Tassal Operations Pty Ltd

MF279 WEST OF WEDGE ISLAND

EL10211/1

ANNUAL ENVIRONMENTAL REVIEW REPORT

SEPTEMBER 2021

Document Status

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Draft 1	07/09/21	JC	Submitted for internal review	DC
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Section 1: Introduction

In accordance with Environmental License EL10211/1 (EL), environmental monitoring is undertaken in the waters of Storm Bay. Tassal is authorised to undertake finfish farming in State Waters to the west of Wedge Island, within Marine Farming Lease 279 (MF279). Figure 1 below displays the sites included within the environmental monitoring program. Table 1 overpage provides further detail of each site.

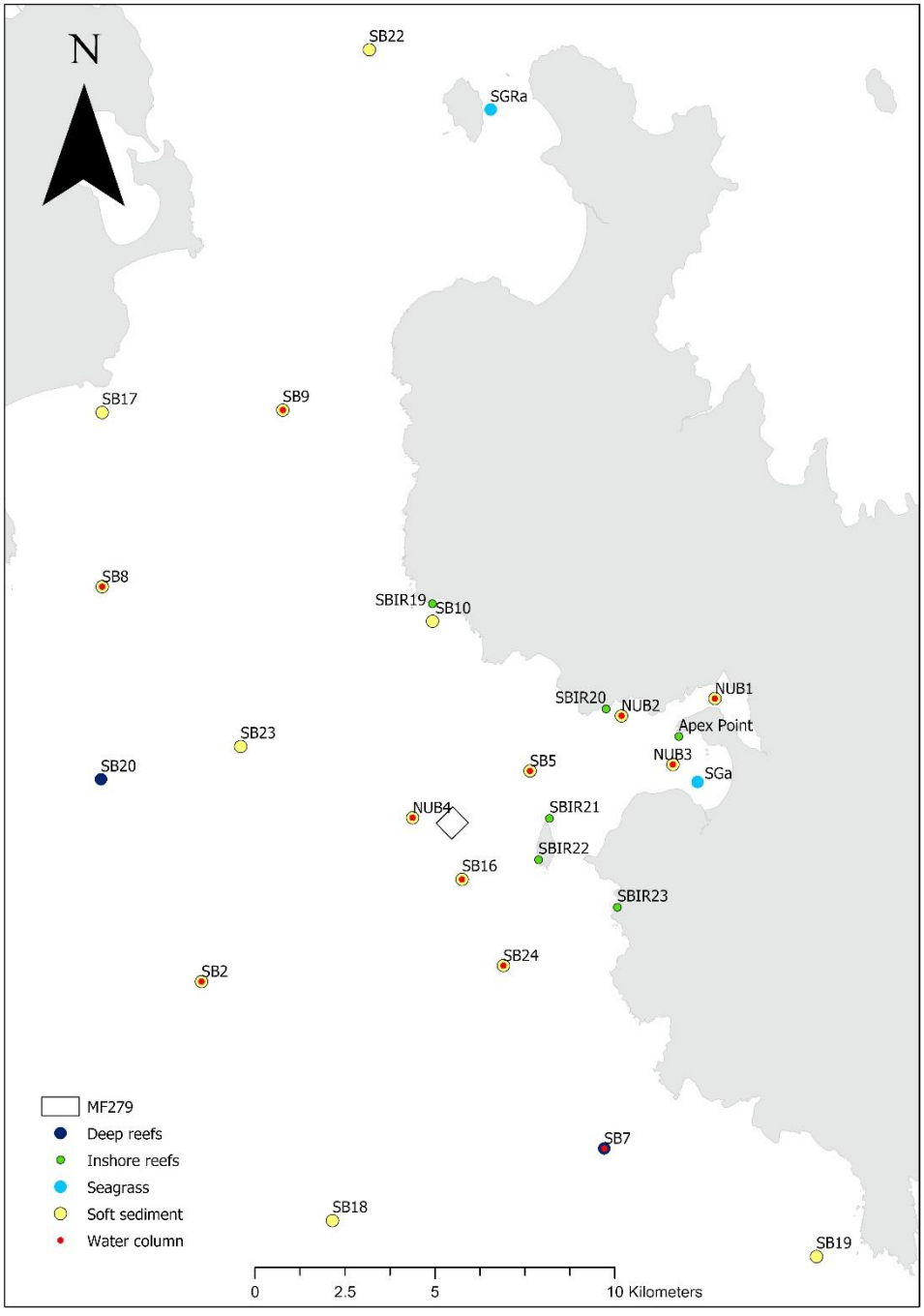

Figure 1: Map of the sites surveyed from May 2020 to April 2021 for EL 10211/1. Details of each site are given in Table 1.

Table 1: Details of sites surveyed in Storm Bay from May 2020 to April 2021. *Denotes the compliance sites for water quality monitoring.

Site	Location	Easting	Northing	Matrix
SB-2	Mid Storm Bay	545112	5220157	Water column, Soft sediment
SB-5*	North of Wedge Island	554239	5226021	Water column, Soft sediment
SB-7	Storm Bay at Darts Reef	556300	5215510	Water column, Deep reefs
SB-8	South East of Betsey Island	542350	5231150	Water column, Soft sediment
SB-9	South West of North West Head	547371	5236067	Water column, Soft sediment
SB-10	South of Outer North Head	551531	5230187	Soft sediment
SB-16	South east corner of west of Wedge zone	552350	5223000	Water column, Soft Sediment
SB-17	South of Cape Contrariety	542350	5236000	Soft sediment
SB-18	Mid southern Storm Bay	548750	5213500	Soft sediment
SB-19	West of cape Raoul	562200	5212500	Soft sediment
SB-20	Central Storm Bay	542318	5225789	Deep reefs
SB-22	Fredrick Henry Bay	549775	5246100	Soft sediment
