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# Annual Environmental Compliance Report 2023/2024

Report prepared for: Tassal Group | Prepared by: Stantec  
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# Quality statement

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# Summary

This document summarises the findings of the 2023-2024 annual environmental monitoring program conducted between June 2023 and March 2024, pursuant to Condition 6-1 of Ministerial Statement 966 (MS 966).

The report summarises the farm's performance against the Environmental Protection Authority's (EPA) Environmental Quality Objectives (EQO), which are in turn assessed against Environmental Quality Criteria (EQC), comprising Environmental Quality Guidelines (EQGs) and Environmental Quality Standards (EQSs).

Under the Environmental Monitoring and Management Plan (EMMP), sampling is conducted across three levels of ecological protection: moderate (MEPA), high (HEPA) and maximum (MaxEPA). Water and sediment sampling is conducted monthly between June and October in the dry season and monthly between December and March in the wet season.

The 2023-2024 monitoring program results indicated no adverse environmental effects that could be attributable to farming operations. Comparing monitoring data with the EQC found that the EQSs were met, and no further investigation was required.

Based on these results, it was considered that there were no significant risks to the EQOs in the 2023-2024 reporting period.





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# Abbreviations

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



# 1 Background

Tassal Group Ltd (TG) (formerly Marine Produce Australia (MPA) is responsible for the management of the Cone Bay Ocean Barramundi Farm (**Table 1-1**) located at the eastern end of the Kimberly Aquaculture Development Zone (KADZ), Cone Bay, Western Australia (**Figure 2-1**). Premium salt-water barramundi (*Lates calcarifer*) has been farmed 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              | Tassal Group Ltd                       |
| Proponent's Australian Company Number | 106 067 270                            |

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

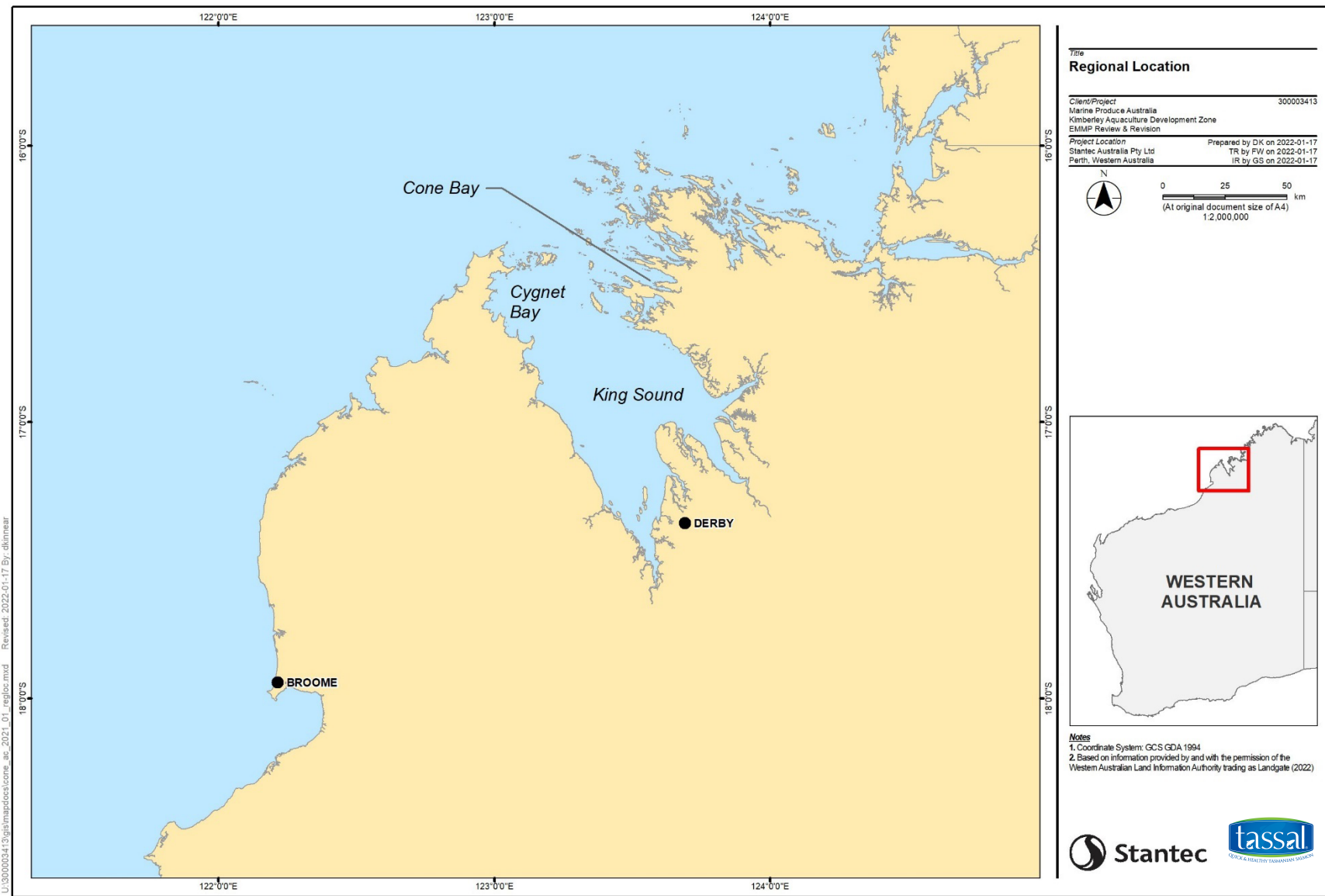
Farming activities in the KADZ are closely regulated by the Department of Primary Industries and Regional Development (DPIRD) and the Department of Water and Environment (DWER) under Licence Number 1465 and Ministerial Statement (MS) 966, respectively. Under the Conditions of approval, TG is required to conduct an annual marine environmental monitoring program comprising measurements of water and sediment quality at a number of fixed locations.

