

Clean Seas Seafood Limited – Western and Eastern Fitzgerald Bay

Periodic Environmental Monitoring Program

Introduction

Clean Seas Seafood Limited (CS) currently operate all aquaculture licences within the Western and Eastern sectors of the Fitzgerald Bay aquaculture zone, as identified in the *Aquaculture (Zones – Fitzgerald Bay) Policy 2008*. The maximum prescribed criteria of 4,245 tonnes of finfish is fully allocated for the Fitzgerald Bay aquaculture zone.

The Fitzgerald Bay licensed aquaculture sites are positioned into two blocks, one in each sector. The Western sector block is made up of one 150 hectare licensed site (AQ00397) which allows for the farming of a maximum of 2,250 tonnes of finfish. The Eastern sector block is made up of two licensed sites (AQ00140 and AQ00396) in a consolidated 133 hectare farming area which allows for the farming of a maximum of 1,995 tonnes of finfish.

Each aquaculture licence listed above has the following licence condition to monitor and manage possible habitat effects associated with farming in the Fitzgerald Bay aquaculture zone:

"The Licensee must undertake an environmental monitoring program of the sea floor in relation to the Licensed Site when directed by the Minister in writing and in a manner and form determined by the Minister."

The purpose of this document is to describe the amended environmental monitoring program (EMP) of the sea floor associated with Fitzgerald Bay licensed aquaculture Finfish sites in the Western sector (AQ00397) and the Eastern sector (AQ00140 and AQ00396).

The required EMP will include the collection and analysis of two data sets. The first is related to site-based environmental monitoring and the second is related to environmental monitoring at a broadscale (regional) level.

Objectives

Site-level monitoring

It is recognized that the benthic habitat in and around the Fitzgerald Bay aquaculture sites is comprised of sand with minimal resident macro-flora (seagrass or algae). However, particulate matter in the form of fish faeces, uneaten feed and biofouling from cages is discharged from farming sites. This may result in a buildup of organic matter on the seafloor which may result in presence of benthic algal mats, changes to the sediment chemistry including generation of anoxia and shifts in the type and abundance of benthic and epi-fauna. The purpose of site level monitoring is to identify if there is a buildup of organic matter or aquaculture-related debris occurring under and adjacent the cages.

Broadscale monitoring

The majority of waste discharged from finfish farming sites is in the form of soluble nutrients that are carried away by ocean currents (~82%). Accumulation of these nutrients may result in the loss of seagrass and impacts to other sensitive habitats in the receiving environment. There is a need to consider the current condition of the environment and its ability to be resilient of additional and/or changes in nutrient inputs from consolidating farming activities. The purpose of broadscale monitoring is to identify if there are any cumulative impacts to the receiving environment (in this case seagrass) as a result of nutrients being discharged from the farming sites.

1. Site Level Monitoring

Monitoring Locations

Western Sector (AQ00397) - four benthic video samplings points taken equidistant across the site (western end, 2 in the middle and eastern end) and commencing at or near a sea-cage.

Eastern Sector (AQ00140 plus AQ00396) – four benthic video samplings points taken equidistant across the site (western end, 2 in the middle and eastern end) and commencing at or near a sea-cage.

Methodology

Benthic video/photo sampling will be taken commencing at the outer edge of the sea-cages in the direction of the prevailing current (see Figures 1 and 2 for representative locations of sampling lines).

Along each line, video/photo sampling points will be taken at four fixed distances (0m, half-way to licence boundary, at the licence boundary, licence boundary +100m). The sampling at the sea-cage (0 m) is to be conducted on the line parallel to the outer edge of the sea-cages. At each distance 3 replicate videos will be taken with 3 replicate screen captures provided per video.