SB-23	East of Petuna lease	546200	5226700	Soft sediment
SB-24	West of Tumbledown point	553500	5220600	Water column, Soft sediment
TPNB-1	Nubeena (NUB 1)	559377	5228036	Water column, Soft sediment
TPNB-2	Nubeena (NUB 2)	556780	5227554	Water column, Soft sediment
TPNB-3	Nubeena (NUB 3)	558210	5226198	Water column, Soft sediment
TPNB-4	Nubeena (NUB 4)	550977	5224716	Water column, Soft sediment
SB-IR15	Curio Bay Southern side	557789	5218057	Inshore reefs
SB-IR16	Cape Contrariety	542325	5236677	Inshore reefs
SB-IR17	Lobster Point	554390	5243100	Inshore reefs
SB-IR18	Mt Zion (north)	550845	5234620	Inshore reefs
SB-IR19	Outer North Head	551522	5230673	Inshore reefs
SB-IR20	Lory Point	556353	5227748	Inshore reefs
SB-IR21	North Wedge	554780	5224699	Inshore reefs
SB-IR22	Outside Wedge	554475	5223548	Inshore reefs
SB-IR23	Crooked Billet Bay	556670	5222225	Inshore reefs

SB-IR24	Eastern Betsey Island	539715	5233430	Inshore reefs
SB-IR25	Northern Betsey Island	538580	5234155	Inshore reefs
SB-IR26	Western Betsey Island	538880	5232820	Inshore reefs
SGRa (Transect 1)	Sloping Island	553146	5244436	Seagrass
SGRa (Transect 2)	Sloping Island	553089	5244052	Seagrass
SGRa (Transect 3)	Sloping Island	553071	5243516	Seagrass
SGRa (Transect 4)	Sloping Island	553520	5244100	Seagrass
SGRa (Transect 5)	Sloping Island	553825	5244642	Seagrass
SGRa (Transect 6)	Sloping Island	553887	5244096	Seagrass
SGRa (Transect 7)	Sloping Island	553856	5243665	Seagrass
SGa(Transect 1)	White Beach	558895	5225714	Seagrass
SGa (Transect 2)	White Beach	559059	5225480	Seagrass
SGa (Transect 3)	White Beach	559383	5225392	Seagrass
SGa (Transect 4)	White Beach	559335	5225219	Seagrass
SGa (Transect 5)	White Beach	558878	5225317	Seagrass
SGa (Transect 6)	White Beach	558719	5225560	Seagrass
SGa (Transect 7)	White Beach	558863	5225497	Seagrass
SGa (Transect 8)	White Beach	559118	5225282	Seagrass

