Annual Environmental Compliance Report 2021/2022

PREPARED FOR BARRAMUNDI GROUP | SEPTEMBER 2022

Stantec

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Quality statement

Project manager	Project technical lead
Amber Evans	Dr Glenn Shiell

PREPARED BY Amber Evans		17/10/2022
CHECKED BY Dr Glenn Shiell		17/10/2022
REVIEWED BY Fiona Taukulis		17/10/2022
APPROVED FOR ISSUE BY Fiona Taukulis		17/10/2022

226 Adelaide Terrace, Perth, Western Australia, 6000
Tel +61 08 6222 7000
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Summary

This document – *The Annual Environmental Compliance Report 2021/2022* - summarises the findings of the annual monitoring program undertaken to address Condition 6-1 of Ministerial Statement 966 (MS 966); which requires the implementation of the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (KADZ EMMP).

The intent is to summarise the performance of the farming activities against the Environmental Protection Authority's (EPA) Environmental Quality Objectives (EQO), which in turn are assessed against Environmental Quality Criteria (EQC), comprising Environmental Quality Guidelines (EQG) and Environmental Quality Standards (EQS).

Under the EMMP, sampling is conducted across three levels of ecological protection, comprising the moderate ecological protection area (MEPA), high ecological protection area (HEPA) and maximum ecological protection area (MaxEPA). Water and sediment sampling is conducted monthly between June and September in the dry season and monthly between December and March in the wet season.

The results of the 2021-2022 monitoring program determined there were no adverse environmental affects that were attributable to farming operations within the KADZ. Comparison of monitoring data with the EQC found the EQS were either met or pending the results of further testing. **Based on these results, it was concluded that there was no significant risk to the EQOs over the 2021-2022 reporting period.**

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Abbreviations

Enter Abbreviation	Enter Full Name
BG	Barramundi Group
CAR	Compliance Assessment Report
CEO	Chief Executive Officer
CHL-A	Chlorophyll A
DIN	Dissolved Inorganic Nitrogen
DPIRD	Department of Primary Industry and Regional Development
DoF	Department of Fisheries (Now DPIRD)
DWER	Department of Water and Environment
EMMP	Environmental Monitoring and Management Plan
EPA	Environmental Protection Authority
EQC	Environmental Quality Criteria
EQG	Environmental Quality Guidelines
EQMF	Environmental Quality Management Framework
EQO	Environmental Quality Objectives
EQP	Environmental Quality Plan
EQS	Environmental Quality Standards
EV	Environmental Value
HEPA	High Ecological Protection Areas
KADZ	Kimberley Aquaculture Development Zone
LAC	Light Attenuation Coefficient
LEP	Levels of Ecological Protection
MaxEPA	Maximum Ecological Protection Areas
MEMP	Management and Environmental Monitoring Plan
MEPA	Moderate Ecological Protection Areas
MPAFF	Marine Produce Australia Fish Farms Pty Ltd
SWDI	Shannon-Wiener Diversity Index
TOC	Total Organic Carbon
TP	Total Phosphorus
TSS	Total Suspended Solids

1 Background

Marine Produce Australia Fish Farms Pty Ltd (MPAFF) is a wholly owned subsidiary of Barramundi Group. MPAFF is responsible for the management of the Cone Bay Ocean Barramundi Farm (**Table 1-1**), which is located at the eastern end of the Kimberly Aquaculture Development Zone within the broader Buccaneer Archipelago (KADZ) (**Figure 2-1**). MPAFF has been farming premium salt water barramundi (*Lates calcarifer*) for the Australian domestic market at this location since 2014.

Table 1-1: Proposal and proponent details.

Proposal and proponent details	
Proposal Title	Kimberley Aquaculture Development Zone
Statement Number	MS: 996
Derived Proponent's Name	Marine Produce Australia Fish Farms Pty Ltd
Proponent's Australian Company Number	108 494 079

Prior to its approval in May 2014, the KADZ was subjected to a rigorous environmental impact assessment (EIA), comprising numerous technical studies, marine habitat mapping and environmental modelling. The KADZ was referred to Environmental Protection Authority (EPA) by the Minister of Fisheries on the 12 June 2012, and following the review of the EIA, was approved as a Strategic Assessment on the 12 May 2014, subject to Conditions 1-6 of Ministerial Statement (MS) 966.

Farming activities in the KADZ are closely regulated by the Department of Primary Industries and Regional Development (DPIRD) and the Department of Water and Environment (DWER), under Licence Number 1465 and Ministerial Statement (MS) 966, respectively. Under the Ministerial Conditions of approval, MPAFF is required to conduct an annual marine environmental monitoring program, comprising measurements of water and sediment quality under and immediately adjacent to the sea pens. MPAFF is committed to meeting its environmental and regulatory commitments, including the environmental values and environmental quality objectives for Ecosystem Health and Maintenance of Ecosystem Integrity, respectively.

2 Purpose of this Document

This document – *The Annual Environmental Compliance Report 2021/2022* - summarises the findings of the annual monitoring program as described in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (KADZ EMMP).

As the only derived proponent to have commenced farming in the KADZ, Marine Produce Australia Fish Farms (MPAFF) is solely responsible for implementing and reporting against the findings of the EMMP. All farming is undertaken in Cone Bay at the eastern end of the Kimberly Aquaculture Development Zone (KADZ), as shown in **Figure 2-1** and **Figure 3-2**.

The intent of this document is to summarise the findings of the annual monitoring program against the Environmental Protection Authority's (EPA) environmental values and environmental quality objectives for Ecosystem Health and Maintenance of Ecosystem Integrity, respectively.

