

**POINT CEYLON (SUNTAY) AQUACULTURE
ESTATE**

**ENVIRONMENTAL ASSESSMENT REPORT
AND RECOMMENDATIONS**

By the Office of Environment and Heritage
Department of Infrastructure, Planning and Environment

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EXECUTIVE SUMMARY

This report assesses the environmental impacts of the proposal by Suntay Aquaculture Pty Ltd (Suntay Aquaculture) to build and operate a prawn aquaculture farm at Point Ceylon near Bynoe Harbour. This project has been identified throughout this report as the Point Ceylon (Suntay) Aquaculture Estate (PCAE).

This Assessment Report reviews the draft Environmental Impact Statement (EIS) and Supplement to the EIS. It also relies on information, comments and advice provided by Northern Territory Government agencies, comments from the public and previous studies undertaken in the region.

Environmental Assessment is the process of defining those elements of the environment that may be affected by a development proposal and of determining the significance, risk and consequences of the potential impacts of the proposal.

Major Issues

The principal environmental issues identified by the proponent and this assessment are:

1. site design and layout;
2. land clearing and erosion control;
3. weeds and pests;
4. biting insects;
5. water management;
6. waste management; and
7. decommissioning and rehabilitation.

The potential benefits associated with the proposal include:

- significant economic growth;
- employment and training; and
- export of a premium product.

Conclusion

It is considered that the environmental issues associated with the project have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Construction and Operational Environmental Management Plans.

Initially, the EIS, the Supplement and recommendations detailed in this Assessment Report will form the basis for Suntay Aquaculture's management and monitoring commitments. The Operational Environmental Management Plan will be a working document for the operation of the facility and will require continual review and updating in the light of operational experience and changed circumstances.

This facility will require licensing under the *Water Act* and the *Fisheries Act* and will be required to comply with any licence conditions as well as regulations set down by those Acts.

In addition, expansion from the Stage One pilot to the full scale facility will be dependent on demonstration of successful operation and environmental management and “proof of concept” of the aquaculture method proposed, as licensed under the *Water Act* and the *Fisheries Act*.

Provided the environmental commitments and safeguards detailed in the EIS and the Supplement are implemented, the recommendations in this Assessment Report are adopted and regular reviews and reporting are undertaken, significant long term environmental impacts are expected to be avoided or minimal.

SUMMARY OF RECOMMENDATIONS

Recommendation 1

Suntay Aquaculture Pty Ltd shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Point Ceylon Aquaculture Estate Environmental Impact Statement (summarised in Table 7-1), as made in the Supplement to the EIS and as recommended in this Assessment Report. All safeguards and mitigation measures outlined in the EIS are considered to be commitments by Suntay Aquaculture Pty Ltd.

Recommendation 2

Prior to the expansion of the facility from Stage One to the full scale development, approval shall be sought from the Office of Environment and Heritage and shall be based on demonstration of the successful operation and environmental management of Stage One (including the proposed new farming technique).

Recommendation 3

In accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act* the proponent shall advise the Minister of any changes to the proposal, including an “open” or “recirculating” production system with discharges to the environment, for determination of whether further environmental impact assessment is required.

Recommendation 4

An Environmental Management Plan that covers the construction phase of Stage One of the PCAE shall be submitted to the Office of Environment and Heritage and DBIRD for approval, prior to construction commencing.

Recommendation 5

An Environmental Management Plan for the operational phase of Stage One of the PCAE shall be submitted to the Office of Environment and Heritage and DBIRD for approval prior to commencement of operations.

Recommendation 6

Prior to construction, a certified civil engineer shall review and amend, where necessary, the plans for all ponds, dams and earthen water-retaining structures to ensure their stability, water holding capacity and groundwater protection. Certified plans shall be submitted to DIPE for approval prior to construction.

Recommendation 7

The hatchery should be relocated to a site away from Point Ceylon to ensure increased separation between the hatchery and the pearling operations in Bynoe Harbour. The preferred location would be on a site with access to and drainage into Wheatley Creek.

Recommendation 8

The stormwater drainage system for the facilities should be designed and constructed to ensure all drainage is into Wheatley Creek.

Recommendation 9

A biting midge and mosquito breeding survey of the development area should be undertaken at a specific time for expected peaks of both biting midge adults and salt marsh mosquito larvae. This survey should be carried out in consultation with the Medical Entomology Branch of the DHCS.

Recommendation 10

Clearing should be staged in accordance with the timing of construction of the facilities as described in the EIS.