As required by condition G3(8) of the EL, an Annual Environment Review Report (AER) must be submitted to the Director by 31 August of each calendar year, or another date previously approved in writing. The reporting period is the 12-month period up to and including April of each reporting year. The report must satisfy the information requirements outlined in the EL and also must be made publicly available. This document represents the first AER required under the EL and, as per communications received from the Department on 26 August 2021, approval for submission to occur on 13 September 2021 was granted in writing by the Director. All monitoring required by the EL, as detailed in Table 2 overpage, was satisfied for the reporting period.

As presented in the following sections, this AER provides a summary of all relevant monitoring parameters surveyed between May 2020 and April 2021, for EL 10211/1. The report includes an assessment of, or summary of:

- Water quality performance
- Benthic surveys
- Lease hydrodynamics
- Reef monitoring
- Sediment dispersion modelling, and
- Seagrass monitoring

All monitoring required for the annual report was conducted by suitably qualified and experienced professionals. With the exception of the benthic video surveys, all monitoring fieldwork was conducted by the Institute of Marine & Antarctic Studies (IMAS) and Aquenal Pty Ltd. Benthic video surveys were conducted by Fulcrum Robotics Pty Ltd.

Table 2: Information Requirements of the Annual Environment Report

Type of information	Relevant section in EL 10211/1	Information requirements	Frequency / timing	Notes
Water quality performance report	G2, 1 & 2	• Comparison of water quality results recorded at the compliance site against investigation trigger limits specified in Table 1. • Use rolling annual median 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 that time to be utilised and median values to be calculated on that basis.
Benthic surveys (broad-scale monitoring)	3F2	Results of benthic infauna and sediment surveys undertaken at BEMP monitoring sites. Sites are specified in Attachments 7/8/9.	Results relating to surveys undertaken in Spring of the reporting year.	
Water quality measurements	3F3	Results of water quality monitoring, including nutrients, field parameters and phytoplankton to be summarised 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.	Refer to Attachments 13 and 14 for guidance on data presentation and analysis. For first annual report, data available at that time to be reported.
Water currents (hydrodynamics)	3F4	Summary of real-time, in-situ ADCP measurement. Interpretation of hydrodynamic patterns and associated adaptive management decisions.	Data recorded for 12- month period, up to and including April of each year, to be summarised and analysed.	Refer to Attachments 13 and 14 for guidance on data presentation and analysis.
Ecology – reef & seagrass monitoring	3F5 3F6	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 late Summer). Edgar-Barrett reef surveys are to be conducted every 5 years. Seagrass surveys to be undertaken annually in late Spring.	
Modelling – dispersion water quality	3M2	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	3M3	Outputs from DEPOMOD sediment modelling to be included.	As above.	As above.
Video surveys (compliance sites)	3V	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.	Note: detailed video survey reporting not required for AER, as submission is already a requirement under 3V9.
Benthic surveys (compliance & control sites)	3V12	Results of benthic infauna and sediment surveys undertaken at compliance and control sites including those shown in Table 5.	Surveys 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.

Section 2: Far Field Environmental Monitoring

2.1 Benthic Surveys (Broadscale Monitoring)

2.1.1 Information Requirement

EL 10211/1 Condition 3F2

Results of benthic infauna and sediment surveys undertaken at BEMP monitoring sites during Spring of the reporting year.

2.1.2 Summary of Findings

Note – Further detail is provided in the annual BEMP report (2021). A summary of findings is provided below.

Soft Sediments: Visual Assessment and Sediment Chemistry

The visual descriptions of the sediment cores from the 2020 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 at most sites. The exceptions were SB21 and TPNB1 which contained more silt than the other sites. No odour or gas bubbles were detected from any core.