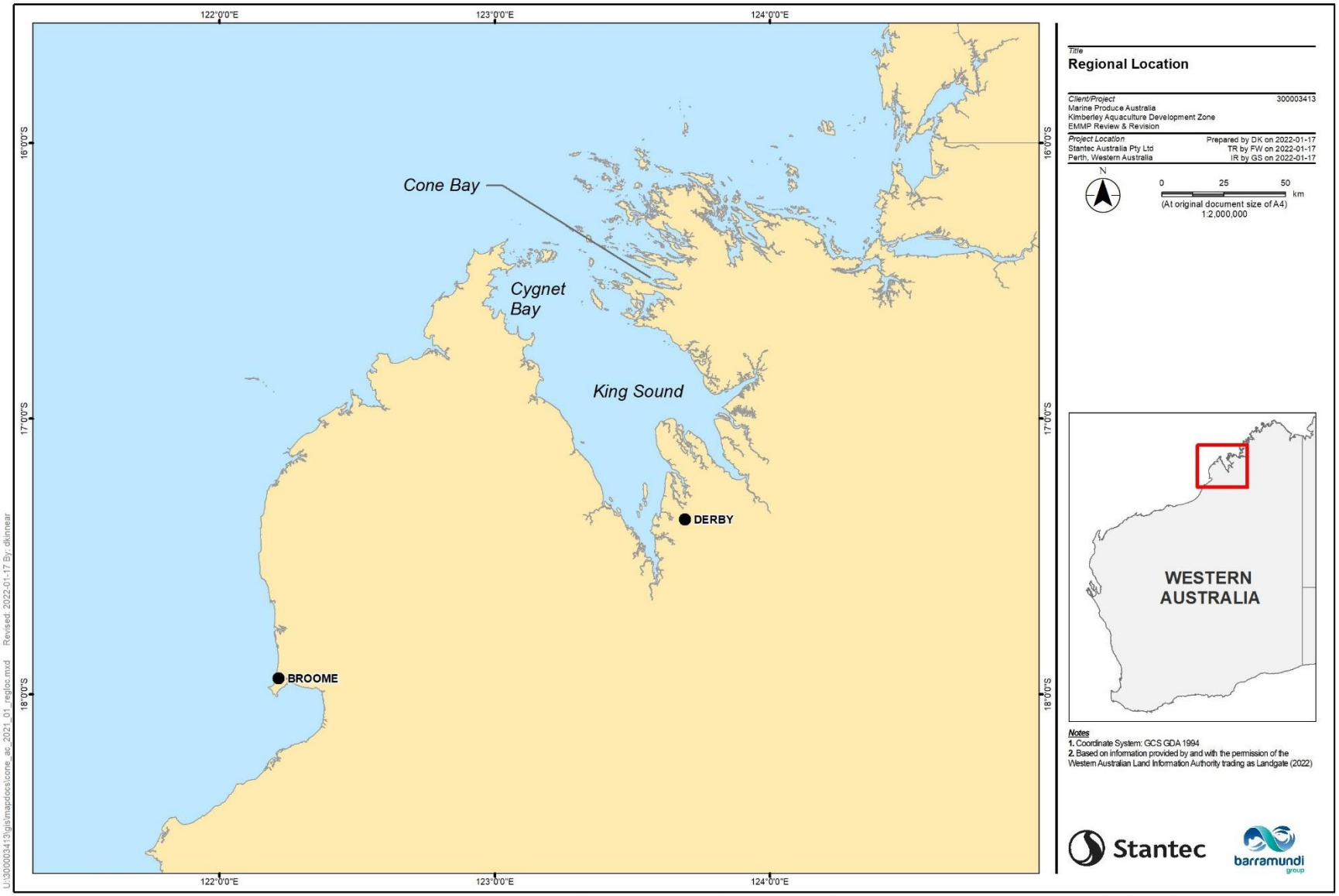

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Figure 2-1: Location of the MPAFF barramundi farm, Cone Bay, Western Australia

3 Methods and Approach

3.1 Management Framework

The KADZ is managed under EPA Environmental Quality Management Framework (EQMF), described in EPA (2016). The EQMF relies on the identification of an agreed set of Environmental Values (EVs) and EQOs, which must be achieved on an annual basis and in perpetuity. Under the EQMF, the KADZ is managed under the EVs and EQOs for Ecosystem Health and Maintenance of Ecosystem Integrity, respectively.

The EQO for Ecosystem Integrity is unique in that allows for the designation of up to four Levels of Ecological Protection (LEP); maximum, high, moderate and low (**Figure 3-1**). The approach is practical because it recognises the competing environmental, societal, and industrial uses of the marine environment, and allows industry to impart small (and inevitable) localised effects, while aiming to maintain overall environmental integrity (EPA 2017). This is important as MPAFF implements strategies to manage the potential reduction in environmental quality beneath and immediately adjacent to the sea-pens, while maintaining broader regional environmental quality.

On approval, MPAFF, in consultation with the EPA, established an Environmental Quality Plan (EQP) consisting of a Moderate Ecological Protection Area (MEPA) surrounded by concentric High (HEPA) and Maximum Ecological Protection Areas (MaxEPA) (**Figure 2-2**). This framework was designed to be moderately protective of habitats within the MEPA and highly and very highly protective of habitats in the HEPA and MaxEPA, respectively. The EQP is a critical component of the EMMP, because it informs the level of sensitivity applied to the EQC, ranging from very sensitive triggers in the case of the MaxEPA, to moderately sensitive triggers in the case of the MEPA (**Table 3-1**).

Table 3-1: Key elements of ecosystem integrity and their limits of acceptable change.

Element	Limits of acceptable change	Level of protection			
		Max	High	Mod	Low
Ecosystem processes (e.g. primary production, nutrients cycles, food chains)	Ecosystem processes are maintained within the limits of natural variation (no detectable change)	✓	✓		
	Small changes in rates, but not types of ecosystem processes			✓	
	Large changes in rates, but not types of ecosystem processes				✓
Biodiversity (e.g. variety and types of naturally occurring marine life)	Biodiversity as measured on both local and regional scales remains at natural levels (no detectable change)	✓	✓		
	Biodiversity on a regional scale remains at natural levels although there may be moderate changes in variety of biota at a local scale			✓	
	Biodiversity on a regional scale remains at natural levels although there may be significant changes in variety of biota at a local scale				✓
Abundance and biomass of marine life (e.g. number or density of individual animals, the total weight of plants)	Abundances and biomasses of marine life vary within natural limits (no detectable change)	✓	✓		
	Small changes in abundances and/or biomasses of marine life			✓	
	Large changes in abundances and/or biomasses of marine life				✓
The quality of water, biota and sediment (e.g. types and levels of contaminants such as heavy metals, dissolved oxygen content, water clarity)	Levels of contaminants and other measures of quality remain within limits of natural variation (no detect. change)	✓			
	Small detectable changes beyond limits of natural variation but no resultant effect on biota		✓		
	Moderate changes beyond limits of natural variation but not to exceed specified criteria			✓	
	Substantial changes beyond limits of natural variation				✓

