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## **Submission on Environmental Impact Statements for Marine Harvest's sea cage fish farm proposals for Darwin Harbour, Bynoe Harbour and Snake Bay <sup>1</sup>**

**July 21<sup>st</sup> 2006**

### **Issues arising from the Environmental Impact Statements for Bynoe Harbour, Darwin Harbour and Snake bay**

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## 1. **Visual and noise impacts** (Bynoe)

The following listed noise and visual impacts will result in a loss of remoteness, naturalness and aesthetic values and associated natural and cultural tourism values. These impacts may detrimentally impact upon the marine park values of Bynoe Harbour and thus contradict the government's commitment to a marine park for this area.

- a. **PENS** at 48 metre circumference. Lease area/pens will be clearly visible during the day. At night sea pens and lease perimeter marked with flashing lights. Barge lit up at night.
- b. **FACILITIES:** barge in centre of nets; concrete slab pontoon base; Styrofoam on sides; Donga-style demountable buildings; silos for fish feed (250 tonnes); blower system for feeding; an ensiler to digest dead fish; Humphrey sewage system; Barge total is 2 stories high and 40 metres long.
- c. **NOISE:** Diesel generator 24 hours/day; Feed pumps; Boats, barge and other.
- d. **TRANSPORTATION:** 'out-board boats'; 'well-boat'; 'sea-transport company'; and 'a service ship'. Increased boating movements and noise, particularly large boats, will impact upon the amenity of Bynoe Harbour
- e. **NET MAINTENANCE** – one net is replaced every month. This will create further noise and visual impacts upon the amenity of Bynoe Harbour.

## 2. **Hazardous materials and chemicals risk - Bynoe Harbour and Tiwi islands.**

It is our view that hazardous materials and chemicals issues are inadequately dealt with in the EIS documents. Human error and equipment failure does occur (frequently); spills and accidents do happen – this is not discussed.

### a. Spills, accidents and cyclone plans.

At two of the proposed sites, Bynoe Harbour and Snake Bay, there are a large amounts of chemicals and fuels to be stored in floating barges on the marine environment.

The Bynoe Harbour site for example will hold:

- 1 Up to 10,000 litres of diesel fuel
- 2 Up to 1,500 litres of petroleum fuel
- 3 250 tonnes of feed
- 4 1000 kg of potassium hydroxide
- 5 200kg of antibiotic
- 6 47 other chemicals in various amounts

This large volume and wide range of chemicals would likely have a major impact on the Bynoe Harbour and Snake Bay areas should the barge sink, be unturned or ruptured in the course of a climatic or other event, such as a cyclone. We are expecting more severe and potentially more frequent cyclones in the NT.

However the EIS does not discuss remedial actions to be taken in the event of a major or minor spill of contaminants. Nor does the EIS outline its contingency plan in the event of a cyclone.

These details need to be supplied in order analyse information and determine impacts.

## b. Storage of chemicals and hazardous materials

To minimally state that the hazardous materials and fuels will be stored "according to *Dangerous Goods Regulations*" is inadequate to deal with this serious issue. Inadequate information is provided. Further, are these "*Dangerous Goods Regulations*" designed for land based storage or are there specific marine based storage regulatory methods? It can be presumed that the regulations are set up for land based operations as the norm, and therefore will not be adequate for protecting the marine environment. Where spills on land occur the materials can be relatively contained. Whereas in the marine environment this is often not the case and materials are less likely to be recovered and therefore special measures above and beyond the Dangerous Goods Regulations need to be applied in order to ensure Bynoe's (and other) marine environments are not impacted.

## **3. Feed**

Issues pertaining to feed are applicable to all 3 sites and all three EIS documents.

### **a) Feed and contamination issues**

There is extensive literature documenting the bio-accumulation of persistent organic pollutants in the marine environment, but relatively little data is available on contamination pathways in aquaculture systems such as that for farmed fish. There are however multiple reports outlining the existence relatively high concentrations of PCBs and moderate concentrations of organochlorine pesticides and PBDEs in farmed Scottish and European salmon.

*"Most salmon sold in supermarkets today come from fish farms. Farming of salmon has several advantages, in that they are available year round, and are less expensive than wild salmon. However farmed salmon contain levels of 13 fat-soluble persistent organic pollutants (POPs) that are on average ten times higher than those found in wild salmon. The contaminants come from the feed fed the farmed fish, which is made from the fats and protein of trash fish"<sup>1</sup>.*

In recent years fish feed ingredients and additives used in aquaculture have begun to be considered significant<sup>2</sup>. Fish sourced by the fish meal manufacturing industry comes from many different parts of the world. If that part of the world where the feed is sourced has polluted waters, it is likely that the feed is polluted.

Results of research that has been done on POP and other contaminants in aquaculture farming systems does lead to many concerns for what contamination issues will arise for Darwin, Bynoe and Snake Bay local environments with the introduction of large volumes of feed from unknown, possibly contaminated, sources into our marine environments and the local wildlife . These concerns apply now and potentially may be more significant in the future. As our global oceans become more polluted it is also likely that so will the fish and other marine life sourced to produce fish meal.

Even if the proponent can prove that the feed currently has low enough concentrations of contaminants to not cause bio-accumulation problems, there is no guarantee that this will remain the case as the feed will change overtime and wild fish are caught over time.

- The information provided at Appendix H would not be able to be understood by the public looking at this EIS. It is recommended that a summary of feed contaminants be provided for public interpretation.

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<sup>1</sup> A Doctor's viewpoint: Chemical contaminants and Farmed Salmon. Dr David Carpenter, CHEC Science Advisory Committee. CHEC Report. Spring 2004.

<sup>2</sup> Jacobs, M., Covaci, A. and Schepens, P. (2002). Investigation of Selected Persistent Organic Pollutants in Farmed Atlantic Salmon (*Salmo salar*) Salmon Aquaculture Feed, and Fish Oil Components of the Feed. Environ. Sci. Technol. 36, 2797-2805

- A maximum limit figure is provided for some contaminants. Who or what sets this maximum level figure – and how reliable is it?
- What measures are in place, if any, for approval mechanisms for the proponents to change or alter the composition of feed over time?
- The EIS does not discuss issues of contamination and bio-accumulation of local environments and wildlife surrounding the cages. These issues must be covered discussed in detail including current and future scenarios.

#### **b) Feed volume and impacts on wild fisheries**

Seventy-five per cent of the world's fish populations are currently fully exploited, over-exploited or depleted by the global fishing industry<sup>3</sup>. Farming of marine species in aquaculture production isn't expected to compensate for these impacts, and may well exacerbate them, particularly as aquaculture's demand for wild fish species for use as fish feed continues to rise<sup>4</sup>.

The recently released Millennium Ecosystem Assessment report indicates that, while aquaculture production is increasing globally, it has come at the cost of greater pressure on wild fisheries for fish feed<sup>5</sup>. These 'feed fish' species are crucial components of numerous marine food webs, including those supporting large fish, sharks, dolphins, toothed whales and seabirds. Removing these fish can have serious flow-on ecosystem effects<sup>6</sup>. According to CSIRO researchers, fishmeal production is an unsustainable use of wild fisheries resources<sup>7</sup>.