## 2 Purpose of this Document

This document summarises the findings of the 2023 – 2024 annual monitoring program conducted between June 2023 and March 2024, according to the methods described in the EMMP.

As the only derived proponent to have commenced farming in the KADZ, TG is solely responsible for implementing and reporting against the findings of the EMMP. All farming is undertaken at the eastern end of Cone Bay, as depicted in **Figure 3-2**.

The results of the annual monitoring program are reported against the EPA's Environmental Quality Objectives (EQOs) for Ecosystem Health and Maintenance of Ecosystem Integrity, respectively.



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**Figure 2-1: Location of the TG Barramundi Farm, Cone Bay, Western Australia**



# 3 Methods and Approach

## 3.1 Management Framework

The KADZ is managed under the EPA's Environmental Quality Management Framework (EQMF) as described in EPA (2016). The EQMF relies on identifying an agreed set of EVs and EQOs, which must be achieved annually and 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 as it 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, 2016). This is important as TG implements strategies to manage the potential reduction in environmental quality beneath and immediately adjacent to the sea-pens, while maintaining broader regional environmental quality.

TG has established an Environmental Quality Plan (EQP) for the Cone Bay farm consisting of a Moderate Ecological Protection Area (MEPA) within a concentric High Ecological Protection Area (HEPA) and Maximum Ecological Protection Area (MaxEPA) (**Figure 2-2**). The framework was designed to be moderately protective of habitats within the MEPA and increasingly protective of habitats in the HEPA and MaxEPA. 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 |
| <b>Ecosystem processes</b><br>(e.g. primary production, nutrient 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  |                     |      |     | ✓   |
| <b>Biodiversity</b><br>(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 |                     |      |     | ✓   |
| <b>Abundance and biomass of marine life</b><br>(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   |                     |      |     | ✓   |
| <b>The quality of water, biota and sediment</b><br>(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  |                     |      |     | ✓   |