Recommendation 11

An Erosion and Sediment Control Plan (ESCP) shall be included as a part of the construction EMP.

Recommendation 12

Stabilisation of exterior pond walls and cleared areas shall be to the satisfaction of DIPE.

Recommendation 13

A wash down procedure for all vehicles entering the site and an inspection and wash down procedure for all heavy machinery imported to the site shall be implemented as part of the Construction EMP.

Recommendation 14

In the event that zero discharge is not achieved, whether from the production facilities or from the hatchery, the proponent shall obtain the necessary Waste Discharge Licence under the *Water Act* and comply with any conditions of such a licence.

Recommendation 15

There shall be no washing of sludge in the drying beds. All water used for washing sludge shall be returned to the ponds for reuse in the production cycle.

Recommendation 16

A waste management plan for general site operations shall be included in the operational EMP.

Recommendation 17

The NT Government should continue investigations into introducing a system requiring proponents to lodge a bond or similar to be used for rehabilitation in case of failure of an aquaculture production facility.

Recommendation 18

The proponent shall consult with the Natural Resources Management Division of DIPE on the need for a mangrove monitoring program within the EMP (Recommendations 4 and 5).

Recommendation 19

PCAE shall assist NT Authorities in estimating emissions of listed substances for the National Pollution Inventory by providing information required to report aggregated emissions for the industry. Information needed includes:

- **annual crop production;**
- **annual stock feed (including N & P content); and**
- **annual fertiliser used (including N & P content).**

INTRODUCTION AND BACKGROUND

This report assesses the potential environmental impacts of a proposal by Suntay Aquaculture Pty Ltd to build and operate a prawn aquaculture farm on Point Ceylon, Bynoe Harbour. This facility is to be known as the Point Ceylon (Suntay) Aquaculture Estate (PCAE).

This Assessment Report relies on information, comments and advice provided by Northern Territory Government agencies, Non-Government Organisations and the public, and previous studies undertaken in the region.

1.1 Environmental Assessment Process

Environmental impact assessment is based on adequately defining those elements of the environment that may be affected by a proposed development, and on evaluating the significance, risks and consequences of the potential impacts of the proposal at a local and regional level.

The Environmental Impact Statement (EIS), submitted by the proponent (and made up of the draft EIS and appendices, and the Supplement to the EIS), provides a description of the existing environment in the area and the proposed operations, and evaluates the environmental impacts and proposed measures to minimise the expected impacts.

This Assessment Report describes the adequacy of the EIS in achieving the above objectives and evaluates the undertakings and environmental safeguards proposed by the proponent to mitigate the potential impacts. Further safeguards may be recommended as appropriate.

The safeguards may be implemented at various levels within the planning framework of a project. These include, but are not limited to:

1. site selection;
2. design and layout of facilities;
3. management of construction activities;
4. processes used in operations and facilities (ie. inputs and outputs); and
5. management of operations, processes and facilities.

The contents of this Assessment Report form the basis of advice to the Northern Territory Minister for the Environment and Heritage (the Minister) on the environmental issues associated with the project.

1.2 Environmental Assessment History

Following the investigation of several possible sites for development, Suntay Aquaculture received an offer to purchase Section 3192, Hundred of Milnes from the landowner, NT Land Corporation, in August, 2002.

A Notice of Intent to develop an aquaculture estate was lodged with the Office of Environment and Heritage of the Department of Infrastructure, Planning and

Environment (DIPE) on 9 September 2002. On 25 October 2002, the Minister determined that the proposal would require formal environmental assessment, at the level of an Environmental Impact Statement under the provisions of the *Environmental Assessment Act* 1982. This determination took into account (among other things) that the proposal planned to implement new technology that hadn't been proven in the NT, involved high intensity farming, and that the site was adjacent to sensitive Pearl Oyster leases. The proposal was also referred to the Commonwealth Government for determination whether it required assessment under the provisions of the *Environment Protection and Biodiversity Conservation Act*. The Commonwealth determined that assessment was not required under its legislation.

Draft guidelines for the preparation of the EIS were advertised for public comment and circulated to NT Government advisory bodies for comment for a two week period from 11 January 2003. Final guidelines were prepared taking into account the comments received from government agencies and the community. One public submission was received. The Minister issued the final guidelines and a direction to the proponent to prepare the EIS on 13 February 2003.

The EIS was submitted on 26 July 2003 and placed on public review for 4 weeks from 26 July 2003 to 23 August 2003. It was also circulated to government advisory bodies for review and comment. Four public submissions were received. All submissions, including a consolidated NT Government submission were forwarded to the proponent for the preparation of a Supplement addressing the issues raised in the submissions. The issues raised in the submissions have been summarised at Appendix A.

