



PART A – Introduction and Description

GUIDELINES FOR PREPARATION OF A DRAFT

ENVIRONMENTAL IMPACT STATEMENT

ON THE PROPOSED SUNRISE AQUACULTURE ESTATE AT

POINT CEYLON (BYNOE HARBOUR) IN THE NORTHERN

TERRITORY

SUNTAY AQUACULTURE P/L

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1 INTRODUCTION

These Guidelines have been developed to assist Suntay Aquaculture Pty Ltd in preparing a Draft Environmental Impact Statement (EIS) for an aquaculture estate at Point Ceylon, Northern Territory, in accordance with Clause 8 of the Administrative Procedures of the *Environmental Assessment Act* 1982 of the Northern Territory. These (final) Guidelines consist of two sections:

- Part A (this section) is the introduction and description of the project and the EIS process; and
- Part B (attached) details the type and extent of information to be included in the Draft EIS. The list includes issues and concerns that were identified before the public and Government review period (for the Draft Guidelines) in addition to further information requirements identified in nineteen submissions that the Office of Environment and Heritage received on the Draft Guidelines.

2 PROJECT DESCRIPTION

The Notice of Intent submitted by Suntay P/L outlines a two-phase plan to develop a “closed system prawn farm with minimal to zero-discharge.” Phase 1 of the project will involve the development of approximately 15 hectares (including 5-10 hectares of production ponds). Phase 2 will require the further development of approximately 65 hectares (including 50 – 55 hectares of production ponds). The total development area will be approximately 100 hectares including 60 hectares of ponds with 30 hectares allocated for open space, farm infrastructure and staff accommodation. This includes approximately 5 hectares at the northern tip of the property for a hatchery and maturation facility.

The proposed infrastructure includes the following:

- Processing shed;
- Storage warehouse;
- Staff accommodation;
- Hatchery and maturation facility;
- Freshwater dam;
- Sedimentation/recycling basin; and
- Weir.

Initially, the development will produce prawns; however, future aquaculture might include fin- fish.

Suntay Aquaculture Pty Ltd aim to conform with the latest Food and Agricultural Organisation (FAO) code of responsible aquaculture, and apply recently developed principles to achieve the following outcomes:

- a “closed” system with minimal to zero-discharge;
- low saltwater and freshwater consumption;

- no soil leaching;
- no salinisation of groundwater;
- no impact on mangroves; and
- low phosphorous and nitrogen in waste water.

Important note: These Guidelines have been developed for a two-staged proposal, involving

- a total development area of 100 hectares (with 60 hectares of ponds);
- a closed-system prawn farm with discharges to the environment occurring only as transient contingent events (eg. unusually high rainfall or cyclones); and
- production ponds, sedimentation/recycling basin, a small hatchery and associated infrastructure.

If at some future stage the proponent desires to significantly expand its operations or operate

- in a non-closed manner;
- with fin-fish, crabs or other substantially different aquaculture species (ie. non-prawn); and/or
- using a substantially altered design (for infrastructure and process);

then the proponent will have to submit a new Notice of Intent to the Office of Environment and Heritage to determine if formal assessment (at the PER or EIS level) will be required.

The alterations identified above have an increased potential to significantly impact the environment (especially the nearshore waters off the lease area), and environmental assessment would likely require the proponent to do more extensive baseline surveys and on-going monitoring of the marine environment than those identified in these Guidelines.

In addition, the Executive Director of Fisheries can apply complementary conditions to the aquaculture licence to ensure that substantial deviations from the proposed design, processes, etc., as outlined in the Draft EIS, will be subject to further assessment.

3 PURPOSE OF THE EIS

The draft EIS aims to provide:

- a source of information from which individuals and groups may gain an understanding of the proposal, the need for the proposal, the economic and other benefits that might arise from the project, the alternatives, the environment that it would affect, the impacts that may occur and the measures taken to minimise those impacts;

- a basis for public consultation and informed comment on the proposal; and
- a framework against which decision-makers can consider the environmental aspects of the proposal, set conditions for approval to ensure environmentally sound development and recommend an environmental management and monitoring program.

The object of these Guidelines is to identify those matters that should be addressed in the draft EIS. The Guidelines are based on the initial outline of the proposal in the Notice of Intent. Not all matters indicated in the Guidelines may be relevant to all aspects of the proposal. Only those matters that are relevant to the proposal should be addressed. The Guidelines however are not necessarily exhaustive and should not be interpreted as excluding from consideration any matters which are currently unforeseen that emerge as important or significant from scientific studies or otherwise during the preparation of the draft EIS, the public consultation process and the preparation of the Supplement to the draft EIS (response to submissions).

The draft EIS should be a self-contained and comprehensive document written in a clear, concise style that is easily understood by the general reader. Cross-referencing should be used to avoid unnecessary duplication of text. Text should be supported where appropriate by maps, plans, diagrams or other descriptive material. Detailed technical information and baseline surveys should be included as appendices.

Content in the draft EIS should include both quantitative and qualitative analysis as appropriate. Impacts should not just be treated as adverse: beneficial effects should also be identified.

The justification of the project in the manner proposed should be consistent with the principles of ecologically sustainable development. Assessment of the environmental impacts of the proposal and alternatives should be comprehensive. For the purpose of these Guidelines, the “principles of ecologically sustainable development” are as follows:

- the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- inter- and intra-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
- conservation of biological diversity and ecological integrity; and
- improved valuation and pricing of environmental resources.

4 EIS PROCESS

The Northern Territory Minister for the Environment determined (on 13 September 2002) that the proposal (as described in the Notice of Intent submitted by Suntay Aquaculture Pty. Ltd) requires assessment under the *Environmental Assessment Act* at the level of Environmental Impact Statement (EIS). The current proposal was referred to the Commonwealth Government under the provisions of the *Environment Protection and Biodiversity Conservation (EPBC) Act*. On the 22 August 2002 it was confirmed that the proposal is not a controlled action under the *EPBC Act*; therefore, the environmental assessment process will be facilitated wholly under NT legislation.

The EIS process, as described by the Administrative Procedures of the *Environmental Assessment Act 1981* of the Northern Territory, is displayed in Figure 1. (Note that with recent restructuring, the term “Office of Environment and Heritage” should be substituted for “Department of Lands, Planning and Environment” and the correct name for the Minister responsible for the environmental assessment process in the NT is the “Minister for the Environment and Heritage.”

Overview of the Process

Once the Minister has determined that an EIS is required, the Office of Environment and Heritage (OEH) prepares Draft Guidelines for Preparation of an EIS, after consulting with relevant advisory bodies.

These Draft Guidelines are then subject to public review for a 14-day period. At the end of this period, OEH has 14 days to finalise the Draft Guidelines for Ministerial approval. If approved, final Guidelines are forwarded to the proponent.

When the proponent has prepared a Draft EIS, this document is exhibited for public review and comment for a minimum of 28 days, during which time advisory bodies also comment on the document.

Comments are forwarded to the proponent, who addresses issues in a Supplement to the Draft EIS. The Supplement is reviewed by advisory bodies.

OEH then has 35 days to prepare an Environmental Assessment Report and Recommendations based on the Draft EIS and Supplement. If the Minister approves the Report and Recommendations, these are forwarded to the responsible (consent) Minister(s) for inclusion in permit, lease or license conditions and in relevant management procedures (e.g. Environmental Management Plans).

The Assessment Report and Recommendations are included on the OEH website and hard copies are provided to respondents and selected public libraries and viewing sites.