In the 2020 sampling, the redox values and sulphide concentrations at most sites were > 100 mV and 0 µM, consistent with low levels of organic enrichment and healthy sediments (Macleod and Forbes, 2004). However, the mean redox values at TPNB1, TPNB3, SB10 and SB22 declined from >100 mV in 2019 to < 0mV in from 2019 to 2020. These values could reflect increased levels of organic enrichment at these sites; however, given the high variability in redox and sulphide measurements between replicate cores, particularly for SB8, SB10 and SB22 it seems likely that some of the 2020 samples could have been influenced by patches of organic material breaking down.

Soft sediments: Benthic Infauna Abundances and Communities

Overall, the number of families and abundances of annelids in the sediments remained relatively similar between the spring 2019 and 2020 surveys. For both surveys (2019 and 2020), the sediment samples were dominated by the arthropod families Aoridae and Bodotriidae and the annelid families Spionidae and Lumbrineridae. In the 2020 survey, three indicator species of organic enrichment, eight introduced species, and one threatened species were recorded in the sediments. Only one species of organic enrichment Nebalia sp.1 was common at one of the sites, TPNB2, where it averaged 20.6 individuals per grab. The MDS plot showed multiple groupings of sites with similar macrofaunal assemblages based on their location in Storm Bay. The most distinct groups were the shallow, siltier more enriched sites of TPNB1 and TPNB3 near Nubeena.

2.2 Water Quality Measurements

2.2.1 Information Requirement

EL 10211/1 Condition 3F3

- *Results of water quality monitoring, including nutrients, field parameters and phytoplankton to be summarised and analysed. Data recorded for the 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.*
- *Comparison of water quality results recorded at the compliance site against investigation trigger limits specified in Table 1 of the EL (and table 3 of this report).*
    - *Use rolling annual median as compliance metric*
    - *Box & whisker plots should be utilised to illustrate monitoring results and to provide a comparison with investigation trigger levels*
    - *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*

2.2.2 Summary of Findings

Note – Further detail is provided in the annual BEMP report (2021), and the BEMP Water Quality Performance Report (2021). A summary of findings is provided below.

Water Column: Physico-chemical Parameters and Nutrients

Throughout the sampling the water temperature, nitrate, dissolved reactive phosphorus, and total nitrogen to a lesser extent, in the bottom waters showed seasonal trends, with elevated concentrations of nutrients and lower temperatures from May – September and lower levels of nutrients and higher temperatures from October – April. The increase in nutrients during spring and winter coincides with the strengthening of the Leeuwin and/or sub-Antarctic currents which are rich in nitrogen. During late spring and summer, the remaining nitrogen is rapidly absorbed by phytoplankton and the surrounding environment.

At the consistently monitored sites (i.e. SB1-SB9) the values of nitrate and dissolved reactive phosphorus in the bottom waters were generally higher in spring - summer of 2020/2021 and 2019/2020 than in 2018/2019. At these sites, the TAN in the bottom waters was also highest in winter-spring 2020. From May 2020 to April 2021, the surface waters TAN concentrations were generally <

0.012 mg-N/L; however, occasional elevated concentrations of > 0.017 mg-N/L have been recorded at some sites (TPNB1 and TPNB4), particularly during the spring-summer of 2020.

Water Column: Phytoplankton Biomass and Communities

The biomass of chlorophyll *a* showed a weak seasonal trend with higher values recorded in late winter - spring than other seasons. The biomass of chlorophyll *a* was at some sites greatest in the winter - spring of 2020. Sites with the greatest biomass of chlorophyll *a* (>5 mg/m^3) during this time were SB8, TPNB2, TPNB3 and TPNB4. These peaks were considered unusual, both in magnitude and timing. The 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.