It is difficult to ascertain even an estimate of the volume of wild fish that would be removed from oceans to be converted to feed for this farm proposed. The first difficulty faced is that conversion ratios provided are a ratio of dry feed to wet fish. For example it is stated in the EIS that for 500 tonnes *wet* fish produced, between 550 and 700 tonnes of *dry* feed will be used. To compare wet and dry weights and formulate a conversion ratio is an inaccurate and misleading way to analyse protein conversion ratios.

An accurate ratio is derived from comparing wet to wet ratio or dry to dry ratio. The EIS outlines that at least 50% of feed will be fish matter, and a upper value is not provided in the EIS, but for comparisons sake we will use 75% as an example.

At 1:1.4 ratio 500 tonnes wet fish would use 350 tonnes dry fish (at 50% fish matter in feed)

At 1:1.4 ratio 500 tonnes wet fish would use 525 tonnes dry fish (at 75% fish matter in feed)

Presuming fish are 70% water the following figures can be calculated for wet to wet ratio:

At 1:1.4 ratio 500 tonnes wet fish would use approximately 1155 tonnes wet fish (at 50% fish matter in feed)

At 1:1.4 ratio 500 tonnes wet fish would use approximately 1732 tonnes wet fish (at 75% fish matter in feed)

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<sup>3</sup> The State of World Fisheries and Aquaculture 2004. Food and Agriculture Organization of the United Nations.

<sup>4</sup> [www.marine.csiro.au/research/aquaculture/thought.html](http://www.marine.csiro.au/research/aquaculture/thought.html)

Tacon A. (1994) Dependence of intensive aquaculture systems on fish meal and other fishery resources. *FAO Aquaculture newsletter* 6, 10–16.

Naylor R., et. al (1998) Nature's subsidies to shrimp and salmon farming. *Science* 282: 883–884.

Naylor R.L., et. al (2000) Effect of aquaculture on world fish supplies. *Nature* 405: 1017–1024.

Pauly D., et. al (2002) Towards sustainability in world fisheries. *Nature* 418: 689–695.

<sup>5</sup> Flaherty T. (2005). Summary of the statement from the Millennium Ecosystem Assessment Board. *Waves* 11 (1) Winter.

<sup>6</sup> Huntington T., et. al (2004). 'Assessment of the sustainability of industrial fisheries producing fish meal and fish oil'. Report to the Royal Society for the Protection of Birds. Poseidon Aquatic Resource Management Ltd and The University of Newcastle-upon-Tyne.

<sup>7</sup> [www.csiro.au/index.asp?type=faq&id=AllureOfAquaculture\\_BlueRevolution&stylesheet=sectorInformationSheet](http://www.csiro.au/index.asp?type=faq&id=AllureOfAquaculture_BlueRevolution&stylesheet=sectorInformationSheet)

## So the real conversion ratio would be:

- **1:2.3** at 50% fish matter in feed
- **1:3.5** at 75% fish matter in feed

**In other words, every 1 tonne of fish produced would require between 2.3 and 3.5 tonnes of fish matter as food – not a sustainable situation and one that will further deplete world fish stocks, not protect them!**

There have been various analyses performed to attempt to understand real conversion ratios and impacts on wild fish populations. A study undertaken by Pinto, F. and Furci, G<sup>8</sup> found that according to data published by FAO, approximately 45 kilos of pelagic fish are required to produce one kilo of fish meal, while for the production of one kg of fish oil, requires between 21 to 27 kg. Further, a study by the Pew Oceans Commission found that 4.13 kilograms of wild fish are required to produce one kilogram of aquaculture farmed marine finfish<sup>9</sup>.

P 107 states "Fishmeal and fish oil to be sourced only from managed and sustainable fisheries". The management regimes of the fisheries that the feed is sourced from and how these fisheries have been determined to be sustainable needs to be discussed.

The listed fisheries, the Peruvian and Chilean fisheries, do not appear on the Marine Stewardship Council web site as approved, or under assessment, fisheries. In fact a report<sup>10</sup> undertaken by Poseidon Aquatic Resource Management Ltd and The University of Newcastle-upon-Tyne developed a series of 41 tests of sustainability reflecting the Marine Stewardship Council's Principles and Criteria for sustainable fishing and applied these to the Peruvian anchovy fishery. This fishery was chosen as they found that it is the most important source of fish meal, representing some 35% of all global landings of fish destined for fish meal.

The Peruvian anchovy fishery failed to meet the majority of the criteria. The analysis also found that, assuming that Peruvian anchovy is typical of other feed fisheries in the region, the lack of information about the fishery and its wider ecosystem effects is particularly worrying.

Assessment against each set of criteria Peruvian anchovy

- Criteria fully met: 4 (10%)
- Criteria partially met: 19 (46%)
- Criteria not met 6: (15%)
- Insufficient information: 12 (29%)

Further crucial feed issues and questions arising from the EIS

- The EIS says "*up to 50% is non-fish protein*". This is a very imprecise figure. So it could be 0% or 20% non-fish sourced protein or 50%? These figures need to be more accurate as they have significant implications.
- Ingredients will include fish meal, plant protein meal, poultry (chicken) protein meal, wheat, fish oil, poultry oil, vitamins and minerals. Where are these components sourced from? Does the plant-derived component have residues of pesticides and fertilisers? Are hormones and

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<sup>8</sup> Pinto, F. and Furci, G. (2006). Salmon Piranha Style: Feed Conversion Efficiency in the Chilean Salmon Farming Industry. Study by the Terram Foundation.

<sup>9</sup> Goldberg, R., Elliott, M., and Naylor, R. (2001) Marine Aquaculture in the United States: environmental impacts and policy options. Pew Oceans Commission, Arlington, Virginia.

<sup>10</sup> Poseidon Aquatic Resource Management Ltd and the University of Newcastle-upon-Tyne. (2004). Final report to the Royal Society for the Protection of Birds: Assessment of the sustainability of industrial fisheries producing fish meal and fish oil.

antibiotics used in the rearing of the poultry, which is most often the case? What measures are in place to track and monitor changes in ingredients and quality in a transparent manner?

- No estimates of excess feed leaving the cage system and entering the surrounding marine environment are provided. This figure must be provided to consider impacts on surrounding environments.
- No information is provided on the feed supplied by the second fish feed supplier, Ridley's Aquafeed, which makes up 1/8 of the feed supply - a significant volume. There is no information on highly important issues such as sustainability of the source and contaminants contained in the feed.
- Referring to government control does not necessarily mean sustainable management regimes are used. This is a presumption and is not backed up with science or explanation of management regimes and sustainability measures in place.
- To quote a feed company (Skretting) representative and their personal opinion does not provide any scientific justification for claims of sustainability.
- What measures are in place to ensure that all future fishery product sources remain sustainable, under credible assessment processes, especially considering oceans are overfished at an increasing rate and environmental conditions and management regimes continually change? It is particularly relevant to the current fisheries utilised (South American small pelagics) as these fisheries have a common pattern of producing huge catches and then collapsing in response to changes in ocean climate, and reappear 10 to 30 years later (National Oceanic and Atmospheric Administration. Climate variability and marine fisheries <http://www.pfel.noaa.gov/research/climatemarine/cmffish/cmffishery4.html>). These fisheries may collapse, due to natural climatic processes or other, and a new fishery would then need to be accessed. This new fishery needs to then be assessed for sustainability.