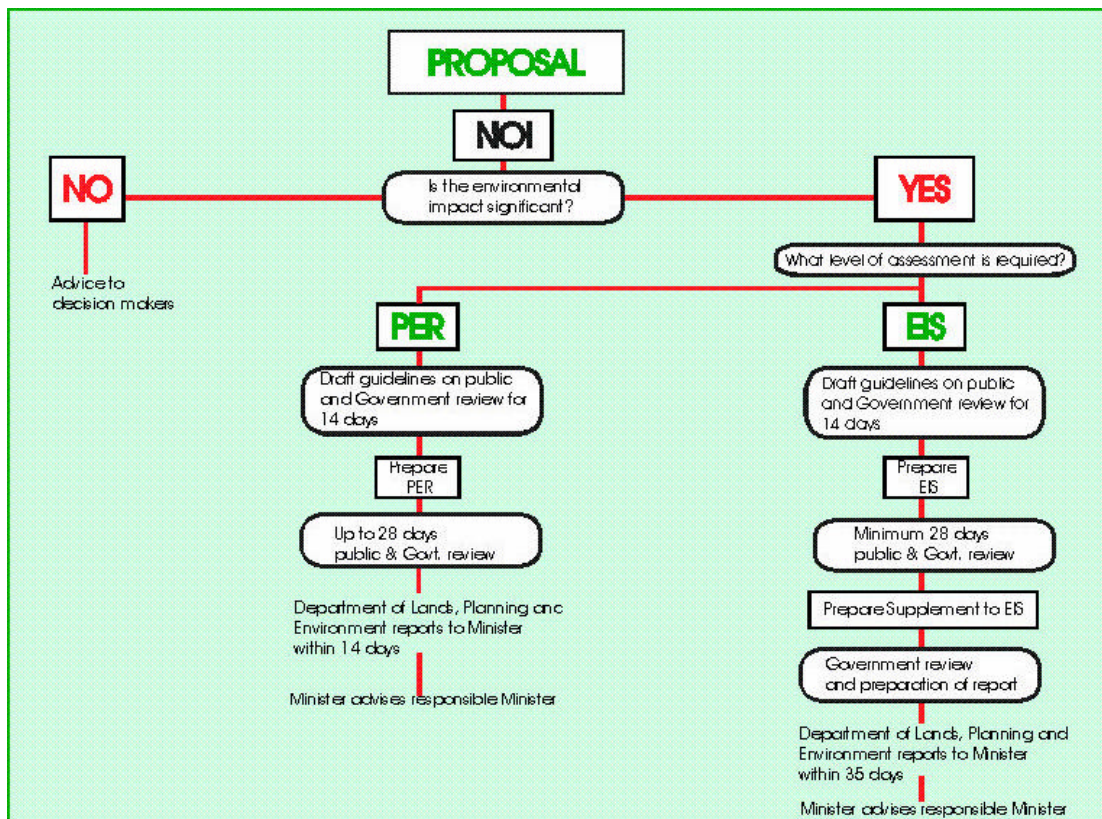


Figure 1 – The Northern Territory Environmental Assessment Process.

(Note: subsequent to preparation of the above figure, the Department of Lands, Planning and Environment has been restructured and renamed the Department of Infrastructure, Planning and Environment.)

PART B – Guidelines

GUIDELINES FOR PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE PROPOSED SUNRISE AQUACULTURE ESTATE AT POINT CEYLON (BYNOE HARBOUR) IN THE NORTHERN TERRITORY

SUNTAY AQUACULTURE P/L

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The Draft Environmental Impact Statement (EIS) should include the following sections but need not be limited to these sections or inferred structure.

1 EXECUTIVE SUMMARY

The Executive Summary should include a brief outline of the project and each chapter of the Draft EIS, allowing the reader to obtain a clear understanding of the proposed project, its potential and anticipated environmental impacts and management objectives to avoid or minimise impacts.

The Executive Summary should be written as a stand-alone document, able to be reproduced on request by interested parties who may not wish to read or purchase the Draft EIS as a whole.

The summary should include

- the title of the project;
- the name and contact details of the proponent;
- a concise statement of the aims and objectives of the project;
- a discussion of the background to and need for the project, including the consequences of not proceeding with the project;
- a description of the economic and other benefits that might arise from the proposal;
- a brief explanation of the structure and scope of the EIS and its legislative basis (including identification of decision-making authorities and other relevant advisory agencies);
- a discussion of the alternative options considered and reasons for the selection of the proposed development option;
- description of similar projects undertaken by the proponent elsewhere, demonstrating its commitment to effective environmental management;
- a brief description of the project and the existing environment, using visual aids where appropriate;
- an outline of the principal environmental impacts (both adverse and beneficial) and environmental management and innovations to overcome or minimise deleterious impacts and enhance beneficial impacts;
- an outline of proposed monitoring and reporting procedures; and
- a description of the studies, surveys and consultations done in developing the proposal and preparing the Draft EIS. (Results of studies, surveys and detailed consultations should be included as appendices).

2 INTRODUCTION

The introduction should include

- a brief explanation of the purpose and structure of the Draft EIS;
- the title of the project;
- the net benefit;
- the name and contact details of the proponent;
- proof of lease and other authorisations;
- the scope and objectives of the proposed project;
- an outline of the NT environmental assessment processes;
- reference to initial consultations, investigations, and feasibility studies done to develop the proposal and prepare the Draft EIS;
- reference to Territory, Commonwealth and International policies, legislation, and treaties relevant to the project; and
- reference to planning issues such as land tenure, zoning, timeframes, potential for additional development and the lifespan of the project. Discuss in the context of the *Finniss Planning Concepts and Land Use Objectives 2002*.

3 OBJECTIVES AND BENEFITS OF THE PROPOSED PROJECT

This section of the Draft EIS should provide a comprehensive explanation of the objectives, benefits and justification for the project. It should identify and discuss socio-economic objectives and benefits, including

- reference to local, regional and global markets and other economic activities in the affected area (e.g. tourism, pearl farming, fishing etc.);
- foreign trade objectives;
- benefit to the local workforce, land users and indigenous people (e.g. training and employment); and
- commercial objectives (e.g. predicted volume of product, proportion of market demand to be met by output and estimated annual earnings).

The proposal should include a brief discussion, in the context of other prawn farms operating in the Northern Territory, of factors that support the proponent's prediction that the facility will be a successful venture.

The Draft EIS should also identify

- occupational health and safety objectives; and

- local, regional and global environmental objectives (e.g. reference to the company's environmental policies and the implications of the project with respect to the National Greenhouse Strategy).

4 PROJECT DESCRIPTION

This section should describe the proposed project, including its purpose, its major infrastructure components and activities during the construction and operational phases of the development. Any headworks to be provided by the Territory Government should be included. It should describe the project in sufficient detail to allow the reader to (i) understand what will be constructed and how the facility will be operated and (ii) determine the potential and anticipated environmental impacts from the project.

The life of the project and proposed rehabilitation of the site and road(s) should be addressed, including proposed works, costs and associated responsibilities.

Because the proponent (Suntay Aquaculture) has indicated that its facility will be based on an “environmentally-friendly” model for development (in Belize), Suntay should demonstrate how the construction and operation of the farm at Bynoe will or will not differ from the Belize model (in terms of particular processes, activities and infrastructure that have potentially significant environmental impacts). (Note: for “Commercial in Confidence” matters, information may be supplied in a separate document for confidential review and comment by relevant NT Government experts and their advisors).

The proponent should identify differences (including those relative to constraints) between its proposal for Point Ceylon, its other prawn aquaculture farm(s) in Australia and overseas, and the model closed-system farm in Belize, including

- different species of prawn;
- more expensive workforce in the Territory; and
- the potentially very heavy rainfall in the Territory during the wet season and from cyclones.

The proponent should provide evidence of the environmental performance of its other farm(s).

Key decision-making processes (such as risk assessment) should be detailed. Where appropriate, relevant Northern Territory and Commonwealth Government legislation, strategies and policies as well as international and national standards should be considered. Relevant NT Government environmental and construction guidelines should also be considered during the design phase of the project.

Maps, figures and diagrams should support technical information. Detailed technical information should be included as appendices. Tables may be an appropriate means of summarising key characteristics of the project (described in the body of the Draft EIS), describing phases of the proposal and identifying those components and activities with potential for environmental impacts.

The project description should include details identified in Sections 4.1 to 4.7 below, as a minimum, for all aspects and components of the project.

4.1 *Major Components of the Proposal*

In this section, the Draft EIS should identify and describe the function of the major components of the development, including

- Production ponds;
- Settlement/recycling ponds;
- Dams and weirs;
- Intake and discharge channels and pipelines;
- Water supply channels and pipelines;
- Water storage tanks;
- Sewerage;
- Waste management infrastructure;
- Buildings;
- Roads and parking;
- Airstrips;
- Electricity and communication infrastructure;
- Stormwater drainage;
- Other components;

and the area of land each will comprise.

Provide design and engineering details of all ponds and dams (dimensions, construction materials, alignment, batter slope design, ancillary facilities, the water intake, overflow outlet and pumping systems).

4.2 *Layout of Major Components*

This section should illustrate the location of major components (indicated in Section 4.1 above) at the development site and include easy-to-read maps and diagrams.

4.3 *Overview of Key Process(es) involved in Production*

This section should describe the key steps involved in the production cycle (from stocking to harvesting, processing, packing and transporting off-site) and include flow-charts or other figures to assist with interpretation.

4.4 Location Details

- Provide a description of the project's location, indicating distance from major regional centres (including port facilities);
- Provide maps and diagrams displaying the above information;
- Provide maps showing the project in relation to current economic, recreational and indigenous uses of the area (e.g. pearling, fishing, conservation and gathering of "bush tucker");
- Provide maps showing the project with respect to catchment location and all watercourses;
- Provide a map indicating the Q100 flood levels (and anticipated discharge paths); and
- Provide maps detailing the land units and fine-scale vegetation types in the area.

