Annual Environmental Review Report 2019/2020

Environmental Licence No. 10180/1

East of Yellow Bluff

Marine Farming Lease no. 281

September 2020

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1. Introduction

Environmental monitoring is undertaken in the waters of Storm Bay as part of Environmental Licence No. 10180/1 (EL 10180/1), issued to Huon Aquaculture Company Pty Ltd on 14 May 2019. The licence is for finfish farming in State Waters East of Yellow Bluff within Marine Farming Lease 281. The various environmental monitoring sites are shown in Figure 1.

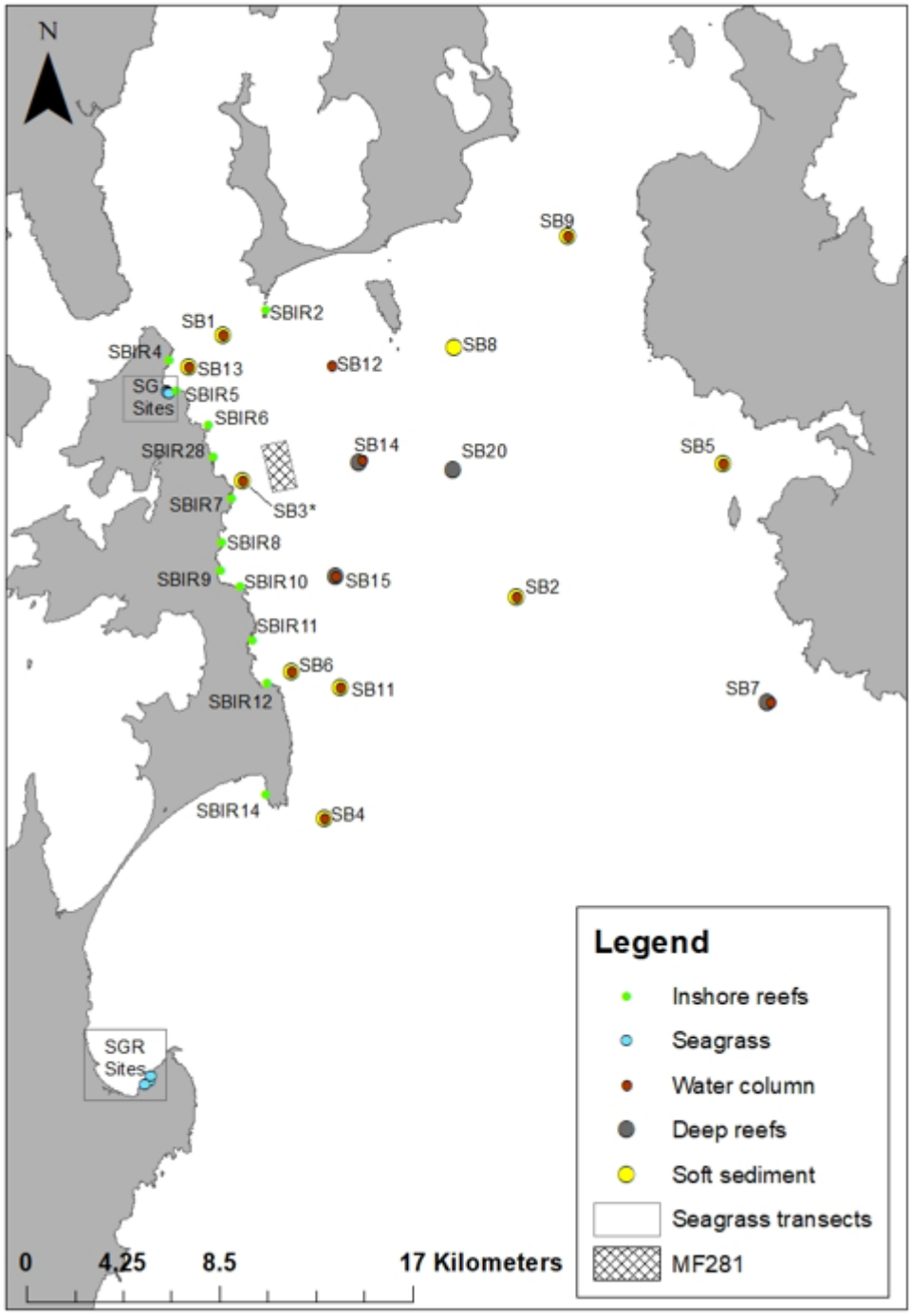

Figure 1: Map of monitoring sites, Yellow Bluff lease (MF281) and the Storm Bay area

