



**Red Tape reduction Working Group**

**ACWA SUBMISSION**

**4 May 2009**

## **ABOUT ACWA**

The Aquaculture Council of Western Australia (ACWA) is the State's peak aquaculture industry body.

ACWA's membership represents over 80% of both the current and future gross value of production of Western Australian aquaculture industry, and consists of Institutions, Corporations, Aquaculture Sector Associations and individual members. Most members are private businesses, all of which undertake their business in all regions of Western Australia.

## **INTRODUCTION**

Aquaculture is a high technology, high risk industry. Competition is worldwide and developing countries, such as, China proving to be a fierce competitor. Firms that enter aquaculture must be prepared to make significant investments not only in physical infrastructure, but also in technology development.

Government policy and regulation significantly affect the environment in which aquaculture investments are made. It is on this basis, the Aquaculture Council of Western Australia (ACWA) welcomes the Review as industry considers that there is considerable opportunity to improve effectiveness and efficiency of government regulation, policy and its continual improvement. This fact was acknowledged by the Productivity Commission (2004) which stated

*“Greater benefits may have been obtained by both the community and by industry from devoting government resources to improving the regulatory framework”.*

The inefficiencies in any regulatory and policy arrangements have the following effects on the industry, community and government:

### Industry

There is significant reduction in the ability of existing firms, to

- Expand
- Develop new product lines
- Obtain financing
- attract investment;
- Minimise costs; and
- At times, defend the reputation of their products.

### Community

- missed opportunities for economic activity and job creation
- efficient use of community resources in protracted decision making processes

### Government

- The uncertain regulatory and policy environment has impacts on government ability to meet its obligations in terms of prioritising resource use; and carrying out operational duties.

ACWA's submission is presented without prejudice, with the overriding objective to design an effective regulatory regime that will facilitate a world class aquaculture industry in Western Australia.

ACWA utilised the following principles to make its submission:

1. **Industry development** – that public policy will enable investment and enterprise development.
2. **Certainty** – for industry and the community. The basis for a competitive and sustainable industry in Western Australia which can generate significant investment and employment opportunities.
3. **Adaptive Management** - that the policy is supported by effective monitoring, review and appropriate management responses in order to improve performance against the objectives after each period of review t
4. **Transparency** – for all stakeholders. A regulatory regime which delivers clear lines of decision making and responsibility, and which is open, affective and efficient.
5. **Accountability** – of government and industry. A regulatory regime that ensures clear, effective and enforceable lines of accountability, which do not place undue burdens on industry.
6. **Streamlined** – creating an efficient and timely regime through greater coordination.
7. **Anticipatory** – placing the emphasis on early planning and coordination to prevent or mitigate problems before they occur;
8. **Integrating and complementary** - ensuring that environmental management and decision-making responsibilities are consistent and mutually reinforcing; and
9. **Parity** - The need to achieve equivalence with other jurisdictions and water users.

ACWA recommends that the Red Tape Working Group take into consideration the Keating review, in particular the following recommendations: 1,2,3,7,9,10,11,18,19,22, 24, 47, 50, and the Productivity Commission Research Paper “*Assessing Environmental Regulatory Arrangements for Aquaculture*” and incorporate the Aquaculture Committee’s benchmarking program.

ACWA submission is divided into four sections:

1. List of Recommendations
2. List of specific areas which are burdensome, complex or redundant
3. General Comments; and
4. Specific Comments

**List of Recommendations**

|                          |  |
|--------------------------|--|
| <b>Recommendation 1</b>  | Wholesale reform of the governments funding model to ensure that its creates incentives and rewards effectiveness and efficiency.                |
| <b>Recommendation 2</b>  | Regulatory gate-keeping unit is a commendable concept. This unit needs have the additional remit to reduce regulatory complexity and efficiency. |
| <b>Recommendation 3</b>  | Create of statutory time limits of 30 days for relevant decision makers, especially for EPA approvals.   |
| <b>Recommendation 4</b>  | Legislate for Continuous Improvement practices of government departments   |
| <b>Recommendation 5</b>  | Whole of government approach to aquaculture development - need for a State Aquaculture Policy  |
| <b>Recommendation 6</b>  | Need for Aquaculture Law Reform  |
| <b>Recommendation 7</b>  | Deregulation of Small scale Aquaculture business on freehold land.   |
| <b>Recommendation 8</b>  | Introduction of Category or Class(es) of Aquaculture Licences  |
| <b>Recommendation 9</b>  | Translocation Approvals – Introduction of Category or Class of translocation approvals   |
| <b>Recommendation 10</b> | Finalise the Deregulation from the DEC works Approval and Licence process  |
| <b>Recommendation 11</b> | Environmental approvals process reform   |
| <b>Recommendation 12</b> | Gazettal of aquaculture development zone on land and coastal waters  |
| <b>Recommendation 13</b> | Provision of Online reporting and application systems.   |
| <b>Recommendation 14</b> | Risk and Outcome focused Licence Conditions  |

**List of specific areas which are burdensome, complex or redundant**

Please find a list of specific areas which are burdensome, complex or redundant and should be removed as a matter of priority.

| <b>Regulation to Modified</b>  | <b>Classification of regulatory Risk</b> | <b>Classification of Priority</b> | <b>Agency Responsible</b>           |
|--|--|-----------------------------------|-------------------------------------|
| Multiple, outcome based environmental impact licence conditions for aquaculture operations.                            | Burdensome and complex                   | 1                                 | EPA and DEC EPA assessment division |
| Environmental approvals process reform   | complex and uncertain                    | 1                                 | EPA                                 |
| Deregulation of Prawns and finfish as a prescribed premise, under Part IV of the <i>Environmental Protection Act</i> . | Redundant                                | 1                                 | DEC                                 |
| Enable the provision of online statutory reporting and applications.   | Burdensome and inefficient               | 2                                 | DoF                                 |
| Introduction of Category or Class of Aquaculture Licences  | Burdensome and redundant                 | 2                                 | DoF                                 |
| Introduction of Category or Class of translocation approvals   | Burdensome and redundant                 | 2                                 | DoF                                 |

**Legend:**

1 = Short term Priority, Urgent

2 = Medium term Priority, Important

EPA = Environmental Protection Authority

DEC = Department of Environment and conservation

DoF = Department of Fisheries

## General Comments

### Key Points and Recommendations

1. De-regulation in the aquaculture industry is required and overdue, as the current regulatory arrangements are too complex, disproportionate to the risk being managed and create significant regulatory duplication.
2. Wholesale reform of the governments funding model to ensure that it creates incentives and rewards effectiveness and efficiency.
3. Regulatory gate-keeping unit is a commendable concept. This unit needs have the additional remit to reduce complexity or create simplicity in regulation(s). Ultimately, there needs to be develop a business culture in government of reducing regulatory complexity and creating the minimum effective regulation.
4. Create of statutory time limits of 30 days for relevant decision makers, especially for EPA approvals, is required.
5. Legislate for Continuous Improvement practices in all statutes.

#### 1. De-regulation of the Aquaculture Industry

De-regulation in the aquaculture industry is required and overdue, as the current regulatory arrangements are too complex, disproportionate to the risk being managed and create significant regulatory duplication.

The productivity commission in their inquiry into the Australian aquaculture industry also emphasized the need to reduce red tape and reporting burdens on the industry. The productivity commission report found that excessive and restrictive levels of regulation currently imposed on the industry are a major limiting factor to the industries growth.

As a result the commonwealth government and all of the state and territory governments agreed through the Australian aquaculture action policy that they would actively seek to remove duplication in regulation and where possible change the nature of the regulation from being “prescriptive” to “outcomes based”.

To date the WA state government has implemented minimal reform.

#### 2. Wholesale reform of the Government Appropriations model

The current budgetary process creates significant reward or incentives for government departments to create complexity and inefficiency. To create systemic reform needed, will require the wholesale reform of the government appropriations model, and would have to be subject of a separate working group or inquiry.

#### 3. Additional Remit for the Regulatory gate keeping Unit

ACWA supports the formation of the Regulatory gate keeping Unit. This unit needs have the additional remit to reduce complexity or create simplicity in government regulation(s). Ultimately, there needs to be develop a business culture in government of reducing the complexity to create the minimum effective regulation or effect co-management<sup>1</sup> arrangements with industry.

#### 4. Statutory Timeframes

Legal reform is required to create absolute certainty in the approval process. This can only be achieved through the introduction of statutory timeframes.

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<sup>1</sup> Co-management: Either informal or legal arrangements between government representatives, community groups and other user groups, to take responsibility for, and manage, a fishery resource and/or its environment on a cooperative basis. In this case, industry takes on more responsibility, as in the safety case in the oil and gas industry.

## Background

There is a strong market signal for aquaculture in Western Australia, the EPA and DEC needs, as a matter of public interest, to prepare systems that will allow decision making over a reasonable period of time and create certainty.

The current delays place aquaculture projects at risk, as the capitalization of aquaculture businesses are geared for assessments being made over a reasonable period, but not the lengthy delays being experienced.

Historically, the regulation and policy that has governed aquaculture has not been the only impediment to development, but rather the speed in which they are administered<sup>2</sup> (see also Appendix 1 for summary of two case studies). These time delays do not serve the applicant, or the public good. It is on this basis, there is a need for the implementation of mechanism(s) that improve government's project management and accountability.

Pilot commercial scale aquaculture take years to get their projects to the start line. This significant opportunity cost to the State, the business and the capital invested, and is not commensurate with the risk of the projects of this scale. The primary reason for the delays is a direct consequence of the environmental approvals process. This is despite the productivity commission report, Keating review and the EPA approval process reform.

Since 2005, WA aquaculture industry has been working with Department of Fisheries, EPA assessment division to create a range of policy and administrative arrangements to increase the level of certainty in the EPA approval process.

These measures have included the following:

- Secondment of Fisheries staff to EPA assessment division to undertake aquaculture assessments.
- Undertake of risk assessment of the sector (Source: <http://www.fish.wa.gov.au/docs/mp/mp229/fmp229.pdf>)
- Develop an industry environmental management code of practice
- Create new government policy and guidelines on:
  1. the minimum standards on Environmental Management and Monitoring Plans
  2. the minimum standards on scoping, PER, EMRP documents
- Deregulation of the aquaculture as a prescribed premise, under part IV, EPA
- Law reform to enable aquaculture development zoning.
- Create administrative arrangements between EPA and DoF on the assessment of "small scale" aquaculture projects.
- Undertake carrying capacity research to demonstrate the industry's ability scale up without area or regional impacts, and to assist in the zoning of aquaculture development sites.

Ultimately, the above will result in a comprehensive and transparent process. This process however, will costly to administer, and may provide greater certainty in decision maker timeframes. It is on this basis, to benefit on statutory timeframes needs to independently reviewed by the regulatory gate-keeping unit

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<sup>2</sup> *Case Aquaculture leases.*

An example of the delays encountered with the issuing of aquaculture leases. To date, the industry has waited 6 years since gazettal of the FRMA amendments that enable leases to be issued. This degree of slippage in timeframes is an impediment to development, and places in to question the government's commitment to aquaculture industry development. For other examples please refer to Appendix 2.

#### Note on the acceptance of peer Reviewed Science from other jurisdictions

The EPA assessment division is information driven. WA aquaculture is a new and emerging industry; first party information and research on its environmental impacts is therefore limited. It is on this basis, the DEC often places extensive baseline and environmental monitoring regimes on the proponent. These are in disincentive to do business in WA, as they are incommensurate with the projects sustainability risk, based on peer reviewed science and the experience from other national and international jurisdictions, which carry little weight by EPA assessment division in the determination of advice to the EPA.

#### **5. Legislate for Continuous Improvement practices.**

There is a need to include the following section that details the Efficient Administrative practices, in *Fisheries Resource Management Act* and other statutes

*New Section: Efficient administrative practices*

(1) The Minister and other [relevant Ministers](#) are to endeavour to ensure that practices are established to integrate and expedite administrative processes under [this Act](#) and other Acts so far as is practicable for the efficient and effective regulation of the fishing and aquaculture industry.

(2) Directions may be given by a [relevant Minister](#) for the purposes of subsection (1) that will be binding (according to their terms) on a body or persons engaged in the administration of an Act for which the [relevant Minister](#) has responsibility.

(3) However, this section is not to be taken to authorise a direction that would be inconsistent with a provision of this or another Act or that would govern the nature of a decision that may be made under an Act (as distinct from the processes leading up to the making of a decision).

(4) In this section— "relevant Minister" means a Minister responsible for the administration of an Act that has application in relation to fishing and aquaculture.

## Specific Comments

Effective regulation is essential to ensure markets operate efficiently and fairly, to protect the public and the environment. However, the benefits must not be offset by unduly high compliance and implementation costs. Currently, aquaculture projects are experiencing undue delays in the processing of their applications, due to excessive and complex government regulation.

Overall, there is a range of systemic issues in the Pre-approval, Approval and Post-approval phases that result in additional costs due to uncertainty and inefficiency. The following recommendations will be categorized into the aforementioned phases.

### **Key Points & Recommendations**

#### **Pre Approval Phase**

- 6. Whole of government approach - State Aquaculture Policy**
- 7. Aquaculture Law Reform**
- 8. Deregulation of Small scale Aquaculture business on freehold land.**
- 9. Introduction of Category or Class of Aquaculture Licences**
- 10. Translocation Approvals – a systematic approach.**
- 11. Deregulation from the DEC works Approval and Licence**

#### **Approval Phase**

- 12. *Gazettal of aquaculture development zone on land and coastal waters***

#### **Post Approval Phase**

- 13. Minimal Use of Online reporting and application systems.**
- 14. Outcome focused Conditions**

### **Pre-Approval Phase**

#### **6. Whole of government approach - State Aquaculture Policy**

The limited expansion of the WA aquaculture industry is symptomatic of the absence of a whole of government approach to aquaculture development. Although the establishment of the de facto "one stop shop" for aquaculture development in 1997 was intended to put into place an integrated business approvals package, the 'integration' which took place at the time was largely cosmetic. The process established by the *Ministerial Policy Guideline No 8 (PG8)* utilises the principles of administrative law. These principles provide for a comprehensive and transparent process. This process is costly to administer, and in a significant number of cases the process has not adhered to stipulated timeframes.

This can easily be remedied by State Policy Statement on the importance and its commitment to aquaculture's ongoing development, and would better able the industry implement the fundamentals of tenure, aquaculture site allocation/zoning and infrastructure provision.

Without a whole of government approach to the development of a properly integrated business approvals package underpinned by regulatory reform, many of the problems with the existing regulatory and management processes will not be resolved. It would be preferable for a whole of government review to be conducted to expedite the process and to ensure that the full range of issues are canvassed.

The current and future development of the aquaculture industry in Western Australia depends upon a degree of reform, but more importantly the effective use of the existing regulatory and management regime for the industry.

## 7. Aquaculture Law Reform

The preferred position of ACWA is that separate legislation is required in Western Australia for the aquaculture industry.

This position is supported by two independent reviews (Lendich 2004, and Ciffolli, 1994).

ACWA understands that the need for separate legislation was also recommended by the Report of the FRMA Review Committee and the Report of the Aquaculture Bill Task Force, of which the latter, (we understand), included considerable evidence as to why aquaculture cannot be managed within a legislative framework designed principally for the management of a natural resource.

### Considerations on Which the Position of ACWA is based

The ACWA considered the following in the development of its position;

- The legislation in the Fish Resources Management Act reflects the title; it is an Act for fish resources management. The Act, and consequently the department, has a focus on fishing and fish processing management, wild catch fishery research, license administration, the regulation of licensees, and compliance and penalties.
- Aquaculture has been clearly defined throughout the world, not as a resource, but as a food producing primary industry. Appropriate legislation for aquaculture, and the culture of the administering body, thus needs to reflect this definition.
- For an industry to be given the appropriate recognition and succeed, it must be administered by its own regulatory regime, e.g., the only WA aquaculture industry which has prospered is the pearl industry and that has its own Act.
- Because the focus in the FRMA, and in the Department of Fisheries, is on wild catch fisheries there are few persons working in the Department that have a significant background in aquaculture or primary industry management.
- Without separate legislation for the aquaculture industry, this new and growing primary industry will continue to be considered as a subset of the wild catch fishing industry, an industry which is mature and declining, and continue to expose aquaculture to an administrative and research culture that reflects the status of the wild catch fisheries.

There have been two reviews of the regulation and management of aspects of the aquaculture industry in Western Australia undertaken over the past five years (Ciffolli 2003, Lendich 2003). The enactment of a separate Act regulating all aspects of aquaculture currently administered under multiple Acts and portfolios is a matter which has been raised in both of these reviews.

The issues raised by aquaculture, particularly marine aquaculture, are unique and require regulation specifically designed to address and manage the issues which arise from fish farming operations. The achievement of a truly integrated business approvals package, together with public confidence in the management of the industry, must be underpinned by the development of appropriate regulatory mechanisms.

Given the range of legislation currently regulating aquaculture in Western Australia that the development of an effective regulatory package would best be done through separate legislation specifically designed for aquaculture. Such legislation needs, among other things, to specifically address the issues of marine and inland aquaculture planning as distinctive planning issues, and to provide for an independent and transparent tenure allocation process.

## **8. Deregulation of Small Scale Aquaculture Businesses on Freehold land.**

There is considerable scope for self regulation of large number of small, low impact sectors, for example, marron, yabbies, small finfish operations. As done in Queensland. For more details [http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/30\\_11191\\_ENA\\_HTML.htm](http://www.dpi.qld.gov.au/cps/rde/dpi/hs.xsl/30_11191_ENA_HTML.htm)

It is on the above basis, ACWA recommends the deregulation of small scale inland aquaculture (marron, trout, silver perch, and Recirculation Aquaculture systems only) from the requirement to hold an aquaculture licence.

## **9. Introduction of Category or Class of Aquaculture Licences**

Currently, aquaculture licences are issued on a species by species basis. This is the equivalent of a liquor licensee holding a licence that details each brand o of alcohol served at a licenced premise.

The introduction of Classes or Category of aquaculture licences will create significant efficiencies and would enable the business owner greater flexibility to respond to market signals. With some basic public policy or regulation or self assessment guidelines may be required to ensure high risk activities where properly regulated.

## **10. Translocation Approvals – a systematic approach.**

The introduction of flexibility in the translocation approval arrangements i.e. creates options for classes of production systems, for example, bio-secure facility.

The aquaculture industry needs access to high quality brood and fingerling stock (“stock”) to enable it to enhance its competitiveness. In aquaculture, as in conventional livestock farming, selective breeding programs are used to generate better performing stocks.