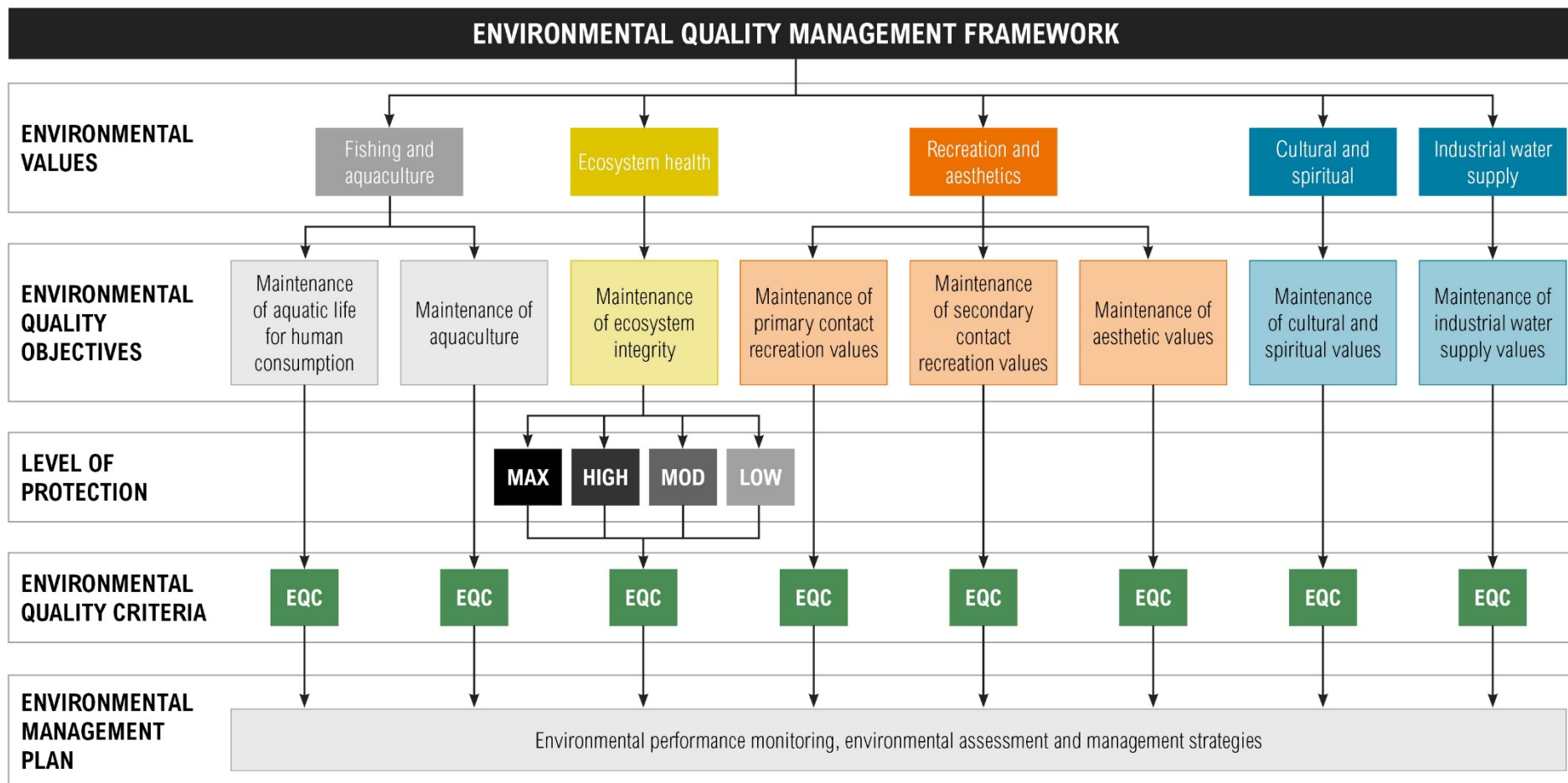


Figure 3-1: Environmental Quality Management Framework (Source: EPA, 2016).