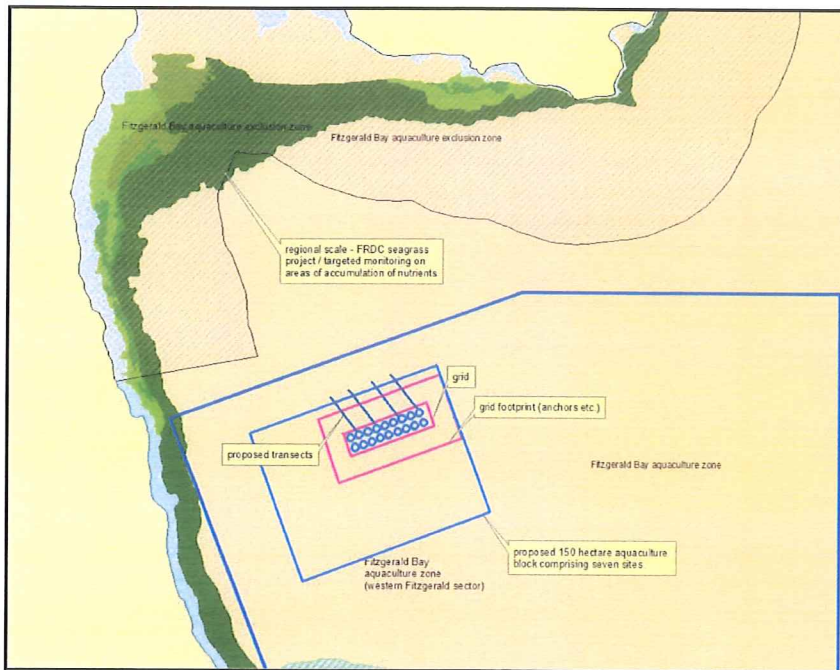


Figure 1: Indicative location of four site level sampling lines in the Western sector

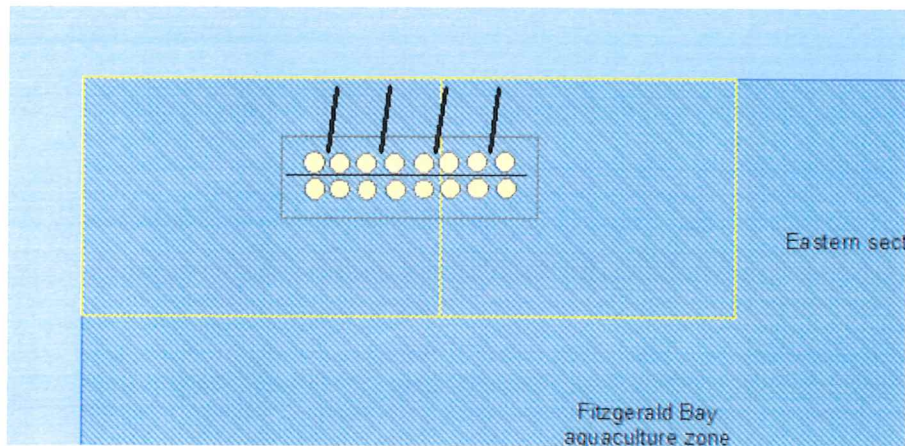


Figure 2: Indicative location of four site level sampling lines in the Eastern sector.

Video/photo sampling method (both production areas)

At each sampling point, three replicates, with at least 30 second videos of the seabed will be taken. Each replicate video should be as close as possible to the coordinate for the sampling point, while avoiding overlap between the 30 sec video transects. Video/photo footage will be taken with adequate lighting attached to a frame set at least 50 cm off the seabed. The footage will be taken for a minimum of 30 seconds (after a clear picture of the seabed is visible) for each replicate at each of the sampling locations.

Each video/photo must be of high quality and have the following features:

- Filmed in colour.
- Filmed in the direction of the prevailing water current.
- Adequate light and resolution to show benthic flora, fauna and sediment detail and colours. **Note this is critical to appropriate scoring of parameters.**
- 'Live' time GPS co-ordinates displayed throughout each video.
- 'Live' time and date display present on each video.
- Clear, continuous and quality footage of the sea floor is taken over 30 seconds and at a slow pace if moving (e.g. 1 m every 5 seconds).
- The focus of the camera is on the seafloor with the angle of the video directly focused to the sea floor.

Each video/photo should be reviewed by CS to ensure it is of sufficient quality and it meets the criteria above prior to moving to the next sampling location.

Video/photo and an accompanying report must be submitted to PIRSA Fisheries and Aquaculture within 4 weeks of being taken to allow for a review of the assessment and outcomes provided by CS.

Video/photo and reports submitted which do not meet the minimum requirements outlined above may be rejected and require resubmission.