Water Column: Performance against Investigative Trigger Levels

Table 3: Water quality investigative trigger levels (As extracted from the EL)

Parameter	Level
Ammonia (surface)	9.0 µg/L
Ammonia (10m)	6.0 µg/L
Ammonia (bottom)	17.0 µg/L
Total Nitrogen (surface)	330.0 µg/L
Total Nitrogen (10m)	328.0 µg/L
Total Nitrogen (bottom)	340.0 µg/L
Nitrite & Nitrate (surface)	15.0 µg/L
Nitrite & Nitrate (10m)	15.0 µg/L
Nitrite & Nitrate (bottom)	35.0 µg/L
Total Phosphorus (surface)	40.0 µg/L
Total Phosphorus (10m)	38.0 µg/L
Total Phosphorus (bottom)	40.0 µg/L
Dissolved Reactive Phosphate (surface)	8.0 µg/L
Dissolved Reactive Phosphate (10m)	6.0 µg/L
Dissolved Reactive Phosphate (bottom)	12.0 µg/L
Oxygen (surface)	7.8 mg/L (lower limit)
Oxygen (10m)	7.8 mg/L (lower limit)
Oxygen (bottom)	7.5 mg/L (lower limit)
Chlorophyll	3.6 mg/m3

During the 12 months of sampling (May 2020 – April 2021), the annual rolling median of total nitrogen, total phosphorous, TAN, nitrate + nitrate and dissolved reactive phosphorus at most sites and depths were below the water quality investigative trigger levels (ITLs). The annual rolling median for the chlorophyll *a* biomass was below the ITLs for sites located in regions 80 and 81. The annual rolling medians of dissolved oxygen at most sites and depths were above the lower-level ITLs.

The median of chlorophyll *a* at some sites near to active leases in region 80 (TPNB1, TPNB2 and TPNB4) were higher than the surrounding sites. These results could indicate a localised (i.e. in space and/or time) effect of fish farming, but further sampling along a transect and modelling (i.e. biogeochemical and CONNIE) is required to distinguish the influence of the Derwent Estuary and Parsons Bay Creek

and the spatial extent of nitrogen emissions from leases in these regions. These patterns are also investigated further in the water quality performance report for the EL.

2.3 Water Current – ADCP Data

2.3.1 Information Requirement

EL 10211/1 Condition 3F4

Summary of real-time, in-situ ADCP measurement. Interpretation of hydrodynamic patterns and associated adaptive management decisions.

2.3.2 Summary of Findings

West of Wedge has a relatively flat bathymetry with water depth across the lease ranging between 36 – 42 m. Flow was monitored by an Aanderaa Doppler Current Profiler Sensor (DCPS) at 30-minute intervals. Additional data, including weather, water quality parameters and wave height were also collected by the unit. The DCPS is surface mounted at 43° 08.455/147° 36.569, approximately 2.5 km to the southwest of the lease. Data was collated for the period beginning August 2020 to February 2021. This period captured the full production cycle for the lease, including peak biomass, as required by condition 3F4 of the EL. The variance in water currents due to tidal influence was calculated. The analysis showed that flow at WoW was largely driven by factors (wind, river flow) rather than tidal forces (refer Table 4 below). All ADCP data has been submitted to the Department in conjunction with this report.

Table 4: Calculated variance in water currents due to tidal influence

Date	Mean Flow Rate (ms^{-1})	Mean Direction (°)	Mean Residual Flow (ms^{-1})	Mean Residual Direction (°)	Tidal Component (%)
22/08/2020 – 08/02/2021	Bottom 0.11 Mid-water 0.06 Surface 0.12	Bottom 157 Mid-water 172 Surface 173	Bottom 0.11 Mid-water 0.11 Surface 0.12	Bottom 158 Mid-water 163 Surface 173	Bottom 3.2 Mid-water 10.3 Surface 0.3

Figures 2a, 2b and 2c below provide a more detailed description of the range of speeds and directions at three depths (surface, mid-water and bottom) for the period of DCPS data examined. Table 5 below provides a breakdown of relevant summary statistics. The stronger currents in the bottom flow were to the northeast, whereas they were mostly south in the mid water and west-northwest or south-southeast at the surface. Mean directions for the residual flow are generally south to southwest for all depths.