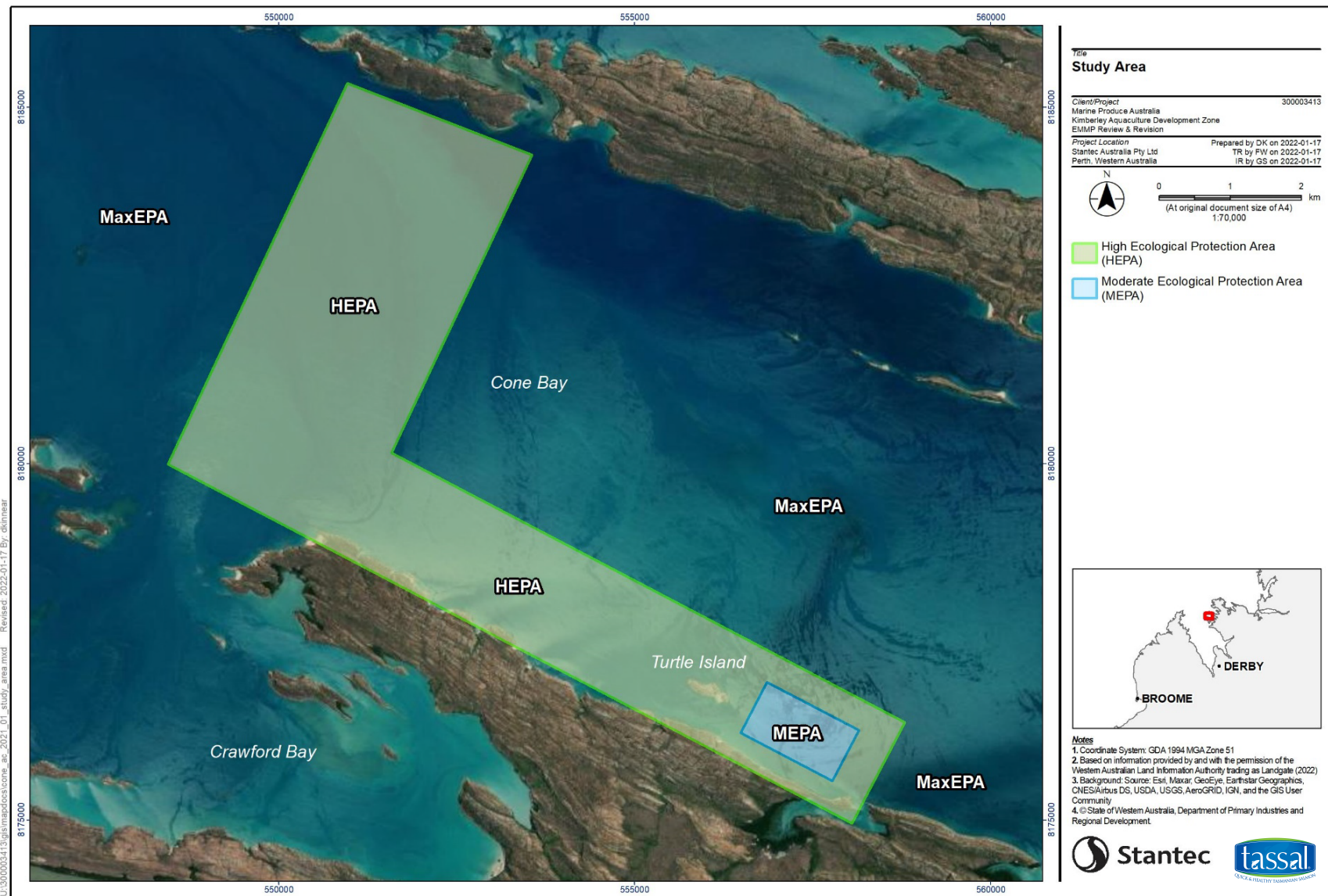


Figure 3-2: Environmental quality plan for the KADZ.

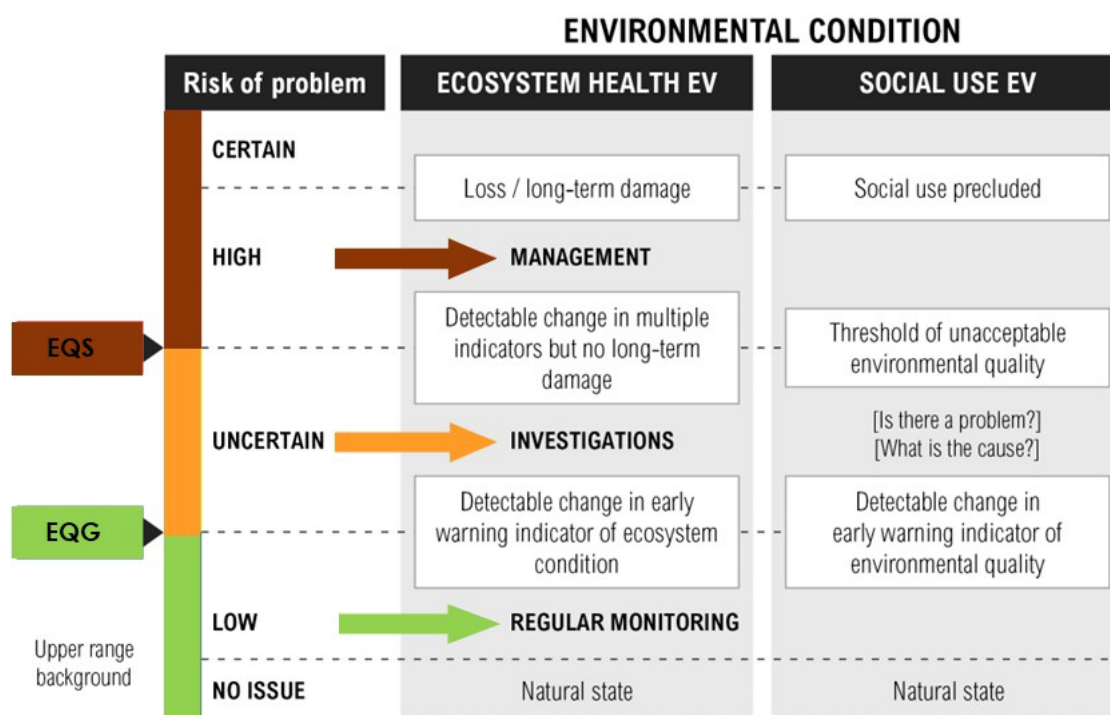


## 3.2 Environmental Quality Criteria (EQC)

The extent to which the EQOs were met over the reporting period was assessed against the agreed-upon EQC, which is comprised of EQGs and EQSs.