As part of the conditions of the environmental licence, an Annual Environmental Review Report must be submitted to the Director of the EPA each calendar year. The report must cover a 12-month period up to and including April of each year. The licence came into effect in May 2019, the first stocking of finfish occurred in July 2019, and official monitoring subsequently began in August 2019. This is the First Annual Environmental Review Report for Environmental Licence 10180/1.

The Annual Environmental Review Report summarises environmental parameters monitored between August 2019 and April 2020. The report includes a summary of water quality performance; benthic surveys; water quality measurements; water currents (hydrodynamics); reef & seagrass monitoring; modeling – dispersion water quality & sediment dispersion; video surveys; and benthic surveys (Table 1).

Schedule prescriptions acknowledge that for the first Annual Environmental Review Report, the available data is to be utilised in lieu of a 12-month data set. The EPA were consulted during the preparation of this report with regard to the analysis and presentation of the part-year dataset. Where possible, other monitoring initiatives were used to provide additional information in order to contextualise results.

All fieldwork for this report (other than the video sediment survey) was undertaken by the Institute of Marine & Antarctic Studies (IMAS) and Aquenal Pty Ltd. Due to escalation of the COVID pandemic in March 2020, the IMAS capacity for field work was limited and ultimately suspended under UTAS policy. This resulted in a revised survey design for the benthic survey components that was acknowledged by both Huon Aquaculture and the EPA. Separate to this, an additional three sites were also outlined for survey in the Environmental Licence; however suitable substrate for soft-sediment surveys was not present at site SB12 (South West of Betsy Island), and sites SBIR3 (Dennes Point) and SBIR13 (Cape Queen Elizabeth) did not contain appropriate inshore reef habitat for monitoring - thus, an exemption from surveying these sites was granted by the EPA. Since monitoring began, all other requirements for frequency and timing of sampling events were met with respect to Environmental Licence 10180/1.

This report iteratively steps through each of the requirements outlined in the Environmental Licence 10180/1 (replicated in Table 1). Information requirements are detailed in each section along with short summaries to illustrate the main findings. Detailed results can be found in full detail in the MF281 Yellow Bluff Broadscale Environmental Monitoring Program Annual Report (BEMP report) for EL 10180/1, and the MF281 Yellow Bluff Benthic Survey Report 2020. The type of information for each requirement was generally unique and compiled concurrently by the Institute for Marine and Antarctic Studies (IMAS), Aquenal, and Huon Aquaculture staff (video sediment survey only).

Table 1: Information requirements of the Annual Environmental Report. Adapted from Attachment 2 and 3 to Environmental Licence 10180/1