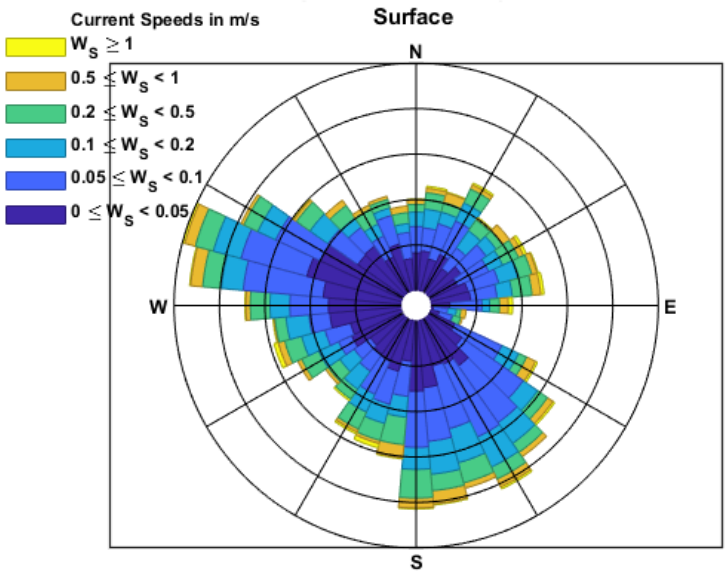

Figure 2a: Water currents (speed & direction) for surface waters at West of Wedge – August 2020 – February 2021

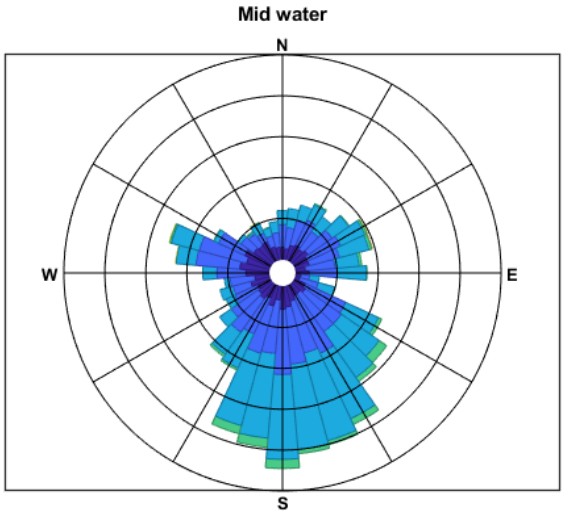

Figure 2b: Water currents (speed & direction) for mid waters at West of Wedge – August 2020 – February 2021

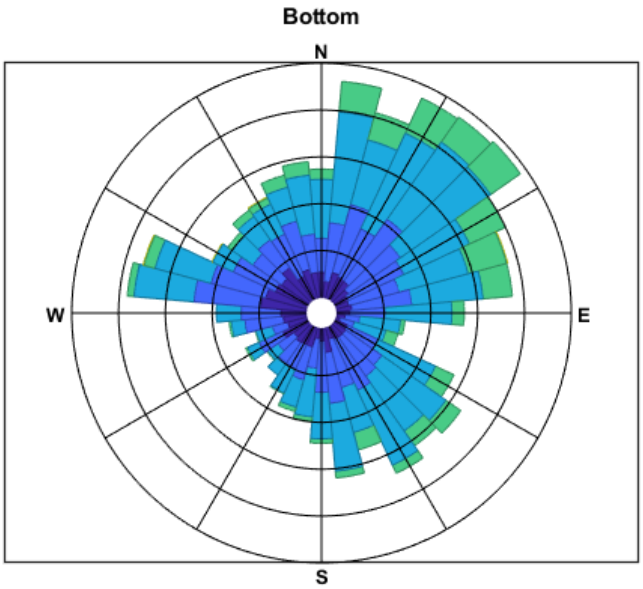

Figure 2c: Water currents (speed & direction) for bottom waters at West of Wedge – August 2020 – February 2021

Table 5: Breakdown of relevant summary statistics

	Flow Velocity at 2m Depth ($cm.s^{-1}$)	Flow Velocity at 5m Depth ($cm.s^{-1}$)	Flow Velocity at 10m Depth ($cm.s^{-1}$)	Flow Velocity at 15m Depth ($cm.s^{-1}$)	Flow Velocity at 20m Depth ($cm.s^{-1}$)	Flow Velocity at 30m Depth ($cm.s^{-1}$)
Minimum	0.1	0.1	0.1	0.1	0.1	0.1
Maximum	58.6	174.7	58.0	55.8	66.9	156.9
Average	10.7	10.7	9.3	8.5	8.3	11.7

2.4 Inshore, Deep Reef & Seagrass Survey Results

2.4.1 Information Requirement

EL 10211/1 Condition 3F5 & 3F6

Findings of reef and seagrass surveys to be analysed. Interpretation of observed changes against background conditions to be provided.