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

EQSs are threshold numerical values or narrative statements which, if not met, indicate **a significant risk that the associated EQO has not been achieved**. 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 indicators, such as infaunal communities and visual assessment of sediment quality.



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

All the EQC in the 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.

**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 total suspended solids (TSS) (also known as volatile suspended solids (VSS)) 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. | VSS 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.      | VSS 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 Dissolved Inorganic Nitrogen (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 dissolved oxygen (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 50thile 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 50thile 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           | <p>If EQG for VSS is exceeded at the moderate protection level, then;</p> <p>(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</p> <p>(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 the 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.</p> | <p>If EQG for VSS is exceeded at the high or maximum protection level, then;</p> <p>(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</p> <p>(2) the impact site's median should be less than the 80th percentile of the Reference Site for a HEPA and MaxEPA.</p> |         |
| Ammonia toxicity                | DIN           | <p>If EQG for DIN is exceeded at the moderate protection level, then;</p> <p>(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 Sites; and</p> <p>(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 the 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.</p>                                  | <p>If EQG for DIN is exceeded at the high or maximum level of protection, then;</p> <p>(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</p> <p>(2) no observed mortalities of benthic macrofauna, such as filter feeders, attributable to ammonia toxicity.</p>   |         |
| 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  | <p>If EQG for chlorophyll-a is exceeded at the high or maximum protection level, then the 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.</p>  |         |

**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 is not to exceed:<br>Copper 65 mg/kg<br>Zinc 200 mg/kg<br>Cadmium 1.5 mg/kg   | Concentration of each individual sampling site is not to exceed:<br>Copper 65 mg/kg<br>Zinc 200 mg/kg<br>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<br><br>(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<br><br>(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<br><br>(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) | <p>If EQG for TP, TOC or trace metals is exceeded at the moderate protection level, then;</p> <p>(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</p> <p>(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 the 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; and</p> <p>(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.</p> | <p>If EQG for TP, TOC or trace metals is exceeded at the high or maximum protection level, then;</p> <p>(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</p> <p>(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.</p>  |
| Benthic hypoxia /anoxic sediments                                 | Redox dis-continuity layer               | <p>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;</p> <p>(1) Evaluation of images taken beneath and within 10 m of the sea-cages must not indicate the presence of white bacterial mats, black sediments, bubbles of hydrogen sulphide or a significant reduction in the presence of animal tracks or bioturbator burrows, relative to Reference Sites; or</p> <p>(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.</p>  | <p>If EQG (1) and/or (2) (pertaining to the redox dis-continuity layer) is exceeded at the high or maximum protection level, then;</p> <p>(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</p> <p>(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</p> <p>(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.</p> |

### 3.3 Monitoring Sites and Frequency

Water and sediment sampling for the parameters summarised in Table 3-6 is conducted monthly between June and October in the dry season and between December and March in the wet season.