2 THE PROPOSAL

Suntay Aquaculture proposes to build and operate a prawn aquaculture farm at Point Ceylon, a site adjacent to Bynoe Harbour in the Northern Territory.

Suntay Aquaculture seeks to produce a high quality product from the application of new, innovative and environmentally benign technology. Benefits are expected to the local economy through employment, technology development, revenue generation and local enterprise building.

The proposal aims to incorporate revolutionary technology that will result in an environment friendly, commercially sustainable, highly productive and efficient system with minimal to zero operational discharges to the environment.

It is proposed to develop the facility in two stages, with Stage Two commencing after the successful demonstration of the technology in Stage One.

Stage One of the facility incorporates:

- Total clearing of approximately 46.5 ha;
- 9 ha of production ponds;
- construction of a weir wall for freshwater harvesting;
- Removal of large trees from freshwater catchment (approximately 1.5 ha);
- Construction of freshwater weir storage (approximately 8 ha);
- Main production compound and buildings;
- Hatchery compound and buildings;
- Seawater intake and associated pipelines to hatchery, and production ponds;
- Associated access roads and pipeline corridors.

The full scale facility (Stage Two) incorporates:

- Total clearing of approximately 136 ha;
- 50 ha of production ponds;
- 16.5 ha of recirculation and harvest ponds;
- supporting supply and drain pipes;
- 30 ha of freshwater storage;
- 2nd phase breeding facility;
- 2nd phase processing shed;
- 2nd phase staff accommodation

The total area to be utilised will be about 180 ha. See Figure 4.1 from the EIS on the next page. Initially the product will be prawn (*Penaeus monodon*) but other prawns and fin-fish production may be included in the future.

3 ENVIRONMENTAL ASSESSMENT

3.1 Introduction

The information provided in the EIS has been assessed and then used, along with submissions from advisory bodies and the public, to determine the adequacy of the information provided by the proponent and the accuracy and acceptability of predicted impacts and safeguards. Comments and recommendations have been prepared in the form of this Environmental Assessment Report.

It is acknowledged that during implementation, flexibility is necessary and desirable to allow for minor and non-substantial changes to the proposal outlined in the EIS and examined as part of this assessment. It is considered that subsequent statutory approvals for this project could make provisions for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment. However, any changes or alterations and additions, including production of other species, that could have a significant effect on the environment may require further assessment under the *Environmental Assessment Act*.

It is important for interpretation purposes that the recommendations (in bold) are not considered in isolation, as the supporting text also identifies concerns, suggestions and undertakings associated with the project.

Safeguards and mitigation commitments undertaken by the proponent are summarised in Table 7-1 “Summary of Environmental Impacts, Safeguards and Monitoring” in section 7.3 of the EIS. Commitments are also made in the Responses to Comments in the Supplement to the EIS.

Subject to decisions that permit the project to proceed, the primary recommendation of this assessment is:

Recommendation 1

Suntay Aquaculture Pty Ltd shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Point Ceylon Aquaculture Estate Environmental Impact Statement (summarised in Table 7-1), as made in the Supplement to the EIS and as recommended in this Assessment Report. All safeguards and mitigation measures outlined in the EIS are considered to be commitments by Suntay Aquaculture Pty Ltd.

A second key recommendation is:

Recommendation 2

Prior to the expansion of the facility from Stage One to the full scale development, approval shall be sought from the Office of Environment and Heritage and shall be based on demonstration of the successful operation and environmental management of Stage One (including the proposed new farming technique).

A major commitment of the proponent is that there will be minimal to zero discharges to the environment from the operation of the PCAE. This assessment is based on the premise that there will be no discharges to the environment under normal operating conditions and that construction and operational measures will be in place to achieve that aim. Any changes to the proposal as described in the EIS are likely to cause significant impacts to the environment.

Recommendation 3

In accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act* the proponent shall advise the Minister of any changes to the proposal, including an “open” or “recirculating” production system with discharges to the environment, for determination of whether further environmental impact assessment is required.

3.2 Major Environmental Issues

The principal environmental issues identified by the proponent and this assessment are:

1. site design and layout;
2. land clearing and erosion control;
3. weeds and pests;
4. biting insects;
5. water management;
6. waste management;
7. decommissioning and rehabilitation.

3.3 Environmental Management Plans

An integral part of the environmental management of the PCAE will be the preparation and implementation of comprehensive Environmental Management Plans (EMPs) and their effective integration into other management plans relating to construction and operation of the development.