Type of information	Information Requirements	Frequency/timing	Notes
Water quality performance report	• Comparison of water quality results recorded at the compliance site against investigation trigger limits specified in Table 1. • Use rolling annual mean as compliance metric. • Box and whisker plots should be utilised to illustrate monitoring results and to provide a comparison with investigation trigger values. • Analysis of performance in the context of stocking cycles and feed inputs to be provided. • Summary of adaptive management measures implemented in response to trigger value exceedances.	Data for 12-month period, up to and including April of each year, to be analysed.	*For first annual report data available at the time to be utilised and median values to be calculated on that basis*
Benthic surveys (broad-scale monitoring)	*Results of benthic infauna and sediment surveys undertaken at BEMP monitoring sites.*	*Results relating to surveys undertaken in Spring of the reporting year.*	
Water quality measurements	Results of water quality monitoring, including nutrients, field parameters and phytoplankton to be summarise and analysed.	Data recorded for 12-month period, up to and including April of each year, to be summarised and analysed, with consideration to be given to illustrating seasonal and other relevant effects.	Refers to Attachments 11 and 12 for guidance on data presentation and analysis. For the first annual report, data available at that time to be reported.
Water currents (hydrodynamics)	Summary of real-time, in situ ADCP measurements. Interpretation of hydrodynamic patterns and associated adaptive management decisions.	Data recorded for a 6-month period to be summarised and analysed.	Refer to attachment 11 and 12 for guidance on data presentation and analysis.
Ecology - reef & seagrass monitoring	Findings of reef and seagrass surveys to be analysed. Interpretation of observed changes against background conditions to be provided.	Rapid Visual Assessment reef surveys are to be undertaken bi-annually (late Winter and in late Summer). Edgar-Barret reef surveys are to be conducted every 5 years. Seagrass surveys to be undertaken annually in late Spring.	
Modelling - dispersion water quality	Outputs from water quality dispersion modelling to be included.	Model to incorporate at least 6 months ADCP data.	Guidelines outlining specific modelling requirements to be issued by Director, EPA.

Modelling - sediment dispersion	Outputs from DEPOMOD sediment modelling to be included.	Model to incorporate at least 6 months ADCP data.	Guidelines outlining specific modelling requirements to be issued by Director, EPA.
Video surveys (compliance sites)	Summary of main findings of video surveys undertaken in reporting period.	Surveys undertaken every 12 months or in accordance with stocking and fallowing regime. Surveys must be conducted within 30 days of peak production.	Detailed video survey reporting not required for Annual Environmental Report, as submission is already a requirement under 3V9.
Benthic surveys (compliance & control sites)	Results of benthic infauna and sediment surveys undertaken at compliance and control sites including those shown in Table 6.	Survey undertaken every 12 months or in accordance with stocking and fallowing regime. Surveys must be conducted within 30 days of peak production.	Sampling and reporting to occur on an annual basis.

2. Far Field Environmental Monitoring

a. Benthic surveys – monitoring results

Information Requirement

Relevant section in EL10180/1: *3F2*

Information Requirements: *Results of benthic infauna and sediment surveys undertaken at BEMP monitoring sites.*

Frequency: *Results relating to surveys undertaken in Spring of the reporting year.*

Location of information requirements

The information to satisfy the requirements for the benthic surveys (broadscale monitoring) is presented in detail in the BEMP report (2020). Key findings are summarised briefly below.

Summary of information

Soft Sediments: Visual Assessment and Sediment Chemistry

The visual descriptions of the sediment cores from the 2019 survey showed the dominant colour was either brown, olive grey, or a mixture of colours. The sediment type was either fine or very fine sand in all cores. No odour or gas bubbles were detected from any core. The redox values and sulphide concentrations indicated no evidence of impacts from organic enrichment.

All redox and sulphide concentrations were indicative of healthy sediments.

Soft sediments: Benthic Infauna Abundances and Communities

The total abundance of infauna in the Storm Bay sediments was relatively low compared with other BEMP regions in south eastern Tasmania. However, the faunal diversity was similar. In general, the sediment samples were dominated by arthropods, from the family Isaeidae, annelids from the family Spionidae and to a lesser extent, molluscs from the family Cardiidae.

The fauna composition was consistent with natural assemblages, with limited abundances of species that indicated organic enrichment.

b. Water Quality – monitoring results and performance against trigger levels

Monitoring results

Information Requirement

Relevant section in EL10180/1: *3F3*

Information Requirements: *Results of water quality monitoring, including nutrients, field parameters and phytoplankton to be summarise and analysed.*

Frequency: *Data recorded for 12-month period, up to and including April of each year, to be summarised and analysed, with consideration to be given to illustrating seasonal and other relevant effects.*

Notes: *Refers to EL 10180/1 attachments 11 and 12 for guidance on data presentation and analysis. For the first annual report, data available at that time to be reported.*

Location of information requirements

The information to satisfy the requirements for the Water Quality Measurements is presented in detail in the BEMP report (2020). Key findings are summarised below.