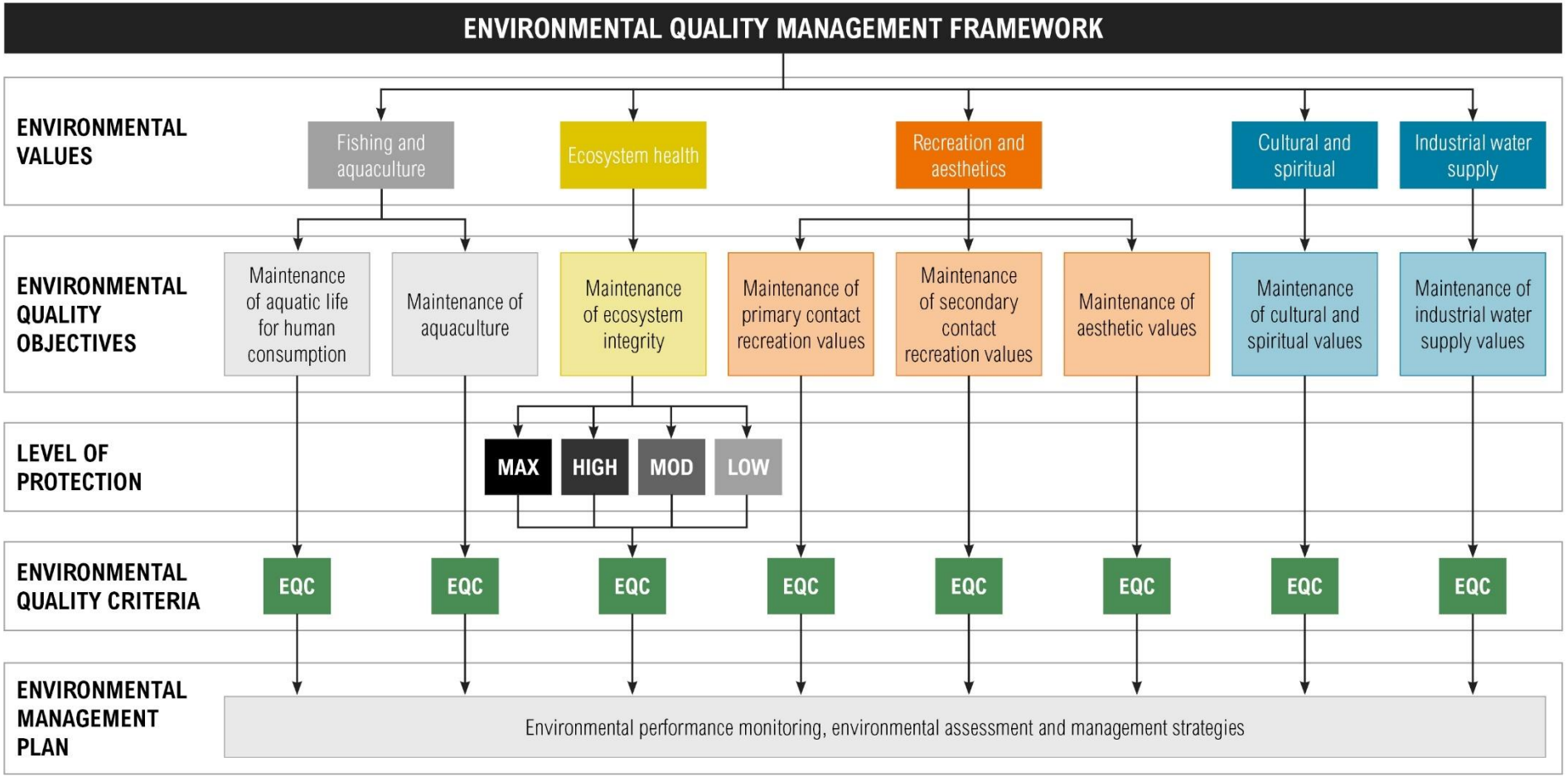

Figure 3-1: Environmental Quality Management Framework (Source: EPA 2016).

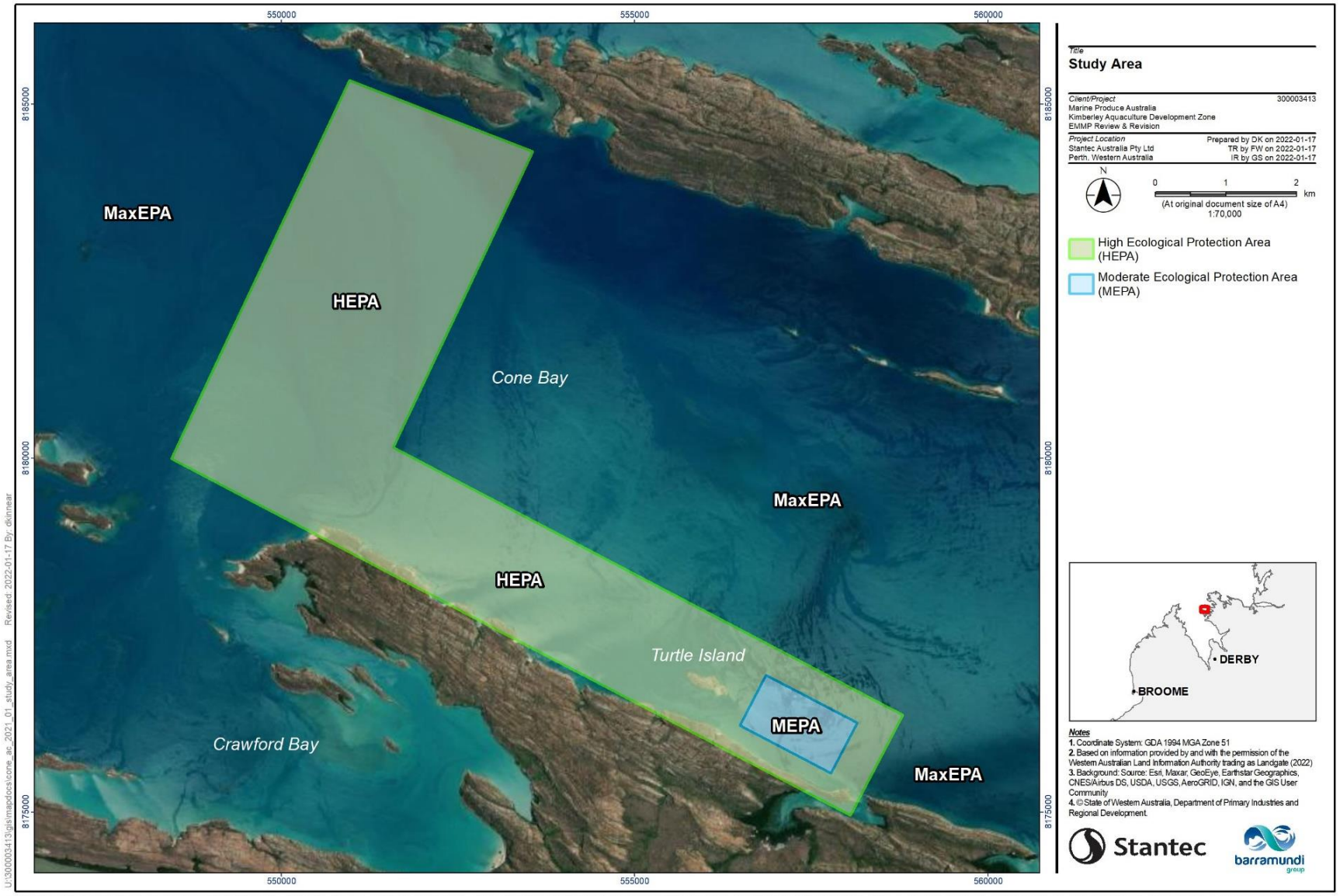

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Figure 3-2: Environmental quality plan for the Kimberley Aquaculture Development Zone.

3.2 Environmental Quality Criteria

The extent to which the EQO's have been met over the reporting period, is assessed against an agreed set of EQC. EQC comprise of EQGs and EQSs.