The EMPs will need to be developed for both aspects of the project, the construction and the operation. Each of these plans will require approval by the Office of Environment and Heritage and the Department of Business, Industry and Resource Development (DBIRD) prior to the commencement of construction and operation.

The EMPs will also need to identify the construction and operational management structure and a specific contact officer and contact details, where these have not been identified within the EIS.

Recommendation 4

An Environmental Management Plan that covers the construction phase of Stage One of the PCAE shall be submitted to the Office of Environment and Heritage and DBIRD for approval, prior to construction commencing.

Recommendation 5

An Environmental Management Plan for the operational phase of Stage One of the PCAE shall be submitted to the Office of Environment and Heritage and DBIRD for approval prior to commencement of operations.

The EMPs should incorporate, but not be limited to, aspects such as Water and Waste Management, Monitoring and Environmental Management. The plans should be routinely reviewed by Suntay Aquaculture, and any major amendments should be submitted to the Office of Environment and Heritage and DBIRD for approval. Additional EMPs will be required for the expansion to Stage Two, taking into account experience from the construction and operation of Stage One.

Both EMPs should incorporate the matters raised in this Assessment Report relevant to construction and operations.

3.4 Site Design and Layout

Given the large scale of the proposed project, aspects associated with water management and public focus on such facilities, and the potential for the site to be exposed to adverse weather such as cyclones, storm surge and torrential rain, a high standard of site design and construction is imperative.

Comprehensive and appropriate pond design and construction are particularly important to ensure that the operation of the facility does not impact adjacent sensitive users such as the pearling operations in Bynoe Harbour. As there is a wide range of local expertise within DIPE and DBIRD, the proponent is advised to liaise with these Departments to obtain relevant advice.

Recommendation 6

Prior to construction, a certified civil engineer shall review and amend, where necessary, the plans for all ponds, dams and earthen water-retaining structures to ensure their stability, water holding capability and groundwater protection. Certified plans shall be submitted to DIPE for approval prior to construction.

An independent review of the environmental risk assessment in the EIS concluded that the risk assessment met the requirements of AS 4360-1999 as to a scoping risk assessment for the whole proposal. The review recommended that the “high risk” events identified in Table 9 of Appendix 7 of the EIS be addressed in the Environmental Management Plan (see Recommendations 4 and 5).

The independent review noted that the potential for the production ponds and related facilities to affect Bynoe Harbour and the pearling operations is very remote because

of the distance between the ponds and the pearling farm. However, the review observed the breeding facility (hatchery) at Point Ceylon is much closer and appears to have a continuous discharge of waters. Further, there appeared to be no stated reason why the hatchery has to be located on Point Ceylon. If there is no alternative location, then a further risk analysis should be carried out as to the possibility of an impact, no matter how remote is the risk of total infection of the pearl stocks.

In a request for further information on this aspect of the proposal the proponent advised that the site was chosen because of its proximity to fresh saltwater for the hatchery and the need to be separated from the production ponds for biosecurity reasons. Biosecurity is one of the main concerns of the pearling operator and a relocation of the hatchery should overcome this concern. There are alternative sites for the hatchery with access to Wheatley Creek that would provide a good separation between the hatchery and the production ponds as well as to the pearling operations. In this location discharge from the hatchery would be into Wheatley Creek rather than directly into Bynoe Harbour.

Recommendation 7

The hatchery should be relocated to a site away from Point Ceylon to ensure increased separation between the hatchery and the pearling operations in Bynoe Harbour. The preferred location would be on a site with access to and drainage into Wheatley Creek.

The production facilities, roads and the other facilities should be designed so that stormwater drainage from the site is into Wheatley Creek and to the creek to the east of the facilities. There should be no stormwater runoff from the facilities into Bynoe Harbour.

Recommendation 8

The stormwater drainage system for the facilities should be designed and constructed to ensure all drainage is into Wheatley Creek

3.5 Biting Insects

The EIS included comprehensive goals for the management of biting insects on site. Design features have been incorporated into conceptual plans of water holding structures to prevent the creation of nuisance biting insect breeding sites. Because of the proximity of the PCAE site to known breeding habitats of biting midges and mosquitoes, the biting insect problems will not be eradicated by these management methods. Biting midges and mosquitoes will continue to be a health problem at the site throughout construction and operation.

Suntay Aquaculture has indicated that in line with recommendations of the Medical Entomology Branch of the Department of Health and Community Services (DHCS), they will implement measures to control or eliminate potential breeding sites and undertake regular inspections to ensure potential habitat areas are kept in check.