Summary of information

The Annual Environmental Review Report requires information that summarises results of water quality monitoring including nutrients, field parameters and phytoplankton. Data was recorded monthly up to and including April each year. Results are summarised with consideration to be given to illustrating seasonal and other relevant effects.

Water Column: Physico-chemical Parameters and Nutrients

The sea temperature, silicate, phosphate and nitrate concentrations showed clear seasonal trends. The trends in nitrate and phosphate concentrations likely reflects the influence of the Southern Ocean. The dissolved nitrate and phosphate concentrations in bottom water have remained elevated through spring and summer 2019-2020, and this is evident at all sites. Distinct peaks of silicates in surface waters at site SB1 which is close to the mouth of the Derwent River highlight that periodic freshwater flows from this river are likely to be an important source of silicate to the system.

Water Column: Phytoplankton Biomass and Communities

Chlorophyll *a* generally exhibited slightly higher values in winter and spring 2019 than summer and autumn 2020. The concentrations of Chlorophyll *a* were generally higher in 2019-2020 than 2018-2019. Phytoplankton communities, as described from cell counts, were dominated by diatoms. A very small proportion of the cell counts, or species recorded were harmful algae species.

Performance against trigger levels

Information Requirement

Relevant sections in EL10180/1: *G2, 1 & 2*

Information Requirements: *(a) Comparison of water quality results recorded at the compliance site against investigation trigger limits specified in* Table 2*; (b) Use rolling annual mean as compliance metric; (c) Box and whisker plots should be utilised to illustrate monitoring results and to provide a comparison with investigation trigger values; (d) Analysis of performance in the context of stocking cycles and feed inputs to be provided; and (e) summary of adaptive management measures implemented in response to trigger value exceedances.*

Table 2: Water quality investigative trigger levels

Parameter	Level
Ammonia (surface)	6.0 µg/L
Ammonia (bottom)	10.0 µg/L
Total Nitrogen (surface)	308.0 µg/L
Total Nitrogen (bottom)	330.0 µg/L
Nitrite & Nitrate (surface)	38.6 µg/L
Nitrite & Nitrate (bottom)	41.8 µg/L
Total Phosphorus (surface)	48.0 µg/L
Total Phosphorus (bottom)	40.0 µg/L
Dissolved Reactive Phosphate (surface)	12.8 µg/L
Dissolved Reactive Phosphate (bottom)	14.0 µg/L
Oxygen (surface)	7.7 mg/L (lower limit)
Oxygen (bottom)	7.1 mg/L (lower limit)
Chlorophyll	1.1 mg/m^3

Frequency: *Data for 12-month period, up to and including April of each year, to be analysed.*

Note: *For first annual report the data available at the time to be utilised and 'indicative' median values to be calculated on that basis*

Location of information requirements

The information to satisfy the requirements for the Water Quality Performance is presented in detail in the BEMP report (2020), which includes indicative rolling annual (inferred from the available 9-months of data) medians for each analyte in relation to their respective investigative trigger levels (Table 2).

Although all frequency and timing requirements for this section have been met, rolling annual medians for parameters could not be calculated, as 12-months of data is yet to be collected. Therefore, water quality performance cannot be fully analysed against investigative trigger levels, and as such, sections b, c, d and e of G1 (1 & 2) will be fully

addressed for the first time in the second MF 281 Annual Environmental Review Report (2021). However, an analysis of the subset of data for each analyte against investigative trigger limits is summarised below – these are referred to as *indicative* median values and therefore not strictly comparable within the compliance framework.

