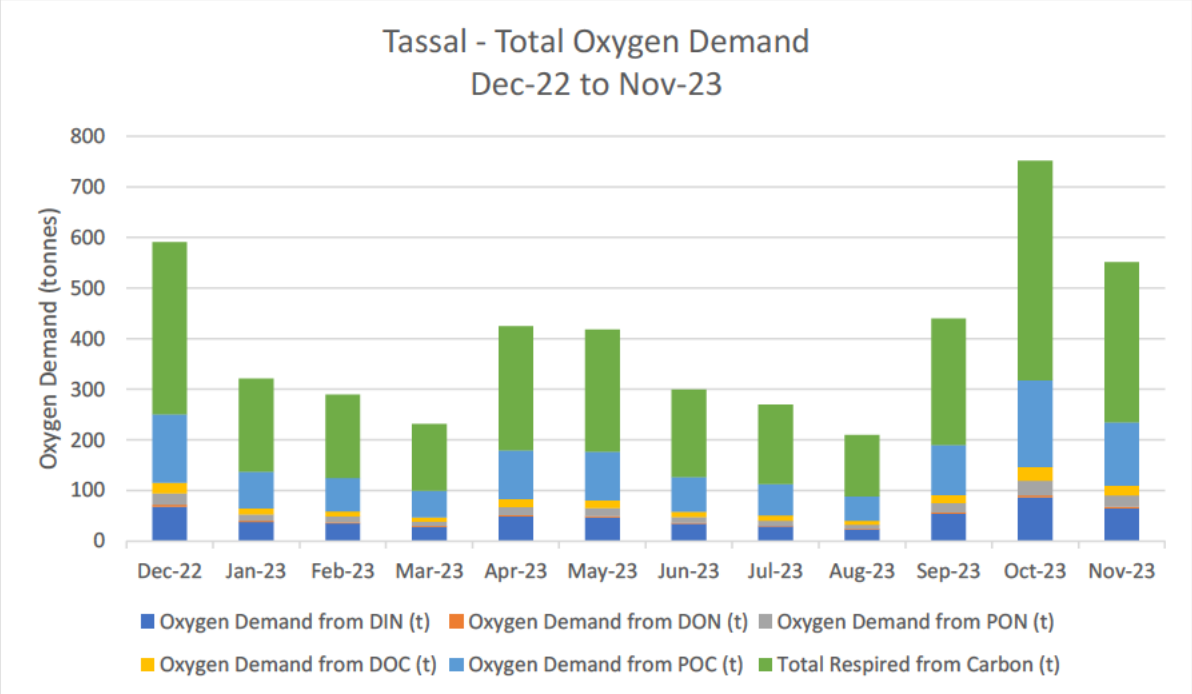
Respired (%)	0.48
DOC (%)	0.03
POC (%)	0.19
Fish Gain	0.30
Respiratory Quotient (RC)	1.0