Suntay Aquaculture should continue to liaise with the Medical Entomology Branch throughout the construction and operation of the site on issues of biting insects.

Workers at the facility should be informed of the potential pest problem and encouraged to use personal protection measures when biting insect numbers are high. Reference should be made to the DHCS publications *Personal Protection for Mosquitoes & Biting Midges in the NT* and *Construction in Tidal Areas*.

Recommendation 9

A biting midge and mosquito breeding survey of the development area should be undertaken at a specific time for expected peaks of both biting midge adults and salt marsh mosquito larvae. This survey should be carried out in consultation with the Medical Entomology Branch of the DHCS.

3.6 Construction Issues

The site is currently undeveloped woodland, occupying an area of approximately 19 km² and 97 hectares. Preparatory works will involve the clearing of approximately 180 hectares of native vegetation for the full scale development, which includes around 45.6 hectares for Stage One alone. Other preparation includes earthworks, pond formation, and construction of necessary infrastructure

Suntay Aquaculture intends to begin construction of Stage One immediately all approvals have been obtained. It is envisaged that construction works will commence prior to the wet season 2003.

3.6.1 Land Clearing and Erosion Control

Farm layout should minimise necessary vegetation clearing and maximise the maintenance of vegetation corridors; however, the large scale clearing of vegetation from areas of low hills and drainage depressions has the potential to escalate land degradation.

Clearing of native vegetation is controlled under Interim Development Control Order No 12 made under the *Planning Act*. Any clearing in excess of 1 ha requires a development permit. The proponent has applied for the necessary permit. A determination has not been made as the Consent Authority must take into account the outcome of the environmental impact assessment.

Recommendation 10

Clearing should be staged in accordance with the timing of construction of the facilities as described in the EIS.

Earth works associated with land clearing and pond development have the potential to impact both surface and groundwater resources. Surface water resources can be contaminated through surface run-off. Groundwater will potentially be impacted by a change in the level of the water table associated with the loss of vegetation. Additionally, off-site discharge of surface drainage can cause undesirable sedimentation problems in low lying areas and waterways.

It is suggested that where possible, major earthworks should be conducted in the dry season. If the construction timetable extends into the wet season, attempts should be made prior to the onset of the wet season, to rehabilitate the disturbed areas or to apply other treatments to minimise the transport of sediment into low lying areas and waterways. The proponent should note that the use of hay bales is not acceptable as they often fail in extreme rainfall events and are notorious for spreading weeds.

Recommendation 11

An Erosion and Sediment Control Plan (ESCP) shall be included as a part of the construction EMP.

The ESCP guidelines are included at Appendix B.

A lack of stabilisation of cleared areas and pond wall slopes has the potential to cause sedimentation in water courses and downstream mangrove areas which may result in mangrove die back.

Recommendation 12

Stabilisation of exterior pond walls and cleared areas shall be to the satisfaction of DIPE.

The EIS commits to implementing appropriate dust control measures should dust levels prove to be an issue. Periodic watering of construction roads and earth materials is seen as a more effective method than attempting to predict conditions when dust is likely, or acting after high levels of dust are observed.

3.6.2 Introduced weeds, pests and diseases

With increased traffic movement on and off the PCAE site the potential for weeds to be spread around the Fog Bay/Darwin area through traffic movements is significant.

Introduced weeds are of particular concern during the construction phase where heavy earthmoving equipment may be sourced from around the Territory and interstate.

It is essential that prior to operation on site, machinery is washed down and inspected to ensure no weeds are present.

Recommendation 13

A wash down procedure for all vehicles entering the site and an inspection and wash down procedure for all heavy machinery imported to the site shall be implemented as part of the Construction EMP.

DIPE should be consulted on the best approach to prevent the importation or proliferation of weeds, pests and diseases.

3.6.3 Extractive Materials

It is important that extractive resources be utilised without creating significant disturbance and with regard to safety considerations. Legislative requirements that are directly applicable to this development are that:

- extractive materials are mined to a depth no greater than two metres below surface level; and
- borrow pits, where constructed, are to be progressively rehabilitated and made stable.

In the event that there is insufficient fill material available on site, it is a requirement that any extractive material supplied to the project is sourced from an operation that has been previously approved and authorised by the DBIRD.

3.6.4 Acid Sulfate Soils

The proposed development does not include any plans to disturb actual or potential acid sulfate soils. If plans are altered in any way, particularly if construction of a intake channel from Wheatley Creek is required, an Acid Sulfate Soils Management Plan must be prepared.