The translocation of stock is being delayed by a lack of sophisticated risk management approach for introductions and transfers. For industry, this has resulted in delayed and inconsistent decisions and impaired competitiveness. In many cases, the current implementation of policy leads to delayed decisions and multiple review of a single request.

### **11. Finalise the Deregulation from the DEC works Approval and Licence**

Currently, there is the requirement for both DEC works approval and license, and Fisheries aquaculture licence (for prawns and fish). The two approvals regulate the same set of risks. In 2005, it was agreed, following the Keating review, to deregulate prawn and finfish operations, prescribed premise, under Part IV of the *Environmental Protection Act*.

The above deregulation needs to be completed, as a matter of priority.

### **Approval Phase**

#### **13. Gazettal of aquaculture development zone on land and coastal waters**

ACWA seeks gazettal of aquaculture development sites on land and coastal waters.

There is genuine need for forward planning for development sites that simplifies site access and gains pre-approvals for operators<sup>3</sup>. Aquaculture, is a small user of the finite resources, such as land and water<sup>4</sup>, and provides significant regional development and return on allocation per unit area.

There is considerable competition for the use of public waters among various groups. Integrated coastal zone management (ICZM) is one means whereby long term, balance decisions could be made on the use of coastal and open seas, including use for aquaculture and enhancement purposes. The timeframe for implementation of an effective mechanism for ICZM, however, is lengthy. To meet current need for the aquaculture industry, waiting for a system of coastal zone management to be implemented is not acceptable.

It is on this basis, the government needs to utilize existing legislation that caters for the establishment of aquaculture development zones.

### **Post-Approval Phase**

#### **14. Minimal Use of Online reporting and application systems.**

Currently the department of Fisheries does not permit the electronic lodgment of statutory forms or reports. This creates inefficiency both for the government and industry.

Proponents need to be able to e-lodge applications, production returns, environmental management report, payments and application progress monitoring. This will ensure efficiency gains through the removal of double handling of data.

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<sup>3</sup> This links with Lendich recommendations 1, 10 & 11 and Keating Review recommendation No.47 that states Government should undertake strategic planning for development sites on a regional basis. Government should encourage development projects and industries to locate where there are fewer environmental and social constraints by the greater use of strategic level EPA assessments, strategic planning for industrial estates, and regional environmental management plans. These plans should be made available to potential developers as a basis for development so that developers could expect approval so long as their proposal complied with the plans. This planning should be undertaken within the State Sustainability Strategy framework.

<sup>4</sup> Currently, only 0.00092 of the coast is licenced for coastal and marine aquaculture, with a potential annual GVP \$200 million.

## 15. Risk and Outcome based Aquaculture licence conditions

The conditions need to be both risk and outcome based, and commensurate with the stage of the enterprises development.

An example, of this is licence conditions used manage the same environmental outcome. Currently, the State uses at least one licence condition (see condition 5-3-1 to 5-3-3, which refers to the “outcome”, and table 1- “*Expected barramundi production*” and “*feed input*” refers to the extra regulations to manage the same risk”).

- 5 Sediment and Water Quality Monitoring**
- 5-1 The proponent shall prepare and conduct a Sediment and Water Quality Monitoring Program to the requirements of the Department of Environment and Conservation.
- 5-2 The Sediment and Water Quality Monitoring Program required by condition 5-1 shall include the monitoring of the following parameters within the water column, sediment or both:
1. chlorophyll-a;
  2. light attenuation co-efficient;
  3. dissolved nutrients;
  4. dissolved oxygen; and
  5. redox discontinuity,
- at the reference sites (Table 2 of schedule 1) and appropriate sites within the “moderate”, “high” and “maximum” zones of ecological protection (Figure 1 of schedule 1).
- 5-3 The proponent shall continually demonstrate that:
1. Within the zone of Moderate Ecological Protection (shown in Figure 1 of schedule 1), the proponent shall achieve median results no greater than the 95<sup>th</sup> percentile and no less than the 5<sup>th</sup> percentile (no less than 60% saturation of dissolved oxygen) guideline ‘trigger’ levels of normal distribution for the parameters mentioned in condition 5-2 from the reference sites (Table 2 of schedule 1).
  2. Within the zone of High Ecological protection (shown in Figure 1 of schedule 1), the proponent shall achieve median results no greater than the 80<sup>th</sup> percentile and no less than the 20<sup>th</sup> percentile (no less than 60% saturation of dissolved oxygen) guideline ‘trigger’ levels of normal distribution for the parameters mentioned in condition 5-2 from the reference sites (Table 2 of schedule 1).
  3. Within the Zone of Maximum Ecological Protection (shown in Figure 1 of schedule 1), the proponent shall detect no changes from the normal distribution of the reference sites (Table 2 of schedule 1) for the parameters mentioned in condition 5-2.
- 5-4 In the event that a guideline “trigger” level referred to in condition 5-3 is exceeded, the proponent shall report the matter to the Department of Environment and Conservation within one working day of determining that

Table 1: Summary of key proposal characteristics

| Element   | Description  |
|---|--|
| <b>General</b>  |  |
| Life of Project   | <ul style="list-style-type: none"> <li>Increase production over 3 years to a maximum of 1000 tonnes per annum</li> <li>Ongoing</li> </ul>  |
| Location  | <ul style="list-style-type: none"> <li>Aquaculture Licence Site 1465, Cons Bay, Buccaneer Archipelago, Western Australia, ~21.5km NNE of Broome</li> </ul>   |
| Species Cultured  | <ul style="list-style-type: none"> <li>Barramundi (<i>Lates calcarifer</i>)</li> </ul>   |
| Expected Barramundi production  | <ul style="list-style-type: none"> <li>1,000 tonnes per year maximum</li> </ul>  |
| Sea Cage characteristics (mesh size, net type) <ul style="list-style-type: none"> <li>Nursery</li> <li>Grow out</li> </ul>  | <ul style="list-style-type: none"> <li>Polyester knotless with mesh ranging between 6 &amp; 10mm</li> <li>Outer net- 3.2mm galvanized steel wire or high density polyethylene (HDPE)</li> <li>50mm HDPE or nylon bird exclusion nets</li> <li>HDPE floatation device, handrail and strachion</li> <li>Nets of 2 different types will be utilized: 1 x 25mm (2.5mm gauge); 1 x 32mm (3.2mm gauge) constructed of marine wire</li> </ul> |
| Feed input <ul style="list-style-type: none"> <li>Source</li> </ul>   | <ul style="list-style-type: none"> <li>1,500 tonnes per year maximum</li> <li>Sinking pellets from an Australian feed manufacturer</li> </ul>  |
| Waste produced (Nitrogen and Phosphorous in solid and dissolved form) <ul style="list-style-type: none"> <li>Maximum (based on Feed Conversion Ratio of 1.5)</li> </ul> | <ul style="list-style-type: none"> <li>238 kilograms per day maximum</li> </ul>  |

kg/m<sup>3</sup> = kilograms per cubic metre

Figure and Table (attached)

Figure 1: Zones of ecological protection

Table 2: Reference sites for determination of Environmental Quality Guidelines (EQG)

The outcome sought by the State is zero impact outside of the licenced area. This State manages this risk by the proponent implementing an Environment Impact Monitoring Plan. In addition, the State is a place additional conditions a total tonnage and feed limit on the farm (see above).

The effect of the two additional conditions is to create an artificial cap on the production per environmental impact signal.

Ideally, the regulator needs rely on the demonstrated environmental impact signal alone. This approach will maintain environmental protections and create incentives for the business to capture productivity gains by increasing economies of scale and feed efficiencies.

The above case is symptomatic of prescriptive licence conditions, and significantly increases the compliance cost to industry and reduces productivity. It is on this basis, as such, needs to be **independently reviewed by the regulatory gate-keeping unit to ensure minimum effective regulation is achieved.**

**Appendix 1: Environmental approval case history**

## Attachment 1: Case History of Environmental Approvals for WA Marine aquaculture projects

|                              | <b>Company X</b>  | <b>Company Y</b>  |
|------------------------------|---|---|
| <b>Zoning</b>                | Subject to Aquaculture licence the second site has been applied for.  | Subject to Aquaculture licence  |
| <b>Aquaculture Licence</b>   | Yes<br>After a 60 day public consultation period  | Yes<br>After a 60 day public consultation period  |
| <b>Project biomass Scale</b> | 1000 tonnes – pilot commercial  | 200 tonnes - pilot commercial   |
| <b>Case History</b>          | <p>The process to obtain a 1,000t licence began 3 years ago.</p> <p><b>October 2001</b> - DoF approval to grow barramundi in a recirculation land based system.</p> <p><b>June 2002</b> - DoF granted an exemption to grow 1t in sea cage.</p> <p><b>June 2003</b> - DoF variation and DEC works approval licence to grow 15t.</p> <p><b>May 2005</b> - variation to DoF and DEC licence submitted to increase licence to 150t. Scoping document submitted to EPA.</p> <p><b>November 2005</b> - approvals granted. Proposal "not assessed - public advice given" by EPA.</p> <p><b>February 2006</b> - contact with DEC, DoF and EPA regarding variation to cone bay licence to increase production to 1,000t. Scoping document submitted to EPA. DoF did not require variation to licence as considers previous licence as commercial. DEC not able to issue licence until EPA approval is gained.</p> <p><b>October 2006</b> - scoping document revised and re-submitted.</p> <p><b>December 2006</b> - scoping document revised and re-submitted. scoping document approved 15th</p> <p>December 2006. Formally assessed - 4 week public environmental review period.</p> <p><b>April 2007</b> - 1st draft of per submitted to EPA.</p> | <p>The process to obtain a 200t licence took three years.</p> <p><b>June 2002</b> Applied for aquaculture licence- Yellow fin tuna, based on a scoping document. The project scale was 200mt.</p> <p>Companies spent significant capital and 12 months on extensive consultation process.</p> <p><b>September 2002</b>- the company referred the application to the EPA for assessment.</p> <p><b>September 2003</b> – EPA set an assessment of Referral Information assessment.</p> <p><b>June 2004</b> - Fisheries WA 5 year licence to conduct 200t trial from Aug 04 (8 x40m cages).</p> <p>Environmental Monitoring was extensive in first year based on stakeholder expectations, approx \$450k (2004) and open to public assessment at completion.</p> <p>The Company deferred investment decision based on export market conditions, exchange rates, purse seining risks and other factors relating to the short term nature of the approvals and ongoing access risks.</p> <p><b>July 2007</b> – applied for section 45 C to amend their proposal. The proposal was to vary the species to be cultivated.</p> <p>Conservation Council and other experts consider this, due to non-use of bait fish, would reduce the environmental; impacts of the project. The assessment section was of a different view.</p> <p><b>October 2007</b> – DEC marine assessment section sought further information.</p> |

|  |   |   |
|--|---|---|
|  | <p>The Company deferred its application to focus its limited resources on separate application for Crawford bay.</p> <p><b>February 2008</b> - per revised and re-submitted.</p> <p><b>April 2008</b> - final copy of per submitted to EPA. Advertising followed.</p> <p><b>July 2008</b> - the company respond to submissions.</p> <p><b>September 2008</b> - the company responded to submissions (2).</p> <p><b>November 2008</b> - changes to zones of influenced received from EPA.</p> <p><b>December 2008</b> - report and recommendations of the EPA received. Advertised and sent to interested parties.</p> <p><b>December 2008</b> - the company responded to appeals.</p> <p><b>March 2009</b> - appeals convenor office writing report for minister.</p> | <p><b>Jan 2007</b> – no approval has been provided to the Department of Fisheries. It is on this basis, an aquaculture licence cannot be granted. ACWA and the company had advocated for a decision to be made.</p> <p><b>Feb 2008</b>– EPA approval was provided on the s45c</p> <p><b>May 2008</b> – Aquaculture Licences was granted.</p> <p><b>January 2009</b> – Environmental Management and Monitoring Plan.</p> |
|--|---|---|

**Appendix 2: History of the Aquaculture regulatory and public policy reform**

| <b>public policy</b>  | <b>completion date set by the department of fisheries and/or minister for fisheries</b>   | <b>Has the public policy been completed yet?</b> |  |
|---|---|--|--|
| <b>Property Rights</b>  |   |  |  |
| 1. aquaculture leases (deed, policy paper, fee& charges and bonds)  | 30 June 2004  | No.  |  |
| 2. Aquaculture license terms that are concurrent with lease term.   | 30 June 2005  | No.  |  |
| 3. registration of aquaculture lease with dept. of land information   | 30 June 2004  | No.  |  |
| 4. new site identification, zoning and vesting under the minister for fisheries   | 1. <i>abalone</i> (October 2001)<br>2. temperate & tropical large scale sites (November 2003)<br>3. <i>ADC study</i> (30 June 2006) | No.<br><br>yes<br><br>No.                        |  |
| <b>Improved regulatory efficiency</b>   |   |  |  |
| 5. Review of the aquaculture licence conditions to ensure that the industry has standard conditions that are risk and outcome based.  | May 2004  | Partial completion. Two of six sectors.          |  |
| 6. Standard minimum environmental monitoring plans for each sector.   | May 2004  | No.  |  |
| 7. deregulation of prawn & finfish as prescribed premises under the environmental protection act  | 30 June 2005  | No.  |  |
| 8. Co-opting of fisheries staff to dept of environment & conservation to educate and development business systems that reduces assessment and decision making times.        | Feb. 2007   | Yes  |  |
| 9. Review of the minister policy guideline no. 8: <i>assessment of applications for authorizations for aquaculture and pearling in coastal waters of Western Australia.</i> | 30 June 2005  | No.  |  |
| 10. review of the translocation policy  | 30 June 2006  | No.  |  |
| 11. online production & environmental production returns  | august 2001   | No.  |  |
| 12. fish resources management act amendment bill  | 30 June 2007  | in progress                                      |  |

| <b>Policy frameworks for new industry sectors.</b>        |  |  |  |
|---|--|--|--|
| 13. price reduction for Broodstock exemptions             | Feb. 2004                                  | Yes  |  |
| 14. Bio-prospecting interim policy & application process. | December 2007                              | No.  |  |
| 15. coral, live rock & live sand aquaculture              | October 2004.<br>revised in august<br>2007 | Revised<br>completion<br>date 30 June<br>2009.                 |  |
| 16. Marron aquaculture umbrella licence                   | 30 June 2005                               | No. A single<br>exemption has<br>been issued.<br>In June 2007. |  |
| 17. Murray darling species translocation policy           | September 2003                             | No.  |  |
| 18. bio-security facility policy                          | august 2004                                | No.  |  |
| <b>aquaculture plans</b>                                  |  |  |  |
| 19. shark bay aquaculture plan                            | July 2004                                  | No.  |  |
| 20. Exmouth gulf aquaculture plan                         | July 2004                                  | No.  |  |
| <b>industry reporting to the community</b>                |  |  |  |
| 21. ESD reporting for finfish                             | 20 June 2005                               | October 2008   |  |
| 22. ESD reporting for prawns                              | 20 June 2005                               | No.  |  |
| <b>other</b>  |  |  |  |
| 23. biosecurity agriculture management regulations        | 30 June 2008                               | No.  |  |

Appendix 3: Report and recommendations of the Environmental Protection Authority

# **1,000 Tonnes Per Year Production Of Barramundi In Cone Bay, Shire Of Derby-West Kimberley**

---

**Maxima Pearling Company Pty Ltd**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
Report 1305  
November 2008**

### **Environmental Impact Assessment Process Timelines**

| <b>Date</b>     | <b>Progress stages</b>  | <b>Time<br/>(weeks)</b> |
|-----------------|---|-------------------------|
| <b>05/06/06</b> | <b>Level of Assessment set (following any appeals upheld)</b> |                         |
| <b>21/04/08</b> | <b>Proponent Document Released for Public Comment</b>         | <b>98</b>               |
| <b>19/05/08</b> | <b>Public Comment Period Closed</b>                           | <b>8</b>                |
| <b>11/09/08</b> | <b>Final Proponent response to the issues raised</b>          | <b>16</b>               |
| <b>24/11/08</b> | <b>EPA report to the Minister for the Environment</b>         | <b>11</b>               |

Report Released: 24/11/08

Appeals Close: 08/12/08

ISSN 1836-0483 (Print)

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Assessment No. 1642

## Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by Maxima Pearling Company Pty Ltd (MPC) to produce 1,000 tonnes per year of Barramundi (*Lates calcarifer*) in Cone Bay.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the *Environmental Protection Act 1986*.

### Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Site Selection – Cone Bay;
- (b) Marine Ecology – Benthic Habitat; and
- (c) Marine Water Quality.

There were a number of other factors which were very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- (a) the principle of the conservation of biological diversity and ecological integrity;  
and
- (b) the principle of waste minimisation.

### Conclusion

The EPA has considered the proposal by Maxima Pearling Company Pty Ltd to produce 1,000 tonnes per year of Barramundi in Cone Bay.

With regard to location the EPA concludes that Cone Bay is a suitable site for an aquaculture operation to be undertaken given its natural hydrological characteristics. It is generally expected that the food and faeces associated with the 1,000 tonnes per year production can be assimilated within Cone Bay.

While food and faeces have the potential to cause nutrient accumulation in sediment and the water column, the proposal can be managed to maintain environmental quality objectives. Three levels of ecological protection (moderate, high and maximum) which defines the limit of acceptable change from natural conditions have been set in and around the proposal area in relation to the Environmental Quality Objective (EQO) “Maintaining Ecosystem Integrity”. A level of moderate protection (moderate changes from natural variation) has been assigned around the sea cage grid systems, a level of high protection (some small changes from natural variation) has been assigned outside of the immediate area of impact and a level of maximum protection (no detectable change from natural variation) has been assigned for most of the waters of Cone Bay surrounding the proposal. The zones of ecological protection will be monitored with management including proper feeding regimes, fallowing and destocking of cages being implemented to ensure these zones of ecological protection are maintained.

The EPA has therefore concluded that it is unlikely that the EPA’s objectives would be compromised provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4 and summarised in Section 4.

### **Recommendations**

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for the culture of 1,000 tonnes of Barramundi per year in Cone Bay.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA’s objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent’s commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

### **Conditions**

Having considered the proponent’s commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Maxima Pearling Company Pty Ltd to culture 1,000 tonnes of Barramundi per year in Cone Bay is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (a) standard conditions for proponent nomination, time limits for approval, compliance reporting; and
- (b) water quality monitoring and management to meet agreed levels of ecological protection.