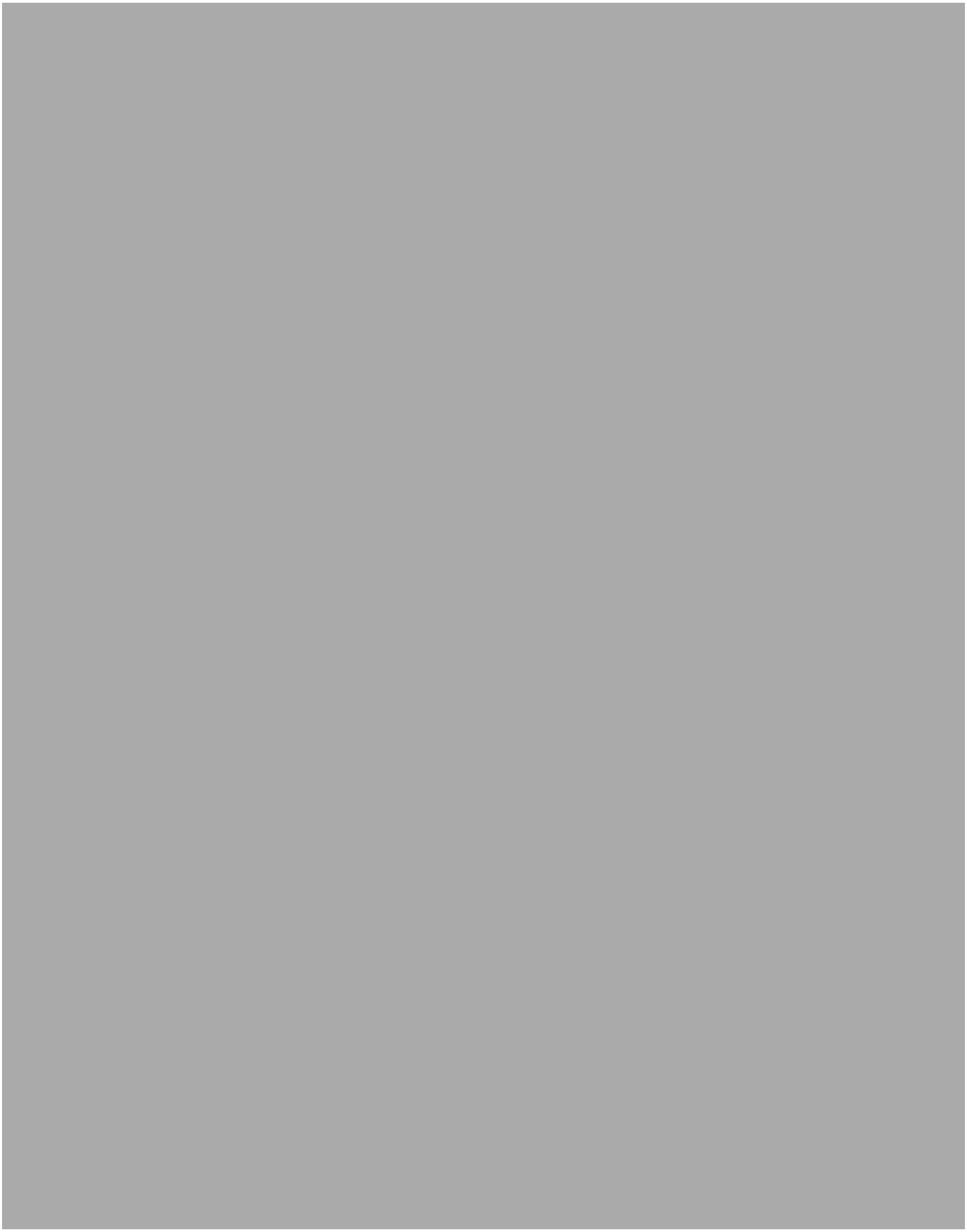
Nitrogen Calculations:

DIN (%)	0.45
DON (%)	0.02
PON (%)	0.15
Fish Gain	0.38

Total Oxygen Demand from Carbon and Nitrogen - December 2022 – November 2023

	Oxygen Demand from DIN (t)	Oxygen Demand from DON (t)	Oxygen Demand from PON (t)	Oxygen Demand from DOC (t)	Oxygen Demand from POC (t)	Total Respired from Carbon (t)
Dec-22	68.2	3.4	23.2	21.3	134.6	340.1
Jan-23	38.4	1.9	13.1	11.5	72.7	183.6
Feb-23	35.3	1.8	12.0	10.3	65.4	165.1
Mar-23	28.1	1.4	9.6	8.2	52.2	131.9
Apr-23	48.8	2.4	16.6	15.3	96.9	244.8
May-23	47.3	2.4	16.1	15.1	95.8	241.9
Jun-23	34.4	1.7	11.7	10.8	68.4	172.9
Jul-23	29.4	1.5	10.0	9.8	62.3	157.4
Aug-23	23.7	1.2	8.1	7.6	48.1	121.4
Sep-23	54.3	2.7	18.5	15.6	98.9	249.8
Oct-23	86.2	4.3	29.3	27.1	171.5	433.2
Nov-23	65.0	3.2	22.1	19.8	125.2	316.4





General Comments

Please do not hesitate to contact me if you wish to discuss any of the information contained within this report. I would be happy to personally guide you through assumptions and calculation models used to estimate oxygen consumption from salmon farming operations. I believe that a workshop is being arranged for the salmon industry, IMAS and the EPA to work through the various assumptions used to determine the oxygen demand from salmon farming in Tasmanian waters and view this as a worthwhile initiative.

Yours sincerely

Sean Riley

Head of Environment