3.7 Operational Issues

Operation practices for the husbandry of prawns will include water uptake, pond maintenance, stocking, feeding, harvest and processing of the product. Water quality and run-off will therefore be areas of potential environmental impact. The waste outputs from the facility will also have the potential to impact the environment.

3.7.1 Water Management

The Darwin region is exposed to intense rainfall throughout the wet season. These events frequently produce flash floods and large quantities of run-off that are not generally experienced in other parts of Australia. The proposed site is also located adjacent to Bynoe Harbour and sensitive mangrove communities and pearl oyster leases. Given this and the nature of the development, water management will be a critical aspect of the environmental management of the PCAE.

The facility is planned as a minimal to zero discharge which should be achievable under normal conditions provided it is operated as set out in the EIS. There are however the possibilities that during extreme rainfall events there would be overflows from the ponds. The proponent has set in place a system that should contain flows in up to 1 in 30 year events. This is based on modelling using Darwin rainfall data over a 62 year period. The main feature of the system is that all contingent discharges are directed to Wheatley Creek.

For a zero discharge operation a Waste Discharge Licence under the *Water Act* will not be required. However, if there are any discharges from the operation, no matter how minimal, a Waste Discharge Licence under the *Water Act* will be required. The proponent needs to consult the Office of Environment and Heritage to ascertain acceptable water quality parameters and monitoring requirements for any discharges. Whether there are continual or intermittent discharges a licence will be required. The proponent should consult the Office of Environment and Heritage to ascertain whether a licence would be required to cover any contingent discharges.

It is not clear from the description of the hatchery whether there will be any discharges from the operations at the hatchery. The planned location of the hatchery is at Point Ceylon with any discharges entering directly into Bynoe Harbour and the nearby pearling leases. This supports the recommendation above that the hatchery should be relocated to a site with access to Wheatley Creek (see Recommendation 7). If feasible, consideration should be given to using water from the hatchery as makeup water for the production facility, ie a location closer to the production ponds may serve more than one purpose.

Recommendation 14

In the event that zero discharge is not achieved, whether from the production facilities or from the hatchery, the proponent shall obtain the necessary Waste Discharge Licence under the *Water Act* and comply with any conditions of such a licence.

3.7.2 Waste Management

Sludge from the production ponds is the main solid waste product that needs to be managed. A flow diagram provided with the Supplement indicates that sludge will be filtered out on a daily basis with the water returned to the harvest basin. The sludge will then be transferred to drying beds for drying. The intention is then to use the sludge as fertiliser on site or sold for off site use. In the EIS it is stated that the sludge will be washed with fresh water. It is assumed that the washing is part of the sludge filtering process and that all water will be returned to the harvest basin. The success of using the washed sludge for fertiliser would depend upon the removing all salt from the sludge.

Some sludge will be removed from the bottom of the ponds at harvest. This sludge will also be washed and dried in the same manner as the filtered sludge. Washing water from this operation should be returned to the ponds for reuse in the production cycle and not be discharged. Any stormwater runoff from the drying beds should be directed to Wheatley Creek (see Recommendation 7).

Recommendation 15

There shall be no washing of sludge in the drying beds. All water used for washing sludge shall be returned to the ponds for reuse in the production cycle.

Sewage and grey water from domestic operations will be treated in a plant to the requirements of the Department of Health and Community Services. A Site Specific Type Approval from the Department will be necessary.

A contractor will be used for collection and disposal of other general wastes. PCAE should consult with the Office of Environment and Heritage regarding appropriate waste disposal and general on-site waste management.

Recommendation 16

A waste management plan for general site operations shall be included in the operational EMP.

3.8 Decommissioning and Rehabilitation

Because at present the nature of the future surrounding land uses is unknown, development of decommissioning and rehabilitation goals, at this stage, is not appropriate. It has been agreed by the proponent, however, that decommissioning and rehabilitation of the site will be the responsibility of the proponent, and all actions must be approved by the relevant authorities at the time of decommissioning. All actions must be appropriate to the surrounding land uses at the time of decommissioning and rehabilitation.

It has been suggested that the proponent should be required to lodge a bond or surety equivalent to the cost of rehabilitating the site in the event the proposal fails at some stage. The size of such a bond is difficult to determine as the life of the proposal is indefinite at this stage. Lodging a bond may also have an adverse effect on the viability of the proposal. Both the DIPE and DBIRD have considered whether this should be introduced and if so how it can be implemented. No conclusions have been reached at this stage.