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## **Appendices**

- 1. List of submitters
- 2. References
- 3. Summary of identification of key environmental factors
- 4. Recommended Environmental Conditions
- 5. Proponent’s Consolidated Commitments
- 6. Summary of submissions and proponent’s response to submissions

# **1. Introduction and background**

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by Maxima Pearling Company Pty Ltd to produce 1,000 tonnes per year of Barramundi (*Lates calcarifer*) in Cone Bay, Western Australia.

Cone Bay and the surrounding waters of the Buccaneer Archipelago are of distinct environmental and historical significance and accordingly, the development of a new industry in such an environment needs to be carefully considered.

The proposal being considered is the expansion of the existing Department of Fisheries (DoF) aquaculture licence No. 1465. This licence currently operates at a maximum production of 150 tonnes of Barramundi per year and the proponent is seeking to increase production to 1,000 tonnes per year. A maximum of 20 grow out cages and 8 nursery cages will be utilised to achieve maximum production.

This proposal was assessed as warranting a formal assessment in accordance with the *Environmental Protection Act 1986* (EP Act). The Level of Assessment was set as Public Environmental Review (PER) with a four week review period. The PER was released for public review on the 21 April 2008 and submissions closed on 19 May 2008. The proposal is considered to be of regional significance and raises a number of significant environmental factors. The EPA considers that such proposals should be subject to a formal review period, and the setting of environmental conditions under Part IV of the EP Act to ensure they are implemented and managed in an environmentally acceptable manner. Issues relevant to this project include the marine ecology of the benthic habitat and water column, specifically, management of nutrients and suspended solids discharged.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The Conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 6 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

## **2. The proposal**

The proposal is to utilise aquaculture techniques to produce a maximum of 1,000 tonnes of Barramundi per year in Cone Bay. Cone Bay is within the Buccaneer Archipelago approximately 215kilometres (km) north-northeast of Broome in the North-West of Western Australia (Figure 1). Cone Bay is approximately 20km long and 6.5km wide near its west-facing opening and is fringed by sandstone cliffs on

both sides. The existing aquaculture site (licence No. 1465) encompasses approximately 700 hectares of the bay (Figure 2 and Table 2).

The proposal is to increase the production of Barramundi from 150 tonnes per year into a commercialized venture with production of 1,000 tonnes per year. The infrastructure required to achieve this will consist of a nursery sea cage system with up to eight 6m (length) x 6m (width) x 5m (depth) square cages and a grow-out sea cage system with up to 20 polar circle sea cages ranging from 40-80m circumference (Figure 3).

Fingerlings will be sourced from accredited hatcheries and all disease translocation protocols and requirements associated with the transport of Barramundi will be strictly adhered to. The fingerlings will be retained in the nursery cage system until they reach a minimum of 160mm and a maximum of 250mm before being transferred into the grow-out cage system. It is intended to stock the nursery cage system at an average density of 10 to 15kg per cubic metre to a maximum of 20kg per cubic metre. The average stocking density of the grow-out cage system will range between 15 to 20kg per cubic metre and will not exceed 60kg per cubic metre.

The fish will be fed an Australian manufactured sinking pellet ranging in size from 4.0mm to 11.0mm dependent on the average size of the fish within the cage at each given time. Harvesting will be conducted using a seine net and fish pump or wet brail. The fish will be pumped whole into large slurry bins with lids and transported to the Port of Derby by a suitable vessel.

All staff will be accommodated utilising the existing infrastructure on Turtle Island and will commute by boat to the aquaculture site, which encompasses the island, on a daily basis. Turtle Island is an operational work base for pearling and aquaculture ventures within Cone Bay where housing and work facilities are already in existence. The land based facilities will be used for staff accommodation, initial rearing of fingerlings and storage of hazardous products such as diesel and unleaded fuel.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 2.3 of the Public Environmental Review document (Maxima Pearling Company Pty Ltd, 2008).



Environmental Protection Authority  
**Locality Map**



**Legend**

Coast

0 0.5 1 2 3 4 km



Projection: Map Grid of Australia Zone 51  
 Datum: Geocentric Datum of Australia, 1994

**Data Source**  
 Coast (Landgate 2008)

**Analysis**

**Presentation**

Environmental Protection Authority (2008)

This map is produced for the Environmental Protection Authority. Both map and report are produced by the Environmental Protection Authority, an independent advisory body on the environment.

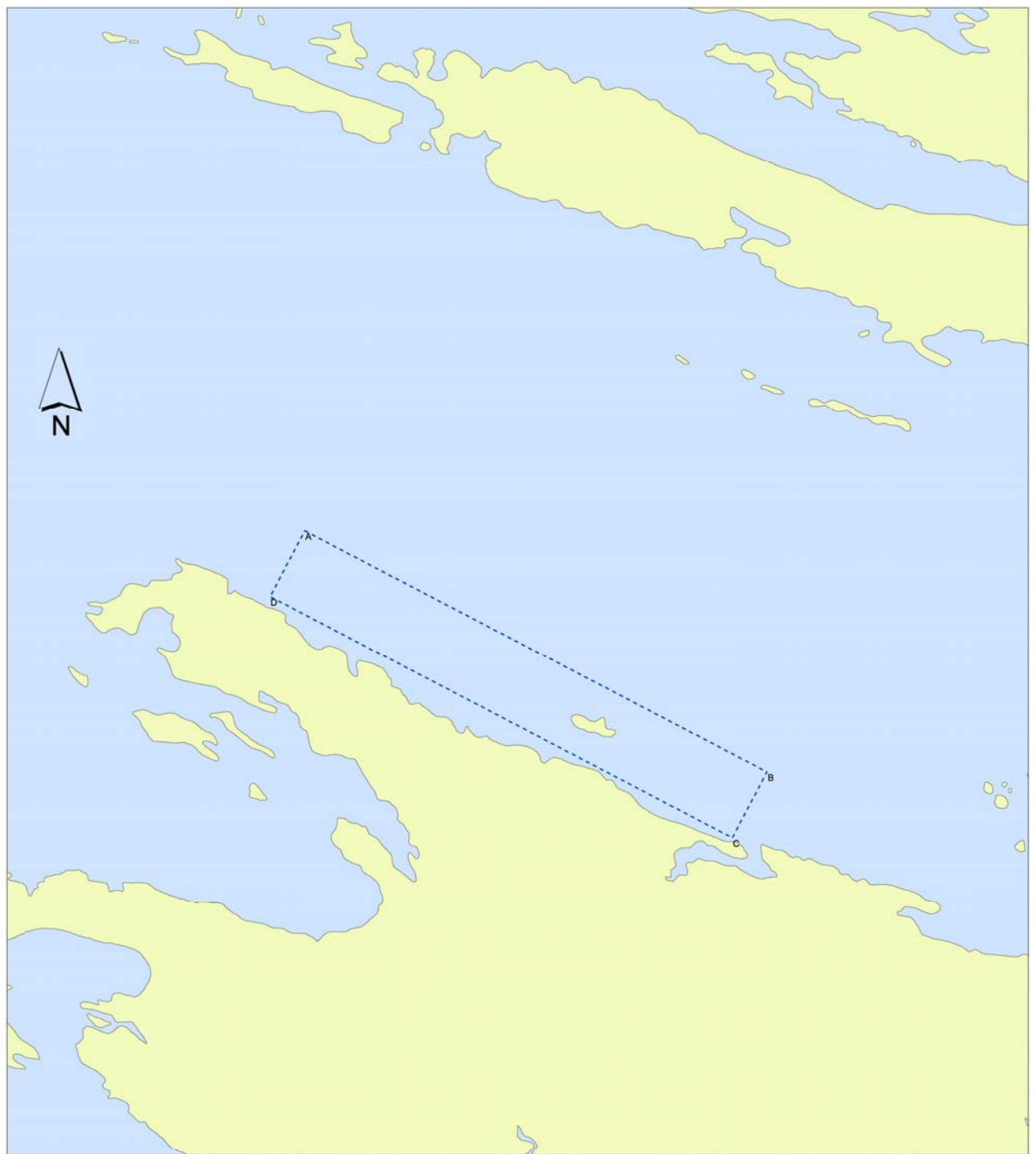
This map depicts the locality of the Cone Bay area in Western Australia.

**Disclaimer:** This map is intended as a generalised interpretation of environmental issues. The information contained on this map is to be considered indicative only and in no event shall the Environmental Protection Authority be liable for any incident or consequential damages resulting from use of the material.

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**Figure 1: Cone Bay Locality Map**

Environmental Protection Authority  
**Cone Bay: Aquaculture Licence Boundary**



|                                      |   |  |
|--------------------------------------|---|--|
| <b>Legend</b><br>Aquaculture licence | <br>Projection: Map Grid of Australia Zone 51<br>Datum: Geocentric Datum of Australia, 1994 | This map is produced for the Environmental Protection Authority. Both map and report are produced by the Environmental Protection Authority, an independent advisory body on the environment.<br><br>This map depicts the location of the aquaculture licence boundary in the Cone Bay area.<br><br>Disclaimer: This map is intended as a generalised interpretation of environmental issues. The information contained on this map is to be considered indicative only and in no event shall the Environmental Protection Authority be liable for any incident or consequential damages resulting from use of the material.<br><br>F Copyright Environmental Protection Authority, 2008.<br>All Rights Reserved. All works and information displayed are subject to Copyright. For the reproduction or publication beyond that permitted by the Commonwealth Copyright Act 1968 written permission must be sought from the Authority. |
|                                      | <b>Data Source</b><br>Aquaculture Licence (Maxima Pearling Company Pty Ltd 2008)            |  |

**Figure 2: Existing Aquaculture Licence No. 1465 Area.**

**Table 2: Licence No. 1465 Boundary Corner Coordinates (Datum GDA94)**

| Point | Latitude      | Longitude      |
|-------|---------------|----------------|
| A     | 16° 28.0238'S | 123° 29.2597'E |
| B     | 16° 29.7783'S | 123° 32.7484'E |
| C     | 16° 30.2572'S | 123° 32.4888'E |
| D     | 16° 28.5037'S | 123° 29.0001'E |



**Figure 3: An example sea-cage, as currently used in the 150 tonnes Barramundi operation in Cone Bay.**

Since release of the PER document, a number of modifications to the proposal have been made by the proponent. These include the:

- removal of a request to culture five other species of finfish from the proposal;
- number of proposed nursery cages reduced from a maximum of 36 units to a maximum of 8 units; and
- modification of the level of ecological protection zone directly beneath the sea cages from high to moderate.

The potential impacts of the proposal initially predicted by the proponent in the PER document (Maxima Pearling Company, 2008) and their proposed management are summarised in Table A (Executive Summary) of the proponent's document (Maxima Pearling Pty Ltd, 2008).

### **3. Key environmental factors and principles**

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as the health and safety of wild fish stocks, waste management procedures, land based infrastructure and entanglements of marine life, are very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

- (a) Site Selection - Cone Bay;
- (b) Marine Ecology - Benthic habitat; and
- (c) Marine Water Quality.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.3. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- (a) the principle of the conservation of biological diversity and ecological integrity; and
- (b) the principle of waste minimisation.

### **3.1 Site Selection – Cone Bay**

#### **Description**

Site selection is one of the most important factors that determines the environmental viability of an aquaculture operation. Also, the intensity of the production system to some degree determines the effects that the proposal will have on the environment. The use of sea cages to produce finfish has environmental concerns that need to be identified and managed accordingly. The specific environmental concerns relevant to sea cage systems include:

- eutrophication as a consequence of increased nutrient loadings (faecal and uneaten food wastes will either dissolve or settle on the sea beneath the cage);
- impacts on wild fish stocks;
- genetic and competitive effect on wild fish;
- disease; and
- visual amenity.

To aid in the mitigation of the environmental concerns associated with offshore finfish culture that utilises sea cages, a proposed site should have enough capacity to allow the environment to deal with the wastes, such as uneaten food and fish faeces, produced by the operation and be of a suitable depth to enable good tidal flow to allow the water current to disperse sediments and maintain water quality. This should be coupled with an appropriate environmental monitoring and management program.

## **Submissions**

Public Submissions on the following issues were received.

- That the proposal should be considered in the context of the Kimberley Broad Regional Assessment that is currently being undertaken and the idea that no new development should be permitted in the meantime to avoid piecemeal development of the area.
- Concern of development occurring in the Buccaneer Archipelago (including Cone Bay) which is an area that was identified in the Wilson Report for consideration for reservation as a multiple-use marine park.

There were also public and Department of Environment and Conservation (DEC) submissions expressing a view that the approval of this proposal would lead to development of a large number of similar developments along the Kimberley coast.

## **Assessment**

Cone Bay is located in the Buccaneer Archipelago and forms part of the Yampi Sound in the Kimberley region of Western Australia. This is an area of protected waters and high energy characteristics. Fast flushing rates and dynamic circulatory patterns are prevalent within the bay. The main hydrological influences are a 9 to 11m tide, high velocity currents and rainfall run-off from the coast line. Cone Bay ranges in depth from 3 to 36m, with shallow areas of the bay ( $\leq 3\text{m}$  at low tide) hugging the coast and deep channels ( $\geq 15\text{m}$  at low tide) along the outer perimeters of the bay. Licence area No.1465 is situated predominantly in a deep channel along the Southern side of the bay providing the site with the opportunity for good tidal flow to occur beneath sea cages whilst containing deposition to within 250m of the source point.

The proponent addressed the submissions by identifying that the completion of the Kimberley Broad Regional Assessment is not expected until 2010, and that the proposal is an extension of an existing operation already being undertaken by the proponent and does not require the use of any more land (terrestrial or marine) in the region. The EPA assesses projects on their individual merits and therefore the approval of this proposal does not predetermine the approval of future proposals.

The EPA acknowledges that Cone Bay was recognised in the Wilson Report as a site being suitable for identification as a multiple-use marine park, however, the presence of pearl culture leases and operations within the area was also noted, and it was stated that, 'providing that this industry is managed with due care for the many sensitive natural values of the marine environment, the working group considers that this activity would be compatible with multiple-use marine park status.' The inputs from aquaculture are different from those of pearl culture, however, this use is not considered inconsistent with the Wilson Report provided the conservation values of Cone Bay are maintained.

The prevailing characteristics of the bay, in conjunction with a monitoring and management program, will enable Cone Bay to be utilised for aquaculture operation whilst ensuring the health of the environment is maintained. The EPA considers that through the imposition of appropriate conditions to monitor and manage the outputs of the proposal (refer to Sections 3.2 and 3.3) the aquaculture proposal can be

adequately managed to enable the ongoing protection of the environment of Cone Bay.

### **Summary**

The EPA considers the issue of site selection has been adequately addressed and the proposal can be managed within Cone Bay to ensure that the EPA's objectives are met. The EPA concludes that Cone Bay is a suitable site for an aquaculture operation to be undertaken given its natural hydrological characteristics and the conditions that will be applied to monitor and manage the outputs of the proposal.

## **3.2 Marine Ecology – Benthic Habitat**

### **Description**

A Benthic Primary Producer Habitat (BPPH) is made up of the Benthic Primary Producer (BPP) communities and the substrata/seabed to which they are attached (EPA, 2004). The ecological values of BPPH's vary depending on a range of factors including geographic location, species abundance and the contribution of productivity to the community. BPP's such as, marine plants (e.g. seagrass, mangroves and algae) and coral reefs, provide: primary production (food) via photosynthesis, substrate and shelter to other marine biota, and physical stability to the seabed and coastline.

To protect the benthic habitat and water quality of Cone Bay zones of ecological protection which define the limit of acceptable change from natural conditions have been assigned through this assessment to the licence area and surrounding waters of the bay in accordance with the *State Water Quality Management Strategy*. These zones of protection specifically address the Environmental Value of 'Ecosystem Health' and Environmental Quality Objective of 'Maintaining Ecosystem Integrity'. Three levels of ecological protection (moderate, high and maximum) have been set in and around the proposal area. A level of moderate protection (moderate changes from natural variation) has been assigned around the sea cage grid systems, a level of high protection (some small changes from natural variation) has been assigned outside of the immediate area of impact and a level of maximum protection (no detectable change from natural variation) has been assigned for most of the waters of Cone Bay surrounding the proposal.

BPPH's have the potential to be indirectly impacted through potential changes in hydrodynamics caused by the presence of the sea cage system and the accumulation of excess nutrients in the water column and the consequential impacts to water quality. It is worth noting that water quality in the benthic habitat can affect the productivity of the BPP's, however, this issue will be addressed in section 3.3. This section deals primarily with the potential for deposition and accumulation of nutrients (faeces and uneaten food) to occur in the sediment, the potential for hydrodynamic changes caused by the presence of the sea cage infrastructure, and to a lesser extent the potential for direct impacts from broken moorings and nets.

The benthic environment of Cone Bay can be described as in a natural, undisturbed state. Cone Bay is predominantly mud substrate with large areas of solid rock characteristic of the surrounding coastal landscape. Mangroves occur in the mid to upper intertidal levels of the shoreline. The mangrove communities are not within the boundaries of aquaculture licence No. 1465 and the nearest mangrove community is

2.6km from the southern boundary of the licence area. The muddy seabed and turbid waters tend to prevent the development of major coral reefs; however, small fringing reefs do occur in the shallow waters on the north-western side of the bay approximately 6km from the licence area.

Cone Bay is swept by high velocity currents and a large amount of rainfall run-off from the steep coastline during the wet season. Therefore, depending on current movements, circulation patterns and the degree of pollutant discharge, impacts could extend relatively far off site. To aid in the containment of potential impacts it is critical that the placement of sea cages be based on sound hydrodynamic modeling and an understanding of the natural currents within the bay. This enables the cages to be placed in adequate water depth and positioned in such a manner as to keep the deposition of nutrients contained within a manageable area.

Sea cages in Cone Bay will be positioned according to results of the hydrodynamic studies conducted by APASA (Asia-Pacific Applied Science Associates) which demonstrated that fish faeces may occur up to 250m and the settlement of waste feed between 130 and 140m from the sea cages. As such, all cages will be a minimum of 250m from the east and west boundaries of the licence area to ensure that the potential effects are contained and that the environmental integrity of the area is maintained. Infrastructure requirements will be kept to a minimum and a clearance zone of at least 2m between the lowest point of the cages and the benthic substrate will be maintained to enable the natural hydrology of the bay to be maintained. This will reduce the potential for stagnant areas and nutrient accumulation to occur beneath the sea cages. In addition a combination of regular cleaning and fallowing (moving or removing) of cages will assist in the prevention of the degradation of the environment through nutrient accumulation.