**It is legally necessary to address the impacts of the proposals on wild fisheries. This is the case based on precedent set regarding downstream impacts in the "*Nathan Dam Case*" (*Queensland Conservation Council Inc. v Minister for the Environment and Heritage [2003] FCA 1463*). This case has set an important precedent in determining that the assessment process must address downstream and long term impacts, not just the immediate, local effects of a proposal. These impacts would include the direct and indirect impacts of sourcing feed.**

#### **4. Pollution**

##### a. Pollution - volumes

The two proposed sea cage fish farms will discharge large volumes of nutrients into the surrounding marine environments for a time period defined as 'indefinitely'. This may cause undesirable and irreversible ecological impacts in the marine environment, and to many marine species and communities.

The estimated nutrient outputs from the Bynoe Harbour sea cages are up to **135** and **450** tonnes of Nitrogen and up to **23.35** and **84.5** tonnes of Phosphorous per annum, when using 1500 and 5000 fish tonnes output respectively, depending on how the EIS total farm output figures are read. The estimated nutrient outputs from the Darwin Harbour sea cages are up to **90** tonnes of Nitrogen and up to **16.9** tonnes of Phosphorous per year.

The output from Larrakeyah raw sewage outfall is **100** tonnes Nitrogen and **20** tonnes Phosphorous per year. The output from Ludmilla sewage outfall is **90** tonnes Nitrogen and **20** tonnes Phosphorous per year. Whether the 1500 or 5000 tonne farmed fish per year figure is used, the Bynoe fish farm will

discharge more Nitrogen and Phosphorous into the Bynoe Harbour marine environment in the form of fish wastes than each of the Larrakeyah and Ludmilla sewage outfalls. The Darwin Harbour sea cage will discharge as much nitrogen as the Ludmilla sewage outfall and almost as much as the Larrakeyah sewage outfall (only 10% less).

The Darwin Harbour proposal at 1000 tonnes per annum fish output would equate approximately to the human Nitrogen waste output of up to 15,900 people and the Bynoe Harbour proposal at its peak production of 5000 tonnes of fish per annum would equate to the human Nitrogen waste output of up to 79,900 people, based on the average human output of around .016 kg of Nitrogen per day (Goldburg, R., & Naylor, R. (2005). Future seascapes, fishing, and fish farming. *Frontiers in Ecology and the Environment*, 3(1), 21-28).

The Larrakeyah sewage outfall has already been identified as a problem and proven to be of serious concern to the community. This outfall will be stopped and work has progressed by Power and Water Corporation on this. It has been estimated to cost between \$20 and \$40 million of tax payers dollars to completely shut down the Larrakeyah outfall and treat the sewage.

The community is bearing the cost of cleaning up their own waste to protect the health of Darwin Harbour. Is it then fair to ask the community to accept almost this same amount of nitrogen pollution from a private fish farm?

Do we now want to pump more than this raw sewage volume of pollution into the currently unpolluted Bynoe Harbour from the sea cage fish farms here?

#### b. Pollution - site specific flushing considerations

The Bynoe Harbour sea cage lease site is proposed to be in an area that has much less flushing than the location of the Larrakeyah outfall, and is a site with less flushing than the Port Hurd pilot site. The concerns of having pollution sources deep in the Harbour where flushing is relatively little can be illustrated using the case of the Palmerston sewage outfall. This outfall contains less than half the Nitrogen of the Larrakeyah outfall, yet is regarded to be of greater pollution concern (Paul Heaton, Manager Water Facilities, Power Water Corporation. Pers comm.) because the waters further into the Harbour have been shown to not flush (Williams, D., & Wolanski, E. (2003). *Darwin Harbour hydrodynamics and sediment transport*. Paper presented at the Proceedings of the Darwin Harbour Public Presentations, Darwin, Northern Territory Australia)

The Darwin Harbour sea cage site is also deep in the Harbour where levels of flushing are less. It is estimated that up to **90** tonnes of Nitrogen and up to **16.9** tonnes of Phosphorous will be discharged from this site. This is almost as much pollution in the form of Nitrogen and Phosphorous as the Larrakeyah raw sewage outfall.

When compared to the more concerning sewage outfall, the Palmerston outfall, the sea cages will discharge more than double the pollution in the form of Nitrogen and almost as much Phosphorous. The proposed sea cage site and the Palmerston sewage outfall are in similar positions in the Harbour in relation to flushing conditions: little flushing occurs - rather water moves to and fro returning to the site of origin (Williams, D., & Wolanski, E. (2003). *Darwin Harbour hydrodynamics and sediment transport*. Paper presented at the Proceedings of the Darwin Harbour Public Presentations, Darwin, Northern Territory Australia) - and therefore pollution inputs to this part of the Harbour are greatly concerning.

#### c. Pollution - impacts

Global experience has shown fish farms can be major sources of **waste and nutrient pollution** in the marine environment. Sea cages, being an "open system", directly discharge nutrients, waste products, chemicals and antibiotics (when used) into the marine environment, without any form of treatment. Wastes directly input to the marine environment at the proposed Bynoe Harbour, Darwin

Harbour and Snake Bay sites include excess feed not consumed by fish; fish faeces; dead fish; chemical parasite control treatment; grey water which includes treated sewage from staff occupation on site (Bynoe EIS p. 39 EIS); and potentially chemicals from the treatment of farmed fish.

#### d. Pollution -Impacts - corals

A number of studies have indicated nutrient pollution poses a threat to coral species and communities.

*"Elevated nutrient concentrations affect corals by promoting phytoplankton growth, which in turn supports increased numbers of filter feeding organisms such as tubeworms, sponges and bivalves that compete with coral for space. Macroalgal blooms can also result under enhanced nutrient regimes and macroalgae may overgrow coral structures, out-competing coral for space and shading coral colonies to critical levels. Elevated nutrients can inhibit fertilisation rates and embryo formation of corals, as well as causing direct coral mortality"* (Great Barrier Reef Marine Park Authority<sup>11</sup>)

The Darwin Harbour EIS baseline survey of Channel Island states that little is known of the biology and reaction to organic loading of corals. This overlooks the work of Harrison and Ward (2001)<sup>12</sup> and Hughes et al, (2003)<sup>13</sup>. It is recommended that the information gathered in these two studies be taken into consideration and the EIS sections discussing nutrient impacts on corals be re-written accordingly.

At 5.3.2 the Darwin Harbour EIS states *"It can be expected that the waters of Jones Creek will wash back and forth past the farm with the potential for nutrients to accumulate during the dry season"* and *"the sites where nutrients may be expected to accumulate in the incoming tide are located within Jones Creek"*. Figures 4 and 7 of the EIS show that at Jones Creek there are areas containing corals, algae and other marine life. What will be the impact of this nutrient accumulation on corals, algae, benthic habitats and marine wildlife, including listed species that feed on algae etc? It is likely that there will be detrimental impacts. What will be the impact on dugong and turtle feed sources considering both species are known to frequent the Channel Island area and feed on algal species? (Whiting, S. (2001). *Preliminary Observations of Dugong and Sea Turtle around Channel Island, Darwin Harbour* (Report). Darwin NT: Power and Water Authority, Darwin.)