EQGs are numerical values or narrative statements **which, if met, indicate <u>there is a high degree of certainty that the associated environmental quality objective has been achieved</u>**. If the guideline is not met, the proponent is obligated to undertake a more detailed assessment against an environmental quality standard (**Figure 3-3**). EQGs are relatively simple and easy to measure indicators of environmental quality; and typically based on a single indicator e.g. Chlorophyll-*a.*

EQSs are threshold numerical values or narrative statements which if not met indicate **there is a <u>significant risk that the associated environmental quality objective has not been achieved</u>.** If not met, proponents are obligated to initiate a contingency management response (**Figure 3-3**). EQSs are typically assessed using a multiple lines of evidence approach, involving one or more types of indicator. e.g. infaunal communities together with visual assessment of sediment quality.

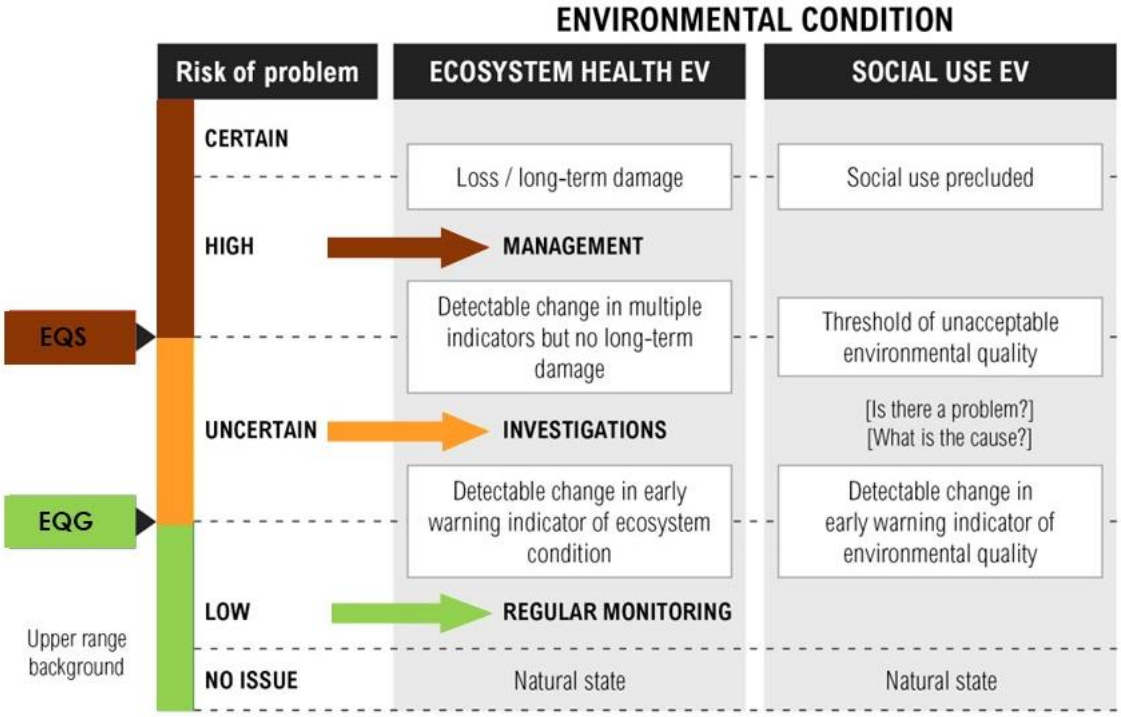

Figure 3-3: Management response protocol (Source: EPA 2016).

All EQC in this EMMP relate to the EQO for Ecosystem Integrity (**Table 3-2**). The EQC for Ecosystem Integrity are highly conservative and by meeting the EQC it is expected that the EQOs for other EVs – Fishing and Aquaculture, Cultural and Spiritual and Industrial Water Supply EVs – will also be achieved. The EQGs and EQSs are detailed in **Tables 2-2** to **2-5**, below.

Table 3-2: Environmental quality guidelines for water quality (Source: DoF 2014).

Issue	Indicator	Environmental Quality Guidelines		
		Moderate	High	Maximum
Shading or smothering	VSS	Median organic fraction of TSS calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 95th percentile of Reference Site data.	Median organic fraction of TSS calculated from pooled sites after each sampling occasion and from individual sites after each season must be less than the 80th percentile of Reference Site data.	Median organic fraction of TSS calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 70th percentile of Reference Site data.
Ammonia toxicity	DIN	Median DIN calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than 1200 µg/L.	Median DIN calculated from pooled sites, after each sampling occasion and from individual sites after each season, must be less than 500 µg/L.	Median DIN calculated from pooled sites, after each sampling occasion and from individual sites after each season, must be less than 250 µg/L
Deoxygenation	DO	Median bottom water DO calculated from pooled sites after each sampling occasion and from individual sites after each season, must be greater than 80% saturation.	Median bottom water DO calculated from pooled sites after each sampling occasion and from individual sites after each season, must be greater than 80% saturation.	Median bottom water DO calculated from pooled sites after each sampling occasion and from individual sites after each season, must be greater than 80% saturation.
Phytoplankton biomass/shading (due to increased nutrients)	Chlorophyll-a	N/A	Median Chl-a calculated from pooled sites, after each sampling occasion and from individual sites after each season, must be less than 3 x 50%ile of the Reference Site data.	Median Chl-a calculated from pooled sites, after each sampling occasion and from individual sites after each season, must be less than 3 x 50%ile of the Reference Site data.

Table 3-3: Environmental quality standards for water quality (Source: DoF 2014).

Issue	Indicator	Environmental Quality Standards		
		Moderate	High	Maximum
Shading or smothering	VSS	f EQG for VSS is exceeded at the moderate protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the Shannon-Wiener Diversity Index (SWDI), must not be less than 50% of the Reference Sites, and (2) An evaluation of seabed images from a 10m transect taken at the edge of the sea cage and at each of the MEPA transect sites where the EQG was exceeded must not indicate presence of white bacterial mats, black sediments, bubbles of hydrogen sulfide or a significant reduction in the presence of animal tracks, or bioturbator burrows, or benthic macrofauna (i.e. filter feeders) relative to Reference Sites.	If EQG for VSS is exceeded at the high or maximum protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 80% of the Reference Sites, and (2) that the median of the impact site should be less than the 80th percentile of the Reference Site for a HEPA and MaxEPA.	
Ammonia toxicity	DIN	If EQG for DIN is exceeded at the moderate protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 50% of the Reference Sites4; and (2) An evaluation of seabed images from a 10m transect taken at the edge of the sea cage and at each of the MEPA transect sites where the EQG was exceeded must not indicate presence of white bacterial mats, black sediments, bubbles of hydrogen sulfide or a significant reduction in the presence of animal tracks, or bioturbator burrows, or benthic macrofauna (i.e. filter feeders) relative to Reference Sites.	If EQG for DIN is exceeded at the high or maximum level of protection then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 80% of the Reference Sites; and (2) no observed mortalities of benthic macrofauna, such as filter feeders, attributable to ammonia toxicity.	
Physical and chemical stressors	DO	Median bottom water DO on each sampling occasion and after each season at individual sites, must be greater than 60% saturation in all areas of ecological protection and not the result of a regional event as indicated by similar reductions in DO at the Reference Sites.		
Phytoplankton biomass/shading	Chlorophyll-a	N/A	If EQG for chlorophyll-a is exceeded at the high or maximum protection level then mean light attenuation coefficient (LAC) over an 8 week period (based on fortnightly sampling) is not significantly greater than the mean LAC at the Reference Sites, as determined by ANOVA.	