Recommendation 17

The NT Government should continue investigations into introducing a system requiring proponents to lodge a bond or similar to be used for rehabilitation in case of failure of an aquaculture production facility.

3.9 General Issues

The proponent has addressed the issues detailed in the EIS Guidelines of 13 February 2003; however, the EIS lacks detail in some areas resulting in uncertainty as to the impacts of the proposal, their mitigation and management. Where this uncertainty occurs, recommendations have been made to resolve this.

3.9.1 Noise

The proposed aquaculture facility is sufficiently distant from existing residential areas that off-site construction and operation noise will not be an issue.

On site exposure to noise, however, will be significant for workers and contractors particularly during construction, but also in the immediate vicinity of the generators during the operation of the facility. Suntay Aquaculture should liaise with NT Work Safe to ensure that appropriate Occupational Health and Safety practices are implemented.

3.9.2 Mangroves

Impacts to mangroves are expected to be minimal but will include changes relating to altered drainage patterns and lack of direct freshwater input from run-off:

A change in species composition may be observed where the facility inhibits the direct influx of fresh water into the mangroves. Altered morphology of vegetation may be observed from the changed hydrodynamics relating to an increased volume of water and from modified composition in the run-off water.

Recommendation 18

The proponent shall consult with the Natural Resources Management Division of DIPE on the need for a mangrove monitoring program within the EMP (Recommendations 4 & 5).

3.9.3 National Pollutant Inventory

The National Pollutant Inventory (NPI) is an Internet database designed to provide the community, industry and government with information on the types and amounts of certain substances being emitted to the air, land and water.

Since 1998, larger Australian facilities are required to estimate and report annually their emissions to the NPI. Estimation of emissions from smaller industry, households and everyday activities have been made by State and Territory environment authorities and listed on the data base.

The main objectives of the NPI are to:

- provide information to industry and government to assist in environmental planning and management;
- satisfy community demand for accessible information on emissions to the environment; and
- promote waste minimisation, cleaner production, and energy and resource savings.

The aquaculture industry is not required to report for the NPI until an industry handbook has been produced for their industry. However, the NT has produced an Aggregated Emissions Data (AED) Manual for Tropical Aquaculture.

Aggregated data is collected by the NT for facilities without a handbook and for mobile and non-industrial sources.

Recommendation 19

PCAE shall assist NT Authorities in estimating emissions of listed substances for the National Pollution Inventory by providing information required to report aggregated emissions for the industry. Information needed includes:

- **annual crop production;**
- **annual stock feed (including N & P content); and**
- **annual fertiliser used (including N & P content).**

4 CONCLUSION

It is considered that the environmental issues associated with the proposal have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Construction and Operational Environmental Management Plans.

Initially, the EIS and recommendations detailed in this Assessment Report will form the basis for the PCAE management and monitoring commitments. The Operational Environmental Management Plan will be a working document for the operation of the facility and will require continual review and updating in the light of operational experience and changed circumstances.

This facility will require licensing under the *Water Act* and the *Fisheries Act* and will be required to comply with any licence conditions as well as regulations set down by those acts.

In addition, expansion from Stage One to the full scale facility will be dependent on demonstration of successful operation and environmental management including waste water discharges, as licensed under the *Water Act* and the *Fisheries Act*.

Provided the environmental commitments and safeguards detailed in the EIS and the Supplement are implemented, the recommendations in this Assessment Report are adopted and regular reviews and reporting are undertaken, significant long term environmental impacts are expected to be avoided or minimal.

5 REFERENCES

Australian Prawn Farmers Association, 2000. *Environmental Code of Practice for Australian Prawn Farmers*

Preston, N. 2001. Co-operative Research Centre for Aquaculture, Personal Communication

Primavera, J. H. *et al*, 1993. *A survey of Chemical and Biological Products used in Intensive Prawn Farms in the Philippines*. Marine Pollution Bulletin 26:34-40

APPENDIX A

SUMMARY OF PUBLIC AND GOVERNMENT AGENCY COMMENTS ON THE EIS

Agency Areas of Concern

Issue/Agency	A	B	C	D	E	F	G
Planning	X						X
Water Storage Tanks (Cane Toads)			X				
Access Roads and Parking							X
Electricity and Communications			X				
Sewerage		X	X			X	X
Waste Generation and Management			X			X	
Hygiene and Quarantine						X	
Terrestrial Flora (Mangroves)	X	X					
Biting Insects	X						X
Water Quality		X					
Erosion and Sediment Control		X					
Impact on Marine Biota and Habitats		X		X			
Weed Invasion		X					