Analysis

For each video/photo sampling point, the presence and relative quantity of each parameter listed in Attachment 1 must be assessed.

Frequency of site level sampling

Site level baseline sampling must be undertaken prior to the stocking of fish on site. This will provide an analysis of current ecological condition allowing a comparison to be made once the site is actively farmed. Thereafter, on-site video/photo sampling will be required every 12 months at or around time of peak biomass held on site (May).

Triggers and Management Actions

Triggers

- Presence of build-up of organic matter such as feed and faeces
- Presence of build-up of benthic algal mats.
- Presence of buildup of biofouling from cages
- Presence of aquaculture-related debris

Management actions may include (will depend on current circumstances)

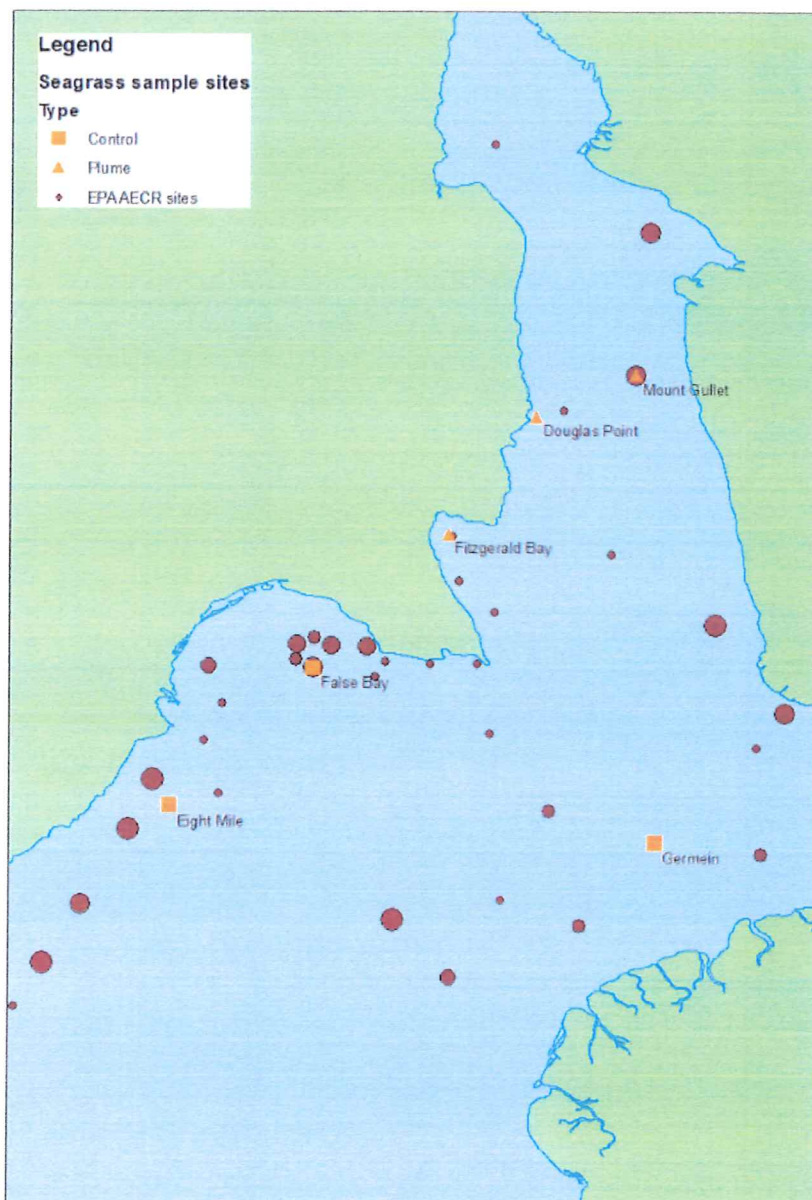
- Reduce feed inputs
- Reduce stocking densities
- Fallow cages and relocate stock to other growing areas
- Remove biofouling more frequently to reduce buildup of growth on cages
- Remove debris.