Table 3-4: Environmental quality guidelines for sediment quality (Source: DoF 2014).

Issue	Indicator	Environmental Quality Guidelines		
		Moderate	High	Maximum
Sediment nutrient enrichment	TP	Median Total Phosphorous concentration calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 95%ile of Reference Site data.	Median Total Phosphorous concentration calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 80%ile of Reference Site data.	Median Total Phosphorous concentration calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 70%ile of the Reference Site data.
Organic enrichment	TOC	Median concentration of TOC calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 95%ile of Reference Site data.	Median concentration of TOC calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 80%ile of Reference Site data.	Median concentration of TOC calculated from pooled sites after each sampling occasion and from individual sites after each season, must be less than the 70%ile of Reference Site data.
Contaminants	Trace metals (Cu, Zn, Cd)	Concentration of each individual sampling site not to exceed: Copper 65 mg/kg Zinc 200 mg/kg Cadmium 1.5 mg/kg	Concentration of each individual sampling site not to exceed5: Copper 65 mg/kg Zinc 200 mg/kg Cadmium 1.5 mg/kg	Concentration of each individual sampling site must not be significantly different to the concentrations at the Reference Sites for copper, zinc and cadmium, as determined by ANOVA.
Benthic hypoxia /anoxic sediments	Redox dis-continuity layer	(1) Median depth of redox discontinuity layer calculated from pooled sites, on each sampling occasion, must not be less than the 5%ile, or 20%ile of Reference Site data; or (2) Median depth of the redox discontinuity layer at any site over a four month period must be no less than the 5%ile, or 20%ile of the Reference Site data.	(1) Median depth of redox discontinuity layer calculated from pooled sites, on each sampling occasion, must not be less than the 20%ile of Reference Site data; or (2) Median depth of the redox discontinuity layer at any site over a four month period must be no less than the 20%ile of the Reference Site data.	(1) Median depth of redox discontinuity layer calculated from pooled sites, on each sampling occasion, must not be less than the 30%ile of Reference Site data; or (2) Median depth of the redox discontinuity layer at any site over a four month period must be no less than the 30%ile of the Reference Site data.

Table 3-5: Environmental quality standards for sediment quality (Source: DoF 2014).

Issue	Indicator	Environmental Quality Standards		
		Moderate	High	Maximum
Sediment nutrient enrichment, organic enrichment and contaminants	TP, TOC and trace metals (Cd, Zn and Cu)	If EQG for TP, TOC or trace metals is exceeded at the moderate protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 50% of Reference Sites; and (2) An evaluation of seabed images from a 10m transect taken at the edge of the sea cage and at each of the MEPA transect sites where the EQG was exceeded must not indicate presence of white bacterial mats, black sediments, bubbles of hydrogen sulfide or significant reduction in the presence of animal tracks, or bioturbator burrows, or benthic macrofauna (e.g. filter feeders) relative to Reference Sites. (see Section 2.2); and (3) Median bottom water DO on each sampling occasion and over a season must be greater than 60% saturation and not the result of a regional event as indicated by similar reductions in DO at the Reference Sites.	If EQG for TP, TOC or trace metals is exceeded at the high or maximum protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 80% of Reference Sites; and (2) Median bottom water DO on each sampling occasion and over a season must be greater than 60% saturation and not the result of a regional event as indicated by similar reductions in DO at the Reference Sites.
Benthic hypoxia /anoxic sediments	Redox dis-continuity layer	If EQG (1) and/or (2) (pertaining to the redox dis-continuity layer) is exceeded and the exceedance is based on the moderate protection guideline (95%) then; (1) Evaluation of images taken beneath and within 10 m of the sea-cages must not indicate presence of white bacterial matts, black sediments, bubbles of hydrogen sulphide or a significant reduction in the presence of animal tracks, or bioturbator burrows, relative to Reference Sites; or (2) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 50% of Reference Sites; or (3) Median bottom water DO on each sampling occasion must be greater than 60% saturation, and not the result of a regional event as indicated by similar reductions in DO	If EQG (1) and/or (2) (pertaining to the redox dis-continuity layer) is exceeded at the high or maximum protection level then; (1) the sediment infauna monitoring program is instigated. The sediment infauna community diversity, measured using the SWDI, must not be less than 80% of Reference Sites; or (2) Median bottom water DO on each sampling occasion must be greater than 60% saturation, and not the result of a regional event as indicated by similar reductions in DO at the Reference Sites; or (3) Median bottom water DO at any site over a four month period must be greater than 60% saturation, and not the result of a regional event as indicated by similar reductions in DO at the Reference Sites.

3.3 Monitoring Sites and Frequency

The monitoring program for the EMMP comprises water and sediment sampling, which is conducted monthly between June and September in the dry season and monthly between December and March in the wet season. Sampling is conducted across the three levels of ecological protection, comprising the MEPA, HEPA, and MaxEPA categories.

Sampling in the MEPA is conducted at five sites, beginning immediately adjacent to the sea pens (0 m) and then at distances of 10 m, 50 m, 100 m and 200 m down-current of the sea-pens. Sampling at the HEPA sites is conducted at five sites positioned perpendicular to the prevailing current, approximately 1000 m down-current of the sea-pens. Sampling at the MaxEPA is also conducted at 5 sites located perpendicular to the prevailing current, but at a distance approximately 1500 m down-current of the sea pens (**Figure 3-4**).

Results obtained at the MEPA, HEPA and MaxEPA sites have been compared against fixed triggers or the measurements obtained at the reference sites, which are distributed across the central region of Cone Bay (**Figure 3-4**).