#### e. Pollution - Impacts - other issues

- Although **algal blooms** are a natural occurrence in NT waters, it is possible that the large quantity of organic wastes may result in more occurrences of algal blooms and over a larger area.
- Sea cage farming has been known to use **antibiotic and chemicals** treatments for disease and sealice control.
- Increased nutrients, even in small amounts, may affect the algal and seagrass balance and the species composition within these groups and therefore affect (possibly decrease) food availability for turtles and dugongs (Dr Scott Whiting, Pers. comm)
- Introduction of waste and nutrient pollution to an ecosystem has the potential to reduce the depth to which seaweed and seagrass can grow as there is a reduction in light penetration. Given that seagrasses in the waters west of Darwin already live in a marginalised environment (large tides and high turbidity), any adverse changes may have a large negative impact (Neil Smitt, Pers comm).

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<sup>11</sup> GBRMPA [http://www.gbrmpa.gov.au/corp\\_site/key\\_issues/water\\_quality/principal\\_influences.html](http://www.gbrmpa.gov.au/corp_site/key_issues/water_quality/principal_influences.html)

<sup>12</sup> Harrison, P. L., & Ward, S. (2001). Elevated levels of nitrogen and phosphorus reduce fertilisation success of gametes from scleractinian reef corals. *Marine Biology*, 139(6), 1057-1068

<sup>13</sup> Hughes, T. P., Baird, A. H., Bellwood, D. R., Card, M., Connolly, S. R., Folke, C., Grosberg, R., Hoegh-Guldberg, O., Jackson, J. B. C., Kleyvas, J., Lough, J. M., Marshall, P., Nystrom, M., Palumbi, S. R., Pandolfi, J. M., Rosen, B., & Roughgarden, J. (2003). Climate Change, Human Impacts, and the Resilience of Coral Reefs.

#### f. Pollution - relevance of Port Hurd data

The Port Hurd pilot farm produced only two years monitoring data (EIS Section 7.1.1) on nutrient output impacts. This cannot be compared or applied to the sea cage farm projects now being proposed, which will discharge nutrients indefinitely. The Port Hurd site has different site-specific characteristics, e.g.: tides, currents, flushing, water depth.

In both the Darwin and Bynoe EIS's it is stated that nutrients are likely to be removed more efficiently at Port Hurd than Channel Island or Port Patterson.

### **5. Physical and biological environment and baseline investigations**

- Bynoe Harbour: This section states the proposed farm area "has a 6 to 7 metre tidal range", "which results in large daily flushing of the mangroves with sea water". Local knowledge (Pers comm., Chris Makepeace and Bill Brisco) says otherwise. Local knowledge says that the area is shallow and that the 6 to 7 metre tidal range would occur only 2 times per month at the spring tide and at other times is much less, getting as low as 1.5 to 2 metres at the neap tides. This would result in very little flushing for the majority of the time and there would be build up of farm wastes in the area. Potential environmental impacts of this local waste build up is very concerning and needs to be addressed. This section goes on to make a statement that raised questions: "towards the end of the dry, when terrestrial run-off has ceased". Should this actually say "towards the end of the wet, when terrestrial run-off has ceased" because, as there are no substantial creeks or rivers in the area, you could presume that at the end of the wet and when the dry season starts, the terrestrial run-off has ceased? It appears that corrections for tidal and seasonal characteristics may be needed here.
- Bynoe Harbour: The EIS does not spell out the time periods when negligible net flushing occurs through the bay. It would be presumed that this would be a very important consideration as it would be during this time period that wastes would build up in the area. The time period that net flushing does not occur needs to be documented.
- Bynoe Harbour: The EIS only provides information on coral communities in relation to Geranium Channel and fails to provide information on, or address as a parameter to be measured, coral communities in the surrounding areas. Coral communities in the surrounding areas need to be identified, sampled and measured as there is potential for these corals to be impacted upon. Coral reefs are exceptionally diverse marine ecosystems and are becoming increasingly valuable as, globally, reefs are continuing to decline (DEH 2001: *Australia State of the Environment 2001*, Independent Report to the Commonwealth Minister for the Environment and Heritage. Australian State of the Environment Committee, Authors CSIRO Publishing on behalf of the Department of the Environment and Heritage, Canberra). In the NT, with a marine park system yet to be put in place, very little coral is protected and managed. There is only one marine park in the Northern Territory where reefs are protected and managed, this being Garig Gunak Barlu National Park.
- Bynoe Harbour: The EIS only minimally addresses seagrass stating "seagrass is known to exist along the seaward end of Indian Island". However the EIS fails to address this seagrass in parameters sampled and measured, in baseline studies, or ongoing monitoring. Further the EIS does not provide information on, or address as a parameter to be measured in baseline studies nor ongoing monitoring, seagrass communities in the surrounding areas.

*"Seagrasses are also found in the intertidal zone. They are important for stabilizing coastal sediments, providing food and shelter for a range of organisms, acting as a nursery ground for shrimp and fish and for nutrient trapping and recycling (Coles et al. 2004). Seagrass play an important role as habitats for endangered species and commercial fisheries. Once removed, seagrass recovery is not assured (DEH 2001), making the prevention of damage to seagrass critical". (GLYDE POINT REPORT p18)*

- Bynoe Harbour: There are two very important habitats for threatened and migratory species that may occur in the area and therefore may be impacted upon by the development under consideration. These habitats are not discussed in the EIS. These are firstly, rocky reefs and secondly, mudflats. Rocky reefs and shelves, with their algal growth, are, in the Darwin Region, thought to be important food source for turtles, and potentially other wildlife. In a radio tracking study of dugongs around the Vernon Islands and Darwin Harbour it was found that dugongs spent a considerable amount of time on intertidal rocky reefs. The study concludes that algal growth on rocky reefs around Darwin may be an essential food source for dugongs, as well as seagrass beds (Whiting, S. 2004: *Conserving Dugongs in Darwin Harbour*. Coast and Clean Seas Project. Report to Natural Heritage Trust, Canberra in Glyde Report). Considering the importance of rocky reefs to threatened species and the sensitivities of algae to nutrient loads, the presence of this habitat needs to be investigated.
- Mudflats can be important habitat for threatened and migratory species. Little research has been conducted in Australia, however the limited work done suggests that mudflats are a valuable feeding and breeding site for migratory birds, and are a diverse habitat in their own right (DEH, 2001; Noske 1996 IN Glyde Point Report). The occurrence of mudflats in the area and potential impacts needs to be investigated, especially considering that the EIS states that in times of little flushing nutrient.

The occurrence of rocky reef and mudflat habitat, and potential impacts from sea cages, needs to be investigated.