2.4.2 Summary of Findings

Note – Further detail is provided in the annual BEMP report (2021). A summary of findings is provided below.

Inshore and Deep Reefs

For the inshore reefs, the cover of canopy algae species was above 50% for both the winter 2020 and summer 2021 surveys. The understorey community was dominated by brown and red algae, with the more exposed sites recording lower cover of foliose understorey algae and higher cover of encrusting pink algae than the more sheltered sites. When the enrichment parameters were examined, the epiphytic algae had the highest cover and was consistently recorded at low levels (< 5%) at nearly all sites. Only limited occurrences of other enrichment status species (i.e. filamentous algae, nuisance green and nuisance red) were recorded.

When compared with the results from the previous years' BEMP, the cover of canopy-forming macroalgae was consistently higher in the summer and lower in the winter across both years. The cover of epiphytic algae was higher in the winter of 2020 than in the winter of 2019, which appears to be a broadscale trend throughout Storm Bay.

The deep reef benthos was dominated by red algae of various forms including branching *Rhodymenia* spp., and *Callophyllis* spp. and prostrate and encrusting forms of *Peyessonnelia* spp. Sponges dominated the invertebrate community, with erect laminar, erect branching, simple massive and cup forms of sponges all recorded, along with soft foliaceous bryozoans and feather stars. The most common fish species were Butterfly perch (*Caesioperca lepidoptera*), Barber perch (*Caesioperca razor*) and Rosy wrasse (*Pseudolabrus rubicundus*), consistent across both 2020 and 2021 sampling. Further information is provided in the Annual BEMP Report (2021).

Seagrass

The cover of *Zostera* spp. varied considerably between and within sites. The cover of *Zostera* spp. was 20-50% at East of Sloping Island, but almost absent at Wedge Bay, which was instead dominated by *Caulerpa* spp., consistent with baseline conditions. The epiphytic cover on the seagrass in Bull Bay was "low," whereas at East of Sloping Island and Wedge Bay it ranged from "moderate" to "high". The variation in the epiphytic cover on the seagrass beds between the baseline survey and the EL survey could be linked to a range of factors including natural variability and differences in survey methods. Further detail is provided in the Annual BEMP Report (2021).

Section 3: Modelling

3.1 Water Quality Dispersion Modelling

3.1.1 Information Requirement

EL 10211/1 Condition 3M2

Outputs from water quality dispersion modelling to be included.

3.1.2 Summary of Findings

CSIRO are currently responsible for the scope of work necessary to satisfy the requirements of condition 3M2 of the EL. Water quality dispersion modelling, on a regional and local scale, and is required to be completed and reported by December 2021. CSIRO have been delayed in providing the final report. This will be submitted as soon as possible.

3.2 Sediment Dispersion - DEPOMOD

3.2.1 Information Requirement

EL 10211/1 Condition 3M3

Outputs from dispersion modelling to be included.

3.2.2 Summary of Findings

Note – Further detail was provided in the Depositional Modelling Final Report (2021), submitted to the Department on 4 August, 2021. A summary of findings is provided below.

In accordance with condition 3M3 of the EL, a depositional modelling study was undertaken to determine the distribution of waste feed and faeces attributable to fin fish farming on the lease. A report of findings was subsequently compliled and submitted to the Department in July 2021. This report summarises the results from modelling conducted for that lease using NewDEPOMOD, the latest version of the DEPOMOD software. The modelling requirements are outlined in section 3M3 of the EL.