Agency Key:

- A** Department of Infrastructure, Planning and Environment
Development Assessment Services
- B** Department of Infrastructure, Planning and Environment
Conservation and Natural Resources Group
- C** Power and Water Corporation
- D** Department of Business, Industry and Resource Development
Executive
- E** Department of Business, Industry and Resource Development
Fisheries Group
- F** Department of Health and Community Services
Environmental Health
- G** Department of Health and Community Services
Medical Entomology
- H** Northern Territory Police
- I** Museum and Art Gallery of the Northern Territory

Public comments

Author	Comments
Steve & Donna Mahony	<ul style="list-style-type: none"> • Generally supported the proposal. • Need to seal Fog Bay Road because of increased traffic. • Need a properly supervised fire brigade in the area. • Need for a health centre in the Dundee Downs area.
Australian Marine Conservation Society & Environment Centre of the NT	<ul style="list-style-type: none"> • High resource use required for feed, particularly wild fish stocks together with fishing practices impacts • Discharge – overflow and waste products entering the adjacent environment. • Site impacts, ie clearing of 180 ha of vegetation, including monsoon vine forests, and associated impacts. • Rehabilitation and the need for the proponent to lodge a bond in case of failure.
AFANT	<ul style="list-style-type: none"> • Commends the proponent for the approach of zero discharge. • Concern about decommissioning and rehabilitation in case of failure and proponent not in a position to carry out remedial work.
Paspaley Pearls	<ul style="list-style-type: none"> • Opposed to the proposal because of concerns that it could have detrimental impacts on their operations in Bynoe Harbour, an integral part of the pearl growing operations. • Concerned that the “Belize method” will not work as it has not been proven in Australia. • Management of the production ponds and possible effluent discharges into Bynoe Harbour. • Similarly for the sludge processing which could also lead to discharges into Bynoe Harbour.

APPENDIX B

EROSION AND SEDIMENT CONTROL PLAN GUIDELINES

An Erosion and Sediment Control Plan (ESCP) is a plan that shows how to minimise soil erosion on, and sediment from, any type of construction site. These plans should communicate with all involved in undertaking any works on a site/land development, how erosion and sedimentation can be controlled on and offsite. The Natural Resources Division requires that an ESCP be submitted for **all on ground works**, which involve the clearing of land and subsequent exposure of soil to rainfall and runoff. The erosion and sediment control measures as outlined in the plan must/should be put in before any disturbance of the site occurs.

Site Layout

- Timing of construction.
- Locality plan identifying the development site and external catchment area.
- Plan scale, north arrow and benchmarks.
- Plans showing the existing topography and final site contours with cut and fill locations identified.
- The staging of works, including the staging of site clearing and topsoil stripping.
- Locations of all site access points, parking areas, site facilities and on-site roadways/tracks.
- Location of site storage and stockpile areas (sand, gravel, topsoil & building materials).
- Property boundaries.
- Contour levels.
- Erosion risk mapping – identification of low, medium, high and extreme risk areas.
- Recognised topographic site limitations to include aspects such as:
 - excessive slope gradients.
 - relevant design flood inundation lines.
 - rock outcrops
 - existing soil erosion or streambank erosion.
 - significant water bodies.
 - drainage problem areas.
- Location of erosion control/drainage structures.

Vegetation Layout

- General location, nature and condition of existing vegetation.
- Location plan of protected trees and bushland, non-disturbance areas and buffer zones – includes buffers to vegetation and watercourses.
- Natural vegetation to be retained – buffers – avoid area being used as a dumping ground.
- Revegetation landscape plan and critical areas of stabilising vegetation.
- Limits of clearing.

Soil Properties

- Location and limitations of major soil types.
- Identification of all known dispersive soils – including subsoils.
- Drainage depressions – problem soils – geotechnical report (eg. Land Unit 6a, 6b).
- Identification of any Potential Acid Sulphate Soils. (If such soils are present a treatment/management plan will be required).

Drainage and Land Management

- Plans for both temporary and permanent drainage, including design frequency/capacities, identification of all proposed overland flow paths or watercourses from the site.
- Location, type and timing (instigation and decommissioning) of all drainage, erosion and sediment control measures.
- Maintenance access ramps to major sediment control structures.
- Proposed grades and batter slopes.
- Location of disposal sites for trapped sediment.
- Return period proposed for earthworks.
- Gross pollutant trap identification and installation.
- Program for maintenance of erosion and sediment controls.

For more information please contact:

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