The benthic habitat immediately below the sea cages is at the greatest risk of impact from caged culture due to the potential for high sediment rates to occur due to the design of the sea cages which allow excess feed and fish faeces to fall directly to the ocean floor. High levels of food and faeces may elevate nutrient levels in the area. This can affect other naturally occurring marine species by decreasing light penetration and overall productivity of the BPP's. This has the potential to impact directly on the marine biodiversity of the ecosystem. The repercussions for the marine system depend on the capacity of the local environment to disperse or otherwise assimilate the wastes and to withstand changes caused by aquaculture and infrastructure operations. To minimize the potential impacts to the benthic environment the proposal will include an Australian manufactured pelletised and sinking feed ranging in size between 4.0mm and 11.0mm dependent on fish size, a strict feeding regime, including, the use of feed tables and video monitoring, and tide tables to gauge dispersion, will be implemented to enable feed rates to be properly managed. By monitoring tidal data the proponent can alter the time of day at which the feed is given to the stock to control the dispersion of any excess feed, however, behaviour of the fish will also be continually monitored to ensure that the amount of feed given is adjusted as per the fishes response.

The inclusion of infrastructure such as sea cages into the natural marine ecosystem has the potential to impact upon the hydrodynamics, such as, circulatory patterns, flushing rates and current speeds, of the bay, which can also lead to an accumulation

of nutrients and the follow on effects to the benthic habitat. Hydrodynamic modeling undertaken by the proponent demonstrates that the presence of sea cages would not significantly alter the circulatory patterns of Cone Bay and would have only a slight impact on the current speeds during spring tides around the cages.

The benthic habitat of Cone Bay may also be at risk should damage occur to the mooring equipment or nets. To mitigate potential impacts all anchors and mooring components will be set at a minimum of 100m and cages a minimum of 200m from sensitive BPPH systems, such as mangroves and reefs, to prevent damage in the event that moorings “drag”. To prevent damage or breaks occurring steel mesh nets and mooring equipment that has already been tested in Cone Bay and proven to withstand pressure from adverse weather conditions will continue to be utilised for grow out culture of the proposed 1,000 tonnes per year production. All mooring lines and ropes will be kept to a minimum with regular inspection and replacement of nets and mooring systems occurring as a part of the standard operating procedures.

As well as locating sea cages in accordance with the natural hydrology of the bay zones of ecological protection have been assigned within Cone Bay to ensure that no significant impacts occur outside of the licence area and no long-term impacts occur within the licence area. The zones of ecological protection apply to both the maintenance of the benthic habitat and the sediment and water quality of Cone Bay. The assigned zones of ecological protection are illustrated in Figure 4. The EPA has modified the zones of protection depicted in the PER (Maxima Pearling Company, 2008) to allow for some operational flexibility while still protecting the values of the area.

### **Submissions**

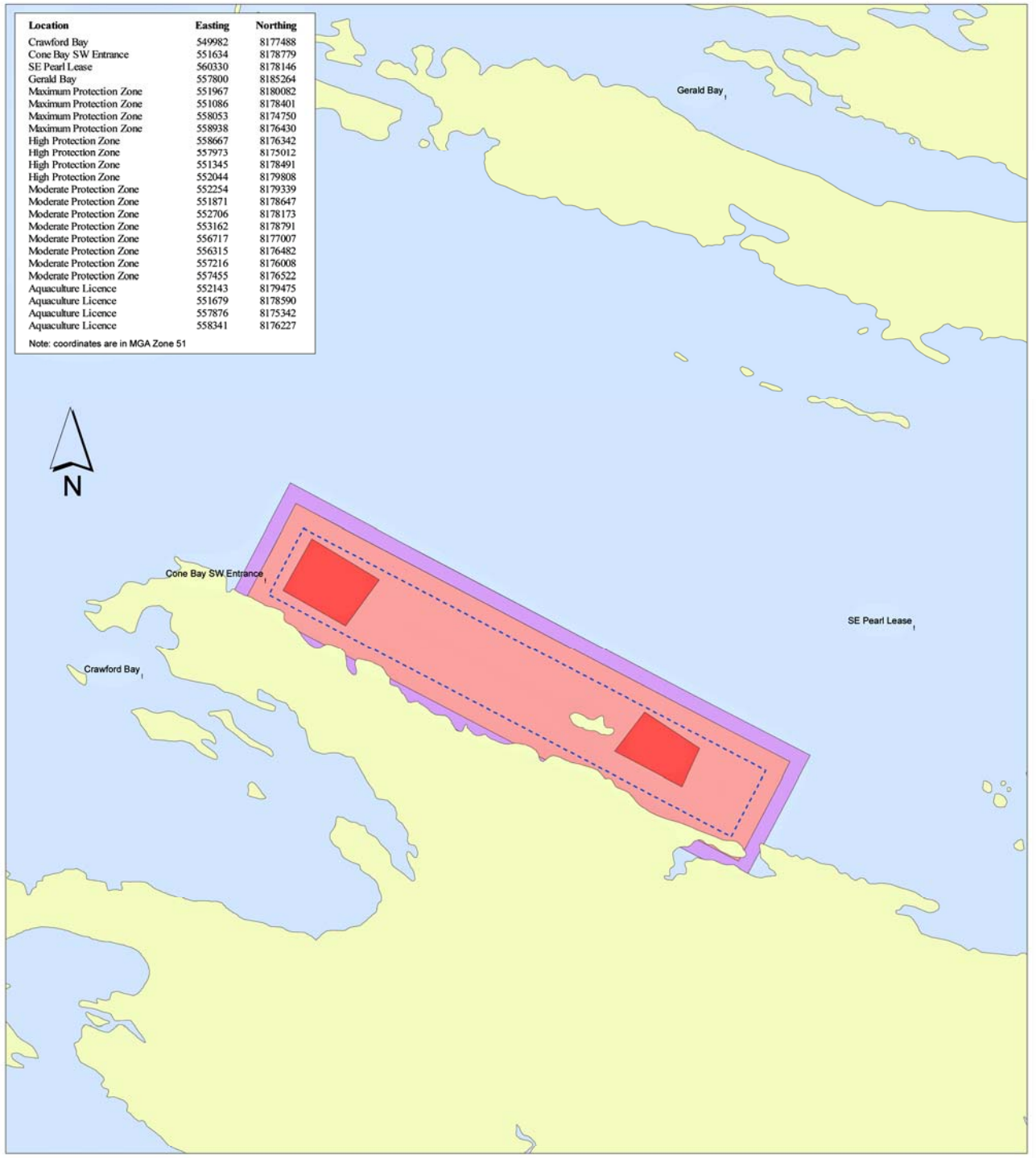
Public Submissions on the following issues were received.

- The use of phrases such as “unacceptable impacts” and “minimal”, if used, need to be defined explicitly, i.e. what exactly is considered an unacceptable impact to the proponent, there needs to be clearly stated performance standards that have to be met.
- The comment that “mud is considered to be a rather hostile environment with little flora and faunal assemblages” is completely inappropriate.

DEC submissions were received on the following issues.

- The proponent has identified a management unit of seven square kilometres. This management unit has not been calculated to account for ecologically meaningful boundaries, nor does it include the predicted zones of influence based on the modeling presented in Appendix B of the PER.

Environmental Protection Authority  
**Cone Bay: Zones of Ecological Protection**



| Location                 | Easting | Northing |
|--------------------------|---------|----------|
| Crawford Bay             | 54982   | 8177488  |
| Cone Bay SW Entrance     | 551634  | 8178779  |
| SE Pearl Lease           | 560330  | 8178146  |
| Gerald Bay               | 557800  | 8185264  |
| Maximum Protection Zone  | 551967  | 8180082  |
| Maximum Protection Zone  | 551086  | 8178401  |
| Maximum Protection Zone  | 558053  | 8174750  |
| Maximum Protection Zone  | 558938  | 8176430  |
| High Protection Zone     | 558667  | 8176342  |
| High Protection Zone     | 557973  | 8175012  |
| High Protection Zone     | 551345  | 8178491  |
| High Protection Zone     | 552044  | 8179808  |
| Moderate Protection Zone | 552254  | 8179339  |
| Moderate Protection Zone | 551871  | 8178647  |
| Moderate Protection Zone | 552706  | 8178173  |
| Moderate Protection Zone | 553162  | 8178791  |
| Moderate Protection Zone | 556717  | 8177007  |
| Moderate Protection Zone | 556315  | 8176482  |
| Moderate Protection Zone | 557216  | 8176008  |
| Moderate Protection Zone | 557455  | 8176522  |
| Aquaculture Licence      | 552143  | 8179475  |
| Aquaculture Licence      | 551679  | 8178590  |
| Aquaculture Licence      | 557876  | 8175342  |
| Aquaculture Licence      | 558341  | 8176227  |

Note: coordinates are in MGA Zone 51

**Legend**

- Reference site
- Aquaculture licence
- Moderate protection zone
- High protection zone
- Maximum protection zone

0 0.25 0.5 1 1.5 2 km

Projection: Map Grid of Australia Zone 50  
 Datum: Geocentric Datum of Australia, 1994

**Data Source**  
 Moderate Protection Zone (DEC 2008)  
 High Protection Zone (DEC 2008)  
 Maximum Protection Zone (DEC 2008)

**Analysis**

**Presentation**  
 Environmental Protection Authority (2008)

This map is produced for the Environmental Protection Authority. Both map and report are produced by the Environmental Protection Authority, an independent advisory body on the environment.

This map depicts the location of the protection zones in accordance to the Cone Bay aquaculture licence area.

Disclaimer: This map is intended as a generalised interpretation of environmental issues. The information contained on this map is to be considered indicative only and in no event shall the Environmental Protection Authority be liable for any incident or consequential damages resulting from use of the material.

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**Figure 4: Zones of ecological protection.**

- It is questioned why the key characteristics table in the PER includes a maximum of 1,500 tonnes per annum of feed when the trial indicated that the maximum feed conversion ratio (F.C.R) was 1.2 with an average of 1. Based on the trial and the proponent's confidence that this ~1:1 F.C.R can be maintained, the maximum feed for this proposal should be limited at 1,200 tonnes per annum to limit the potential for overfeeding, nitrification and unacceptable water and sediment quality changes.

### **Assessment**

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of flora, at species and ecosystem levels, through the avoidance or management of adverse impacts and improvement in knowledge.

The EPA considers that adequate monitoring of the sediment is an important element of the project. The EPA notes that the proponent intends to monitor total nitrogen, total phosphorous, total Kjeldahl Nitrogen (a measure of the sum of organic nitrogen and ammonia in the water body), particulate organic matter, redox potential and infaunal species and abundance. To ensure that the zones of ecological protection are maintained, the proponent will measure those parameters by taking sediment samples from within the licence area and comparing these to samples taken from reference sites within the bay. Reference sites have been chosen that are representative of the cage sites in relation to depth, tidal flow and proximity to potential land rainfall run-off, but at a distance and direction that will not be influenced by the sea cage operation.

Dissolved oxygen (DO), total dissolved nutrients (TN), [including: NO<sub>2</sub> +NO<sub>3</sub>, NH<sub>4</sub><sup>+</sup>, Total Kjeldahl Nitrogen, Filterable Reactive Phosphorous, Total Nitrogen and Total Phosphorous] and redox discontinuity (REDOX) will be measured as early indicators of organic enrichment. The median of the measurements taken from the sample sites at any given time will be compared to the reference site data. This approach may be adapted to apply to one or more different seasons to account for seasonal variability. The median should not exceed the guideline 'trigger' values as determined by the reference site data.

When compared to the reference data the aim will be for the median of the monitoring results:

- in the area of moderate ecological protection to be no greater than the 95<sup>th</sup> percentile for TN and REDOX and no less than 60% saturation of DO;
- in the area of high ecological protection to be no greater than the 80<sup>th</sup> percentile for the TN and REDOX and no less than 60% saturation of DO; and
- in the area of maximum ecological protection for there to be no detectable changes.

Any exceedance of these 'trigger' values would instigate further investigation and management measures to mitigate the potential impacts. These include an altering of feed regimes, fallowing (moving or removing) sea cages and reducing or removing stock.

The EPA recommends that the proponent establishes a monitoring program in consultation with the DEC for the benthic habitat. The proponent's existing environmental monitoring and management plan includes regular monitoring and analysis of sediment chemistry and benthic infauna. The program should address the Environmental Quality Guidelines (EQG) and establishment of Environmental Quality Standards (EQS) to be met and actions to be taken should monitoring show that these criteria are being exceeded.

Modeling has been done on the settlement of uneaten food and faeces and it has been determined that waste settles within 250m of the cages. The proponent should therefore situate the cages at a minimum of 250m from the licence area boundaries to ensure that no waste accumulates outside of the high ecological protection zone.

The proponent has addressed the issue of F.C.R's by including strict feeding regimes which will ensure that waste feed levels are minimised and the most efficient FCR is maintained, modeling has been undertaken utilising a maximum F.C.R of 1.5 to illustrate worst-case scenarios, modeling at this level will provide flexibility to grow out the Barramundi to a larger size if required. Limiting feed input to only that which is required will reduce the level of nutrients released to the environment. It is generally expected that the food and faeces associated with the 1,000 tonnes per annum production can be assimilated within Cone Bay. In addition, monitoring of sediment and water quality will be used to trigger changes to the feeding regime, based on EQG and EQS.

Although some impact is anticipated from anchors these impacts are considered temporary and minor. The proponent maintains ongoing monitoring of the functionality of all moorings and nets to contain stock.

### **Summary**

The EPA considers the issue of Marine Ecology – Benthic Habitat has been adequately addressed and the proposal can meet the EPA's objective for this factor provided that a condition is imposed requiring the proposal to meet the environmental water objective for maintenance of ecosystem integrity for the various levels of protection defined in the report (Appendix 4, Condition 5).

## **3.3 Marine Water Quality**

### **Description**

Water quality refers to the state of health of a water body and is defined by its physical, chemical, biological and aesthetic characteristics. Finfish aquaculture in open water sea cages inevitably causes some degree of deterioration to water quality locally due to the input of nutrients from uneaten feed and fish faeces and the potential impacts of hydrodynamic changes caused by the sea cage infrastructure.

Biological inputs (feed) and outputs (fish faeces) associated with a maximum production of 1,000 tonnes of Barramundi per year has the potential to impact on the water quality of Cone Bay by increasing nutrient loading, such as chlorophyll-a, nitrogen, phosphorous and total suspended solids. The potential for a decrease in water quality through the accumulation of nutrients and suspended solids in the water column is considered to be the most significant impact to water quality as it can have

follow on effects to the health of the whole ecosystem. Excess nutrients in the water column can decrease light attenuation and lead to an increase in algal matter which can decrease the overall productivity of the BPP's. The sea cage infrastructure has the potential to cause local changes in water current flow and direction and the potential for shading effects of the nets can lead to algal blooms which can also affect water quality.

The water quality within Cone Bay and surrounding areas is in a natural state. Natural fluctuations associated with seasonal variations do occur, however, this is characteristic of the Buccaneer Archipelago. Water temperatures range between 24 - 33°C and patterns are directly related to seasonal influences. Dissolved oxygen shows similar patterns to temperature with levels increasing as temperature increases and vice versa. Salinity is relatively constant. Turbidity is highly variable and is dependent on tidal cycles and other environmental conditions.

Water currents may quickly spread pollutants from the site of origin to nearby habitats. It is therefore imperative that an appropriate monitoring and management program, that includes reference points that are unaffected by the proposal and represent the natural state of the environment, is in place to ensure that threats to the water quality are recognized and acted upon promptly.

Chlorophyll-a (chl-a) and a decrease in the light attenuation co-efficient in the water column act as early warning indicators of phytoplankton response to increased nutrient availability. Total suspended solids provide an early warning indicator of organic enrichment.

The proponent believes that pollution from biological inputs should be minimal due to the implementation of the following management practices: conservative fish stocking densities, daily feed monitoring, conservative feed regimes and the ongoing monitoring and comparison to unaffected reference sites, of chlorophyll-a levels and light attenuation.

### **Submissions**

Public submissions on the following issues were received.

- Given the importance of the water flow around the proposed site, the hydrological models predicting the flushing rates in Cone Bay should be verified and water movement should be monitored to include seasonal variations.
- Comparing the nutrient outputs from the sea cages to peak natural nutrient outputs during the wet season is inappropriate.

Submissions from the DEC on the following issues were received:

- What are the risks to water quality should overfeeding occur?

## Assessment

The EPA's environmental objective for this factor is to ensure that emissions do not adversely affect the environmental values of Cone Bay or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

The EPA acknowledges that adequate monitoring of water quality is an important element of the proposal and notes that the proponent has considered this proposal in accordance with the environmental management framework developed in the *National Water Quality Management Strategy* (NWQMS). The framework requires identification of the environmental values (EV's) of a region, the environmental quality objectives (EQO's) or management goals needed to protect EV's and environmental quality criteria (EQC).

As described in Section 3.2 levels of ecological protection (moderate, high and maximum) have been set in and around the proposal area in relation to the EQO "Maintain Ecosystem Integrity". The zones of ecological protection are illustrated in Figure 4, Section 3.2.

The EPA acknowledges that it is impractical to catch the waste products from marine farming operations and this need to be managed in situ. In assessing the proposal the EPA notes that the proponent has modeled the predicted flushing times for Cone Bay and that the bay is expected to flush within 2 to 3 days throughout the year. Flushing rates within Cone Bay were determined by two independent companies Brown and Root Services Asia Pacific Pty Ltd in 2000 and APASA in 2006. Results obtained by Brown and Root demonstrate that the site is 95% flushed within 2 hours during the modeling period (based on tidal data for 23-28 March 2000 (spring tide)). Flushing rates are somewhat lower during neap tide, although 95% flushing still takes place within a few hours. The APASA model results suggested that for the existing morphology, the Cone Bay licence area was completely flushed within 2 days during both December (wet season) strong spring currents and June (dry season) weak neap currents.

Flushing times were not greatly affected by the introduction of sea cages during a spring tide but flushing took approximately one day longer, a total of 3 days, during the neap tide. This timeframe is considered acceptable and it is anticipated that the operational impacts of the aquaculture facility will be small and the sea cages will have little effect on circulation patterns within Cone Bay. It is further anticipated that the aquaculture operation will be managed to ensure no adverse impacts on the environmental values of Cone Bay and the broader waters of the Buccaneer Archipelago.

The EPA considers that the potential impacts on water quality can be appropriately managed so that the proposal is environmentally acceptable subject to the recommended Condition (Appendix 4, Condition 5), where the proponent is required monitor chlorophyll-a and the light attenuation co-efficient in water as an early indicator of phytoplankton responses to increasing nutrients and compare this data to the reference sites. The aim is to achieve median results that do not exceed the 'trigger' (guideline) values as determined by the reference site data.