Summary of information

Water Column: Performance against Investigative Trigger levels – Water Column
Across the nine months of sampling, the median values of TAN, total nitrogen, nitrate and nitrite, total phosphorus, dissolved phosphorus for surface and bottom waters, were below the annual rolling median investigation trigger levels and the dissolved oxygen concentration never fell below the rolling median investigative trigger levels.

During the 9 months of sampling, the chlorophyll *a* measurements at SB3 have been higher than the annual rolling median investigative trigger level eight times, but notably the majority of chlorophyll *a* measurements at other sites are also over the annual rolling median investigative trigger levels. A comparison with both intermediate and far field sites points to a broader system scale change.

c. Water Current – ADCP data

Information Requirement

Relevant section in EL10180/1: *3F4*

Information Requirements: *Summary of real-time, in situ ADCP measurements. Interpretation of hydrodynamic patterns and associated adaptive management decisions.*

Frequency: *Data recorded for 6-month period to be summarised and analysed.*

Notes: *Refer to attachment 11 and 12 for guidance on data presentation and analysis.*

Location of information requirements

See details below.

Summary of information

Both the EPA and IMAS were consulted prior to deployment of the Acoustic Doppler Current profiler (ADCP) to ensure data captured would include the period of first annual peak production. In accordance with this, the ADCP was deployed at the East of Yellow Bluff lease by IMAS in February 2020 to record flow characteristics and hydrodynamic patterns, and is planned to be removed in October 2020. This data will be analysed and reported in the 2021 Annual Environmental Review Report, additionally it will be used to develop the DEPOMOD component of the report.

d. Reef – inshore and deep reef survey results

Information Requirement

Relevant section in EL10180/1: *3F5*

Information Requirements: *Findings of reef surveys to be analysed. Interpretation of observed changes against background conditions to be provided.*

Frequency: *Rapid Visual Assessment (RVA) reef surveys are to be undertaken bi-annually (late Winter and in late Summer). Edgar-Barret reef surveys are to be conducted every 5 years.*

Location of information requirements

The information to satisfy the requirements for the Ecology – reef monitoring is presented in detail in the BEMP report (2020). The inshore reef winter fieldwork was conducted in August and early September 2019, and the summer fieldwork in February and March 2020. The deep reef fieldwork was done in March 2020 in fulfillment of EL 10180/1.

Summary of information

The RVA surveys indicated that the inshore reefs had >50% cover of canopy algae. The dominant canopy cover shifted from *P. comosa* at the southern sites to *Ecklonia radiata* at the northern sites. Sites with higher canopy cover had higher cover of pink coralline algae on the substrate and low understorey algae values, with the reverse observed at sites with lower canopy cover. Of the enrichment parameters examined (epiphytic algae, filamentous algae, nuisance green and nuisance red), only epiphytic algae was present in any significant cover. At most sites, there was a greater average percentage cover of epiphytic algae in summer (February - March 2020) compared to winter (August – September 2019).

The observations from the ROV surveys in 2020 indicate that the deep reefs in Storm Bay had not changed since previous baseline surveys were conducted by Aquenal Pty Ltd, and were dominated by sponges and red algae, and large school of perch and wrasse.

e. Seagrass – survey results

Information Requirement

Relevant section in EL10180/1: *3F6*

Information Requirements: *Findings of seagrass survey to be analysed. Interpretation of observed changes against background conditions to be provided.*

Frequency: *Seagrass surveys to be undertaken annually in late Spring.*

Location of information requirements

The information to satisfy the requirements for the Ecology – seagrass monitoring is presented in detail in the BEMP report (2020). The seagrass fieldwork was undertaken by IMAS in November 2019 in fulfilment of EL 10180/1.

Summary of information

The mapping data suggests that the main seagrass bed in Bull Bay has shifted approximately 30 m to the east since the original SeaMap Tasmania mapping was conducted in 2001. In contrast, the location of the Adventure Bay seagrass bed has remained relative constant through time. The average cover of seagrass in Adventure Bay was around 75%, indicating a continuous and relatively dense seagrass bed. There was more variability in seagrass cover at the Bull Bay site, with values between 25 – 50% cover, suggesting the seagrass bed is patchier. The epiphytic algal cover was dominated by filamentous algae at Adventure Bay and a more mixed epiphytic algal assemblage at Bull Bay.