Because the proposed hatchery will be close to the Bynoe Harbour shoreline (Point Ceylon) and because contingent events (e.g. cyclones, heavy rainfall) may lead to discharges to the marine environment, some information on the nature of the shoreline (e.g. rocky platform vs. extensive mud-flats) and broad substrate types of the adjacent marine environment should also be provided.

4.5 Construction Phase

This section should describe the major engineering works to be done during the construction phase in addition to any surveys and site-preparation works (e.g. clearing of vegetation, construction of access roads, provision of power and communication infrastructure, etc.). Relevant plans, photos and maps should be included to assist with interpretation.

The principles of geotechnical engineering for safe design should be used for all construction and support requirements. Relevant industry standards or best practice models should be applied to

- Buildings;
- Environmental management;
- Maintenance of occupational health and safety; and
- Project management.

Specific advice on roads

Because road access is essential to the viability of the project, the proponent should negotiate permanent legal access. Issues such as title over the access, the standard of construction required (e.g. size, vehicle types, all weather requirements, etc.) and responsibility for construction and on-going maintenance should be addressed.

Regarding the construction of roads, the following information should be provided (if the road "footprint" is not covered by these issues elsewhere in the Draft EIS:

- Size (project area and area of land to be disturbed);

- Tenure;
- Current uses;
- Claims under the *Native Title Act 1993* and the *Aboriginal land Rights (Northern Territory) Act 1976*; and
- Aboriginal Areas Protection Authority Certificates issued or required under the *NT Aboriginal Sacred Sites Act*.

In the instance that access is gained via a track across private land that is not the responsibility of the NT Government, the following issues should still be addressed:

- Access from the Government's road network must be defined in terms of ownership, standards and on-going maintenance. Estimated use (including vehicle numbers, vehicle types and wet/dry season use requirements) needs to be included.
- The likely generation of traffic associated with the new facility and its effect on the current road network should be assessed through a traffic study that covers both construction and operational stages. Any upgrading to the road network required as a result of the facility should be included in the Draft EIS. The costs of, and funding for, the required upgrade should be identified and cover both upgrade and maintenance.

When a road is constructed, sidetracks are generally used to access the road. A plan to rehabilitate any such sidetracks should also be addressed. (This and other issues common to the construction of roads are usually addressed in contracts for road construction.)

The text in this section of the Draft EIS should discuss details relating to the following key components and activities (Sections 4.5.1 – 4.5.5).

4.5.1 Infrastructure

- Provide a time-line for all construction activities (including start date, finish date and date facility is expected to become operational).
- Identify materials required for construction, including
 - Solids – the volumes and possible sources of extractive materials (e.g. clay, soil, gravel and/or rock) for construction of ponds, dams and other infrastructure);
 - Liquids; and
 - Gases.
- Provide detailed specifications for water supply (including source and volumes of freshwater) and management requirements for maintenance of water quality during construction. (Note 1: a permit may be required under the *Water Act* to construct or alter a dam, water storage or water control structure; or obstruct or interfere with a waterway. Note 2: the project will require self-contained power, water and sewerage systems, as the Power and Water Corporation has no current assets in or near the project area).

- Provide detailed specifications and construction methods and materials for any proposed water storage areas, including sources of fill, storage capacity, impacts of storage on the catchment, overflow design capacity, spillway stabilisation and risk assessment in the event of a Probable Maximum Flood, storm surge, cyclone, etc. (Design and construction should be certified by appropriately qualified experienced practitioners).
- Outline design and engineering details of all
 - Ponds and dams (dimensions, geological cross-sections, construction materials, alignment, batter slope design, relevant Q100 levels);
 - Ancillary facilities; and
 - Location of water intake and wastewater outlets and pumping systems, and strategies to minimise disturbance associated with their installation and maintenance.
 - Include process descriptions and flow charts (where applicable) indicating volumetric capacity and requirements.
- If bunds are to be constructed in or near mangroves or marine muds, the proponent should indicate if mud will be excavated from the bund footprint or “mud-waving” be used.
- For production ponds, if impermeable plastic liners are to be used, detailed specifications and (if available) evidence of effectiveness of these in preventing contamination of groundwater should be provided.
- The proponent should describe what contingency plans will be in place in case of failures of bund walls or significant acid generation.
- Outline possible future increases to the area of ponds and impoundments.

Specific guidance on avoiding problems with biting insects

Water storages can breed mosquitoes if not properly sealed or maintained. Rainwater tanks should be sealed to prevent the entry of mosquitoes. The water level in open water tanks should be kept high and not allowed to stagnate, as low water levels and stagnant water will encourage mosquito breeding.

Prawn ponds should have steep and vegetation-free margins to preclude mosquito breeding. Colonisation by aquatic insects that prey on mosquito larvae may also mitigate against developing a mosquito problem.

Further advice is included in guidelines identified in Section 4.5.3 below. They should be referred to in the Draft EIS and followed during the construction and operation of the facility.

4.5.2 Utilities and temporary facilities required during construction

- Outline requirements for water (including potable water), electricity and communications and options to deliver these utilities.
- Identify and briefly describe temporary construction facilities, e.g.

- Personnel/briefing/induction facility;
- Site construction office(s);
- Warehouse;
- Batch plant and material yard;
- Bulk materials lay-down yard;
- Vehicle and equipment repair shop;
- Vehicle and equipment parking areas;
- Portable toilets; and
- Fire-fighting equipment storage.

4.5.3 Site preparation and initial works

- Indicate extent of area to be cleared of vegetation (or substantially thinned) in the form of a Land Clearing Plan. (Note: Under *Interim Development Control Order 12*, any proposal to clear in excess of 1 ha of native vegetation will require development consent prior to commencement of works. Permits can be obtained from the Natural Resource Management Division of the Department of Infrastructure Planning and Environment [DIPE]).
- Describe the management and fate of cleared vegetation.
- Indicate the footprint for construction compared with the operational layout.
- Describe erosion and sediment control measures during the construction of roads, production ponds, freshwater dams, laying of intake pipes and pumps.
- Describe excavation methods and scale of operations.
- Describe on-site and off-site borrow material requirements, potential source areas, extraction methods and uses.
- Describe road access requirements and associated corridors.
- Identify any headworks to be built by the NT Government.
- Outline construction practices and ongoing management to minimise the potential for exacerbating any existing biting insect situation.

Specific guidance on biting insects

Trapping by the Medical Entomology Branch of the NT Department of Health and Community Services at Crab Claw Island found significant numbers of biting midges and disease vector mosquitoes which are likely to also occur at Point Ceylon during certain times of the year. The proponent can obtain more specific information by contacting the Medical Entomology Branch.

Construction activities that result in the pooling of water, whether intentional or unintentional, can lead to the creation of mosquito breeding sites. These include stormwater drainage, ponds and dams, sewage treatment facilities, road construction, irrigation, water storage tanks, borrow pits, vehicle-disturbed areas, etc.

The Medical Entomology Branch has several guidelines that should be used for preventing the creation of mosquito breeding sites as a result of this development. They should be obtained by the proponent, referred to in the Draft EIS and used during the construction and operation of the facility:

- *Construction practice near tidal areas in the Northern Territory – Guidelines to prevent mosquito breeding.* NT Coastal Management Committee, June 1988.
- *Guidelines for preventing the creation of mosquito breeding sites in non-residential rural subdivisions or developments.* Medical Entomology Branch Handout.
- *Guidelines for preventing mosquito breeding sites associated with mining sites.* Medical Entomology Branch Handout.
- Whelan, PI (1997). The prevention of mosquito breeding in sewage treatment facilities. *Bulletin of Mosquito Control Association of Australia*, 10(3):19-28.

Other recommended guidelines that include other aspects of biting insect management are

- *Guidelines to minimise mosquito and biting midge problems in new development areas.* Queensland Health (March 2002); and
- *Guidance statement for management of mosquitoes by land developers.* WA Environment Protection Authority (June 2000).

Specific guidance on potential for erosion.

Erosion and sediment control planning need to be addressed during the construction and operational phases of the development. Detailed land resource information, including point source data, has been collected and collated into mapping both on section 3192 and the adjacent mangroves (vegetation mapping only). This includes interpretive products such as maps of acid sulfate soils, erosion risk soil waterlogging, etc.

An assessment of regional geology probably needs to take into account superficial sediments and soil parent material, as the landscape is so highly weathered.

The construction phase is probably more reliant on superficial materials than hard geologies.

Information to assist in the above is available from staff at the Natural Systems Division, DIPE.

4.5.4 Waste generation and management

- Identify and quantify the anticipated wastes generated during the construction phase, including solids, liquids and gases (including greenhouse gases) and identify any that are hazardous.
- Provide detailed description and standards (where applicable) for prevention, treatment and disposal of wastes during the construction phase.