When compared to the reference site data the aim will be for the median of the monitoring results:

- in the area of moderate ecological protection to be no greater than the 95<sup>th</sup> percentile for chl-a, and no less than the 5<sup>th</sup> percentile for the light attenuation co-efficient.
- in the area of high ecological protection to be no greater than the 80<sup>th</sup> percentile for the chl-a and no less than the 20<sup>th</sup> percentile for the light attenuation co-efficient.
- in the area of maximum ecological protection for there to be no detectable changes.

Any exceedence of these “trigger” values will instigate further investigation and management measures to mitigate the potential impacts. These include an altering of feed regimes, fallowing (moving or removing) sea cages and reducing or removing stock.

While the EPA expects the proposal can generally be managed to keep water quality below ‘trigger’ levels, Environmental Quality Standards (EQS) will need to be developed for the next level of investigation under the NWQMS should ‘trigger’ levels be exceeded. The EPA recommends that the proponent establish EQS’s through ongoing monitoring of the reference sites of the number and density of benthic infauna, the variety and types of marine life and nutrient cycles.

The proponent has addressed the concern of water quality if overfeeding was to occur through feed rates being monitored and managed through the use of feed tables and tide tables and monitoring fish behaviour through video. Feeding will be conducted on a daily basis and feed placement will be appropriate to the tidal movement.

### **Summary**

The EPA considers the issue of Marine Water Quality has been adequately addressed and the proposal can meet the EPA’s objective for this factor provided that a condition is imposed requiring the proposal to meet the environmental water objective for maintenance of ecosystem integrity for the various levels of protection defined in the report (Appendix 4, Condition 5).

### **3.4 Environmental principles**

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986)*. Appendix 3 contains a summary of the EPA’s consideration of the principles.

## **4. Conditions and Commitments**

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance.

#### **4.1 Proponent's commitments**

The proponent's commitments as set out in the PER and subsequently modified, are shown in Appendix 5. This includes the preparation of an Environmental Monitoring and Management Plan (EMMP) that addresses the following issues.

1. Water Quality Management.
2. Benthic Substrate Management.
3. Mangrove System Management.
4. Coral Reef System Management.
5. Biota Management.
6. Environmental Quality Criteria (EQC) and trigger values developed.
7. Management responses.
8. Auditing, review and liaison procedures.

#### **4.2 Recommended conditions**

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal, by Maxima Pearling Company Pty Ltd to culture 1,000 tonnes Barramundi per year in Cone Bay, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (a) standard conditions for proponent nomination, time limits of approval, compliance reporting; and
- (b) water quality monitoring and management to meet agreed levels of ecological protection.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Licensing of aquaculture operation issued by the Department of Fisheries under Regulation 69 of the *Fish Resources Management Regulations 1995*;
- Management of the translocation of Barramundi under Regulation 176 and 177 of the *Fish Resources Management Regulations 1995* and guided by Fisheries management Paper No. 159 *The translocation of barramundi (Lates calcarifer) for aquaculture and recreational fishery enhancement in Western Australia*;

- Transfer of diesel from barges to the land based facility on Turtle Island is managed by the Department of Consumer and Employment Protection (DOCEP) under the *Dangerous Goods (Transport) Act 1998*; and
- Waste disposal managed by the Department of Environment and Conservation under the *Environmental Protection (Waste Management) Regulations 2004*.

## 5. Other Advice

Although not discussed in detail in this report the EPA expects that the other Environmental Quality Objectives (EQO's) outlined in the Environmental Quality Framework and as described in the document, *Pilbara Coastal Water Quality Consultation Outcomes – Environmental Values and Environmental Quality Objectives* (Department of Environment, March 2006) will be maintained throughout the proposal. These values relate to social use values, namely, recreation and aesthetics, cultural and spiritual, fishing and aquaculture and industrial water supply. However, it is expected that in achieving the EQO for ecosystem integrity that the other objectives will be maintained.

While this proposal has been assessed on its own merits as required under Part IV of the EP Act, the development of aquaculture industry in the Kimberley is one of many aspects that needs to be considered as part of the Kimberley Broad Regional Assessment (KBRA) to ensure that a strategic approach is taken in the protection of the region's environmental integrity.

## 6. Conclusions

The EPA has considered the proposal by Maxima Pearling Company Pty Ltd to produce 1,000 tonnes per year of Barramundi in Cone Bay.

With regard to location the EPA concludes that Cone Bay is a suitable site for an aquaculture operation to be undertaken given its natural hydrological characteristics. It is generally expected that the food and faeces associated with the 1,000 tonnes per year production can be assimilated within Cone Bay.

While food and faeces have the potential to cause nutrient accumulation in sediment and the water column, the proposal can be managed to maintain environmental quality objectives. Three levels of ecological protection (moderate, high and maximum) have been set in and around the proposal area in relation to the Environmental Quality Objective "Maintaining Ecosystem Integrity". A level of moderate protection has been assigned around the sea cage grid systems, a level of high protection has been assigned outside of the immediate area of impact and a level of maximum protection for most of the waters of Cone Bay surrounding the proposal. Management including proper feeding regimes, fallowing and destocking of cages will be implemented to ensure these zones of ecological protection are maintained.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4 and summarised in Section 4.

## **7. Recommendations**

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is to produce 1,000 tonnes per year of Barramundi in Cone Bay
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

# **Appendix 1**

## **List of submitters**

**Organisations:**

Department of Fisheries (DoF)

Department for Planning and Infrastructure (DPI)

Coastal Engineering

Department of Environment and Conservation (DEC)

**Individuals:**

Environs Kimberley

The Wilderness Society

# **Appendix 2**

## **References**

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000) *National Water Quality Management Strategy – An introduction to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 4A*, ANZECC and ARMCANZ.

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EPA (2004) *Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment*, Environmental Protection Authority Guidance Statement No. 29, June 2004.

EPA (1993) *Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters*. Environmental Protection Authority Bulletin 711, October 1993.

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EPA (2002) *Revised Environmental Quality Criteria Reference Document (Cockburn Sound) – A supporting document to the draft Environmental Protection (Cockburn Sound) Policy 2002*, EPA.

Government of Western Australia (undated) *State Water Quality Management Strategy No. 6 – Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Water Quality Monitoring and Reporting (Guidelines Nos. 4 & 7: National Water Quality Management Strategy)*, Government of Western Australia.

Makaira Pty Ltd (1999) *The Translocation of barramundi – A Discussion Paper*, Fisheries Management Paper No. 127, Department of Fisheries, Government of Western Australia.

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Sim; C and Masini; R. (2004) *A framework to guide the development of environmental monitoring programs for marine aquaculture in seagrass dominated coastal environments in South Australia*. Department of Environment; Government of Western Australia

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## **Appendix 3**

**Summary of identification of key environmental factors and principles**

| Preliminary Environmental Factors                              | Proposal Characteristics  | Government Agency and Public Comments   | Identification of Key Environmental Factors   |
|--|---|---|---|
| <b>BIOPHYSICAL</b>   |   |   |   |
| Marine Ecology –   |   |   |   |
| 1. Benthic Habitat   | The potential for deposition and accumulation of faeces or uneaten food (nutrients).<br>The potential changes in hydrodynamics caused by the presence of sea cage system.<br>The potential effect of increased phytoplankton and total suspended solids in the water column reducing light penetration to the benthic habitat.<br>Seabed disturbance. | <u>DEC and Public:</u><br>- Management units need to be clearly defined and established in accordance with Guidance Statement 29 <i>Benthic Primary Producer Habitat protection for Western Australia’s Marine Environment</i> (EPA, 2004) and the use of phrases such as ‘unacceptable impacts’ and ‘minimal’ should be avoided and performance standards with clearly stated targets that have to be met should be established.<br>- The perception that mud sediment is not considered an important habitat needs to be addressed.           | <b>Marine Ecology of Benthic habitat considered to be a key environmental factor. See Section 3.2.</b>  |
| 2. Location – Cone Bay   | Potential to impact the ecology of the region.  | <u>DEC and Public:</u><br>-Consideration of the Buccaneer Archipelago (including Cone Bay) to be reserved as a multiple-use marine park.  | <b>Location of aquaculture operation considered to be a key environmental factor. See Section 3.1.</b>  |
| 3. Wild fish stocks (genetic diversity and disease protection) | The potential for introduction and transfer of exotic diseases to wild fish. The potential for escaped fish to impact on the genetic variation of the natural populations.  | <u>Public:</u><br>-A great deal more rigour should be applied to the health testing proposed for fingerlings. Health testing for the fingerlings may not be sufficient.<br>- With the intensification of production there is concern over the increased likelihood of disease occurrence within cultured stock and transmission to wild populations.<br>- The risk of escapes cannot be ignored and a contingency plan should be developed.<br>- Impact and consequences of escapes on the health and genetic diversity of the wild population. | Managed by the Department of Fisheries (DoF) under regulation 176 and 177 of the <i>Fish Resources Management Regulations 1995 (FRMR)</i> , also guided by Fisheries Management Paper No. 159 <i>The translocation of barramundi (Lates calcarifer) for aquaculture and recreational fishery enhancement in Western Australia</i> and Fisheries Management paper No. 127 <i>The translocation of barramundi- A discussion paper.</i><br><b>Not considered to be a key environmental factor.</b> |

|                                |   |  |   |
|--------------------------------|---|--|---|
| 4. Mega fauna                  | The potential loss of nets or damaged nets and/or mooring systems could potentially lead to the entanglement of marine life in sea cage system equipment.                                   | <p><u>DEC:</u></p> <ul style="list-style-type: none"> <li>- The risks to conservation significant fauna have not been adequately explored and acknowledged in the PER.</li> <li>- It is unclear how the proponent has come to the conclusion that the risk to fauna as a result of changes in feeding patterns and distribution is low to moderate according to the risk assessment presented in the PER, there is a lack of detail with regard to fauna management issues and contingencies.</li> </ul>   | Has been addressed by the proponent in the updated EMMP, which now includes a Wildlife Interaction Avoidance Strategy. Ongoing maintenance of nets and moorings. <b>Not considered to be a key environmental factor.</b>                  |
| 5. Terrestrial (Turtle Island) | The proposal involves continued utilisation of housing and work facilities currently in existence on Turtle Island.   | <u>Public:</u> Will the expansion of the sea cage system and infrastructure impact on Turtle island?   | Turtle Island has a number of work operation and housing facilities already in existence. The facilities are substantial and no new infrastructure is required for Turtle Island. <b>Not considered to be a key environmental factor.</b> |
| <b>POLLUTION</b>               |   |  |   |
| Marine Water Quality           | Water pollution from biological inputs (fish faeces and other nutrient inputs). The potential accumulation of excess nutrients in the water column and consequent impacts on water quality. | <p><u>Public:</u></p> <ul style="list-style-type: none"> <li>- Due to the importance of water flow around the proposed site, the hydrological models predicting the flushing rates in Cone Bay should be verified and water movement should be monitored to include seasonal variations.</li> <li>- What are the risk and consequences of elevated nutrient levels during the dry season on the surrounding environment? Comparing nutrient outputs from sea cages to peak natural nutrient outputs during the wet season is inappropriate.</li> </ul> <p><u>DEC:</u></p> <ul style="list-style-type: none"> <li>- What are the risks and impacts to water and sediment quality if overfeeding was to occur, and why is there a variation in Feed conversion Ratio (FCR) modeling data between 1.2 and 1.5?</li> </ul> | <b>Marine Water Quality considered to be a key environmental factor. See section 3.3</b>  |

|   |  |   |   |
|---|--|---|---|
| <p>Waste management procedures</p>                              | <p>All chemicals, fuel and related materials are appropriately stored at the island based operation (Turtle Island).<br/>All rubbish and discarded material is removed from the sea-based operation and transported to Turtle Island facilities for re-use, recycling or correct disposal.</p> | <p><u>DEC:</u><br/>- MPC has indicated that the transfer of diesel is done from a supply barge and is pumped via a floating pipe into the storage tank on the island. DEC suggests this method is referred to the Department of Consumer and Employment Protection (DOCEP) for comments on whether this is best practice.<br/>- Assurance that MPC are complying with the <i>Environmental Protection (Unauthorised discharges) Regulations 2004</i> in terms of waste management, particularly the burning of waste.</p> <p><u>DEC and Public:</u><br/>- What is the expected increase in nutrient output from the land based tank on Turtle Island with the increase in sea cage production and how will the waste water be treated or dealt with to prevent release of pathogens or treatment chemicals into the surrounding waters.</p> | <p>The current procedure was deemed satisfactory by DOCEP as the following equipment and methodology are utilized:</p> <ul style="list-style-type: none"> <li>• high pressure fuel grade hoses;</li> <li>• high pressure fittings at entry and exit points;</li> <li>• one length of pipe between the barge and tank with no connection fittings;</li> <li>• valve for emergency shut off;</li> <li>• pump has one-way valve to prevent back flow;</li> <li>• regular assessment of all equipment and replacement as required;</li> <li>• spill mitigation procedures and equipment on site; and</li> <li>• qualified personnel (Master 4/5 on boat and Marine Engineer at tank) operating/conducting transfer.</li> </ul> <p>Other waste disposal is managed under <i>Environmental Protection (waste management) regulations 2004</i>.</p> <p><b>Not considered to be a key environmental factor.</b></p> |
| <p><b>SOCIAL SURROUNDINGS</b></p>                               |  |   |   |
| <p>Heritage –<br/>1.Kimberley Broad<br/>Regional Assessment</p> | <p>The proposal is an extension of an existing operational aquaculture operation. Significant consultation and liaison with local indigenous people has been undertaken to identify and discuss native title and culturally significant areas.</p>   | <p><u>Public:</u><br/>-There is concern that the approval of this proposal will lead to a large number of similar developments along the Kimberley coast. Can this development be postponed until the completion of the Kimberley Broad Regional Assessment to avoid piecemeal development of the area?</p>   | <p>Individual proposals are assessed on their merits. The EPA does not consider the operation will compromise the existing environment.</p> <p><b>Not considered to be a key environmental factor.</b></p>  |

| <b>OTHER</b>                      |  |  |   |
|-----------------------------------|--|--|---|
| Decommissioning (Bond and Surety) | The potential for irreversible changes to the proposed site and surrounding areas. | <p><u>Public</u></p> <p>- The need for a bond or surety scheme is clear for all aquaculture projects. When there is no bond or surety scheme and an operation has a significant environmental impact or the project collapses (as has occurred in the past, the taxpayer is left to pick up the costs for rehabilitation, if it is carried out at all. This is unacceptable and aquaculture project developers should be required to lodge a rehabilitation bond for all developments.</p> | <p>Managed by Department of Fisheries directly in accordance with the <i>Fish Resources Management Act 1994</i> (FRMA) and <i>Fish Resources Management Regulations 1995</i> (FRMR). A surety program is in place to ensure that a site is left in the same condition as it was prior to aquaculture operation, this is carried out through a bond during application for an aquaculture lease and secure of tenure.</p> <p><b>Not considered to be a key environmental factor.</b></p> |
| Precautionary Principle           | Not considered relevant to this proposal.  | <p><u>Public</u></p> <p>- The view of the proponent that the Precautionary Principle does not apply in this case is worrying.</p>  | <p>The impacts of the proposal have been analyzed under other factors and sufficient information has been provided by the proponent. The EPA is confident that the EPA's objectives will not be compromised by the proposal.</p> <p><b>Not considered to be a key environmental factor.</b></p>   |

| <b>PRINCIPLES</b>  |                        |   |
|--|------------------------|---|
| <b>Principle</b>   | <b>Relevant Yes/No</b> | <b>If yes, Consideration</b>  |
| <p>1. The precautionary principle</p> <p><i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i></p> <p><i>In application of this precautionary principle, decisions should be guided by –</i></p> <p>(a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p>(b) <i>an assessment of the risk-weighted consequences of various options.</i></p> | No                     | The EPA notes that the proponent has undertaken significant modeling to ensure the hydrodynamics of Cone Bay will not be compromised during the aquaculture operation and is satisfied with, and confident in, the predictions that have been made to ensure the nearby environment is adequately protected.  |
| <p>2. The principle of intergenerational equity</p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>  | No                     | <p>In considering this principle, the EPA notes that: aquaculture is a sustainable industry that is subject to regulations which ensure the ongoing productivity and health of the environment is maintained.</p> <p>The EPA also notes that :</p> <ul style="list-style-type: none"> <li>• site selection has minimized impacts on natural resources; and</li> <li>• ongoing environmental monitoring exists to assess water and benthic parameters. The management strategies have been developed to continually monitor and assess any impacts from the project including the development of triggers and management actions.</li> </ul> |
| <p>3. The principle of the conservation of biological diversity and ecological integrity</p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>  | Yes                    | <p>In considering this principle, the EPA notes that:</p> <ul style="list-style-type: none"> <li>• conservation of biological diversity and ecological integrity has been a fundamental consideration of this proposal;</li> <li>• site selection has minimized impacts on natural resources; and</li> <li>• ongoing environmental monitoring exists to assess water and benthic parameters. The management strategies have been developed to continually monitor and assess any impacts from the project including the development of triggers and management actions.</li> </ul>  |

| <b>PRINCIPLES</b>  |                        |  |
|--|------------------------|--|
| <b>Principle</b>   | <b>Relevant Yes/No</b> | <b>If yes, Consideration</b>   |
| <p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p> |                        |  |
|  | No                     |  |
| <p>5. The principle of waste minimisation</p> <p><i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i></p>  |                        |  |
|  | Yes                    | <p>The proponent has indicated that:</p> <ul style="list-style-type: none"> <li>• feed regimes will be monitored to reduce wastes produced;</li> <li>• regular equipment maintenance and the implementation of reduce, reuse and recycle waste ethos; and</li> <li>• a Waste Management Plan will be developed and implemented.</li> </ul> |

# **Appendix 4**

## **Recommended Environmental Conditions**

RECOMMENDED ENVIRONMENTAL CONDITIONS

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED  
(PURSUANT TO THE PROVISIONS OF THE  
*ENVIRONMENTAL PROTECTION ACT 1986*)**

**VARIATION TO EXISTING AQUACULTURE LICENCE 1465 TO  
INCREASE PRODUCTION TO 1000 TONNES PER YEAR PRODUCTION OF  
BARRAMUNDI IN CONE BAY,  
SHIRE OF DERBY-WEST KIMBERLEY**

**Proposal:** To produce 1,000 tonnes per annum of Barramundi in Cone Bay, 215 kilometres north-northeast of Broome, Shire of Derby-West Kimberley, with the use of eight nursery and 20 grow out sea cages.

The proposal is further documented in schedule 1 of this statement.