Agreed actions must be implemented within an agreed timeframe of the trigger exceedance being detected as determined/directed by PIRSA in consult with EPA and CS

2. Broadscale Monitoring:

Monitoring Locations

Site ID	Lat (Deg.Min)	Long (Deg.Min)	Location
control 1	33.0828°	137.5948°	Eight Mile
control 2	33.0005°	137.6809°	False Bay
control 3	33.1043°	137.8861°	Germein
In plume site 1	32.8507°	137.8144°	Douglas Point
In plume site 2	32.9206°	137.7619°	Fitzgerald Bay
In plume site 3	32.8253°	137.8741°	Mount Gullet



Methodology

Methodology for the broadscale monitoring will be consistent with that described in the FRDC project 2018-186 and Section 6 of the AECR Methodology Report¹ to complement and enhance other data sets. To ensure that potential impacts are adequately identified and monitored, the broadscale monitoring will consist of benthic video transects and biological sampling.

A total of three (3) potentially impacted and three (3) control sites will be selected using the SARDI biogeochemical and hydrodynamic model that will be run for the FRDC project (see above). Each site is broadly defined within a 16 hectare area.

a) Transects

Within each site, ten 50 m transects will be undertaken dispersed randomly within the 16 hectare area. Broadscale benthic video transects must be undertaken using the method described in this EMP and assessed by a suitably experienced marine biologist or similarly qualified person in accordance with the attached assessment matrix (to be provided by PIRSA). Parameters will include as seagrass species, % cover (in 10% increments), epiphyte load, opportunistic macroalgae, bioturbation and ascidians or any other significant feature scored for each metre (or second of video) along the 50 m transect. PIRSA will provide an excel spreadsheet for recording purposes.

Filming should be conducted in a straight line, filmed in colour, in the direction of the prevailing current and meet the requirements detailed below (as described in Appendix 5 of the AECR Methodology

- On a visual cue board record the location and site codes, date, transect number and operators and film the board to record a visual reference point for the transect.
- The camera must be positioned approximately 1 m from the substrate at an angle of 90 degrees to the substrate (i.e. pointing straight down).
- The video should maximise the area of benthos in the field of view but be close enough to identify species to at least genus level in the case of seagrass. This set-up provides a field of view of approximately 1 m², where each belt transect equates to approximately 50 m².
- A video encoding system (such as Geostamp) which overlays a GPS location, direction, speed, date and time strings overlaid to the video and recorded to a hard drive to enable analysis of the data.
- Adequate light and resolution to show benthic flora, fauna and sediment detail and colours. Note this is critical to appropriate scoring of parameters.
- Once camera orientation is stabilised and the picture on the live feed video screen is clear, drift or put the vessel in gear to maintain a consistent movement across the benthos. The camera operator must continuously watch the live feed screen to optimise the speed of the vessel and communicate with the vessel operator to vary the speed based on the video picture attained. This speed is typically between 0.5 and 1 knot.
- At least two minutes of clear video footage of the benthos should be captured for each transect to equate to a transect of approximately 50 m in length.
- If the substrate depth or complexity changes it may be necessary to raise or lower the camera slightly to maintain optimal positioning relative to the benthos. Any obvious features should be communicated by the vessel operator to ensure camera safety.
- At the end of the transect, the video should be paused or stopped, and the camera raised to the surface until the next transect location is reached.
- Repeat for each transect in a site, depending on the degree of replication, ensuring that information on the visual cue board is recorded for each transect.

¹ Gaylard et al. 2013 The South Australian monitoring, evaluation and reporting program for aquatic ecosystems: monitoring near-shore marine waters, rationale and methodology. Environment Protection Authority 70 pp).

https://www.epa.sa.gov.au/files/477487_marine_methods.pdf

Each video should be reviewed by CS to ensure it is of sufficient quality for assessment and it meets the criteria above prior to moving to the next sampling location. Video that is deemed by PIRSA Fisheries and Aquaculture to be of insufficient quality or clarity to meet the objectives of the monitoring will be required to be resubmitted.

b) Phytoplankton sampling

Methodology for biological sampling must be undertaken as described in Appendix 5 of the AECR methodology report https://www.epa.sa.gov.au/files/477487_marine_methods.pdf

Analysis

Data from sampling must be analysed by a suitably qualified person to determine if triggers have been breached. Water quality analysis (phytoplankton) must be undertaken by a NATA accredited laboratory.