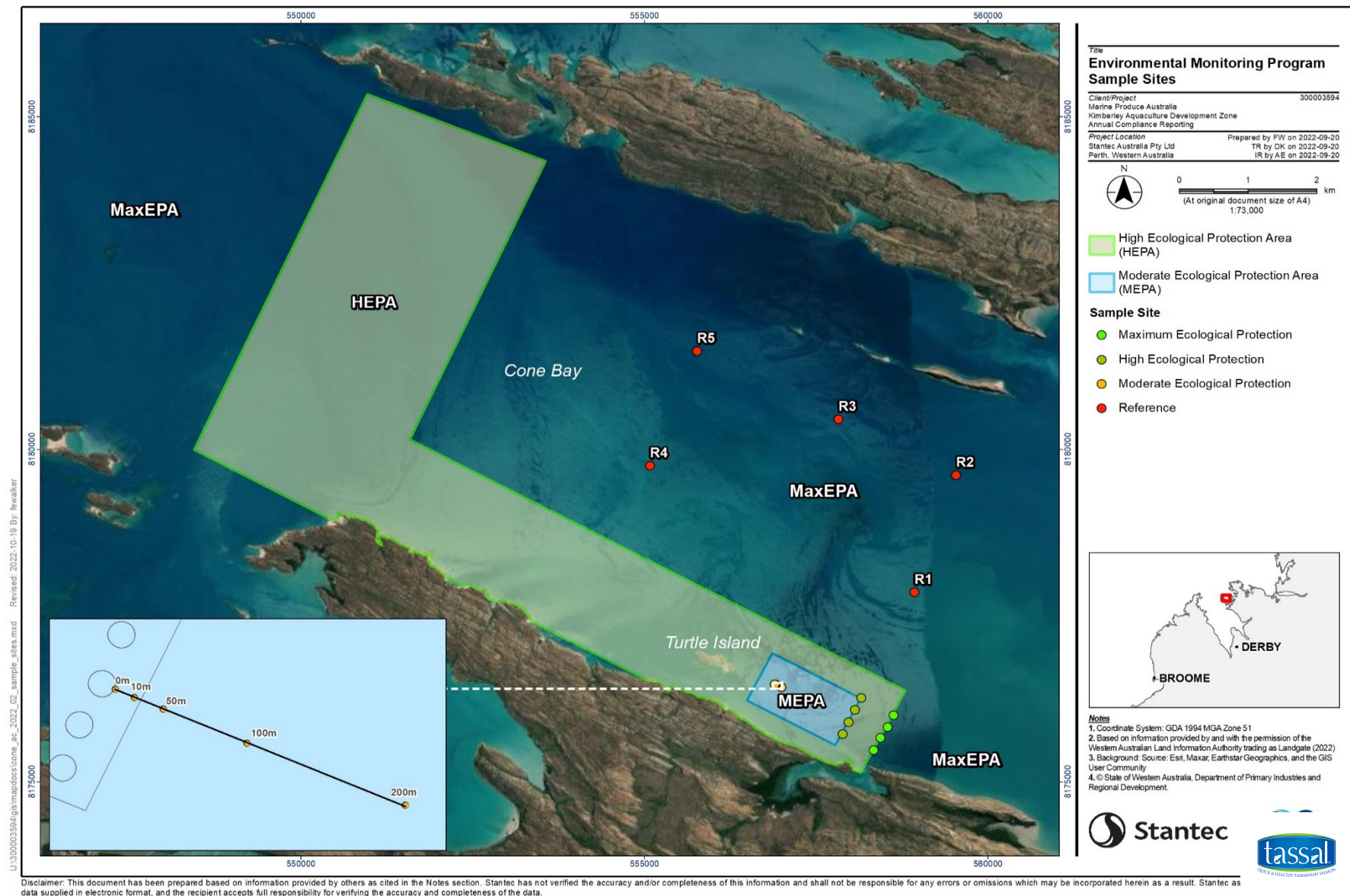
**Table 3-6: Water and sediment monitoring parameters.**

| Parameter | Analysis   |
|-----------|--|
| Sediment  | Total organic carbon (%c);<br>Total phosphorus (mg/kg);<br>Trace metals (Cu, Zn, Cd)(mg/kg); and<br>Redox dis-continuity layer (cm). |
| Water     | Total Suspended Solids (mg/L)<br>Dissolved Inorganic Nitrogen (mg/L)<br>Dissolved Oxygen (% saturation)<br>Chlorophyll-a (µg/L)      |

Sampling in the MEPA is conducted at five sites along an assumed contamination gradient, 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 performed at 5 sites located perpendicular to the prevailing current but at a distance of approximately 1500 m down-current of the sea-pens (**Figure 3-4**).

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





**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** against the legend shown in **Figure 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 that indicate a significant risk of not achieving the associated environmental quality objective (EQO) if they are not met. If they are met, the EQO is considered to have been met.




| Outcome   | Legend  |
|---|---|
| <b>Monitor:</b> EQS met (continue monitoring)             |  |
| <b>Action:</b> EQS not met (management response required) |  |


**Figure 4-1: Summary of the legend for the results of the 2023-2024 monitoring program.**

The results of the 2023-2024 monitoring program determined no adverse environmental effects could be attributable to farming operations in Cone Bay. Comparison of monitoring data with the EQC found the EQS were met and no further investigation was required.




Based on these results, it was concluded that there was no significant risk to the Environmental Quality Objectives in the 2023-2024 reporting period.