**Proponent:** Maxima Pearling Company Pty Ltd

**Proponent Address:** PO Box 843, BROOME WA 6725

**Assessment Number:** 1642

**Report of the Environmental Protection Authority:** Report 1305

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

**1 Proposal Implementation**

1-1 The proponent shall implement the proposal as assessed by the Environmental Protection Authority and documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

**2 Proponent Nomination and Contact Details**

2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

### **3 Time Limit of Authorisation**

- 3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.
- 3-2 The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

### **4 Compliance Reporting**

- 4-1 The proponent shall submit to the CEO of the Department of Environment and Conservation environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO of the Department of Environment and Conservation to report more frequently.
- 4-2 The environmental compliance reports shall address each element of an audit program approved by the CEO of the Department of Environment and Conservation and shall be prepared and submitted in a format acceptable to the CEO of the Department of Environment and Conservation.
- 4-3 The environmental compliance reports shall:
  - 1. be endorsed by signature of the proponent's chief executive officer or a person, approved in writing by the CEO of the Department of Environment and Conservation, delegated to sign on behalf of the proponent's chief executive officer;
  - 2. state whether the proponent has complied with each condition and procedure contained in this statement;
  - 3. provide verifiable evidence of compliance with each condition and procedure contained in this statement;
  - 4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement;
  - 5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement;
  - 6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance;
  - 7. review the effectiveness of all corrective and preventative actions taken; and

8. describe the state of implementation of the proposal.

4-4 The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO of the Department of Environment and Conservation.

## **5 Sediment and Water Quality Monitoring**

5-1 The proponent shall prepare and conduct a Sediment and Water Quality Monitoring Program to the requirements of the Department of Environment and Conservation.

5-2 The Sediment and Water Quality Monitoring Program required by condition 5-1 shall include the monitoring of the following parameters within the water column, sediment or both:

1. chlorophyll-a;
2. light attenuation co-efficient;
3. dissolved nutrients;
4. dissolved oxygen; and
5. redox discontinuity,

at the reference sites (Table 2 of schedule 1) and appropriate sites within the “moderate”, “high” and “maximum” zones of ecological protection (Figure 1 of schedule 1).

5-3 The proponent shall continually demonstrate that:

1. Within the zone of Moderate Ecological Protection (shown in Figure 1 of schedule 1), the proponent shall achieve median results no greater than the 95<sup>th</sup> percentile and no less than the 5<sup>th</sup> percentile (no less than 60% saturation of dissolved oxygen) guideline ‘trigger’ levels of normal distribution for the parameters mentioned in condition 5-2 from the reference sites (Table 2 of schedule 1).
2. Within the zone of High Ecological protection (shown in Figure 1 of schedule 1), the proponent shall achieve median results no greater than the 80<sup>th</sup> percentile and no less than the 20<sup>th</sup> percentile (no less than 60% saturation of dissolved oxygen) guideline ‘trigger’ levels of normal distribution for the parameters mentioned in condition 5-2 from the reference sites (Table 2 of schedule 1).
3. Within the Zone of Maximum Ecological Protection (shown in Figure 1 of schedule 1), the proponent shall detect no changes from the normal distribution of the reference sites (Table 2 of schedule 1) for the parameters mentioned in condition 5-2.

5-4 In the event that a guideline “trigger” level referred to in condition 5-3 is exceeded, the proponent shall report the matter to the Department of Environment and Conservation within one working day of determining that

this has occurred, and shall initiate an investigation against the environmental quality standards into the cause of the exceedance in accordance with the framework developed in the *State Water Quality Management Strategy No. 6: Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Water Quality Monitoring and Reporting* (Government of Western Australia, Report no. SWQ6), to the requirements of the Department of Environment and Conservation.

- 5-5 In the event that an environmental quality standard referred to in condition 5-6 is exceeded, the proponent shall report the matter to the Department of Environment and Conservation within one working day of determining that this has occurred and initiate a management response to determine the source and remedy the exceedance in accordance with the implementation framework for the *National Water Quality Management Strategy*, to the requirements of the Department of Environment and Conservation.
- 5-6 The proponent shall establish Environmental Quality Standards utilising data on the number and density of benthic infauna, the variety and types of marine life and nutrient cycles gathered from ongoing monitoring of the reference sites (Table 2 of schedule 1) to the requirements of the Department of Environment and Conservation.

#### Notes

1. Where a condition states “on advice of the Environmental Protection Authority”, the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.
2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.
3. The Minister for Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.
4. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.
5. Compliance reporting should be undertaken in accordance with the framework set out in Figure 4 of *A framework guide to the development of environmental monitoring programs for marine aquaculture in seagrass dominated coastal environments in South Australia* (A collaborative project between the South Australian Environmental Protection Authority and the Western Australian Department of Environment, October 2004).

## Schedule 1

### The Proposal (Assessment No. 1642)

The proposal involves the production of 1,000 tonnes of Barramundi per annum through the construction of 20 'grow-out' and eight 'nursery' sea cages in an aquaculture operation in Cone Bay, Shire of Derby-West Kimberley.

An area of approximately 700 hectares of Cone Bay, currently licensed by the Department of Fisheries will be utilised for an aquaculture operation under licence no. 1465.

The proposal will include a:

- maximum production of 1,000 tonnes per annum of Barramundi (*Lates calcarifer*);
- maximum of 20 grow-out sea cages with circumference ranging between 40 and 80 metres with 5 metres deep side walls and a maximum central depth of 8 metres; and
- maximum of 8 nursery cages at 6m x 6m x 5m with polyester knotless nets with mesh size of between 6 and 10mm.

The proposal is described in the following document – *Cone Bay 1,000 tonne barramundi production proposal – Public Environmental Review document* Maxima Pearling Company Pty Ltd (April 2008).

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in sections 1.0 to 2.0 of the project public environmental review document.

### Summary Description

A summary of the key proposal characteristics is presented in Table 1.

**Table 1: Summary of key proposal characteristics**

| Element   | Description  |
|---|--|
| <b>General</b>  |  |
| Life of Project   | <ul style="list-style-type: none"> <li>• Increase production over 3 years to a maximum of 1000 tonnes per annum</li> <li>• Ongoing</li> </ul>  |
| Location  | <ul style="list-style-type: none"> <li>• Aquaculture Licence Site 1465, Cone Bay, Buccaneer Archipelago, Western Australia, ~215km NNE of Broome</li> </ul>  |
| Species Cultured  | <ul style="list-style-type: none"> <li>• Barramundi (<i>Lates calcarifer</i>)</li> </ul>   |
| Expected Barramundi production  | <ul style="list-style-type: none"> <li>• 1,000 tonnes per year maximum</li> </ul>  |
| Sea Cage characteristics (mesh size, net type) <ul style="list-style-type: none"> <li>• Nursery</li> <li>• Grow out</li> </ul>  | <ul style="list-style-type: none"> <li>• Polyester knotless with mesh ranging between 6 &amp; 10mm</li> <li>• Outer net- 3.2mm galvanized steel wire or high density polyethylene (HDPE)</li> <li>• 50mm HDPE or nylon bird exclusion nets</li> <li>• HDPE floatation device, handrail and strachion</li> <li>• Nets of 2 different types will be utilized: 1 x 25mm (2.8mm gauge); 1 x 32mm (3.2mm gauge) constructed of marine wire</li> </ul> |
| Feed input <ul style="list-style-type: none"> <li>• Source</li> </ul>   | <ul style="list-style-type: none"> <li>• 1,500 tonnes per year maximum</li> <li>• Sinking pellets from an Australian feed manufacturer.</li> </ul>   |
| Waste produced (Nitrogen and Phosphorous in solid and dissolved form) <ul style="list-style-type: none"> <li>• Maximum (based on Feed Conversion Ratio of 1:5)</li> </ul> | <ul style="list-style-type: none"> <li>• 238 kilograms per day maximum</li> </ul>  |

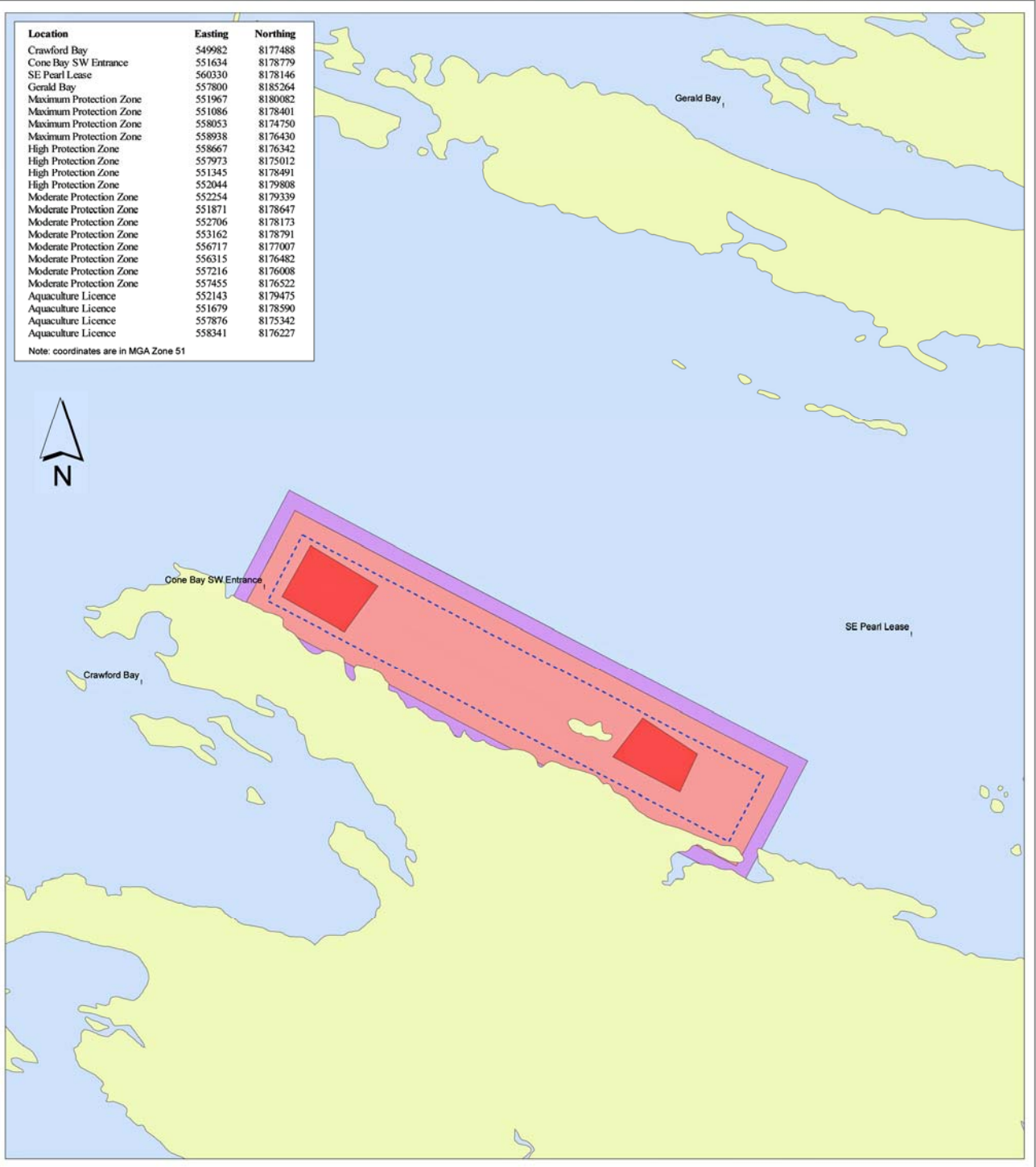
Key  
 kg/m<sup>3</sup> = kilograms per cubic metre

Figure and Table (attached)

Figure 1: Zones of ecological protection

Table 2: Reference sites for determination of Environmental Quality Guidelines (EQG)

Environmental Protection Authority  
**Cone Bay: Zones of Ecological Protection**



| Location                 | Easting | Northing |
|--------------------------|---------|----------|
| Crawford Bay             | 549982  | 8177488  |
| Cone Bay SW Entrance     | 551634  | 8178779  |
| SE Pearl Lease           | 560330  | 8178146  |
| Gerald Bay               | 557800  | 8185264  |
| Maximum Protection Zone  | 551967  | 8180082  |
| Maximum Protection Zone  | 551086  | 8178401  |
| Maximum Protection Zone  | 558053  | 8174750  |
| Maximum Protection Zone  | 558938  | 8176430  |
| High Protection Zone     | 558667  | 8176342  |
| High Protection Zone     | 557973  | 8175012  |
| High Protection Zone     | 551345  | 8178491  |
| High Protection Zone     | 552044  | 8179808  |
| Moderate Protection Zone | 552254  | 8179339  |
| Moderate Protection Zone | 551871  | 8178647  |
| Moderate Protection Zone | 552706  | 8178173  |
| Moderate Protection Zone | 553162  | 8178791  |
| Moderate Protection Zone | 556717  | 8177007  |
| Moderate Protection Zone | 556315  | 8176482  |
| Moderate Protection Zone | 557216  | 8176008  |
| Moderate Protection Zone | 557455  | 8176522  |
| Aquaculture Licence      | 552143  | 8179475  |
| Aquaculture Licence      | 551679  | 8178590  |
| Aquaculture Licence      | 557876  | 8175342  |
| Aquaculture Licence      | 558341  | 8176227  |

Note: coordinates are in MGA Zone 51

**Legend**

- Reference site
- Aquaculture licence
- Moderate protection zone
- High protection zone
- Maximum protection zone

0 0.25 0.5 1 1.5 2 km

Projection: Map Grid of Australia Zone 50  
 Datum: Geocentric Datum of Australia, 1994

**Data Source**  
 Moderate Protection Zone (DEC 2008)  
 High Protection Zone (DEC 2008)  
 Maximum Protection Zone (DEC 2008)

**Analysis**

**Presentation**  
 Environmental Protection Authority (2008)

This map is produced for the Environmental Protection Authority. Both map and report are produced by the Environmental Protection Authority, an independent advisory body on the environment.

This map depicts the location of the protection zones in accordance to the Cone Bay aquaculture licence area.

Disclaimer: This map is intended as a generalised interpretation of environmental issues. The information contained on this map is to be considered indicative only and in no event shall the Environmental Protection Authority be liable for any incident or consequential damages resulting from use of the material.

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**Figure 1: Zones of ecological protection.**

**Table 2: Reference sites for determination of Environmental Quality Guidelines (EQG)**

| Number | Location             | Longitude     | Latitude      | Depth (m) |
|--------|----------------------|---------------|---------------|-----------|
| 1      | SE Pearl Lease       | 123°33.9136'E | 16° 28.6580'S | 8.6       |
| 2      | Cone Bay SW Entrance | 123°29.025'E  | 16° 28.327'S  | 9.8       |
| 3      | Crawford bay         | 123°28.098'E  | 16° 29.029'S  | 10.5      |
| 4      | Gerald Bay           | 123° 32.481'E | 16° 24.801'S  | 11.5      |

## **Appendix 5**

### **Summary table of the proponents' commitments**

| No. | Topic  | Action  | Objectives   | Timing   |
|-----|--|---|--|--|
| 1   | Environmental Monitoring and Management Plan | <p>The proponent will prepare a more comprehensive EMMP that addresses:</p> <ol style="list-style-type: none"> <li>1. Water Quality Management.</li> <li>2. Benthic Quality Management.</li> <li>3. Mangrove System Management.</li> <li>4. Coral Reef System Management.</li> <li>5. Biota Management.</li> <li>6. Environmental Quality Criteria (EQC) and trigger values developed.</li> <li>7. Management responses.</li> <li>8. Auditing, review and liaison procedures.</li> </ol>  | To minimise direct and indirect impacts associated with the sea cage system on fauna, flora, water quality, coral reef systems, mangroves and benthic substrate. | Preparation prior to commencement of proposal. |
| 2   | Environmental Monitoring and Management Plan | Implement the approved EMMP referred to in commitment 1.  | As for objectives in commitment 1.   | Prior to, during and post operation.           |
| 3   | Water Quality Management                     | <p>Prepare a Water Quality Management program as part of the EMMP that:</p> <ol style="list-style-type: none"> <li>1. Identifies the concentration of nutrients and other environmental parameters in the water column.</li> <li>2. Develops a comprehensive monitoring schedule.</li> <li>3. Creates EQC for parameters that may have an impact on water quality.</li> <li>4. Develops a management plan in the event that unacceptable nutrient levels are detected or environmental parameters are impacted (EQC are exceeded).</li> </ol> | To maintain acceptable water quality within the proposal site and the surrounding waters.  | Preparation prior to commencement of proposal. |
| 4   | Water Quality Management                     | Implement the approved Water Quality Management Program referred to in commitment 3.  | As for objectives in commitment 3.   | Prior to, during and post operation.           |

|   |                              |  |  |  |
|---|------------------------------|--|--|--|
| 5 | Benthic substrate management | <p>Prepare a Benthic Quality Management Program as a part of the EMMP that:</p> <ol style="list-style-type: none"> <li>1. Identifies the concentration and zone of nutrients and other environmental parameters within the benthic substrate.</li> <li>2. Creates EQC for parameters that may have an impact on the benthic substrate and benthic biota.</li> <li>3. Develops a fallowing program.</li> <li>4. Develops a comprehensive monitoring schedule.</li> <li>5. Develops a management action plan in the event that unacceptable nutrient levels are detected or environmental parameters are impacted (EQC are exceeded).</li> </ol> | To maintain acceptable levels of environmental impact on the benthic substrate and to maintain abundance and diversity of benthic biota. | Preparation prior to commencement of proposal. |
| 6 | Benthic substrate management | Implement the approved Benthic Quality Management Program referred to in commitment 5.   | Achieve the objectives in commitment 5.  | Prior to, during and post operation.           |
| 7 | Mangrove system management   | <p>Prepare a Mangrove Management Program as a part of the EMMP that:</p> <ol style="list-style-type: none"> <li>1. Avoids direct and minimises indirect impacts on all mangrove systems within Cone bay and the zone of influence.</li> <li>2. Where mangroves may be impacted, management's objective will be no net loss of function or value.</li> </ol>  | To minimise impacts (both direct and indirect) on mangrove systems to ensure no net loss of function or value.                           | Preparation prior to commencement of proposal. |
| 8 | Mangrove system management   | Implement the approved Mangrove Management Program referred to in commitment 7.  | Achieve the objectives in commitment 7.  | Prior to, during and post operation.           |
| 9 | Reef system management       | <p>Prepare a coral reef management program as part of the EMMP that:</p> <ol style="list-style-type: none"> <li>1. Avoids direct and minimises indirect impacts on all reef systems within Cone Bay and the zone of influence.</li> <li>2. Where reefs may be impacted, management's objective will be no net loss of function or value.</li> <li>3. Develops a monitoring schedule.</li> <li>4. Creates EQC for parameters that may have an impact on the reef systems.</li> <li>5. Develops a management plan in the event that environmental parameters are impacted (EQC are exceeded).</li> </ol>   | To minimise impacts (both direct and indirect) on reef systems to ensure no net loss of function or value.                               | Preparation prior to commencement of proposal. |