4.5.5 Other construction details

4.5.5.1 Construction workforce

- Numbers and source (local or interstate) of workers;
- Housing and transport requirements;
- Indicate if numbers of workers will change substantially during different stages of construction; and
- If staffing will include an Environmental Officer.
 - If so, describe that officer's responsibilities.

4.5.5.2 Occupational health and safety, and emergency response details

- Induction details (including environmental management and avoidance of mosquito-borne disease);
- Contamination prevention and protection responsibilities;
- Bio-hazard and contamination response plans;
- Disease control (e.g. preventing introduction of malaria from workers who come from or have visited overseas areas having this disease and who have contracted the disease);
- Fire and emergency services planning, including
 - bush fire management; and
 - accident management emergency contingency plan, including evacuation to hospital.
- Management structure responsibilities; and
- Communication structure and processes.

4.5.5.3 Construction fleet and traffic/freight requirements

- Describe vehicle types and numbers (cars, trucks, heavy plant, etc.); and
- Indicate expected fuels, oil and tyre usage (and storage/disposal).

4.6 Operational Phase

One of the key environmental issues associated with the project is water management: both the capture/storage of freshwater and the management of saline waters in and wastewater from production and settlement/recycling ponds.

4.6.1 Water management

For ponds, dams, weirs and impoundments, provide details on

- Water requirements and sources (fresh- and saltwater);
- Water balance (all inputs and outputs) based on long-term modelling using rainfall/runoff data for a period equivalent to the expected life of the venture, to demonstrate operational viability;

- Monitoring the water quality of the ponds;
- Management of clean, used and potentially contaminated water;
- Diversion of surface waters;
- Management of process water;
- Recycling water;
- Maintenance of salinity levels, with reference to outputs (e.g. evaporation) and inputs; and
- Management of potential impacts from high/extreme rainfall events.
 - In this section, the proponent should illustrate what is meant by the term “minimal to zero discharge,” indicating the source, frequency and volumes of ponds and reservoirs expected to discharge in heavy rains (including cyclones).
 - Cyclone procedures should be developed to direct lock-down or securing the facility before the arrival of a cyclone.

4.6.2 Erosion and sediment control

In the development area, erosion gullies are evident from past mining and aquaculture activities; therefore, disturbance of soil is expected to result in erosion, unless mitigation is planned and implemented.

The Draft EIS should explain how erosion (and potential sedimentation of waterways) will be avoided or minimised during the operational phase of the project.

An *Erosion and Sediment Control Plan* should be developed (e.g. as part of the Environmental Management Plan), including

- Layout, design and specification of sediment control measures (e.g. drains, waterways/mangrove “bio-filters”, spillways, silt traps, cross-flow banks, batter slopes, surface protective measures and topsoil stockpiling);
- Timing of construction (especially in relation to wet and dry seasons of the Top End of the NT);
- Peak discharge flows (flooding frequencies); and
- Draining of access tracks.

The seawater/brackish water intake sites (and any discharge sites) must have appropriate erosion control measures in place to prevent accumulation of sediments in the nearby mangroves.

Open unlined stormwater drains containing organically-enriched water will breed mosquitoes. Any stormwater drain likely to have continuous dry season flow will become a mosquito breeding site. The proponent should consult with Medical Entomology Branch (NT Department of Health and Community Services) and refer to the guidelines listed in Section 4.5.3 to obtain specific guidance on avoiding these situations.

4.6.3 Waste management

The following wastes may be generated within the lease area:

- sewage and domestic effluent;
- sludge from production or water treatment ponds;
- washdown water from vehicles;
- washdown water from the processing plant;
- used cooking brine;
- diseased prawns or other product;
- used parts, sump oil, etc. from farm machinery;
- miscellaneous items such as bags from feed and fertiliser;
- domestic garbage or food waste; and
- any other types of waste.

To provide adequate information for management of these wastes, this section of the Draft EIS should

- Outline plans for collection, storage, treatment, analysis and disposal of wastewater;
- Describe arrangements for general waste collection, storage, treatment and disposal. Include discussion of waste prevention initiatives;
- Identify and describe proposed waste dump locations and dimensions in relation to water catchments (including contingency drainage interception arrangements) and discuss surface treatment and final landform;
- Identify all identified wastes as hazardous or non-hazardous;
- Outline sludge treatment practices, including harvesting, conditioning and disposal. Provide details of all monitoring programs;
- Describe the remedial action required where any waste dumps of the former land use are disturbed; and
- Outline arrangements for treatment of sewage and domestic effluent.

Sewage treatment facilities can breed prolific numbers of mosquitoes. The Medical Entomology Branch guideline “*The prevention of mosquito breeding in sewage treatment facilities*” should be reviewed when considering what type of sewage facility is to be built at point Ceylon.

Specific guidance on air emissions

- If the operation will generate emissions to air (including greenhouse gases), these should be identified and quantified, and a description should be provided indicating techniques to minimise these.

- Greenhouse gas emissions should be predicted for on-site sources and the upstream supply of energy to the site. The greenhouse gas emission estimates should be calculated using the most recent National Greenhouse Gas Inventory (NGGI) methodology. Alternative methodologies may be used if they can be shown to be more accurate than those used by the NGGI. (Note: this will provide data for assessing the impacts of the farm on the Territory's greenhouse gas emissions. Estimating these emissions using the NGGI methodology is straight-forward).
- There may be minor upstream sources of emissions, such as those associated with producing the food for the prawns. Estimates of emissions from these sources need not be provided, however, because they are unlikely to be significant and are difficult to calculate.

4.6.4 Product stock and harvest

Discuss species to be cultured, sources of juveniles/broodstock and farming techniques. Provide information on design and all aspects of the food manufacturing, processing and packaging, including the internal structure and fit-out of the enclosed processing and packing areas. This information is required to allow the assessment of risks relating to quarantine, hygiene and food safety (eg. final rinse water of stock prior to packaging), translocation of non-endemic (genetically different) organisms and waste management. (Note: for "Commercial in Confidence" matters, information may be supplied in a separate document for confidential review and comment by relevant NT Government experts and their advisors).

- All monitoring programs to be undertaken, including monitoring of freshwater used for final rinsing/washing of product before packaging. (Note: the NT Department of Health and Community Services recommends use of potable water for this final pre-packaging rinse/wash).

4.6.5 Other operational phase information

This Section of the Draft EIS should provide information indicated below.

4.6.5.1 Utilities and related infrastructure

- Potable water source, quality, quantity and monitoring (to ensure safe to consume); and
- Power supply, including fuel type, supply and storage during the operational phase.

4.6.5.2 Operational workforce (personnel requirements)

- Numbers and source (local or interstate) of workers;
- Transport and housing requirements (including design and maintenance of staff accommodation); and
- If staffing will include an Environmental Officer
 - If so, describe that officer's responsibilities.

4.6.5.3 Occupational health and safety, and emergency response details

- Induction details (including environmental management);
- Contamination prevention and protection responsibilities;
- Bio-hazard and contamination response plans;
- Fire and emergency services planning, including bush fire management;
- Management structure responsibilities; and
- Communication structure and processes.

4.6.5.4 Operational fleet and traffic/freight requirements

- Describe vehicle types and numbers (cars, trucks, heavy plant etc.); and
- Indicate expected fuels, oil and tyre usage (and storage/disposal).

4.7 Decommissioning and rehabilitation details

This section of the draft EIS should include information associated with the eventual decommissioning of the project. Options for decommissioning and any constraints should be discussed. The text should also include an outline for determining compliance with and release from requirements of relevant authorities.

At a minimum, the information should

- Identify prudent and feasible options and strategies for decommissioning, including any staged approaches and design considerations;
- Identify proposed environmental indicators to measure progress in achieving the completion criteria (or process to develop these);
- Describe past experiences (personal or otherwise) relating to decommissioning of similar ventures;
- Describe erosion and sediment control procedures;
- Describe progressive and/or final rehabilitation plan for the ponds and surrounds; and
- Discuss strategies to collect native vegetation species, e.g. native grasses and other life-forms, to be used for run-off and erosion control.

Should the project have to be abandoned, the site must be rehabilitated to avoid creation of chronic problems with mosquito breeding, as has occurred in the NT in the past with other abandoned aquaculture sites.

Discuss viable revegetation options, including

- methods;
- selection of appropriate flora for the area;
- fertiliser use (if needed);

- rehabilitation trials; and
- weed suppression.

5 ALTERNATIVES

Alternative proposals, which may still allow the objectives of the project to be met, should be discussed, detailing reasons for the selection and rejection of particular options. The selection criteria should be discussed and the advantages and disadvantages of preferred options and alternatives detailed. The potential beneficial and adverse impacts of the alternatives should also be described. The short-, medium- and long-term advantages and disadvantages of the options should also be considered.