- Bynoe Harbour, Darwin Harbour and Tiwi Islands: It appears that no baseline studies have been done on the native barramundi populations. The native barramundi populations are facing a number of risks such as transfer of disease, pests, pathogens, fungus and also genetic pollution if selective breeding programs occur (**which is indeterminable as the breeding program is not mentioned in the EIS**). These baseline studies of barramundi populations must occur to be able to determine if a sea cage development was impacting native populations in any way and to enable appropriate action to be taken.

## 6. Processing plant

The EIS does not deal with any issues associated with the "Processing Plant in Darwin" (as per Marine Harvest media release, 6<sup>th</sup> July 06).

In December 2003 the Federal Court of Australia in *Queensland Conservation Council Inc. v Minister for the Environment and Heritage [2003] FCA 1463* (the "*Nathan Dam Case*") interpreted the EPBC Act to require that the Commonwealth Minister must consider the 'whole, cumulated and continuing' effect of actions including indirect consequences in his or her deliberations over proposed development that may impact on a site triggering the EPBC Act. This case has set an important precedent in determining that the assessment process must address downstream and long term impacts, not just the immediate, local effects of a proposal. The EIS fails to address the downstream impact of the processing plant.

## 7. Diseases and parasites

Intensive fish farming brings a high risk of disease and new diseases being encountered. New diseases may require antibiotic use (refer to 6. Pollution). Disease and parasite risks have potential to impact upon wild fish populations.

## 8. Impacts on threatened and migratory species, including turtle and dugong

There are 13 threatened and 31 migratory species listed for the Bynoe Harbour proposed fish farm area; 13 threatened and 33 migratory species listed for the Darwin Harbour fish farm area; and 12 threatened and 19 migratory species listed for the Snake Bay fish farm area. This is a very large and

significant number of species. Of particular concern, for both natural and cultural values, are turtle, dugong and crocodile species.

#### a. Turtle and Dugong

Turtle and dugong may be impacted upon by a range of activities and processes: impacts on breeding and feeding habitats; increased predation rates due to increased presence of predators attracted by the sea cage fish; boat strike; species avoiding the area due to ongoing disturbance; and lighting impacts on turtles.

##### *Channel Island, Darwin Harbour*

Scott Whiting conducted a study to undertake preliminary observations of dugong and sea turtle around Channel Island, Darwin Harbour<sup>14</sup>. This study found:

- Dugongs were present in the area during most months of the year except from September to December (although more sampling may have picked up their presence in these months)
- Dugongs regularly feed on intertidal algae in the vicinity of the eastern end of the Channel Island Bridge
- Thirty-five of the 37 dugong sighted showed distinct foraging behaviour while the other two dugongs looked as though they were traveling through the area
- Their diet was determined to be algae as no seagrass was present in the area
- Their diet could include a number of algal genera that sparsely cover the rocky reef in this area.
- Habitat assessments around Channel Island indicate that most of the intertidal algae occur between Channel Island and the mainland.
- Both Green and Hawksbill turtles of immature and adult size were abundant and regularly used the intertidal area in the vicinity of the Channel Island Bridge. Evidence presented here indicates that rocky reefs in Darwin Harbour are extremely important for both dugongs and sea turtles and this should be recognised during the future development of Darwin Harbour
- Three species of sea turtles were observed from the Channel Island Bridge
- Large numbers of Green and Hawksbill turtles foraged on the intertidal reef flats east of Channel Island when the tidal height allowed access to these areas.
- The large number of turtles observed over this small patch of rocky reef at Channel Island indicates that it is important habitat.

##### *Port Patterson, Bynoe Harbour*

In Bynoe Harbour, dugong and turtles are known to feed on seagrass beds, reef flats and algal beds and around rocky reefs in the region of the proposed sea cages and in adjacent areas. Flatback and Olive Ridley sea turtles nest in the region at Bare Sand and Quail islands and also at Indian Island. Dugongs occur in the Bynoe Harbour proposed lease area, particularly around Turtle, Indian and Bare Sand Islands. Seagrass beds occur around the top of Indian Island at the intertidal and subtidal interface with seagrass being the primary food source for dugong<sup>15</sup>.

Areas within Snake Bay and surrounding areas may also be significant for turtle and dugong however it is difficult to determine as information is scarce.

Concerns relating to turtle and dugong highlighted by Dr Scott Whiting<sup>16</sup> include:

- 1 Sea cages attract predators to the area. This is a major problem for the turtles in the area,

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<sup>14</sup> Whiting, S. (2001). *Preliminary Observations of Dugong and Sea Turtle Around Channel Island, Darwin Harbour* (Report). Darwin NT: Power and Water Authority, Darwin

<sup>15</sup> Whiting, S. (2005). Some Possible Problems with Sea Cage Farming in Port Patterson – Sea Turtle and Dugong. WWF.

<sup>16</sup> Whiting, S. (2005). Some Possible Problems with Sea Cage Farming in Port Patterson – Sea Turtle and Dugong. WWF

particularly the juvenile turtles. Increased predators in the area may result in an increase in predation of turtles.

- 2 Lighting associated with the operation will attract hatchlings in the area. Survival chances would then be close to nil, either from predation or from using up their energy reserves before they reach open water
- 3 Disturbance is a major issue for sea turtles and dugongs. Increased disturbance may impact turtle and dugong in the area. Dugongs are shy animals and continuous disturbance will cause dugongs to move away from an area on a permanent basis
- 4 Increased nutrients may affect the algal and seagrass balance and the species composition within these groups and therefore affect (possibly decrease) food availability for turtles and dugongs
- 5 Boat strike: Increased boats in the area could increase injuries and deaths from collisions with dugongs and turtles.

Considering the Bynoe and Channel Islands areas appear to provide feeding grounds for both dugong and turtles there should be a great deal of precaution applied. The fish farms will have large outputs of nutrients which may pose a significant risk of altering the local ecology. Of concern is the EIS stating it is likely these nutrients will accumulate in the estuary on intertidal flats and deeper channels in Bynoe Harbour. The sea cage farm could also interfere with the movements of turtle and dugong.

The 'risk assessment' in the EIS documents relating to impacts on turtle and dugong is completely subjective and inadequate as there is no evidence provided to support the statement that the proposed project is unlikely to cause displacement of the above species of concern. In fact, based on the best information available on turtle and dugong, it is likely that the proposals will impact upon turtle and dugong, resulting in displacement.