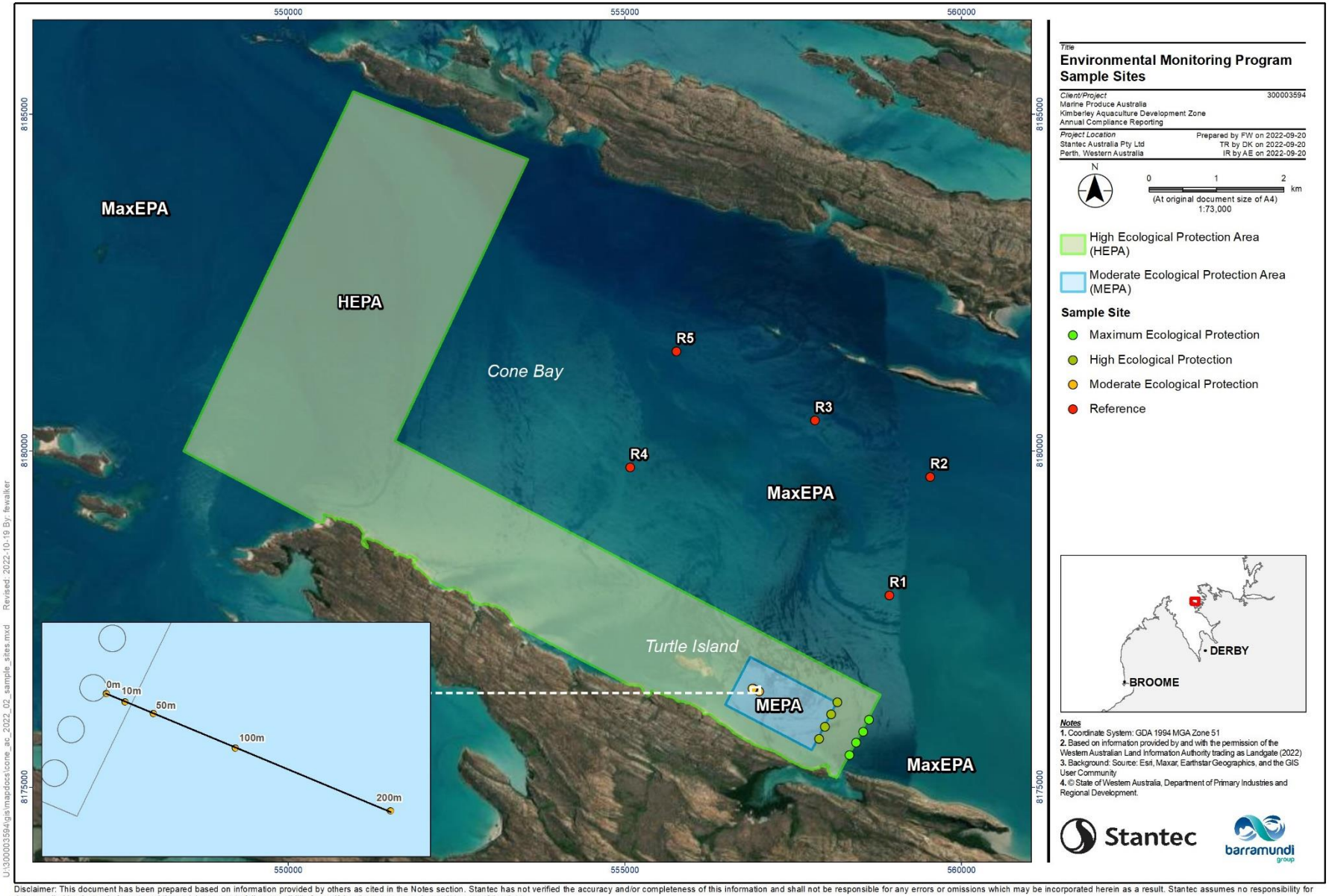

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Figure 3-4: Location of the MEPA, HEPA and MaxEPA sampling sites for the monitoring program.

4 Results

The results of the monitoring program are summarised in **Table 4-2** according to the legend shown in **Table 4-1**. Results are presented in the context of the EQSs for moderate, high and maximum ecological protection. As described in **Section 3.2**, EQSs are threshold numerical values or narrative statements which if not met indicate there is a significant risk that the associated environmental quality objective has not been achieved. If met, it is considered that the EQO was achieved.

Table 4-1: Summary of the legend for the results of the 2021-2022 monitoring program.

Outcome	Legend
Monitor: EQS met (continue monitoring)	
Ongoing Investigation: EQS sampling scheduled (results pending)	
Action: EQS not met (management response required)	

The results of the 2021-2022 monitoring program determined there were no adverse environmental affects that were attributable to farming operations within the KADZ. Comparison of monitoring data with the EQC found the EQS were either met or pending the results of further testing. **Based on these results, it was concluded that there was no significant risk to the Environmental Quality Objectives over the 2021-2022 reporting period.**

Table 4-2: Summary report for marine water quality.

Indicator	EQS	Result	Outcome
Volatile Suspended Solids (VSS)	VSS is the organic fraction of the total suspended material in the water column. In high enough quantities, VSS poses a risk to sediment infauna via smothering or interruption to filter feeding processes. The EQSs for VSS were assessed in the HEPA and MaxEPA zones. To meet the EQS the diversity of sediment infauna must not be less than 80% of the reference sites, as measured using the Shannon-Wiener Diversity Index (SWDI). Average SWDI scores at the HEPA and MaxEPA were >100% compared to the reference site value. Based on these data, the EQSs were met.		The EQS was met. Based on these results, there was no significant risk to the environmental quality objective during the reporting period.
Dissolved Inorganic Nitrogen (DIN)	Dissolved inorganic nitrogen (DIN) is the aggregate of ammonia, nitrite and nitrate. DIN in aquaculture wastewater is comprised predominantly of ammonia; which is also the most biologically available form of nitrogen. The EQG for dissolved inorganic nitrogen is assessed against the EPA's toxicity criteria for ammonia. The Median DIN calculated from pooled sites after each sampling occasion and from individual sites after each season met the EQGs in the MEPA, HEPA and the MaxEPA, and there was no further need to assess against the EQS. However, the EQS for DIN is identical to the EQS for VSS. The EQS for VSS was met.		There is a high degree of certainty that the environmental quality objective for the moderate level of ecological protection was achieved during the reporting period.
Dissolved Oxygen (DO)	Dissolved oxygen is assessed in bottom waters to determine the risk of persistent oxygen drawdown resulting from the accumulation of organic material. To meet the EQS, dissolved oxygen values must be maintained at greater than 60% saturation. Ongoing monitoring determined that there were no instances in which the percentage saturation of DO fell below 60%, with the lowest value recorded at **82%**.		The EQS was met. Based on these results, there was no significant risk to the environmental quality objective during the reporting period.

Indicator	EQS	Result	Outcome
Chlorophyll-a	To meet the EQS, Light Attenuation Coefficient (LAC) values over an eight-week period must not be greater than the mean LAC at the reference sites, as determined by statistical analysis (analysis of variance). **Assessment against the EQS is pending the outcome of discussions with DWER**. In the interim, MPAFF has conducted a detailed investigation based on an analysis of chlorophyll-a data collected since June 2014. Chlorophyll-a is monitored on an ongoing basis in Cone Bay and provides important early warning of the potential for algal blooms. The results are indicative of a seasonally driven system, with chlorophyll-a values peaking consistently in the wet season (October-March), together with a strong spatial gradient between the western and south-eastern regions of the bay. The gradient results in consistently elevated chlorophyll-a concentrations in the SE corner, relative to the central (reference) and western regions of the bay. Exceedances of the EQG for VSS are typically related to this variability (i.e. false positives), and there is no evidence (present or historical) the exceedances are related to farming activities.		The analysis of long-term data suggests the observed variations at the HEPA and MaxEPA sites are (with 95% confidence) attributable to natural variation, and more specifically the naturally occurring productivity gradient within the Bay. **Based on these results, it is considered that there was no significant risk to the EQO for Ecosystem Integrity, during the 2021-2022 reporting period.** **MPAFF will continue to communicate with the EPA regarding the timing of the light attenuation coefficient (LAC) assessment, and in the interim, will continue to monitor chlorophyll-a.**

Table 4-3: Summary report for marine sediment quality.