|    |                                 |   |  |  |
|----|---------------------------------|---|--|--|
| 10 | Reef system Management          | Implement the approved Coral reef Management Program referred to in commitment 9.   | Achieve the objectives in commitment 9.  | Prior to, during and post operation.           |
| 11 | Biota management                | Prepare Biota management program as part of the EMMP that: <ol style="list-style-type: none"> <li>1. Minimises impacts on all biota at the proposed site and within the region.</li> <li>2. Implements strategies to minimise attraction of fauna to sea cage system.</li> <li>3. Minimise boating activity.</li> <li>4. Promotes boating regulations and awareness of boating safety to protect mega fauna and other marine biota in the region.</li> <li>5. Records all biota observations and activities.</li> </ol>   | To minimise impacts (both direct and indirect) on marine biota.  | Preparation prior to commencement of proposal. |
| 12 | Biota management                | Implement the approved Biota management Program referred to in commitment 11.   | Achieve the objectives in commitment 11.   | Prior to, during and post operation.           |
| 13 | Disease and parasite management | Prepare a Barramundi Health Management and Emergency Plan (BHMEP) which: <ol style="list-style-type: none"> <li>1. Minimises the occurrence of disease or parasite outbreak by utilising biosecurity best practices.</li> <li>2. Abides by translocation legislation.</li> <li>3. Notifies the Chief Veterinary Officer (CVO) and WA Department of Fisheries Director (WAFD) of any suspected disease or parasite outbreak of pathogenic origin immediately.</li> <li>4. Limits the spread of disease by best isolating suspected infected fish and/or culling.</li> <li>5. Develops a sampling protocol to enable correct diagnosis by the Veterinary Health Laboratories.</li> <li>6. States all instructions given by the CVO and WAFD in regards to treatment of diseased fish must be adhered to.</li> <li>7. Develops a contingency plan for any disease outbreak.</li> </ol> | To minimise the occurrence of disease or parasite outbreak and if suspected minimise the impact the disease or parasite outbreak has on the environment. | Preparation prior to commencement of proposal. |

|    |                                 |  |   |  |
|----|---------------------------------|--|---|--|
| 14 | Disease and parasite management | Implement the approved BHMEP referred to in commitment 13.   | Achieve the objectives in commitment 13.  | Prior to, during and post operation.           |
| 15 | Cyclone procedures management   | Update and improve the current Cyclone Procedures Protocol that incorporates: <ol style="list-style-type: none"> <li>1. Preparation procedures for the land based nursery system.</li> <li>2. Preparation procedures for the sea cage system.</li> <li>3. Preparation procedures for staff, equipment and other island infrastructure.</li> <li>4. A contingency plan in the event cyclone damage occurs.</li> </ol> | To minimise the impacts associated with cyclone damage of sea cage and island infrastructure to the surrounding environment.      | Prior to and during operation.                 |
| 16 | Cyclone procedures management   | Implement the Cyclone Procedures Protocol referred to in commitment 15.  | Achieve the objectives in commitment 15.  | Prior to, during and post operation.           |
| 17 | Fuel and Chemical Management    | Prepare a toxic and hazardous substances protocol which will include: <ol style="list-style-type: none"> <li>1. Fuel and Chemical storage facilities.</li> <li>2. Best practice usage.</li> <li>3. A fuel spill contingency plan.</li> </ol>   | To minimise the use of fuel and chemicals and in the event of a fuel or chemical accident minimise the impact to the environment. | Preparation prior to commencement of proposal. |
| 18 | Fuel and Chemical Management    | Implement the approved Fuel and Chemical Management Plan referred to in commitment 17.   | Achieve the objectives in commitment 17.  | Prior to, during and post operation.           |

|    |                                 |   |   |  |
|----|---------------------------------|---|---|--|
| 19 | Staff and Stock Management      | <p>Prepare a standard operating procedures protocol for the purpose of staff training and stock management that will include the requirements and procedures for:</p> <ol style="list-style-type: none"> <li>1. The nursery facility.</li> <li>2. The sea cages.</li> <li>3. Feeding.</li> <li>4. Harvesting and transport.</li> <li>5. Biosecurity.</li> <li>6. Environmental monitoring.</li> <li>7. Animal Husbandry techniques.</li> <li>8. Occupational, Health and Safety.</li> <li>9. Code of Conduct.</li> </ol>  | To provide all staff with the training and knowledge to ensure correct husbandry techniques and procedures are continuously upheld and allow for a successful operation and a safe working environment. | Preparation prior to commencement of proposal. |
| 20 | Staff and Stock Management      | Implement the approved standard operating procedures protocol referred to in commitment 19.   | Achieve the objective in commitment 19.   | Prior to, during and post operation.           |
| 21 | Environmental Management System | <p>Prepare an Environmental Management System (EMS) in alignment with the ISO14001 standards that includes:</p> <ol style="list-style-type: none"> <li>1. Monitoring of key environmental factors.</li> <li>2. Management of environmental impacts from the sea cages.</li> <li>3. A process to ensure the planning, implementation and operation of actions meets environmental requirements.</li> <li>4. Measurement and evaluation of environmental improvement.</li> <li>5. Review and improvement of all management programs.</li> <li>6. Reporting requirements.</li> </ol> | To monitor environmental performance by managing the environmental impacts and implementing regular reviews of all operating procedures and programs to ensure environmental best practice.             | Preparation prior to and during operation.     |
| 22 | Environmental Management System | Implement the approved EMS referred to in commitment 21.  | Achieve the objectives in commitment 21.  | During and post operation.                     |

|    |                       |   |  |  |
|----|-----------------------|---|--|--|
| 23 | Waste Management Plan | <p>Prepare a Waste Management Plan that incorporates:</p> <ol style="list-style-type: none"> <li>1. Waste minimisation, reduction, reuse and recycling principles and strategies.</li> <li>2. Procedures and processes for waste disposal.</li> <li>3. Environmental best practice of waste disposal and management.</li> </ol>   | To ensure that waste generated is managed and disposed of in a practicable manner so as not to become litter.                | Preparation prior to and during operation. |
| 24 | Waste Management Plan | Implement the approved WMP referred to in commitment 23.  | Achieve the objectives in commitment 23.   | During and post operation.                 |
| 25 | Best Practice         | <p>Undertake research and development into improving all aspects of the proposal operations including:</p> <ol style="list-style-type: none"> <li>1. Annual analysis of industry wide research and development practices and processes.</li> <li>2. Research into the use and/or incorporation of improved and relevant techniques, equipment and processes.</li> <li>3. Regular communications with national R &amp; D organisations including: <ul style="list-style-type: none"> <li>• Australian Barramundi Farmers Association (ABFA)</li> <li>• Fisheries Research and Development Corporation (FRDC)</li> <li>• Aquafin Cooperative Research Centre (Aquafin CRC)</li> </ul> </li> </ol> | To ensure continual improvement in all operations and procedures of the proposal and the best practice is being implemented. | During operations.                         |

# **Appendix 6**

## **Summary of Submissions and Proponent's Response to Submissions**

# MAXIMA

## PEARLING CO PTY LTD

ACN 009 251 441 / ABN 70 009 251 441

PO Box 843  
BROOME WA 6725

Environmental Protection Authority  
Locked Bag 33  
Cloisters Square  
PERTH WA 6850

Attention: Amy Sgherza

**RE: CONE BAY 1000 TONNE BARRAMUNDI PRODUCTION PROPOSAL – PROPONENTS RESPONSE TO SUBMISSIONS RECEIVED REGARDING PER DOCUMENT – AMENDED 11<sup>TH</sup> SEPTEMBER 2008**

| Submission Number | Stakeholder                   | Response/Outcome   |
|-------------------|-------------------------------|--|
| 1                 | Unidentified person/persons   | See corresponding issues and responses below.  |
| 2                 | Unidentified person/persons   | See corresponding issues and responses below.  |
| 3                 | Department of Fisheries (DoF) | <p>Comment is provided on the potential impact of the proposal and recommendations are provided for the environmental management of the site below:</p> <ul style="list-style-type: none"><li>• The PER covers the environmental issues adequately and includes discussion of expected impacts on water quality, benthic quality, and marine habitats. All relevant risks are identified with appropriate management strategies. The proponents' commitments in this regard are strengthened by the statutory arrangements implemented by the DoF which will be achieved via licence conditions.</li><li>• The DoF supports the proposal to develop in consultation with the DoF and DEC a more comprehensive EMMP to incorporate the proponents' commitments, <i>Fisheries Resource Management Regulations 1995</i> requirements and annual reporting commitment to the DoF for assessment and reporting back to the DEC.</li><li>• The environmental assessment of this proposal is occurring at the same time that the DoF is progressing</li></ul> |

|   |  |   |
|---|--|---|
|   |  | <p>to formalise arrangements for environmental management of aquaculture in WA, which includes an “Environmentally Sustainable Development” (ESD) Risk Assessment process for the finfish aquaculture sectors in consultation with the DEC. An outcome of this process will be that emissions will be managed in accordance with Codes of Practice and to develop a Memorandum of Understanding between the DoF and DEC. These are currently being draft. The DoF will also be developing aquaculture licence conditions and Environmental Monitoring Plans.</p> <ul style="list-style-type: none"> <li>• The DoF believes that the proponent has operated (pearl and Barramundi farm operations) within Cone Bay appropriately and that the carrying capacity of the bay will not be exceeded.</li> <li>• The DoF is currently developing a project to monitor finfish aquaculture across the state to develop and test a Decision Support Tool for Aquaculture. The Cone Bay proposal will form part of that project and allow both the DoF and DEC to consider these types of proposals in a much more informed manner in the future.</li> </ul> |
| 4 | Department for Planning and Infrastructure (DPI), Coastal Engineering                          | No comment to make on this proposal with the understanding that no dredging will occur to accommodate the new aquaculture licence, that the sea cage structures will be relocatable should damage from coastal processes be imminent and that no new infrastructure will be needed for the land based operations.   |
| 5 | Daryl Moncrieff (Kimberley Regional Manager, Department of Environment and Conservation (DEC)) | See corresponding issues and responses below.   |
| 6 | Keiran McNamara (Director General, Department of Environment and Conservation (DEC))           | See corresponding issues and responses below.   |

**Issue 1 (refer to submissions 1 and 2): Will the expansion of the sea cage system and infrastructure impact on Turtle Island.**

Maxima Pearling Company (MPC) has operated in Cone Bay since 1989 and as a result Turtle Island has a number of work operation and housing facilities already in existence. The facilities are substantial and as stated in the PER document no additional infrastructure is required on Turtle Island (Section 2.3.3). Currently MPC has 12 cages in operation within Cone Bay aquaculture licence site 1465 and only 8 more will be required to produce 1,000 tonne of Barramundi per annum. As a result additional infrastructure requirements are minimal to obtain the proposed production goal.

**Issue 2 (refer to submissions 1 and 2): Can this development be postponed until the completion of the Kimberley Broad Regional Assessment to avoid piecemeal development of the area.**

The completion of the Kimberley Broad Regional Assessment is not expected until July 2010 and the response states "No new development should be permitted in the meantime" (as stated in submission 1). Waiting until this time for the approval for this proposal is an unreasonable constraint on MPCs business and would result in significant financial loss to the company. In addition as this proposal is an extension of an already existing operation and the culture of Barramundi in a sea cage system is undertaken within licence 1465 site, MPC does not consider this a new development, instead MPC is seeking a variation to current licence conditions.

**Issue 3 (refer to submissions 1, 2 and 6): Consideration of the Buccaneer Archipelago (including Cone Bay) to be reserved as a multiple-use marine park.**

The reserves selection working group paper states that if Buccaneer Archipelago was to be reserved as a multiple-use marine park. Aquaculture would not be excluded and as such aquaculture ventures such as this one could be conducted within the region. Also, licence site 1465 is an aquaculture licence that allows the production of a number of species including Barramundi, which is already being cultured in a sea cage system at the site.

In addition, the reserves selection working group paper with the recommendation to consider the Buccaneer Archipelago as a multiple use marine park was released in 1994 by CALM and yet the process is yet to start and as such a completion date for the process has not been stated. Taking into consideration that the recommendation was made 14 years ago, there is no guarantee that the process will be completed by July 2010. As such, waiting until the process for Marine Parks and Reserves Selection to be completed (as recommended by submission 2) is an unreasonable constraint on MPCs business in particular as licence 1465 is already in existence and is being utilised for the culture of Barramundi.

**Issue 4 (refer to submission 1 and 2): There is concern that approval of this proposal will lead to development of a large number of similar developments along the Kimberley coast.**

The concern that the approval of this proposal may encourage others to follow suit is not relevant nor any business of MPC. Current regulations ensure that each proposal submitted is judged on its own merits and approval is granted with a set of licence conditions (as per government policy) that must be adhered to. In addition, the DoF is currently developing a project to monitor finfish aquaculture across the state to develop and test a Decision Support Tool for Aquaculture. The Cone Bay proposal will form part of that project and allow both the DoF and DEC to consider these types of proposals in a much more informed manner in the future.

**Issue 5 (refer to submission 1): A great deal more rigour should be applied to the health testing proposed for fingerlings.**

Health testing and all fish movement is conducted in adherence with the Department of Fisheries WA "The Translocation of Barramundi (*Lates calcarifer*) for Aquaculture and Recreational Fishery Enhancement in Western Australia", Fisheries Management Paper No. 159 and therefore comply with current regulations that address this issue. All known diseases

that affect Barramundi are endemic to wild stock within the Timor Sea Drainage Basin which encompasses Cone Bay. These include diseases of concern such as Nodavirus and *Streptococcus iniae* for which fingerlings being transported from accredited hatcheries to Cone Bay are tested. It is therefore a greater risk that disease will be contracted by the cultured fish from the wild stock population instead of in the reverse. This is because farmed fish are cultured at a greater density than they would occur naturally (per com. Dr Brian Jones, Senior Pathologist, WA Fisheries).

**Issue 6 (refer to submission 1, 2 and 5): What is the expected increase in nutrient output from the land based tanks situated on Turtle Island with the increase in sea cage production and how will the waste water be treated or dealt with to prevent release of pathogens or treatment chemicals into the surrounding waters.**

The land based tank system has been operating at full capacity for approximately 2 years and as a result the treatment of wastewater has been addressed to the satisfaction of WA Fisheries and the DEC and licence conditions (all outgoing water must be filtered to 200 microns before release to the environment) have been determined to ensure MPC fulfil their obligations. The proposed production increase to 1,000 tonne of Barramundi per annum does not require any further increases in size or water flow to the land based tank system which is currently operating at full capacity.

**Issue 7 (refer to submission 1 and 2): Hydrological models should be verified and water movement should be monitored to include seasonal variation.**

Flushing rates within Cone Bay were determined by two independent, well respected companies Brown and Root Services Asia Pacific Pty Ltd in the year 2000 and Asia-Pacific Applied Science Associates (APASA) in 2006. Results obtained by Brown and Root demonstrate that the site is 95% flushed within 2 hours during the modelling period (based on tidal data for 23 -28 March 2000 (spring tide)). Flushing rates are somewhat lower during neap tide, although 95% flushing still takes place within a few hours (see Appendix B, Section 2.3.1.4). The APASA model results suggested that for the existing morphology, the Cone Bay licence area was completely flushed within 2 days during both December (wet season) strong spring currents and June (dry season) weak neap currents. Flushing times were not greatly affected by introduction of the sea cages during a spring tide but flushing took approximately one day longer (3 days) during the neap tide (see Appendix B, Section 3.5). Drogue studies were undertaken by Brown and Root in Cone Bay between the 21<sup>st</sup> and 23<sup>rd</sup> January 2000 and observed current velocities and direction verified predictions provided by the hydrodynamic modelling exercise. The drogue studies also demonstrate that wind velocity and direction had very little influence on water currents (drogues were deployed simultaneously at 2 depths (at 0 metres and 5 metres)) and as such tidal variation is a greater influence on water movement than season.

**Issue 8 (refer to submission 1 and 2): What are the risks and consequences of elevated nutrient levels during the dry season on the surrounding environment? Comparing nutrient outputs from the sea cages to peak natural outputs during the wet season is inappropriate.**

Elevated nutrient levels during the dry season can impact water and sediment quality by reducing DO levels, decreasing light penetration to BPPHs, inducing algal blooms and causing changes to abundance and diversity of benthic infauna. As such to ensure elevated nutrient outputs from the sea cages are detected these outputs have not been nor will they be compared to naturally occurring outputs during the wet season. As stated in the PER, Section 6.6.2, seasonal variation is difficult to define and use as background data and as such, nutrient levels resulting from the sea cage

operation are compared to nutrient levels at the reference sites for each given sampling date to reduce bias that may occur due to seasonal and/or tidal variations. This is because during the wet season, elevated nutrient levels occur within the region because of the large amounts of run-off that occur after heavy rainfall and tidal variation influences flushing rates of nutrients and TSS within the bay.

**Issue 9 (refer to submission 1 and 2): With the intensification of production there is concern over the increased likelihood of disease occurrence within cultured stock and transmission to wild population.**

As stated in the response to issue 5, it is a greater risk that disease will be contracted by the cultured fish from the wild stock population instead of in the reverse. This is because all known disease that affects Barramundi are endemic to the local wild population and as farmed fish are cultured at a greater density than they would occur naturally (per com. Dr Brian Jones, Senior Pathologist, WA Fisheries) there is a greater risk of transmission from the wild population to the farm stock. Farmed fish may be at risk from the wild population, but there are no documented instances of cultured fish causing disease epidemics among wild fish. Evidence that diseases from farmed stocks do affect wild stocks is circumstantial (Fisheries WA, 1999).