Alternatives to be discussed should include

- not proceeding with the project;
- alternative locations/layouts for components of the proposal within the site (e.g. to minimise the amount of mangroves and other vegetation to be cleared);
- alternative locations for intake and discharge structures (if any);
- alternative designs for production and settlement ponds;
- alternative species;
- alternative environmental management techniques (in particular, techniques to promote recirculation and minimise need for or occurrences of unplanned discharges);
- alternative power supply, including details relating to type of fuel, storage volumes and expected fuel consumption rates (e.g. per hour); and
- alternative staging.

6 EXISTING ENVIRONMENT AND IMPACTS OF THE PROJECT

6.1 *Preliminary*

The Draft EIS should include an in-depth description of the areas potentially impacted or expected to be impacted by the project.

Seasonal and diurnal meteorological changes and any significant trends (e.g. flood, cyclone frequency) should be indicated where appropriate. Areas of environmental sensitivity should be identified and the scope of investigations fully discussed. Where areas of environmental sensitivity have been identified, any inter-relationship between sensitive areas and other areas should be discussed. Sites and species of special conservation status should be identified and described (e.g. RAMSAR wetlands; endangered, protected or migratory species; areas or artefacts with significant environmental and conservation values to indigenous people).

Studies to describe the existing environment should be of a scope and standard sufficient to serve as a benchmark against which the impacts of the project may be assessed over an extended period. Control areas not impacted by the project should be included in proposed studies, and long-term monitoring locations should be established.

All data (including raw data, derived data and results from analysis) to be provided to the NT Government should be in digital format. Reports from monitoring required by the NT Government must be submitted at an appropriate frequency and timing to the relevant NT Government agency.

The potential impacts and proposed mitigation measures of the proposal should be discussed for all relevant stages of the project (including construction, operation, decommissioning, incidents and accidents). Performance indicators for all potential impacts and remediation efforts should be identified. The nature of effects should be characterised by the following qualities:

- direct/indirect
- short-term/ medium-term/ long-term
- adverse/beneficial.

The section should also include an assessment of the level of significance of the impact, be it global, regional or local (e.g. global and national implications of greenhouse gases and the localised impact of service roads or artificial water bodies).

The vulnerability of key habitats and species to potential impacts should be assessed, as should visual impacts of the proposed development. Cumulative impacts should also be discussed. The reliability and validity of forecasts and predictions, confidence limits and margins of error should be indicated where appropriate.

The proponent should present information on its other facilities in Australia and overseas, and on the “model” closed-system prawn farm in Belize to demonstrate the environmental performance of these facilities. Of particular interest are (i) records demonstrating the proportion of time that facility complied with environmental safeguards and monitoring/reporting requirements and (ii) records of incidents (including causes, environmental impacts and duration before compliance was achieved again).

Description of those areas potentially impacted by the project should, as a minimum, include the details identified in Sections 6.1 – 6.8 below.

6.2 Land Administration Issues (Tenure, Claims and Development Permit)

This section should indicate and describe the following aspects of the land to be developed:

- size (area of total project and area of land disturbance);
- tenure;
- current uses;
- claims under the *Native Title Act, 1993* and the *Aboriginal Land Rights (Northern Territory) Act 1976*;
- Aboriginal Areas Protection Authority Certificates issued or required under the NT *Aboriginal Sacred Sites Act*;

- acquisition requirements; and
- access requirements.

The proponent needs to obtain an Authority Certificate to be “protected” with regard to potential for disturbance to Aboriginal Sacred Sites.

A Development Permit will not be required; the only planning control in the area is control of subdivision. (Note: under the Planning Act, section 5(3)(a), “subdivision” includes the grant of land by lease for more than 12 years.)

Provision of access to the site needs to be addressed in the Draft EIS. The area is an existing parcel; however, there is no formed/maintained road providing access. The proponent should identify if the NT Government will be expected to provide any access headworks.

6.3 *Physical Environment*

6.3.1 Existing environment

6.3.1.1 Topography, geology, soils and bushfires

- Provide maps of and interpret the site and regional topography (including near-shore bathymetry);
- Provide maps of and interpret the site and regional geology;
- Provide maps of and interpret the site and regional geomorphology, including that of the coastline off the lease area;
- Discuss the soil types and land unit(s), including the major marine substrate types;
- Location and extent of sulfate soils, with illustrative 3D map of soils to be disturbed (note: the proposed siting of the ponds shoreward of tidal mudflats should theoretically avoid any potential acid sulfate soil problems; however, any soil disturbance in mangrove zones or adjacent swamps will require management to prevent generation of acid);
- Detail the existing level of soil erosion and other disturbances;
- Discuss soil capability and suitability for water impounding structures (e.g. freshwater dams and ponds); and
- Discuss the current bushfire regime for the region. (Note: As per the *Bushfires Act* 1996, the proponent will be required to ensure that a 4-metre wide fire-break is installed and maintained along all boundaries).

6.3.1.2 Meteorology, air quality and noise

- ***Describe seasonal and diurnal meteorology, including but not limited to***
 - prevailing wind directions and strengths;
 - maximum wind gusts;
 - precipitation (maxima, minima, average);
 - temperature;
 - evaporation;
 - relative humidity;
 - frequency and strength of cyclones; and
 - frequency and extent of flooding.
- Describe ambient air quality and noise levels for the area and development site.

6.3.1.3 Oceanography and coastal water quality

- For the seaward margin of the development area, describe local and regional tides and current patterns.
- If results from the hazard and risk assessment (described in Section 6.3.2.4) indicate that contingent discharges have the capacity to significantly increase levels of suspended solids and nutrients in nearshore waters (to an extent that could lead to algal blooms or smothering of benthic marine communities), describe the existing temporal and local variations in suspended solids, nutrient levels and algal blooms.
 - If increases in nutrients are substantial enough to stimulate significant growth in bacterial pathogens (especially those relevant to the health of pearl oysters), then the proponent should determine baseline levels of these pathogens offshore from the development area.
- Describe the potential impacts of cyclonic storm surge on the proposed hatchery at Point Ceylon.

6.3.1.4 Hydrology

One of the key environmental issues for the proponent to address is the feasibility of harvesting and storing adequate freshwater to maintain required salinities in production ponds and for other operational requirements. To accomplish this, the proponent will have to do a hydrological study to determine where and how the necessary amounts of freshwater can be harvested, based on the size of catchments and taking account of the variability of rainfall and run-off coefficients for a range of time-steps.

More specific requirements for information are outlined below.

- Using the best information currently available, provide a general description of the surface water systems on-site and adjacent to the development area (to a distance

reflecting potential impacts from the development) including rivers, creeks, lakes, lagoons and wetlands.

- Describe the ground water systems in and adjacent to the lease area, including confined aquifers, unconfined aquifers; and ground soaks, expressions, bores, etc. (The proponent should note that if ground water is to be used, an Extraction Licence may be required, depending on volume to be used, location of bores, etc).
- For both ground water and surface water systems, discuss
 - their significance (e.g. RAMSAR wetlands);
 - current uses, including as potable water supply;
 - beneficial uses;
 - Q100 levels;
 - tidal influences: and
 - water quality.

6.3.2 Impacts on the physical environment and proposed mitigation

- Describe how the project will or might impact the quality of land, water (marine and freshwater) and air, and the existing surface water quantities and flows during the construction and operational phases. Detail this with reference to the inputs and outputs from the farming, harvesting and processing operations. Indicate the risk and seriousness of each potential and anticipated impact.
- Discuss, with reference to each impact, the proposed management and mitigation measures to avoid or minimise environmental impacts.
- Discussion should include, but not be limited to, issues identified below.

6.3.2.1 Soils

- Discuss the potential for acid leachate formation. Discuss the prevention or minimisation of the effects of mangrove clearing and the management of acid sulfate soils including a contingency plan to manage acid leachate.
- Describe the potential for soil erosion and dust generation from construction and operational activities. Outline any preventive, protective or remedial actions to be undertaken.

6.3.2.2 Air quality and noise

Discuss potential and anticipated impacts on air quality (including greenhouse gases) and noise from construction and operation of the development. The potential opportunities to offset greenhouse gas emissions generated by the project should be identified and discussed.

6.3.2.3 Hydrology

- Discuss anticipated or potential modifications to natural hydrological regimes, such as changes to the freshwater flow and flooding in the area (including those impacts arising

from the impounding of fresh water), alteration of stream morphology, bank stability and water tables as a result of dam construction and interruption of regular tidal flow. In particular, the draft EIS should discuss potential flooding of adjacent properties (largely to the south of the development area) from any alteration of surface water (e.g. impoundments). Discuss preventive measures and mitigation. (Note that an application for a Surface Water Extraction Licence under the *Water Act* may be required).