Indicator	EQS	Result	Outcome
Total Phosphorus (TP)	The EQS for TP uses a 'multiple lines of evidence' approach and incorporates testing against the infauna, DO and visual thresholds. Because the EQGs for TP were met in the HEPA and MaxEPA zones, there was no further requirement to assess against the EQS criterion. However, The EQS for TP – incorporating multiple lines of evidence - was assessed in the MEPA. 1. To meet the EQS for a moderate level of ecological protection, the diversity of infauna must not be less than 50% of the reference sites, as measured using the SWDI. Average SWDI scores at the MEPA was 82% compared to the reference site value. Based on these data, the EQS for the maximum level of ecosystem protection was met. 2. To meet the EQS, dissolved oxygen values must be greater than 60% saturation AND dissolved oxygen values at any site over a four-month period must be greater than 60% saturation, and not the result of a regional event as indicated by similar reductions at the reference sites. 3. To meet the visual criteria, evaluation of images taken beneath and within 10 m of the sea-cages must not indicate presence of white bacterial matts, black sediments, bubbles of hydrogen sulphide or a significant reduction in the presence of animal tracks, or bioturbator burrows, relative to the reference sites. Towed video assessments are pending.	  	The EQS based on two of the three lines of evidence was met. Testing against the visual criteria is pending.

Indicator	EQS	Result	Outcome
Total Organic Carbon (TOC)	Total Organic Carbon is the proportion of organic material measured in the sediments. It is typically expressed as a percentage. The EQS for TOC uses a 'multiple lines of evidence' approach and incorporates testing against infauna and dissolved oxygen-based thresholds. The EQS for TOC was assessed in the HEPA and MaxEPA zones. 1. To meet the EQS for the high and maximum levels of ecological protection, the diversity of infauna must not fall below 80% of the reference sites, as measured using the SWDI. Average SWDI scores at the HEPA and MaxEPA sites were >100% compared to the reference site value. Based on these data, the EQSs were met. 2. To meet the EQS for the high and maximum levels of ecological protection, dissolved oxygen values must be greater than 60% saturation. Ongoing monitoring determined that there were no instances in which the percentage saturation fell below 60%, with the lowest value recorded at **82%**.	 	The EQS was met. Based on these results, there was no significant risk to the environmental quality objective during the reporting period.
Trace Metals (Cu, Zn and Cd)	The EQG for Cu, Zn and Cd is assessed against the EPA's toxicity criteria. Median Cu, Zn and Cd concentrations calculated at individual MEPA, HEPA and MaxEPA sites at the completion of the wet and dry sampling periods, met their respective EQGs and there was no further need to assess against the EQS. The EQS for heavy metals is assessed against the same EQS criteria as TP, TOC and DO. Based on the assessments conducted for these indicators, it can be inferred that the EQS for heavy metals was also met.		The EQS was met. There is a high degree of certainty that the environmental quality objective was achieved during the reporting period.

Indicator	EQS	Result	Outcome
Redox Discontinuity Layer	The median depth of the redox discontinuity layer calculated from pooled sites after each sampling occasion and from individual sites after each season, did not exceed the respective EQGs for the moderate, high or maximum levels of ecosystem protection. The EQGs were met. The EQS for redox discontinuity is assessed against the same EQS criteria as TP, TOC and DO. Based on the assessments conducted for these indicators, it can be inferred that the EQS for heavy metals was also met.		The EQS was met. There is a high degree of certainty that the environmental quality objective was achieved during the reporting period.

5 Audit Table

Table 5-1: Summary of compliance (NA=not applicable).

Audit Code / Condition	Section	Requirements	Implementation	Evidence	Timeframe	Status	Further Information
MS 966 Condition 1.1	Derived Proposals	Proposals referred to the EPA and declared to be derived proposals shall not exceed the specifications and characteristics provided for in Schedule 2. Note: It may be that more than one proponent implements the Proposal identified in Schedule 2.	Project will be implemented in accordance with the specifications and characteristics of this statement	Compliance Assessment Report (CAR)	Life of Proposal - Yearly	Completed	
MS 966 Condition 2.1	Contact Details	The proponent shall notify the Chief Executive Officer (CEO) of any change of its name, physical address or postal address for the serving of notices or other correspondence within 28 days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.	Notify the CEO of any change to contact name and address	CAR	Within 28 days of such change	Compliant	
MS 966 Condition M3.1	Time Limit for Proposal Implementation	The proponent must ensure that the Proposal is substantially commenced within five years of the date of the section 45A Notice.	Commence proposal within 5 years of June 28, 2014	CAR	25 June 2019	Completed	
MS 966 Condition M3.2	Time Limit for Proposal Implementation	The proponent shall provide the CEO with written evidence which demonstrates that the Proposal has substantially commenced on or before the expiration of five years from the date of the section 45A Notice.	Provide written advice to CEO demonstrating the commencement of the Proposal	CAR	25 June 2019	Completed	
MS 966 Condition M4.1	Compliance Reporting	The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.	Submit Compliance Assessment Plan to CEO	Compliance Assessment Plan (CAP)		Completed	
MS 966 Condition M4.2	Compliance Reporting	The proponent shall submit to the CEO the compliance assessment plan required by Condition 4-1 at least six months prior to the first CAR required by Condition 4-6, or prior to implementation, whichever is sooner. The compliance assessment plan shall indicate: 1. The frequency of compliance reporting; 2. The approach and timing of compliance assessments; 3. The retention of compliance assessments; 4. The method of reporting of potential non-compliances and corrective actions taken; 5. The table of contents of CARs; and 6. Public availability of CARs.	Submit Compliance Assessment Plan to CEO	CAP	Submitted to the CEO	Completed	
MS 966 Condition M4.3	Compliance Reporting	The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by Condition 4-1.	Assess compliance in accordance with the Compliance Assessment Plan	CAR	Annually	Completed	
MS 966 Condition M4.4	Compliance Reporting	The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by Condition 4-1 and shall make those reports available when requested by the CEO.	Retain digital copies of CARs	Available by direct enquiry to MPAFF	Annually and continued	Compliant	
MS 966 Condition M4.5	Compliance Reporting	The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.	Notify CEO (and compliance branch of OEPA) by email of any potential non-compliance	CAR	Within 7 days of potential non-compliance being identified	Compliant	
MS 966 Condition M4.6	Compliance Reporting	The proponent shall submit to the CEO and the Department of Fisheries the first CAR 15 months from the date of issue of this Statement addressing the 12-month period from the date of issue of this Statement and then annually from the date of submission of the first CAR. The CAR shall:	Prepare and submit CAR to CEO annually	CAR	15 months from date statement issued	Compliant	