**Table 4-1: Summary report for marine water quality.**


| Indicator                          | EQS   | Result  | Outcome   |
|------------------------------------|---|---|---|
| Volatile Suspended Solids (VSS)    | <p>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 EQS is assessed based on the outcomes of two measurements:</p> <ul style="list-style-type: none"> <li>• The median VSS values at the HEPA and MaxEPA sites must be less than the 80<sup>th</sup> percentile of the reference sites, and</li> <li>• The diversity of sediment infauna must not be less than 50% (MEPA) or 80% (HEPA and MaxEPA) of the reference sites measured using the Shannon-Wiener Diversity Index (SWDI).</li> </ul> <p>While the median VSS values at some impact sites exceed the 80th percentile of the reference sites, average SWDI scores at the HEPA and MaxEPA.</p> |    | The EQS was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period.                       |
| Dissolved Inorganic Nitrogen (DIN) | <p>DIN is the aggregate of Ammonia, Nitrite and Nitrate. DIN in aquaculture wastewater is predominantly comprised of Ammonia, the most biologically available form of nitrogen.</p> <p>The EQG for DIN is assessed against the EPA's toxicity criteria for ammonia. The Median DIN concentration calculated from pooled sites after each sampling occasion and from individual sites after each season met the EQGs in the MEPA, HEPA and MaxEPA. Therefore, there was no further need to assess against the EQS for this criterion.</p>  |    | The EQG was met. There is a high degree of certainty that the environmental quality objective for a moderate level of ecological protection was achieved during the reporting period. |
| Dissolved Oxygen (DO)              | <p>Dissolved oxygen is assessed in bottom waters to determine the risk of persistent oxygen drawdown due to the accumulation of farm waste.</p> <p>To meet the EQG, dissolved oxygen values must be greater than 80% saturation within the MEPA and above 90% saturation in both the HEPA and MaxEPA. Ongoing monitoring determined there were no instances in which the median percentage saturation fell below these values.</p>  |  | The EQG was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period.                       |

| Indicator     | EQS  | Result  | Outcome   |
|---------------|--|---|---|
| Chlorophyll-a | To meet the EQS, the average Light Attenuation Coefficient (LAC) values at the impact sites over an eight-week period must be less than the average values at the reference sites, as determined by statistical analysis. Assessment against the EQS was completed in August 2024. |  | The EQS was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period. |

**Table 4-2: Summary report for marine sediment quality.**

| Indicator             | EQS   | Result  | Outcome   |
|-----------------------|---|---|---|
| Total Phosphorus (TP) | <p>The EQS for TP uses a 'multiple lines of evidence' approach and incorporates testing against the infauna, DO and visual thresholds. The EQS for TP – incorporating multiple lines of evidence - was assessed for the MEPA, HEPA and MaxEPA.</p> <p>1. To meet the EQS for a moderate level of ecological protection, the diversity of sediment infauna must not be less than 50% (MEPA) or 80% (HEPA and MaxEPA) of the reference sites measured using the Shannon-Wiener Diversity Index (SWDI).</p> <p>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.</p> <p>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.</p> | <br><br><br><br> | <p>The EQS based on three lines of evidence was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period.</p> |

| Indicator                       | EQS   | Result   | Outcome  |
|---------------------------------|---|--|--|
| Total Organic Carbon (TOC)      | <p>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.</p> <p>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.</p> <p>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%.</p> | <br><br><br><br><br><br><br><br><br><br>     | The EQS based on two lines of evidence was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved 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 met their respective EQGs and there was no need to assess against the EQS.  |   | The EQG was met, and there was no further need to assess against the EQS. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period. |
| Redox Discontinuity Layer (RDL) | <p>The EQS for RDL uses a 'multiple lines of evidence' approach and incorporates testing against the infauna and visual thresholds.</p> <p>1. To meet the EQS for a moderate level of ecological protection, the diversity of sediment infauna must not be less than 50% (MEPA) or 80% (HEPA and MaxEPA) of the reference sites measured using the Shannon-Wiener Diversity Index (SWDI).</p>   | <br><br><br><br><br><br><br><br><br><br> | The EQS based on three lines of evidence was met. Based on these results, there is a high degree of certainty that the environmental quality objective was achieved during the reporting period.                         |

| Indicator | EQS  | Result  | Outcome |
|-----------|--|---|---------|
|           | <p>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.</p> <p>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.</p> |  |         |