- Discuss alteration of riparian zones as a result of dam construction. Impacts to receiving waters (surface/groundwater), associated habitats and biota, from the unplanned or contingent discharge of wastewater and site run-off, such as depletion of dissolved oxygen levels, eutrophication, siltation, etc. should also be described for these freshwater systems.

6.3.2.4 Coastal Water Quality

Although the facility is being designed as a “zero- or near-zero discharge” operation, because of significant rainfall in the wet season (with occasional cyclones) and the potential for failure of bund walls, pumps or other infrastructure, the proponent should anticipate at least occasional discharges.

The potential for unacceptable impacts on the quality of the coastal waters adjacent to the development site is considered a crucial issue for the proponent to address. Discharge of significant amounts of suspended solids, nutrients, algae and/or pathogens could threaten the viability of benthic nearshore habitats (seagrasses, corals, sponges, etc., and their associated fauna) and the important pearl aquaculture operations immediately offshore from the lease area.

Hazard and risk analysis for contingent discharges

In order to enable an adequate assessment of these risks and development of effective safeguards to avoid or minimise unacceptable impacts, the proponent should conduct a thorough hazard and risk analysis (HRA). Because the outcome of this analysis will identify the level of risk associated with all relevant hazards, this information will be crucial to identifying the type and comprehensiveness of information required to assess the environmental acceptability of the proposal, in addition to designing baseline and on-going monitoring studies of an appropriate scope and intensity for early detection of marine impacts.

It is in the proponent’s interest to complete this as soon as possible, because the outcome could be used to eliminate the need for extensive baseline studies and on-going monitoring of coastal water quality indicators.

At a minimum, the HRA should provide the following information:

- The anticipated frequency and volumes of contingent discharges;
- The circumstances under which discharges would occur;
- The likely composition/quality of discharged water at the point of release and when it enters the coastal waters of Point Ceylon, including suspended solids, nutrients, algae, zooplankton, bacteria (and other pathogens);

- The potential impacts on nearshore benthic marine communities and the health of pearl oysters off Point Ceylon; and
- Recommended measures to avoid or minimise these impacts.

6.3.3 **Monitoring and reporting**

Discuss monitoring and reporting procedures for each of the potential impacts identified above.

- **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
- **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

(Note that the Wastewater Discharge Licence issued under the *Water Act* may stipulate monitoring parameters and procedures).

6.4 ***Biological Environment***

This section should describe terrestrial and aquatic flora and fauna species, communities and habitats of local, regional or national significance that may comprise constraints to the project. In particular, information should be provided on mangrove or terrestrial vegetation likely to be disturbed, including a map at an appropriate scale showing floral communities to be cleared. An initial weed assessment should also be done and the relationship between fire regimes and biological communities determined.

If the proponent will be making biological collections (as part of required environmental surveys), the proponent must obtain a Scientific Permit to Collect (from the Conservation and Natural Resources Group of DIPE). This Permit sets out standards for collection, recording, storage and provision of data to DIPE.

Sites and species of special conservation status should be identified and described, e.g. endangered, protected or migratory species; species of environmental and conservation value to indigenous people; and vegetation communities that are limited to the Finnis sub-region. Where relevant, reference should be made to current legislation, including the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and the *Territory Parks and Wildlife Conservation Act 2001*.

6.4.1 **Existing environment**

6.4.1.1 **Terrestrial and aquatic (freshwater) biota**

(a) ***Flora***

- Describe vegetation communities within and adjacent to the development footprint, including
 - A broad overview of the dominant vegetation communities;
 - Biodiversity (number of genera and species, and evenness);
 - Size of the survey area;

- Floristic zones (from the seaward edge inland); and
- Weeds.
- For each vegetation community, indicate
 - Prevalence;
 - Conservation status (e.g. rare, endangered, vulnerable, etc., and with reference to which listing); and
 - Whether native or introduced.
- A table or list of all species, including conservation status, should be included in an appendix that also lists “declared weeds.”
- Note that this section should specifically address regionally-significant cypress pine (*Callitris intratropica*) which occurs in a very healthy stand on a small portion of mainland west of Point Ceylon (southwest of Indian Island) and which has not been burned in a decade. Vegetation mapping in the Lower Finnis region indicates that these communities occur only in Section 3192 and adjacent coastal islands; therefore, the significance of potential impact on these communities will need to be verified to determine the risk this proposal poses to this species/habitat.
- Also note that no records of plants of conservation interest are on the NT Herbarium database; however, this probably reflects that collections have not been made from the area.
 - Within 25 km of the site, a number of species of varying levels of significance are on the database and could be in the development area, depending on the type of habitats present (e.g. in wet and dry rainforests, coastal cliffs, coastal dunes, eucalypt woodland, sandy swamps, along lagoons and rivers a range of trees, shrubs, grasses, vines, sedges and an orchid of potential significance might be found);
 - Proponents must therefore do appropriate surveys to determine the potential for impacts from the development.

(b) Fauna

- For each major terrestrial and aquatic habitat within and adjacent to the development area, describe the resident and migratory species, including
 - prevalence;
 - conservation status;
 - international treaty obligations;
 - preferred habitats (e.g. for feeding, breeding, roosting, etc.);
 - whether native or introduced;
 - hazardous nature and pest status; and
 - social significance.

- No records of fauna of conservation interest are on the Biodiversity Assessment Unit (DIPE) fauna database; however, this probably reflects that surveys have not been done for the area.
- Indicate/describe the size of the survey area and number of species for major groups (e.g. amphibians, reptiles, birds, mammals and aquatic fauna).
- The proponent should describe protocols for discovery and reporting (to DIPE) of endangered or other significant species encountered during the construction or operational phases of the project.
- Indicate the range and density of mosquitos and biting midges and their seasonal habits.
 - A 12-month baseline study is generally recommended, including monthly trapping around the time of a full moon to determine the peak numbers and diversity of biting midges.
 - Medical Entomology Branch should be consultant to advise on indicators to be measured and other methodological details.
- Indicate other invertebrate pests and harmful bacteria that may occur in the area
 - Of particular concern are pathogens whose populations could be greatly stimulated by discharges and threaten the health of pearl oysters in leases adjacent to Point Ceylon.
- In an appendix, include a list or table of all faunal species, indicating conservation status.

6.4.1.2 Marine/estuarine biota (flora and fauna)

Note that the scope and extent of information identified below could be reduced if the outcome of the hazard and risk assessment (described in Section 6.3.2.4) indicates that contingent discharges are likely to be infrequent, of limited duration/volume or involve effluent of a quality that is unlikely to impact nearshore benthic communities or the pearling operations off Point Ceylon.

- Provide an overview of the major marine/estuarine habitats of Bynoe Harbour and tributaries, including
 - Rocky shoreline;
 - Muddy tidal flats;
 - Sandy beach;
 - Mangrove forests;
 - Upper intertidal/supratidal salt marshes;
 - Sponge/Coral/algal assemblages; and
 - Seagrass beds.

- For each marine/estuarine habitat within and adjacent to the development area, provide a general description of resident and migratory species, including (for key or significant species)
 - prevalence;
 - conservation status;
 - international treaty obligations;
 - preferred habitats (e.g. breeding, feeding, roosting);
 - whether native or introduced;
 - hazardous nature and pest status; and
 - social significance.
- The key groups of biota to consider include
 - Seagrasses;
 - Corals;
 - Fish;
 - Marine reptiles (e.g. turtles and snakes); and
 - Dugongs.
- Because of their usefulness as indicators of environmental impact in soft-sediment environments (mudflats, mangroves, salt marshes), a general description of the crabs, snails (e.g. mud-whelks), bivalves, polychaete worms (and other fouling organisms) should be included.
- A broad description of the dominant macroalgae in the inter- and subtidal areas adjacent to the proposed hatchery at Point Ceylon should also be included, as this group of flora could be used to determine impacts from increased nutrients that may be associated with contingent, wet season discharges from the hatchery. Epiphytic growth of macroalgae on seagrasses or other biota could indicate an unacceptable level of nutrient enrichment.
- Indicate/describe the size of the survey area for the major groups above.
- The proponent should note that turtles (especially juveniles) are known to feed along the shores from Indian Island to Knife Island (including Dawson Rock).
- The proponent should also note that small seagrass beds run along the deeper part of the intertidal zone and shallower part of the subtidal zone along the east side of Indian Island. Although these are patchy and sparse, they could be important fish and prawn habitat, and good yields of prawns are obtained on the mudflats northwest of Point Ceylon.