Audit Code / Condition	Section	Requirements	Implementation	Evidence	Timeframe	Status	Further Information
		1. Be endorsed by the proponent's Chief Executive Officer or a person delegated on the Chief Executive Officer's behalf; 2. Include a statement as to whether the proponent has complied with the conditions; 3. Identify all potential non-compliances and describe corrective and preventative actions taken; 4. Be made publicly available in accordance with the approved compliance assessment plan; and 5. Indicate any proposed changes to the compliance assessment plan required by Condition 4-1.					
MS 966 Condition M5.1	Public Availability of Data	Subject to Condition 5-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the Proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this Proposal and implementation of this Statement.	Make data publicly available	Available on the MPAFF website	Within a reasonable time period approved by the CEO	Compliant	The Annual compliance report will be posted on, and downloadable from: **https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Aquaculture/Aquaculture%20Zones/Pages/default.aspx** Reports will also be made available upon request from members of the public who are unable to access the website.
MS 966 Condition M5.2	Public Availability of Data	If any data referred to in Condition 5-1 contains particulars of: 1. A secret formula or process; or 2. Confidential commercially sensitive information. The proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.	Submit request to CEO	N/A	N/A	Compliant	
MS 966 Condition M6.1	Benthic Communities and Marine Environmental Quality	The proponent shall ensure that implementation of the Proposal causes no irreversible loss of benthic communities and achieves the levels of ecological protection for each of the ecological protection areas as specified in Table 1 of Schedule 3 and referred to in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO.	Assess health of environment by assessing compliance in accordance with KADZ EMMP	CAR	Annually	Compliant	
MS 966 Condition M6.2	Benthic Communities and Marine Environmental Quality	The proponent shall implement the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO, and continue implementation until otherwise agreed by the CEO.	Implement EMMP	CAR	Annually	Compliant	
MS 966 Condition M6.3	Benthic Communities and Marine Environmental Quality	In the event that monitoring required by the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO, indicates the levels of ecological protection as specified in Table 1 of Schedule 3, environmental quality guidelines or environmental quality standards as specified in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO, are not being met, the proponent shall: 1. Report such findings to the CEO within two working days of the exceedance(s) being identified; 2. Investigate to determine the likely cause(s) of the exceedance(s) of the criteria defined in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO; 3. If the exceedance(s) is determined by the CEO to be a result of implementation of the Proposal, the proponent shall immediately implement the mitigation measures identified in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan	Notify the CEO within two working days Investigate the likely cause of exceedance Implement mitigation measures if determined necessary Continue implementing as required	Notification to CEO 05/10/2022	Within two working days of the exceedance being identified	Compliant	

Audit Code / Condition	Section	Requirements	Implementation	Evidence	Timeframe	Status	Further Information
		(Version 1, January 2014), or its revisions as approved by the CEO; and 4. Continue implementing the mitigation measures required by Condition 6-3(3) until the criteria defined in the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO, are no longer being exceeded, or until advised otherwise by the CEO.					
MS 966 Condition M6.4	Benthic Communities and Marine Environmental Quality	The proponent shall submit to the CEO and the Department of Fisheries annual CARs in accordance with Condition 4-6 and which includes: 1. The monitoring results required by the Kimberley Aquaculture Development Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or subsequent approved revisions, under Condition 6-1; 2. An assessment of the effectiveness of the management and contingency measures implemented to ensure compliance with the requirements of Conditions 6-1 and 6-2; and 3. Evidence that the Moderate Ecological Protection Area defined in Table 1 of Schedule 3 comprises no more than 33 per cent of the proponent's Aquaculture Lease Area.	Submit CAR to CEO	CAR	Annually	Compliant	

6 Environmental Monitoring and Management Plan Compliance

The KADZ Environmental Monitoring and Management Plan (EMMP) is required to meet the regulatory environmental quality objectives and commitments for benthic communities and habitat, marine environmental quality and marine fauna. These include:

- To maintain the structure, function, diversity, distribution and viability of benthic communities and habitats at local and regional scales;
- To maintain the quality of water, sediment and biota so that the environmental values, both ecological and social, are protected; and,
- To maintain the diversity, geographic distribution and viability of fauna at the species and population levels.

Table 6-1: Summary of KADZ EMMP compliance (NA=not applicable).

Section of EMMP	Commitments	Status
Section 2 Environmental monitoring program	Sample medians will be calculated after each sampling occasion and at the completion of each season's sampling (i.e. on completion of the four-month sampling period).	**Completed**
	Upon exceeding an Environmental Quality Guidelines (EQG) for Total Suspended Solids (TSS), Dissolved Inorganic Nitrogen (DIN), Total Phosphorus (TP), Total Organic Carbon (TOC) or trace metals (Zn, Cu and Cd), the operators will undertake sediment infauna sampling	**Compliant**
Section 3 Reporting	An annual Management and Environmental Monitoring Plan (MEMP) report which includes validated monitoring data and a summary of the results of all of the environmental monitoring as outlined in this KADZ EMMP for the Zone must be submitted to the DPIRD	**Completed**
	In the event an EQG trigger level is exceeded, the proponent will report the matter to the Zone Manager (DPIRD) within one working day of determining this has occurred and initiate investigation against the Environmental Quality Standards (EQS) within a timeframe agreed with the DPIRD	**Compliant**
Section 4 Adaptive management and monitoring – the feedback loop	If any EQGs are exceeded, monitoring against the relevant EQS is instigated. If an EQS is exceeded, then a management response is triggered.	**Compliant**
Section 5 Mitigation measures	In the event that an EQS is exceeded, management will be undertaken to reduce the effect of contaminant(s) and restore environmental quality to comply with the specified level of ecological protection.	**N/A**
Section 6 Decommissioning plan	Should the operation be discontinued the aquaculture gear will be removed from the site.	**N/A**
Section 7 Marine fauna interaction plan.	The licence holder is responsible for ensuring that potential impacts on other aquatic fauna are managed and minimised by adhering to the requirements and procedures set out in this section.	**Compliant**

7 References

Environmental Protection Authority (2016), Technical Guidance – Protecting the Quality of Western Australia's Marine Environment (2016), Perth, Western Australia

Environmental Protection Authority (2017), Environmental Quality Criteria Reference Document for Cockburn Sound (2017), Perth, Western Australia

Department of Fisheries (2014), Kimberley Aquaculture Development Zone, Environmental Monitoring & Management Plan, Version 1 (2014), Perth, Western Australia

DHI Water & Environment Pty Ltd (2013), Kimberley Aquaculture Development Zone Environmental Field Studies and Numerical Modelling in Support of an EIS (2013), Perth, Western Australia.

Stantec Pty Ltd (2022) Revised Kimberley Aquaculture Development Zone: Environmental Management and Monitoring Plan (2022), Perth, Western Australia

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Stantec
Ground Floor, 226 Adelaide Terrace, Perth WA, 6000
ABN: 17 007 820 322
Australia: +61 (08) 6222 7000 | www.stantec.com