#### *Questions arising from the EIS's content*

The EIS states that impacts on EPBC-listed threatened and migratory species and their habitat is "unlikely" for Darwin Harbour, "Possible unlikely" for Bynoe Harbour, and "unlikely/rare" for Snake Bay. The reasoning given being:- based on Baseline and Port Hurd information and monitoring; mitigation and management methods diminishing most risks; measures will be put in place to minimise possible impacts from farm lighting on turtle hatchling; and, for Darwin Harbour, most species are already adapted to a disturbed environment. These statements raise a number of questions:

- What is the baseline study that shows impacts on species and habitats are unlikely? Have there been studies done on dugong, turtle, migratory birds and other? Considering that the previous baseline studies have omitted dugong, turtle and bird habitat (coral communities, seagrass communities, mudflat communities, rocky reef communities) how has it been determined that impacts on these habitats will be "unlikely, possible unlikely, unlikely/rare"? Considering there will be no baseline data on these habitats how will it be determined if and when these habitats are altered or impacted in any way?
- What is the likelihood of increased predation rate on turtle and dugong from increased predator numbers drawn to these areas? The EIS statement that the new fish farms are unlikely to increase total predator densities is more speculative than evidence-based.
- What data or information is there to show that EPBC-listed species have adapted to disturbed environments in Darwin Harbour? What does this statement mean for those EPBC-listed species in Bynoe Harbour and Snake Bay that, according to this rationale, have not yet adapted as the areas are not yet disturbed?
- What data or information is there to show that turtles and dugong do not avoid farm areas? This question relates to information that suggests that these species respond to continued disturbance by leaving the area (Whiting 2005). If this were to occur, what impact will this have on turtle and dugong?
- What is the Port Hurd information and how is this information comparable to the potential species and habitat impacts at Darwin and Bynoe Harbours and Snake Bay?

- Previous analysis looking at boat activity in the nearby Whickam Point (Darwin Harbour) area and risk of boat strike to dugong has raised concerns<sup>17</sup>. The EIS states that there will be an increase in boat traffic by 20% in Middle Arm and thus a close analysis of similarities between the situations needs to be undertaken. Currently it appears that the information within the EIS contradicts that of the local experts and researchers for both the Channel Island and Bynoe Harbour areas.

The EIS documents are inadequate in analysis of impacts on turtle and dugong, fail to mention birds (except to state there were no apparent concerns at Port Hurd), does not address other species, glosses over potential impacts on important habitats such as seagrass, corals, rocky reefs and mudflats, and omits these important habitats in baseline studies and monitoring. It is impossible to make an informed analysis of likely or potential impacts on EPBC-listed species without this information.

Given that both Channel Island/Darwin Harbour and Bynoe Harbour (and maybe Snake Bay) are of importance to dugong and turtles, the known potential impacts together with a number of uncertainties associated with impacts from the proposed project make these locations unsuitable for the sea cage fish farm proposals. Further investigation of turtle and dugong presence and activity in Snake Bay needs to be undertaken.

#### b. Crocodile

Crocodiles may be impacted upon as it is likely that crocodiles will be attracted to the farm. The impact of this aggregation on the species is unknown. However, a related impact of this aggregation is that it is likely to simultaneously occur with an aggregation of recreational fishers (and other people) around the cages. This may cause a conflict as it is likely recreational fishers (and others) will be concerned about large predator aggregation and may in turn request a crocodile culling program, or similar.

### **9. Decommissioning and rehabilitation**

The EIS documents have not assessed issues related to rehabilitation and consequently have not provided any indication of how it is intended to rehabilitate the area after the project ceases to be viable. Also there is no discussion of rehabilitation related to one-off incidents.

Here in the NT, as in other areas of Australia and the world, there is a history of aquaculture ventures collapsing: The projects are abandoned and the taxpayer then left to pick up the bill for rehabilitation, if, in fact, rehabilitation is carried out at all. This is unacceptable and aquaculture project developers should be required to lodge an adequate rehabilitation bond for all such developments. Without a rehabilitation bond government and industry are failing to safeguard the public interest. Please refer to Attachment 1: *Aquaculture bonds in the Northern Territory: A summary of the issues for the Ministerial Advisory Committee on Aquaculture in the Northern Territory. 2003*

### **10. Legislative considerations - requirements addressed in the EIS and existing legislation and regulation**

#### a. Existing legislation and regulation

- The NT fisheries Act 1988 is vague, outdated and inadequate in its ability to address aquaculture, particularly marine based aquaculture.
- There exists no plan or process for identification of suitable sites for aquaculture: no site selection criteria, no transparent process.
- There is no strategic plan or management plan for the aquaculture industry in the Northern

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<sup>17</sup> ABC. (2002). *Gas Plant could threaten Dugongs-7:30 report 7th August 2002* [Webpage]. AND Heather Stewart. Retrieved 13th July, 2006, from the World Wide Web: <http://www.abc.net.au/7.30/content/2002/s642763.htm>

Territory.

- The NT government's aquaculture development plan *Farming the Future 2010* is minimalist and does not adequately address environmental and community requirements. Of the nine objectives outlined in the plan only one mentions the environment, and of the 35 strategies outlined only two mention the environment. This minimal level of environmental consideration clearly demonstrates that serious environmental issues associated with aquaculture are being overlooked.
- There is a lack of integrated policy to direct sustainable aquaculture development in the NT

#### b. Conflict of interest

The NT Fisheries Department is responsible for firstly, assessing the proponents' application for a license to operate the sea cage fish farms, and secondly, for regulating the operations and ensuring compliance with any conditions attached to the licence. However, it is this very same Department that has a **commercial interest** in the granting of the licence and the ongoing, uninterrupted operation of the sea cages. This is due to the Department's operation of a commercial (as well as research) arm, the Darwin Aquaculture Centre, which will supply all 'fingerlings' stock to Marine Harvest's sea cage operation. This arrangement means that the Fisheries Department is in an inherent position of conflict of interest. To refuse the provision of a licence would have a negative impact on its commercial operations. Furthermore, to affect the sea cage operations in a commercially detrimental way through the process of enforcing compliance would also potentially be to negatively impact upon the Department's own commercial activities. This situation does not allow for independent, transparent and accountable decision making and regulation.

The regulator, the Fisheries Department and its Darwin Aquaculture Centre, should not be in a commercial arrangement with those it seeks to regulate; Marine Harvest and its sea cage operations.

#### c. Legislative requirements as addressed in the EIS

##### *Waste Management and Pollution Control Act*

The EIS documents make no mention of the Waste Management and Pollution Control Act and the potential need to acquire a discharge license for the wastes, either from the cages (excess feed pellets, faeces and ammonia from the gills) or from the on-site barges (grey water and sewage - 5000 litres per week).

The estimated waste outputs from the Bynoe Harbour cages are up to 135 and 450 tonnes of Nitrogen up to 23.35 and 84.5 tonnes of Phosphorous per annum, when using 1500 and 5000 fish tonnes output respectively, which is dependent on how the EIS total output figures are read. The estimated discharge from the Darwin Harbour cages with the 1000 tonne per annum fish production goal is up to **90** tonnes of Nitrogen and up to **16.9** tonnes of Phosphorous annually.

The output from Larrakeyah raw sewage outfall is **100** tonnes Nitrogen and **20** tonnes Phosphorous per year. The output from Ludmilla sewage outfall is **90** tonnes Nitrogen and **20** tonnes Phosphorous per year.

For Bynoe Harbour, whether the 1500 or 5000 tonne farmed fish per year figure is used, the farm will discharge more Nitrogen and Phosphorous into the marine environment in the form of fish wastes than the Larrakeyah and Ludmilla sewage outfalls. For Darwin Harbour the farm will discharge nearly as much nitrogen and phosphorous as the Larrakeyah raw sewage outfall.