6.4.2 Potential and anticipated impacts

- Describe the potential and anticipated impacts from the project on the floral and faunal species and communities identified in Section 6.1 above, focusing on species of conservation significance.
- Identify which activities are associated with particular impacts (e.g. construction of dams and altering existing hydrology).
- Indicate the relative risk of each potential impact and rate the significance of each potential and anticipated impact.
- As a minimum, following issues should be covered:
 - A general description of potential or anticipated changes in community structure of aquatic animals (vertebrates and invertebrates) in water courses, from the alteration of habitat resulting from construction of dams or other impoundments.
 - The impact of the development on mosquito and other biting insect habitats, e.g. the creation of breeding sites by
 - impounding tidal water,
 - restricting tidal regimes,
 - allowing increased tidal inundation of low lying areas,
 - restricting or impeding fresh water drainage, or
 - lowering water tables in existing wetlands.
 - Impacts on marine biodiversity should the system not operate completely “closed” as proposed.
 - Impacts of night lighting on turtles and night birds.
 - Potential for introduction and establishment of marine pests and/or aquatic pathogens, such as dinoflagellates.
 - Potential for introduction and spread of weed species, particularly through construction or earthmoving equipment.

6.4.3 Mitigation

For each potential and anticipated impact, discuss the proposed management and mitigation measures to be undertaken.

- For example, for weed management, the Draft EIS should describe methods to reduce the risk of transporting weeds to and from the site, e.g. by
 - Careful selection and monitoring of earth material transported to or from the site;
 - Earthmoving equipment should be washed down before entering and before leaving the site, into a shallow pit that is monitored and where any arising weeds can be eradicated.

6.4.4 Monitoring and reporting

- Discuss monitoring and reporting procedures for each of the potential impacts identified above.
 - **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
 - **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

6.5 *Cultural Environment*

6.5.1 Existing environment

This section should describe the anthropological, archaeological and heritage values of the development area, including sites/objects of Aboriginal significance.

As a minimum, information should be provided on the following:

- Historical uses of the site (Aboriginal and non-aboriginal).
- Descriptions of the cultural values that could be impacted by the project should include:
 - areas nominated for listing or listed on the Register of the National Estate or the Interim list of the Register of the National Estate;
 - nominated, proposed and declared heritage places and objects under the *Northern Territory Heritage Conservation Act 1991*;
 - prescribed archaeological and heritage places and objects (Aboriginal and Macassan) under the *Northern Territory Heritage Conservation Act 1991*;
 - historic sites;
 - marine archaeological places and objects;
 - areas with special values to indigenous and non-indigenous people (e.g. traditional land use, landscape, visual environment, recreational, commercial, tourism, scientific and educational);
 - areas of significance to the Aboriginal population and culture, including sacred sites within the meaning of the *Aboriginal Land Rights Act* and the *NT Aboriginal Sacred Sites Act*; and
 - national parks, conservation reserves or any other category of Territory park or reserve.
- For each of these cultural values, indicate
 - importance;
 - conservation status;
 - national and international treaty obligations; and
 - clearance permits required or obtained.

- The methodology by which these sites and areas were identified, and their importance assessed, should include survey details such as dates, consultants, survey area and methods.
- The protocol to be followed in the event of discovery of new archaeological or heritage sites or objects should be documented. (The proponent should seek advice from the Heritage Conservation Services Branch of DIPE.)
- In relation to prescribed archaeological places and objects protected under the *Heritage Conservation Act*, the proponent should seek advice from an archaeologist and document the following:
 - The precise location of such places and objects in relation to the proposal and where necessary undertake an archaeological survey (see below);
 - The significance of the places and objects which are to be impacted by the proposal; and
 - Options for mitigation of loss of heritage value of places and objects that lie within the area of impact.
- The archaeologist should undertake a further survey to ensure that other unrecorded sites, which are also protected by the Act, are not included in the development area.
- This section of the Draft EIS should also include
 - results of the inspection of the Register of Sacred Sites maintained by the Aboriginal Areas Protection Authority;
 - details of the application lodged with the Aboriginal Areas Protection Authority for an Authority Certificate within the meaning of Part 3, Division 1 of the *Northern Territory Aboriginal Sacred Sites Act*; and
 - a copy of the Certificate issued by the Authority as a result of that application containing conditions (if any) relating to the protection of sacred sites on, or in the vicinity of, the project area.

6.5.2 Potential and anticipated impacts

This section should describe the anticipated or potential impacts the project will have on each cultural value indicated in the previous section.

6.5.3 Mitigation

For each impact, discuss the proposed management and mitigation measures to avoid or minimise the occurrence and extent of unacceptable environmental impacts.

6.5.4 Monitoring and reporting

- Discuss monitoring and reporting procedures for each of the potential and anticipated impacts identified above.
 - **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
 - **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

6.6 Socio-economic Environment

6.6.1 Existing environment

6.6.1.1 Land use, tenure, zoning and land claims

If not already described elsewhere, the proponent should

- Describe the existing land use, tenure and zoning of the development area and adjacent land and sea, including easements, leases and conservation areas (e.g. Indian Island Forest Reserve [managed by the Parks Section of the Conservation and Natural Resources Management Group of DIPE] and proposed Beagle Gulf Marine Park).
- Indicate the consistency of the project with the applicable Land Use Objectives.
- Identify any native title claims under the *Native title Act (1993)* and Aboriginal land claims under the *Aboriginal Land Rights (NT) Act (1976)*.
- Identify constraints the project may place on existing and future land uses in the area (e.g. adjacent residential land-holders).

6.6.1.2 Social profile

- Describe the uses of Bynoe Harbour and the development area that could be directly or indirectly impacted by the project, including
 - Commercial, recreational and subsistence fishing;
 - Other recreation (e.g. diving, tourism, boating);
 - Aquaculture (e.g. pearling leases);
 - Mineral exploration/extraction, including quarrying;
 - Research and education (e.g. surveys of biota and habitats by the NT or Commonwealth Governments or universities); and
 - Defence and quarantine.
- For these categories, the proponent should discuss the associated employment, social and economic value, at least for the more significant commercial uses.
- Describe the socio-economic characteristics of the region (including a prediction of trends over the expected operational life of the project), using tables and figures to summarise patterns.

6.6.1.3 Infrastructure and services

This section should describe the following range of services, facilities and other infrastructure in the area, including

- Housing;
- Transport network and usage (roads, boat ramps, airstrips and navigable waterways); and

- Community services and facilities.

6.6.1.4 Other socio-economic issues

In this section, other socio-economic factors relevant to the project (in terms of constraints or potential impacts) should be described, including

- Potentially significant biting midge problems and response of mosquito populations to disturbance in and adjacent to tidal areas; and
- Other potentially dangerous fauna and proposed management (e.g. crocodiles, box jellyfish, etc.).

Because of the proximity of the development site to mangroves, there is a potentially significant biting midge problem. There is currently no satisfactory way of managing the problem; therefore, the best strategies are avoidance and personal protection. Information provided in this section should be cross-referenced to the relevant section in the description of the Existing Environment (Section 6.4.1.1).

6.6.2 Potential and anticipated impacts and constraints

- Briefly outline the social and economic issues relating to employment potential, “down-stream” employment effects, impact of transport external to the site and demand on current service infrastructure.
- Discuss any constraints placed on the project by sites of recreational or other socio-economic importance.
- Describe potential and anticipated impacts on
 - Existing visual amenity and noise levels (in relation to neighbouring land-holders and others using the adjacent land and coastal zone); and
 - Recreational water quality, from contingent discharges.
- Describe access, fencing and public safety in relation to use of adjacent coastal areas for pearl farming, fishing, boating, recreation and conservation. (Note that the whole area around Point Ceylon is a pearl lease; therefore, the potential risk from disease or degradation of water quality will need to be fully addressed in the Draft EIS. Current patterns are such that impacts could spread easily east and west of Indian Island).
- Describe potential impacts of industrial lighting on neighbouring residents and other users of the adjacent areas.

6.6.3 Mitigation

For each impact, discuss the proposed management and mitigation measures to avoid or minimise the occurrence and extent of unacceptable environmental impacts.

6.6.4 Monitoring and reporting

Discuss monitoring and reporting procedures for each of the potential and anticipated impacts identified above.

- **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
- **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

6.7 Systems and Habitats

6.7.1 Existing systems and habitats

Projects may have environmental impacts the significance of which relates to the way a number of different values interact or inter-relate, e.g. impacts on a significant wetland included in wildlife tours or impacts from clearing vegetation on biota, soil erosion, acid sulfate, etc.

This section of the Draft EIS should identify the significant inter-relationships between values described previously for the physical, biological, cultural and socio-economic environments and indicate (where appropriate) their

- Importance (including national and international treaty obligations);
- Dependencies;
- Sensitivities and vulnerabilities; and
- Uniqueness.