The epiphytic cover in Adventure Bay was found to be much greater in the Environmental Licence survey than in the baseline survey, but the opposite trend occurred at Bull Bay.

3. Modelling

a. Water Quality Dispersion – being undertaken by CSIRO

Information Requirement

Relevant section in EL10180/1: *3M2*

Information Requirements: *Outputs from water quality dispersion modelling to be included.*

Frequency: *Model to incorporate at least 6 months ADCP data.*

Notes: *Guidelines outlining specific modelling requirements to be issued by Director, EPA.*

Location of information requirements

The information to satisfy the requirements for the Modelling – dispersion water quality is currently being undertaken by CSIRO. Dispersion modelling on a regional and local scale will be completed and reported by December 2021 (as outlined in section 3M2 of EL10180/1)

Summary of information

See above

b. Sediment Dispersion - DEPOMOD

Information Requirement

Relevant section in EL10180/1: *3M3*

Information Requirements: *Outputs from DEPOMOD sediment modelling to be included.*

Frequency: *Model to incorporate at least 6 months ADCP data.*

Notes: *Guidelines outlining specific modelling requirements to be issued by Director, EPA.*

Location of information requirements

The specific requirements of sediment dispersion modelling are being developed by EPA, in consultation with IMAS, CSIRO and Huon Aquaculture.

The information to satisfy the requirements for the Modelling – sediment dispersion is currently being captured using AWAC ADCP (February – October 2020) and sediment trap deployment (September 2020).

The DEPOMOD modelling report submission date is 31 December 2020.

Summary of information

See above.

4. Near Field/Lease Environmental Monitoring

a. Video Sediment Survey – compliance annual video surveys undertaken by the Huon Aquaculture

Information Requirement

Relevant section in EL10180/1: *3V*

Information Requirements: *Summary of main findings of video surveys undertaken in reporting period.*

Frequency: *Surveys undertaken every 12 months or in accordance with stocking and fallowing regime. Surveys must be conducted within 30 days of peak production.*

Notes: *Detailed video survey reporting not required for Annual Environmental Report, as submission is already a requirement under 3V9.*

Summary of information

The frequency and timing requirements for the video surveys (compliance sites) outlined in section 3V of the Environmental licence 10180/1 were met. The survey was conducted in February 2020 in fulfilment of EL 10180/1.

Findings from the survey indicate that the compliance sites remain visually consistent with the baseline survey results. There were no visual impacts of farming detected at any compliance sites during the survey, and all compliance sites were compliant with EL Condition G1 (1.1.1).

b. Benthic Sediment Survey – Baseline compliance points and control sites undertaken by IMAS

Information Requirement

Relevant section in EL10180/1: *3V10*

Information Requirements: *Results of benthic infauna and sediment surveys undertaken at compliance and control sites including those shown in Table 6.*

Frequency: *Survey undertaken every 12 months or in accordance with stocking and fallowing regime. Surveys must be conducted within 30 days of peak production.*

Note: *Sampling and reporting to occur on an annual basis.*

Location of information requirements

The information to satisfy the requirements for the benthic surveys (broadscale monitoring) is presented in detail in the BEMP report (2020).

Summary of information

The licence stipulates that there must be no significant visual, physico-chemical or biological impacts at or extending beyond 35m from the boundary of the Lease Area.

All compliance site means are above and below the threshold values identified in the Environmental Licence conditions for redox (0 mV) and sulphide (250 µM) respectively.

For the biological criteria, a comparison against the baseline data, does not indicate

- a 20 time increase in the total abundance of any individual taxonomic family relative to the reference site,
- an increase at any compliance site of greater than 50-times the total Annelid abundance at reference sites,
- a reduction in the number of families by 50 percent or more relative to reference sites,
- or a complete absence of fauna.