The Waste Management and Pollution Control Act states at section 30(3), "A person must not, except under an environment protection licence or a best practice licence, conduct an activity specified in Part 2 of Schedule 2". Part 2 of Schedule 2 lists the activities that require a licence and includes: collecting, transporting, storing, re-cycling, treating or disposing of a listed waste on a commercial basis. Listed wastes include: **animal effluent and residues**. The sea cage farm operations are

disposing of animal effluent on a commercial basis and therefore require a discharge licence to do so under the Waste Management and Pollution Control Act.

### Heritage Conservation Act

The EIS states the following:

*"The proposed lease area:*

- is close to or overlaps two sites on the Register of National Estate, namely the historic Channel Island Leprosarium ruins and the natural Channel Island Reefs;*
- it is also understood that the lease area may overlap heritage objects belonging to the SS Ellengowan Shipwreck which is declared as a heritage site under the NT Heritage Conservation Act 1991".*

The Channel Island Reefs are in fact on the listed Heritage sites under the NT Heritage Conservation Act. The lease area *directly* overlaps the Channel Island Reefs site. This overlap covers an estimated 10% of the Channel Island site. The lease area *directly overlaps* the Ellengowan Shipwreck Heritage site. For the EIS to describe the lease as it relates to these sites with words such as *"is close to or overlaps"* and *"the lease area may overlap"* is misleading.

The Ellengowan shipwreck and the Channel Island Reefs are both Heritage listed sites and thus are protected under the *Heritage Conservation Act*. Section 33 of the Heritage Conservation Act states:

*A person shall not, except as prescribed or in accordance with a conservation management plan*

*(a) carry out work of any sort on, or damage, demolish, destroy, desecrate or alter a heritage place or heritage object.*

The potential for both Heritage-listed sites to be damaged, degraded or altered is high. There is potential for excess feed and fish faeces to build up on the Ellengowan; there is potential for nutrient loads to impact upon the Ellengowan through triggering smothering plant growth; there is potential for nutrient loads to impact upon the coral reefs; there is potential for moorings to break and cage and mooring chain infrastructure to damage both the Ellengowan and the reefs (a cyclone contingency plan is not available for scrutiny).

### Channel Island Heritage Site values:

*"The natural environment of Channel Island is significant as a teaching site, for its geological features and mangroves and for the rocky reef with coral between the island and the mainland. The Channel Island Field Study Centre, the boardwalks through the mangroves, the geological features and the reef are all important teaching resources.*

*From an educational and research point of view the reef is a valuable resource because it demonstrates that a coral based community can survive in an area where most physical conditions are adverse if other conditions (such as strong currents) are met.*

*The Channel Island Reef is significant due to its relatively diverse coral community which is not consistent with its location well inside a large ria system characterised by substantial depression of salinity during the wet season, high turbidity and deep, fine muds over much of its area<sup>18</sup>*

### Ellengowan shipwreck Heritage site values

*"Formerly the SS Nokken, the SS Ellengowan is the oldest known shipwreck in Darwin Harbour and one of the earliest examples of shipping associated with European settlement in the area. The ship was associated with a number of important ventures in the Northern Territory as well as numerous*

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<sup>18</sup> <http://www.nt.gov.au/nreta/heritage/ntregister/declared/display.html?channel>

*people who made significant contributions to the development of Darwin (formerly Palmerston) and the Northern Territory. It is a unique example of nineteenth century maritime history in the Northern Territory and is the only known Norwegian built iron steamer in Australian waters. Its potential to make significant contributions in the field of maritime archaeology is high<sup>19</sup>.*

## **11. Consideration of Marine Park plans.**

The Bynoe Harbour EIS only mentions and does not discuss or address the major consideration that the Bynoe Harbour is currently the site for a proposed marine park and planning is underway via the Government-appointed Bynoe Harbour Marine Park Advisory Committee. Whilst the marine park's goals, objectives, management plan and zoning are currently still being formulated, it is likely that large scale sea cage development is in direct conflict with the values for which Bynoe Harbour is being created as a marine park. It is for this reason that it is recommended that this sea cage proposal only be considered after the marine park details have been finalised.

## **12. Site selection criteria and alternative sites**

The site selection criteria outlined in the EIS state, "*selection criteria included proximity and accessibility to Darwin, shelter from cyclones and marine influences, suitable current speeds, adequate water depth and sea-bed clearance*".

This site selection criterion omits any environmental, social and cultural considerations and is based solely on economic and production desires of the company. In the absence of information it can be concluded that the site selection fails to deal with avoiding or minimizing environmental, social and cultural impacts (see also 14: Lack of planning and management frameworks to protect environments and lack of environmental management plans). The important elements of environment, social and cultural impact must be incorporated into the site selection criteria.

It is a serious failing of the EIS that closed-system, land-based options as an alternative were not at all examined. Closed-system, land-based operations that remove many of the environmental risks associated with open-system sea cages (such as pollution, disease transfer, chemical and hazardous materials pollution) have been shown to be a commercially viable alternative. Having a land-based operation as an alternative should be explored and presented.

## **13. Fish aggregation**

There will be aggregation of large numbers of fish at the fish farm sites. The impact of this is unknown and unexplored.

## **14. Lack of planning and management frameworks to protect environments and lack of environmental management plans**

All three EIS documents do not mention 'Ecologically Sustainable Development (ESD)', 'Ecosystem Based Management (EBM)', the 'Precautionary Principle' or a 'Precautionary Approach', or 'Adaptive Management'. All are essential elements of good planning and management aiming to protect environments. This leads the reader to conclude that environmental protection is not a factor the proponents seriously considered. It is imperative that any applicant address ESD principals in their EIS. The proposals are therefore unacceptable in their current form.

Environmental Management Plans are the key documents that operationalise environmental protection measures. These Environmental Management Plans are yet to be developed and are therefore not outlined in the EIS documents. Without the ability to scrutinise environmental protection measures the

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<sup>19</sup> <http://www.nt.gov.au/nreta/heritage/ntregister/declared/display.html?elleng>

proposals are unacceptable in their current form

## **15. Port Hurd Pilot Farm Environmental Monitoring Results**

It is our opinion that the data obtained for the Port Hurd Pilot farm is only minimally applicable, if at all, to the proposed sea cage developments. The reasons for this are:

- During the lifetime of the Port Hurd farm there were changes to farming techniques, changes to cage infrastructure used, changes in volumes of fish (with multiple escape events), so that the data obtained may not be for consistent conditions for a substantial length of time and thus may not provide usable and applicable data.
- The environmental conditions at the Port Hurd site are different, i.e. at Port Hurd tidal/current water movement were significantly greater thus having a significantly greater flushing capacity. Further, depth of the waterway was significantly greater thus a lesser capacity for wastes to build up under the cages and in the immediate area. As stated above, local knowledge (Chris Makepeace and Bill Briscoe, pers comm.) says that the Bynoe Harbour area is shallow and that the 6 to 7 metre tidal range would occur only 2 times per month at the spring tide and at other times is much less, getting as low as 1.5 to 2 metres at the neap tides. This local knowledge also states that tidal/current water movement at the Bynoe Harbour site is significantly less than that at Port Hurd. These conditions at Bynoe Harbour would result in very different water movement through the area and less flushing. The EIS states at p. 8 that there are (undefined) times when there is negligible net flushing occurring through the bay. The conditions are therefore very different to that at Port Hurd raising questions of applicability of data gathered at Port Hurd to the Bynoe Harbour site. Without baseline data covering site specific information at the proposed new sites, a comparison of the sites cannot be undertaken.
- p10: the EIS states that for the Port Hurd site, "*A general increase in chlorophyll 'a' levels was observed*". There is however no explanation as to what this means. Does this mean that there was a measurable change to the ecological system as a result on the fish farm nutrient input into the system?
- Only two years monitoring data (EIS Section 7.1.1) on nutrient output impacts. This cannot be compared or applied to the sea cage farm situations being proposed, which will discharge nutrients indefinitely into very different environments.
- In both the Darwin and Bynoe EIS's it is stated that nutrients are likely to be removed more efficiently at Port Hurd than at Channel Island or Port Patterson.