The modelling undertaken considered six months of hydrodynamic data collected at the lease. The depositional model was calibrated for local conditions and validated against benthic survey data collected in January 2021. This includes research data collected as part of the Storm Bay Fisheries Research & Development Corporation (FRDC) project. Benthic information was collected beneath pens and at compliance sites to assess the farm's depositional footprint.

The benthic sediment survey included: benthic biota (infauna), sediment chemistry (redox potential, sulphide concentration and stable isotope analysis). Also included was comparison to results found

from ROV footage taken beneath pens and at compliance sites. Scenarios for depositional modelling were developed in discussion with the Department.

Deposition Rates and benthic response

Modelled deposition rates were compared with results from the benthic surveys at WoW in January 2021. The modelled deposition at Pens 1 and 2 were elevated compared with compliance sites. This is in keeping with elevated Capitellid sp. abundance and reduced redox levels found in the IMAS survey results. This is also in keeping with the observations from the ROV survey, where farm debris was observed at Pen 1. Mean bottom currents at WoW were approximately 0.11 ms-1 and it is reasonable to assume that resuspension is likely at this lease.

Modelled Scenarios

The difference in depositional patterns seen between the modelled production scenarios was largely driven by differences in the number of stocked pens (between scenarios). None of the scenarios showed higher deposition (1500 g solids m-2y-1) approaching the lease boundary. Similarly, the low deposition (≥ 200 g solids m-2 y-1) is unlikely to cross the lease under any of the three scenarios. These scenarios represent high production levels at WoW and are therefore considered to represent conservative estimates for deposition rates. Given the period of current data used in the modelling is assumed to be indicative of longer-term hydrodynamic conditions at the lease, it is unlikely that even under scenario 3, there would be impacts at the compliance points.

Section 4: Near Field/Lease Environmental Monitoring

4.1 Benthic Compliance Video Survey

4.1.1 Information Requirement

EL 10211/1 Condition 3V

Summary of key findings of video surveys undertaken in reporting period

4.1.2 Summary of Findings

Note – Further detail was provided in the MF279 Pen Bay Annual Survey Report (January 2021), submitted to the Department in February 2021. A summary of findings is provided below.

Benthic footage was taken by Fulcrum Pty Ltd of out of lease 35m compliance positions and the two stocked pen bays, as determined by the Department, on the 13th January 2021. MF279 lease is one of four leases within a shared zone at the offshore West of Wedge site. This lease had 2 stocked 168m circumference pens on a customised 4 pen bay grid style mooring system. All out of lease compliance and pen bay dives showed normal benthic conditions with no visible impacts from farming observed at the survey. Conditions within the lease and at out of lease compliance positions showed normal sandy sediments and sediments for this high energy offshore location.

4.2 Benthic Sediment Survey

4.2.1 Information Requirement

EL 10211/1 Condition 3V12

Results of benthic infauna and sediment surveys undertaken at compliance and control sites

4.2.2 Summary of Findings

Note – Further detail was provided in MF279 West of Wedge Island Benthic Survey Report (2021), submitted to the department August 2021. A summary of findings is provided below.

Benthic sediment surveys are conducted annually, within 30 days of lease peak production. The benthic sediment survey requirements are outlined in section 3V1 of the EL, and the sites, methodologies and reporting guidelines are described in 3V10, 3V11 and 3V12, respectively.

There was no significant difference between mean redox or sulphide values between control and compliance sites in this survey. Furthermore, 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.

Compared to the baseline survey conducted in November 2019, redox potential was higher by a similar level at both the control and compliance sites. Sulphide concentration was also generally higher than in the baseline, with the exception of one outlier core in that survey, but concentrations were still low overall (i.e <10 µM with the exception of one core).

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 sites,
- 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.

No taxonomic family increased by 20 times or more at compliance sites when compared to baseline reference conditions. The largest increase was 13 times, observed in the crustacean Dexaminidae. For total annelid abundance, the largest increase at any compliance site was 2.3 times at CP6 relative to reference conditions in the baseline survey. There was a minor increase in the number of families at the compliance sites (34 families per grab) relative to the reference conditions in the baseline survey (32 families per grab).