**Issue 10 (refer to submission 1 and 2): The risk of escapes cannot be ignored and a contingency plan should be developed.**

MPCs business is fish farming and considerable expense is incurred in maintaining fish in a secure environment. As a result "tested" mooring systems and best quality nets are utilised that have proven to be able to withstand adverse weather conditions and predators, and routine inspection and replacement of all components of the sea cage system is conducted (PER, Section 4.2.4). MPC is aware of fish escapes that have occurred in the Northern Territory but believes the risk is much lower in Cone Bay as licence site 1465 is more suitable for fish farming procedures and the mooring system has been designed specifically for the local conditions. It is assumed that escaped fish would breed with the local population but it is probable to have minimal if not negligible impact on the genetic makeup of local barramundi stocks. "Scientifically recognised authorities believe there is no direct evidence that mixing gene pools will have detrimental effects on local endemic barramundi populations and have argued that, among barramundi stocks, genetic differences have been demonstrated only for populations, not for individual fish, and that it is the proportion of genes present that differs between different river systems, not the actual genes", Fisheries Management Paper No. 127 (Fisheries, 1999).

Although the company believes the risk is low, a netting program, or other mitigation strategies, would be considered if WA Fisheries thinks it appropriate.

**Issue 11 (refer to submission 1): The perception that mud sediment is not considered important.**

"Species diversity and overall abundance of macrozoobenthic species in King Sound are very low, thus indicating a very hostile environment especially for sessile animals", is a direct quote from a paper written by Pearson and colleagues in 1998 who conducted a sediment survey of the King Sound. MPC is not dismissing mud sediment as unimportant and as demonstrated by regular monitoring and analysis of sediment chemistry and benthic Infauna which is a very considerable part of the EMMP.

**Issue 12 (refer to submission 1 and 6): Management units need to be clearly defined and established in accordance with Guidance Statement 29 *Benthic Primary Producer Habitat Prediction for Western Australia's Marine Environment* (EPA, 2004) and the use of phrases such as 'unacceptable impacts' and 'minimal' should be avoided and performance standards with clearly stated targets that have to be met should be established.**

The management unit for this proposal is described as licence site 1465 which is 699.41 hectares (or 7 km<sup>2</sup>). Further detail is provided in the PER, Section 3.1.

Three levels of protection have been assigned to the proposal area and surrounding waters as follows:

- Maximum level of protection outside the licence area;
- High level of protection within the proposal site; and
- Moderate level of protection to the areas directly beneath the sea cages.

In relation to the maintenance of ecosystem integrity the environmental quality guidelines (EQG) for each level of protection are as follows:

- Maximum level of protection – The median sample site value of all water and sediment quality parameters does not fall outside the 30<sup>th</sup> or 70<sup>th</sup> percentile of the natural distribution for each parameter at the reference sites for that sampling date;
- High level of protection – The median sample site value of all water and sediment quality parameters does not fall outside the 20<sup>th</sup> or 80<sup>th</sup> percentile of the natural distribution for each parameter at the reference sites for that sampling date; and
- Moderate level of protection – The median sample site value of all water and sediment quality parameters does not fall outside the 20<sup>th</sup> or 80<sup>th</sup> percentile of the natural distribution for each parameter at the reference sites for that sampling date.

Environmental quality standards (EQS) are not able to be ascertained from baseline data or ongoing data collected to date due to seasonal and tidal variations. However, with ongoing monitoring and analysis, seasonal and tidal patterns may be established after a number of years that may then be utilised to establish EQS. Until this time it was determined after discussion with the EPA that the environmental quality criteria (EQC) would be most effective as a percentile-based calculation using the percentile values presented above. This is further described in the revised EMMP in addition to monitoring sites and parameters. It should be noted that there is an impact/confirmation site (station 3) located on the western boundary of licence site 1465. This has been added to the monitoring program to ensure that there is no significant impact outside of the licence boundaries ie: that the high level of protection is maintained and that the median sample site value of all water and sediment quality parameters does not fall outside the 20<sup>th</sup> or 80<sup>th</sup> percentile of the natural distribution for each parameter at the reference sites for that sampling date.

**Issue 13 (refer to submission 1, 2, 5 and 6): Effectiveness of Environmental Monitoring and Management Plan (EMMP)**

**The development of Environmental Quality Criteria (EQC)/ Application of EQC and Environmental Quality Standards (EQS):**

MPC does not feel that a BACI design is suitable for this proposal as there is insufficient historical data available to ascertain seasonal and tidal influence. As a result it was determined after discussion with the EPA that the environmental

quality criteria (EQC) would be most effective as a percentile-based calculation and cage sites would be compared to reference sites on each sampling date utilising the levels of protection and EQG stated in issue 12. The justification for comparing results and determining EQCs on any given sampling date (not using historical data) is because the influence of seasonal and tidal variations on this site can not be determined and as such it is not known if results are because of the sea cage operation or other environmental factors. As a result the 20<sup>th</sup> and 80<sup>th</sup> percentiles of the reference site data have not yet been determined. Further more, it should be noted that the EMMP is performance based, whereby if water and sediment quality parameters fall outside the percentile values MPA/MPC is to take either corrective actions, increase monitoring or both measures to remediate the situation.

This issue has been further addressed in the Cone Bay EMMP – Revised July 2008 on advice from the DEC and in consultation with the DoF.

**Appropriate environmental monitoring sites:**

To ensure appropriate site selection, Cameron Sims (EPA Marine Services Branch) assisted with site selection of the reference sites now utilised after visiting the Cone Bay site and surrounding waters. The reference sites chosen are representative of the cage sites in relation to depth, tidal flow and the proximity to potential land run off but at a distance and direction that would not be influenced by the sea cage operation. In addition an impact/confirmation site (station 3) located on the western boundary of licence site 1465 has been included. This has been added to the monitoring program to ensure that there is no significant impact outside of the licence boundaries ie: that the high level of protection is maintained and that the median sample site value of all water and sediment quality parameters does not fall outside the 20<sup>th</sup> or 80<sup>th</sup> percentile of the natural distribution for each parameter at the reference sites for that sampling date. For further detail please refer to the Cone Bay EMMP – Revised July 2008.

**Issue 14 (refer to submission 1 and 2): It is of concern that the proponent does not consider The Precautionary Principle to be relevant in this case.**

The precautionary principle was not applied to this proposal as MPC does not feel that the proposal will cause serious or irreversible damage to the region. The greatest impact is expected to occur to the benthic environment beneath the cages but studies by SARDI have shown that although significant changes have been detected in the sediment quality and the benthic organisms since the inception of tuna farming, no permanent effects have been detected and recovery (described as a return to normal function) of the benthic environment occurs within 3-6 months (Cheshire *et al*, 2005). Even so an environmental impact and risk assessment was conducted (PER, Section 4) and the Cone Bay EMMP - Revised July 2008 addresses potential impacts, a comprehensive monitoring program and management strategies that will apply to this proposal to minimise any negative impact this proposal may cause. In addition MPC has given careful consideration to avoiding serious or irreversible damage to the environment during initial planning stages and in production at the site to date.

**Issue 15 (refer to submission 1 and 2): The lack of an aquaculture bond and surety scheme.**

MPC is currently in discussions with the Department of Fisheries, WA regarding this topic of bonds and surety schemes. However, the EMMP has demonstrated to date that the impacts of sea cage culture are localised and all research documentation has shown that any impact that may occur is reversible in sites suitable to finfish culture. In addition

ongoing monitoring, analysis and reporting to the DEC will ensure that operation conditions are abided by and environmental obligations are met.

**Issue 16 (refer to submission 5 and 6): What are the impacts and risks to water and sediment quality if overfeeding was to occur, and why there is a variation in Feed Conversion Ratio (FCR) modelling data between 1.2 and 1.5.**

If overfeeding was to occur water and sediment quality could potentially be impacted. There is potential accumulation of excess nutrients in the water column which could in turn lead to a depletion of dissolved oxygen (DO), and an increase in phytoplankton, in addition to an increase in Total Suspended Solids (TSS) in the water column which could reduce light penetration to the BPPHs. There is the potential for uneaten food to deposit and accumulate on the sediment which would lead to excess nutrients and a decrease in DO within the sediments which could further impact on BPPHs and benthic Infauna. Further detail regarding the impacts and risks to water and sediment quality associated to overfeeding can be located in the PER, Sections 4.8, 4.9, 4.10 and 4.13.

The revised EMMP describes how water and sediment quality will be monitored and managed should there be a significant change. The EMMP is performance based and will determine if any changes in water and sediment quality has occurred and investigate whether these impacts (if any) are related to food consumption. The EMMP includes a number of management responses that will be triggered if EQC are exceeded.

MPC calculated the nutrient waste outputs utilising a FCR of 1.2 and 1.5 to represent the expected output (FCR of 1.2) and the worst-case scenario (FCR Of 1.5) in the PER. The worst-case scenario was presented to inform all relevant stakeholders and interested parties of the maximum waste output that could occur in the production of 1,000 tonne of Barramundi. Because a FCR of 1.2 or lower has been achieved to date, MPC believes that this can be maintained as production levels increase. It is important to note that the addition of food is an operational response and as such MPC does not wish to place a limit on food consumption as suggested in submission 6 (wanted to limit food to 1,200 tonnes of food per annum) as FCRs could change and may increase to 1.5 if fish were on-grown for a longer period of time resulting in larger fish than have been grown in the past or if changes in feed quality (decrease in marine proteins or oils/increase in vegetable proteins or oils) occur that may affect feed efficiency. Feeding fish is the largest expense in an operation such as this, and as such it is in MPCs best interest to minimise feed to reduce costs.

**Issue 17 (refer to submission 5): Do the current procedures used for transferring diesel from the barge to the island comply with the Department of Consumer and Employment Protection (DOCEP) methods for best practice.**

MPC contacted the Department of Consumer and Employment Protection (DOCEP), Resource Safety unit in regards to the procedures used to transfer diesel from the barge to the island. It was deemed satisfactory as the following equipment and methodology are utilised:

- High pressure fuel grade hoses;
- High pressure fittings at entry and exit points;
- One length of pipe between the barge and tank with no connection fittings;
- Valve for emergency shut off;
- Pump has one-way valve to prevent back flow;

- Regular assessment of all equipment and replacement as required;
- Spill mitigation procedures and equipment on site; and
- Qualified personnel (Master 4/5 on boat and Marine Engineer at tank) operating/conducting transfer.

**Issue 18 (refer to submission 5): Have the *Environmental Protection (Unauthorised Discharges) Regulations 2004* in relation to waste management, particularly, the burning of waste been met as the incineration of biodegradable paper and card products is of concern.**

Presently all paper and card products are incinerated as there is very little suitable space for composting of these materials as a large percentage of Turtle Island is rock. MPA/MPC does compost all food scraps but feels that paper and card would not break down fast enough to enable the area to be reused within a suitable time frame. If deemed necessary, MPA/MPC is willing to transfer paper and card products to the Derby Waste Facility when all other rubbish is transported.

**Issue 19 (refer to submission 5): The Department of Environment and Conservation's (DEC) Kimberley Region Office has received no annual monitoring reports to date.**

MPC (Jason Garwood) has made contact with the Department of Environment and Conservation (DEC) in relation to the annual monitoring reports. MPC was advised that it would be appropriate to combine results from April 2006 to April 2008 into one report (email correspondence from Elizabeth Whisson (DEC, Kimberley Region) dated 11<sup>th</sup> February 2008). Currently MPC is waiting for analysis of samples collected in April 2008 from the independent laboratory before submitting this report. MPC has been in regular contact with the laboratory regarding this matter and it is expected that analysis will be finalised in the very near future and the report will proceed within a week after results are received. The 2005/2006 report was sent to the DEC in February 2006.

**Issue 20 (refer to submission 6): Inappropriate definition of management units and lack of benthic primary producer habitat impact predictions.**

The management unit was defined as the boundaries of the aquaculture licence area based on a number of modelling predictions provided in Appendix B (Cone Bay PER) which assisted in determining the zone of influence generated from the sea cage system. The first was the predicted deposition rates for fish waste and food waste which was determined for December 2005 and June 2006. Results obtained were virtually identical demonstrating the dominance of settling velocities and tidal processes over variations in wind between the wet and dry seasons. Another common result for all simulations is the tendency for material to settle close to the release sites and along the general east-west tidal axis (accumulation occurs to the east during the flood and west during the ebb). For the minimum threshold concentration of 0.01g/m<sup>2</sup>/day, settlement distance for fish waste was estimated as up to 250m from a given discharge source along the main tidal axis. For the fish pellets, this distance was reduced to approximately 130-140m. These distances provide a guide to the distance that cages should be away from the licence boundaries to minimise escape of fish waste and fish food from the aquaculture site (Appendix B, Section 3.6).

The second important factor was the estimated accumulation of outputs from two adjacent medium production fish farms (Appendix B, Section 3.7) in which the BFMASS model was utilised. As part of the study BFMASS was used as a

conservative tracer (no reaction or decay) and neutrally buoyant constituting a “worst case” scenario. The same horizontal ( $10 \text{ m}^2/\text{s}$ ) and vertical ( $0.001 \text{ m}^2/\text{s}$ ) diffusion coefficients were used as in modelling the dispersion and settlement of waste products. Equal amounts of dissolved waste were released from 4 points in Cone and Crawford Bay aquaculture licences (see Appendix B, Figure B40,). The releases were simulated for two 30 day continuous release periods using currents for December 2005 and June 2006. Please note, based on baseline studies, the background Total Nitrogen and Total Phosphorus were estimated at approximately  $130 \text{ }\mu\text{g/L}$  ( $\sim 0.130 \text{ g/m}^3$ ), however as part of this modelling study the background concentrations values were set at  $10 \text{ }\mu\text{g/L}$  ( $\sim 0.010 \text{ g/m}^3$ ), to assess **if any** accumulation or interaction takes place between the two adjacent medium production farms, since this would be a worst case situation.

The model results indicated that the dissolved nutrient concentrations were strongly affected by tidal cycles within the bays. The concentrations increased within the licence area during the periods of slack tidal currents and decreased when the currents became stronger during either the flood or ebb events. The time series graphs show that the predicted concentrations at the western sector were 50% less than that of the dissolved concentrations at the Cone Bay sea cage release site (Appendix B, Figure B41).

Appendix B, Figures B42 – B44 showing the predicted concentration of dissolved nutrient concentrations during 3 distinctive observed stages: (a) initially noticeable accumulation reaching and exceeding the level of  $0.01 \text{ g/m}^3$  ( $10 \text{ }\mu\text{g/L}$ ) after 7 days in December 2005 and after 3 days in June 2006 (Appendix B, Figure B42); (b) the maximum accumulation of up to  $0.02 \text{ g/m}^3$  ( $20 \text{ }\mu\text{g/L}$ ) occurring during neap tides (Appendix B, Figure B43) with a consequent significant dilution during spring tides (Appendix B, Figure B44). From the obtained results there was no observed overlap of dissolved nutrient footprints from these two adjacent medium production fish farms even during the two 30 day simulations.

The zones of impact assigned for this proposal as stated in the Cone Bay PER (page 61) are as follows:

- Maximum level of protection outside the licence boundaries;
- High level of protection within the proposal site (except for the area directly beneath the sea cages); and
- Moderate level of protection for the areas beneath the sea cages.

The zones of impact are represented in figures 6.6 and 6.7 of the Cone Bay PER (pages 63 and 64).

MPC has on advice from the DEC revised the Cone Bay EMMP in consultation with the DoF and have as such included a sampling station on the western boundary of the licence area due to the direction of the currents and the expected zone of influence. This station is designed to confirm that the impact does not extend beyond the licence area and will also serve as an early warning indicator of possible effects (Cone Bay EMMP – Revised July 2008, Page 83).

#### **Issue 21 (refer to submission 6): Lack of benthic primary producer habitat impact predictions.**

Substantial underwater video imagery was provided in the Cone Bay PER which validates the absence of sensitive communities. Video data was collected from 11 transects to ensure all aspects of the licence area were investigated and this data confirmed that licence site 1465 is primarily a mud based substrate. In the near future DoF will be detailing a bathymetric map of Cone Bay which is being used as a study site for a FRDC funded project.

**Issue 22 (refer to submission 6): The risks to conservation significant fauna have not been adequately explored and acknowledged in the PER.**

MPC has been operating in Cone Bay since 1988 and during this time, there has been no evidence of entanglement or negative interaction with significant fauna such as turtles or whales. MPC does acknowledge that significant fauna may utilise the surrounding habitat of Cone Bay and as such have included a "Wildlife Interaction Avoidance Strategy" in the revised Cone Bay EMMP to prevent the proposal negatively impacted on these animals.

**Issue 23 (refer to submission 6): It is unclear how the proponent has come to the conclusion that the risk to fauna as a result of changes in feeding patterns and distribution is low to moderate according to the risk assessment presented in the PER, there is a lack of detail with regard to fauna management issues and contingencies.**

Sections 4.3, 4.4 and 4.5 of the Cone Bay PER discuss the provision of additional food source from waste feed, entanglement of marine life in nets and the provision of artificial habitat to marine fauna in greater detail and provide tables demonstrating the risk matrix (table 4.1), risk ranking (table 4.2), species level consequence categories (table 4.3) and likelihood assessment guidelines (table 4.6) relating to the changes in feeding patterns and distribution. These assessments were made with the use of biota log data collected since the inception of the first sea cage trial in early 2004 and from 20 years of general observations of MPC personnel. A low to moderate risk rating was obtained as very few fauna are observed during feeding time and it is unusual for the same species of fauna to be observed on a daily basis. As a result MPC does not feel that long-term recruitment/dynamics are adversely impacted and the impact is localised. Even so MPC have developed a "Wildlife Interaction Avoidance Strategy" which is included in the Cone Bay Sea Cage Aquaculture Environmental Monitoring and Management Plan – Revised July 2008 which addresses fauna management issues and contingencies.

**Issue 24 (refer to submission 6): The proponent has not referred the project to the Department of Environment, Water, Heritage and the Arts (DEWHA) for consideration of assessment under the EPBC Act.**

The proposal was referred to the Department of Environment and Heritage and a letter dated 31<sup>st</sup> March 2006 was received stating that a referral under the EPBC Act would not appear to be warranted.

## **References**

Cheshire AC, Fernandes M, Loo M & Lauer P; 2005; *The Impact of Tuna Farming on Benthic Systems: Effects and Recovery*; In: Abstracts – World Aquaculture Conference 2005; Bali; Indonesia.

Department of Fisheries WA; 1999; *The Translocation of Barramundi. A Discussion Paper*; Fisheries Management Paper No. 127.

Department of Fisheries WA; 2002; *The Translocation of Barramundi (*Lates calcarifer*) for Aquaculture and Recreational Fishery Enhancement in Western Australia*; Fisheries Management Paper No. 159.

Pearson G, M Lavaleye, E Oldmeadow & M Pepping; 1998; *Preliminary Report on the Benthic Invertebrate/Sediment Survey of King Sound*.