Data from the broadscale monitoring will be made available to the FRDC Project Steering Committee. Analysis of results from both the FRDC project and these transects will be done in a timely manner to enable a rapid detection and management/CS response to seagrass impacts which would be lacking if monitoring was only undertaken under the FRDC project.

Reporting

A report, containing the analysis and assessment of the data, all scoring sheets, video transects and sampling coordinates must be submitted to PIRSA and the EPA (through PIRSA) within six weeks following each sampling date.

Frequency of sampling

Baseline sampling must be undertaken prior to the stocking of fish on site. This will provide an analysis of current ecological condition allowing a comparison to be made once the site is actively farmed. Thereafter, sampling will be required every 12 months at or around time of peak biomass held on site (May).

Triggers and Management Actions

For the purpose of assuring the aquaculture activity is not adversely impacting the benthic environment compliance with the following triggers and management actions will be applied.

Triggers

- Statistically significant ($\alpha = 0.05$) greater loss of seagrass at potentially impacted sites versus control sites

Management actions may include (will depend on current circumstances)

- Reducing feed inputs
- Reduce stocking densities
- Relocate stock to other growing areas
- Subsequent monitoring must be undertaken to identify whether the mitigation strategies have been effective.
- Agreed strategies must be implemented within an agreed timeframe of the trigger exceedance being detected as determined/directed by PIRSA in consult with EPA and CS.

Management/Industry Response

A management response may be considered necessary by PIRSA based on the results from this monitoring program, and in accordance with the aquaculture legislative framework, including;

- Section 52 (3) of the *Aquaculture Act 2001* (The Minister may vary licensee conditions by written notice to the licensee, at any time, in order to prevent or mitigate significant environmental harm or the risk of significant environmental harm).
- Licence condition stating "The Licensee shall in the event that it receives reasonable direction from the Minister to do so, cease and desist from any activity which in the reasonable option of the Minister may tend to cause environmental harm (as defined in the *Environment Protection Act 1993*).

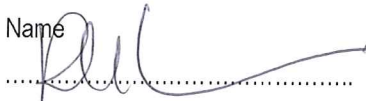
Program Review

This environmental monitoring program may be subject to change by PIRSA following activation of a trigger, a review of the program, changes to the farming strategy in the Fitzgerald Bay aquaculture zone or based on outcomes from relevant research projects.

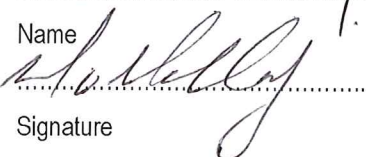
Declaration

I, Robert Gratton, of Clean Seas Seafood Limited note, understand and agree to comply with the requirements of the above periodic environmental monitoring program for the aquaculture licences AQ00140, AQ00396 and AQ00397 contained within this notice.

Signatory 1:

<u>Robert Gratton</u>	<u>CEO</u>
Name	Position
	<u>6/10/21</u>
Signature	Date

Signatory 2:

<u>MICHAEL O'MALLEY</u>	<u>GM Aquaculture</u>
Name	Position
	<u>6/10/21</u>
Signature	Date

Attachment 1: Fitzgerald Bay Environmental Monitoring Program: Benthic Assessment Matrix for Site – level sampling

Sampling Site ID/GPS:

Date Sampled:

Assessed By:

location	at cage rep. 1	at cage rep. 2	at cage rep. 3	half-way to boundary rep. 1	half-way to boundary rep. 2	half-way to boundary rep. 3	at boundary rep. 1	at boundary rep. 2	at boundary rep. 3	boundary + 100 m rep.1	boundary + 100 m rep.2	boundary + 100 m rep.3
Debris												
Macroalgal coverage												
Seagrass coverage												
sand colour												
Benthic mat*												

Keys to Benthic Video Assessment Table

Sand colour	Neutral =	0	Grey =	2	High =	3	Black =	4
Debris	None =	0	Medium =	2	51-75%=	3	Very High	4
Macroalgal coverage	0 =	0	25-50%=	2	51-75%=	3	>75%=	4
Seagrass coverage	0 =	0	25-50%=	2	51-75%=	3	>75%=	4
Benthic Mat*	0 =	0	<25%=	1	<25%=	1	>75%=	4
			>25%=	2	51-75%=	3		

* May include beeggiatoa, algal or cyanobacterial mats