6.7.2 Potential and anticipated impacts and proposed mitigation

- Describe how the project will impact each system and habitat in the area. Detail this with reference to the inputs and outputs from the farming, harvesting and processing operations.
- Rate the risk and seriousness of each impact.
- Note that clearing of native vegetation must be limited to the minimum required for the project and not done until any other constraints to clearing have been identified, e.g. waterlogged soils, steep slopes, rare/endangered floral species, etc.
- Destruction or disruption of habitat areas of flora and fauna communities (including impacts on ecological processes) from clearing large areas of vegetation.
- Impacts on the mangroves and other estuarine biota caused by waste water discharges. Consider alternatives to using the mangrove system as a bio-filter and for polishing effluent.
- Changes in community structure of mangrove species (in addition to other salt intolerant vegetation) via the alteration of salinity gradients as a result of dam construction and changes in freshwater availability.

- Impacts of lighting at the facility at night.

6.7.3 **Monitoring and reporting**

Discuss monitoring and reporting procedures for each of the potential and anticipated impacts identified above.

- **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
- **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

6.8 ***Hazard/risk to Humans and Facilities***

The Draft EIS should include a preliminary hazard analysis and assessment of the risks to people, the environment and nearby facilities. The aim of this section is to demonstrate that

- The proponent is fully aware of the potential hazards associated with the development;
- The prevention and mitigation of potential hazards are being properly addressed in the design specifications for the facility; and
- The potential hazards can and will be managed effectively during the construction, commissioning and operation of the development.

Sufficient quantitative analysis should be provided to indicate whether hazards and risks from the project are likely to be acceptable compared with similar ventures and industries in Australia and overseas. Assumptions used in the analyses should be explained. Relevant standards, codes and best practice that minimise the risk of an unacceptable safety or environmental incident should be discussed.

The proponent should present information on the safety performance of the “model” operation at Belize and its other facilities overseas and indicate the nature, causes and frequency of incidents resulting in damage/injury to facility, personnel and the public.

The preliminary hazard analysis and risk assessment should, as a minimum, address

- The potentially significant biting midge problem and sensitivity of mosquito populations to disturbances in and adjacent to tidal areas;
- Potential accidents associated with the construction, operation and maintenance of the various components of the proposal, including storage and transport of materials to and from the complex;
- Consequences of possible incidents;
- Design, construction and operational requirements of the project to satisfy relevant codes, standards and legislation;
- Potential impacts from an incident on health and safety;
- Perceptions of risk from the surrounding community regarding the project;

- Development of emergency plans, response procedures and staff responsibilities in the event of an emergency or accident, including cyclones, bushfires and lightning strikes;
- Emergency evacuation procedures and requirements, including nearby residents or the public;
- Responsibilities and liability in the event of an incident (including food poisoning of customers); and
- Contingency plans for dealing with spillage of hazardous materials.

This section should also include detailed discussion on disease and quarantine and should outline measures to prevent disease within the farm and its spread to or from natural fisheries. Measures to prevent escape of prawns or fin-fish from the farm to the surrounding natural environment should also be addressed.

The hazard and risk analysis will identify the critical areas that need to be addressed in management plans, monitoring programs and contingency/emergency plans.

7 ENVIRONMENTAL SAFEGUARDS, MANAGEMENT AND MONITORING

The proponent is required to achieve a level of environmental management and performance consistent with principles of ecologically-sustainable development, best practice environmental management, national and international standards and statutory obligations during its pursuit of sound business and financial objectives. The most economically effective, environmentally sound technology and procedures should be incorporated into the design of the project. The adoption of such a strategy should ensure optimal management of all emissions, discharges and waste. This approach is to be adopted for all procedures involving the management of inputs, outputs and the production process itself.

7.1 *Environmental Safeguards and Mitigation of Impacts*

This section should provide information on environmental management practices and safeguards proposed to prevent, minimise or mitigate environmental impacts both on-site and adjacent to the development area during both the construction and operational phases of the development.

Any actions required by others (e.g. NT Government agencies) to enable the proponent to meet these commitments should also be identified.

A summary table listing undertakings and commitments made in the Draft EIS to avoid or mitigate environmental impacts, including performance indicators (where appropriate) should be provided. The table should be indexed and cross-referenced to the relevant section of text in the body of the Draft EIS.

7.2 *Monitoring and Reporting*

A sound monitoring and quality assurance program (including reporting) should be designed to ensure environmental safeguards are being effectively applied and to identify and measure any differences between predicted and actual impacts. Those responsible for monitoring

programs should be identified. A description should be included of any provisions for tightening environmental standards, response mechanisms and remedial action if feedback from monitoring indicates that the project is causing unexpected and unacceptable environmental degradation or other harm.

For each potential or anticipated impact, field and desktop monitoring should be comprehensively outlined at the following levels:

- **Baseline** – Detail completed or proposed baseline surveys, identifying timing of data collection and their relevance to the project.
- **Ongoing** – For each anticipated or potential impact, detail the proposed monitoring programs and reporting arrangements during the operational phase of the development.

Methods for data collection for baseline (pre-construction) and construction /operational phase impacts (e.g. on biodiversity and water quality) should be developed in consultation with relevant NT Government agencies to maximise the potential for

- valid comparison with existing data sets;
- interpreting environmental information collected in the longer-term for this project; and
- collecting environmental data that will be useful (from an environmental management perspective) for both Suntay Aquaculture and the NT Government.

Relevant environmental legislation, standards, codes and policies should be briefly described, together with measures proposed to ensure compliance.

7.3 Environmental Management Plan

A Draft Environmental Management Plan (EMP) should be provided at the time of submission of the Draft EIS. The Draft EMP should be strategic, describing a framework for environmental management. Specific management policies, practices and procedures should be included. A final EMP should be prepared at the conclusion of the assessment process, taking into consideration comments on the Draft EMP and the Supplement and incorporating the Assessment Report and Recommendations (included in that Report).

The Draft EMP should

- Define the management structure of both the construction and operational phases and the relationship to the environmental management of the site;
- Describe the proposed measures to minimise adverse impacts and monitor the effectiveness of these safeguards (e.g. by proving performance indicators by which all anticipated and potential impacts can be measured);
- Describe reactive monitoring programs that allow early detection and management/mitigation of adverse impacts;
- Detail how monitoring will be able to determine the differences between predicted and actual impacts; and
- Provide for the periodic review and revision of the EMP.

Reference should be made to relevant legislation, standards, codes and policies and the proposed arrangements for approvals and permits required for commissioning and continued operation of the project. The agencies responsible for approving and overseeing the EMP should be identified. Proposed reporting procedures should be outlined relating to the implementation of the EMP, independent and self-auditing, and reporting of accidents/incidents.

Details of proposed arrangements for publication of the EMP, any sub-plans and/or monitoring results should be provided.

8 PUBLIC INVOLVEMENT AND CONSULTATION

Public involvement and the role of government organisations should be clearly identified. The outcomes of surveys, public meetings and liaison with interested groups should be discussed and any resulting changes made to the proposal clearly identified. Details of any ongoing liaison should also be discussed.

Negotiations and discussions with local and community government, the Territory Government and the Commonwealth Government should be detailed and any outcomes referenced. Details of any ongoing negotiations and discussion with government agencies should also be presented.

9 INFORMATION SOURCES AND BIBLIOGRAPHY

The Draft EIS should contain a comprehensive reference list/bibliography. Any source of information such as studies, research, maps and personal communications used in the preparation of the Draft EIS should be clearly identified, cited in the text and referenced in the bibliography.

10 GLOSSARY

A glossary should be provided, defining the meaning of technical terms, abbreviations and colloquialisms. (Note: throughout the Draft EIS, technical terms and jargon should be minimised).

11 APPENDICES

Information and data related to the Draft EIS but unsuitable for inclusion in the main body of the statement (e.g. because of its level of technical detail) should be included as appendices. This may include detailed analyses, monitoring studies, baseline surveys, raw data and modelling data. Where necessary, specific guidance should be provided on the most appropriate means of accessing information not appended to the Draft EIS.

12 ADMINISTRATION

The Project Officer is Dr Janice Warren, Office of Environment and Heritage, Department of Infrastructure, Planning and Environment. The contact number is (08) 8924 4002 and facsimile (08) 8924 4053, e-mail janice.warren@nt.gov.au

Three “Preliminary” copies of the Draft EIS should be lodged with the Office of Environment and Heritage for internal review prior to release for public and advisory body comment.

Once this internal review is complete and any necessary changes implemented by the proponent, approximately 25 bound copies of the Draft EIS will be required for distribution to NT advisory bodies and public viewing locations (e.g. libraries, council offices, etc.). In addition, 8 CD ROM copies (in ADOBE*.pdf format) plus two unsecured Microsoft Word copies should be submitted (to allow placement on the Office’s Internet site and to facilitate production of the Assessment Report and Recommendations).

The proponent should also consider producing at least several copies for direct sale to the public, on request.