## 5 Audit Table

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

| Audit Code / Condition       | Section                                | Requirements   | Implementation  | Evidence                           | Timeframe  | Status    | Further Information |
|------------------------------|--|--|---|------------------------------------|--|-----------|---------------------|
| <b>MS 966 Condition 1.1</b>  | 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.<br><br>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 |                     |
| <b>MS 966 Condition 2.1</b>  | 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 |                     |
| <b>MS 966 Condition M3.1</b> | 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 |                     |
| <b>MS 966 Condition M3.2</b> | 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 |                     |
| <b>MS 966 Condition M4.1</b> | 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 |                     |
| <b>MS 966 Condition M4.2</b> | 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:<br>1. The frequency of compliance reporting;<br>2. The approach and timing of compliance assessments;<br>3. The retention of compliance assessments;<br>4. The method of reporting of potential non-compliances and corrective actions taken;<br>5. The table of contents of CARs; and<br>6. Public availability of CARs. | Submit Compliance Assessment Plan to CEO  | CAP                                | Submitted to the CEO                                       | Completed |                     |
| <b>MS 966 Condition M4.3</b> | 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 |                     |
| <b>MS 966 Condition M4.4</b> | 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 TG  | Annually and continued                                     | Compliant |                     |
| <b>MS 966 Condition M4.5</b> | 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 |                     |
| <b>MS 966 Condition M4.6</b> | Compliance Reporting                   | The proponent shall submit to the CEO and the Department of Primary Industries and Regional Development 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  |
|------------------------------|--|---|--|-----------------------------|--|-----------|--|
|                              |  | <ol style="list-style-type: none"> <li>1. Be endorsed by the proponent's Chief Executive Officer or a person delegated on the Chief Executive Officer's behalf;</li> <li>2. Include a statement as to whether the proponent has complied with the conditions;</li> <li>3. Identify all potential non-compliances and describe corrective and preventative actions taken;</li> <li>4. Be made publicly available in accordance with the approved compliance assessment plan; and</li> <li>5. Indicate any proposed changes to the compliance assessment plan required by Condition 4-1.</li> </ol>   |  |                             |  |           |  |
| <b>MS 966 Condition M5.1</b> | 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 TG website | Within a reasonable time period approved by the CEO        | Compliant | <p>The Annual compliance report will be posted on, and downloadable from: <a href="https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Aquaculture/Aquaculture%20Zones/Pages/default.aspx">https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Aquaculture/Aquaculture%20Zones/Pages/default.aspx</a></p> <p>Reports will also be made available upon request from members of the public who are unable to access the website.</p> |
| <b>MS 966 Condition M5.2</b> | Public Availability of Data                          | <p>If any data referred to in Condition 5-1 contains particulars of:</p> <ol style="list-style-type: none"> <li>1. A secret formula or process; or</li> <li>2. Confidential commercially sensitive information.</li> </ol> <p>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.</p>  | Submit request to CEO  | N/A                         | N/A  | Compliant |  |
| <b>MS 966 Condition M6.1</b> | 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 |  |
| <b>MS 966 Condition M6.2</b> | 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 |  |
| <b>MS 966 Condition M6.3</b> | Benthic Communities and Marine Environmental Quality | <p>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:</p> <ol style="list-style-type: none"> <li>1. Report such findings to the CEO within two working days of the exceedance(s) being identified;</li> <li>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;</li> <li>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</li> </ol> | <p>Notify the CEO within two working days;</p> <p>Investigate the likely cause of exceedance;</p> <p>Implement mitigation measures if determined necessary; and</p> <p>Continue implementing as required</p> | Notification to CEO         | Within two working days of the exceedance being identified | Compliant |  |

| Audit Code / Condition               | Section  | Requirements   | Implementation    | Evidence | Timeframe | Status    | Further Information |
|--------------------------------------|--|--|-------------------|----------|-----------|-----------|---------------------|
|                                      |  | <p>Zone Environmental Monitoring and Management Plan (Version 1, January 2014), or its revisions as approved by the CEO; and</p> <p>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.</p>   |                   |          |           |           |                     |
| <b>MS 966<br/>Condition<br/>M6.4</b> | Benthic Communities and Marine Environmental Quality | <p>The proponent shall submit to the CEO and the Department of Primary Industries and Regional Development annual CARs in accordance with Condition 4-6 and which includes:</p> <ol style="list-style-type: none"> <li>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;</li> <li>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</li> <li>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.</li> </ol> | Submit CAR to CEO | CAR      | Annually  | Compliant |                     |

## 6 Environmental Monitoring and Management Plan Compliance

Under the EMMP, TG is obligated to achieve the following EQOs:

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

The extent to which the EQOs have been achieved is assessed annually under the EMMP, including several proponent commitments. TG's compliance with the commitments is summarised in **Table 6-1**.

**Table 6-1: Summary of KADZ EMMP compliance (NA=Not Applicable).**

| Section of EMMP   | Commitments   | Status           |
|---|---|------------------|
| Section 2<br>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).  | <b>Completed</b> |
|   | Upon exceeding an Environmental Quality Guidelines (EQG) the operators will undertake an investigation against the Environmental Quality Standards (EQS).   | <b>Compliant</b> |
| Section 3<br>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.                                | <b>Completed</b> |
|   | 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 an investigation against the Environmental Quality Standards (EQS) within a timeframe agreed with DPIRD. | <b>Compliant</b> |
| Section 4<br>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.  | <b>Compliant</b> |
| Section 5<br>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.   | <b>N/A</b>       |
| Section 6<br>Decommissioning plan                                   | Should the operation be discontinued the aquaculture gear will be removed from the site.  | <b>N/A</b>       |
| Section 7<br>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.  | <b>Compliant</b> |

## 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

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