## **16. Community consultation and Indigenous people's rights, interests and responsibilities**

- The Aboriginal Areas Protection Authority has issued an Authority Certificate for North Channel Island but no Authority Certificate has been sought for Bynoe Harbour operations (D. Jackson, Pers. Comm.)
- At **6.19** and **8.21** of the Channel Island EIS (relating to Archaeological, Historical, Cultural and Aboriginal Sites) the EIS does not address potential impacts on the 20 or so documented Aboriginal archaeological sites on Channel Island including in the coastal zone, or the sacred site called Mingarra. Potential impacts on these sites must be addressed.
- The Kenbi Land Claim Report (1979) contains records of 5 documented sacred sites on Indian Island and several more on the nearby mainland. One sacred site is directly adjacent to the proposed lease area. These sites are protected under Legislation and were not mentioned in the EIS and potential impacts upon these sites must be investigated. There are also two dreaming tracks that cross the area.

- At **11.3** (Future Consultation) the EIS makes no mention of consulting with the Larrakia Traditional Owners. Further it states that Marine Harvest will only, *"brief the Northern Land Council at its meetings about proposed initiatives for potential changes to the operation which could impact on the local people and will seek advice about any considerations they require about the operation"*. This level of consultation is completely inadequate to address rights, interests and responsibilities of the Traditional Owners and demonstrates a lack of understanding of Indigenous people's rights, connection to sea country and sites of significance.
- The EIS documents fail to address Native Title rights such as the right to travel through the area; the right to have access to the sea and sea-bed within the area; and the right to fish, hunt and gather within the area. The proposals may impact upon Native Title rights and therefore these issues must be addressed.
- In the Bynoe Harbour EIS at **6.19** (Potential Impacts on Archaeological, Historical, Cultural and Aboriginal Sites) the following is stated, *"Potential impacts on archaeological, historical, cultural and Aboriginal sites could include the disturbance of artifacts, ruins and remains, or the disturbance of cultural and Aboriginal traditional values and beliefs associated with particular sites"*. No further detail is provided. No surveys for such sites have been undertaken in the surrounding areas.
- At **8.20** (Bynoe EIS) it is stated, "No archaeological or historical features have been reported within the Port Patterson area". This does not mean that the sites do not exist, just that the area has not been formally surveyed.
- In the Bynoe Harbour EIS at **11.2** (Future Consultation) it is stated, "Marine Harvest will continue formal and informal liaison with the Northern Land Council during the operation of the Port Patterson site". There is no mention of consultation prior to the operation of the site. It can therefore be presumed that there is no planned consultation with Traditional Owners nor the Northern Land Council before commencement of the project. This is completely inadequate community consultation.
- The Larrakia people have not been consulted in relation to either the Darwin Harbour or Bynoe Harbour proposals (D. Jackson and G. Constantine in Bynoe Harbour Marine Park Advisory Committee meeting and D. Jackson in the Marine Harvest Public Information Session) and thus have not had the opportunity to form or express a position on the proposals. **Therefore the following statements within the EIS's are incorrect and misleading:**
  1. In both the Darwin Harbour and Bynoe Harbour EIS documents at **1.20** it is stated *"Aboriginal groups indicated preliminary support for the other fish farming operations planned by Marine Harvest"*. We have been informed that the Larrakia representative that attended this day **did not** in fact state 'preliminary support' for the proposals (D. Jackson, Pers comm) and would not alone be in the position to speak on behalf of the groups that make up the Larrakia people.
  2. At Channel island EIS **5.1.9**, *"The Larrakia people and the Northern Land Council have been supportive of the investment, the operation and the opportunities which tropical fish farming can bring"*.
  3. Channel island EIS, *"Marine Harvest has been in contact with the Northern Land Council and the Larrakia People. Neither has voiced any opposition to the proposed lease area"*.
  4. Bynoe EIS at 8.20 it is stated, *"No formal advice has yet been received from the Northern Land Council regarding these matters, however preliminary discussions have*

*not suggested that there would be any opposition to the proposed marine farming operation going ahead in Port Patterson'.*

### **EIS - other issues**

1. P.3, 1.3. EIS states a benefit of the proposal will be, "*a reduction of pressure on wild barramundi stocks*". There is no explanation of how these farms will reduce pressure on barramundi stocks. Are wild fishery licenses to be bought out or similar? At this stage, with no reasoning as to how this would occur, we would have to disagree with this statement. It is misleading to lead the community to believe that these farm proposals will be good for wild populations by reducing pressure on wild stocks.
2. p. 3, 1.6 Layout and Infrastructure: The EIS only makes mention of long-term facilities being entirely contained on water and does not mention where short term facilities will be. Short term facility locations need to be clarified.
- 3 p6 & p39 Parasite control treatment has needed to be used in the past and may be needed to be used in the future if parasite problems arise. Parasite control treatment is outlined to be an emission from the operation at page 6 and 39. However the EIS does not
4. **Construction of farm** (Bynoe)- p3. Will shore based facilities be used for stage 1 over 7 months? **P5** 'temporary local accommodation facilities within Bynoe Harbour'. There is no indication of what or where the local accommodation facility is and if there will be any associated impacts.
5. p110. Sewage from the barge. Contrary to Marine Harvest's reassurance at the Public information session (July 6 th) that sewage wastes will be transported to Darwin, the EIS states that it will be "*discharged to the bay*".

### **General comments**

*From submission on Marine Harvest NOI, June 15 2005*

As with other forms of intensive, industrialized food production, there are many risks and potential negative impacts associated with fish farming and aquaculture.

#### **1. Inappropriate location**

Bynoe Harbour attracts locals and tourists alike due to its pristine state. Port Patterson contains some of the NT's best quality reefs.

Bynoe Harbour is in pristine condition and is of high conservation value. If sea cages are introduced into Bynoe Harbour its' pristine, or 'essentially natural' status will be removed, its current high conservation value ecosystems will be affected, the current low levels of threats will need to be revised, and, especially if 'open' fish farms are approved, it will no longer be free of pollution. Overall values of Bynoe Harbour will be reduced.

2. **Impacts of escapees** - leading to spread of disease and into wild populations and environments and genetic questions arise (selectively breeding fish with a very narrow genetic variation and impacts of this when escape into the wild)

#### **Conservation Position**

ECNT and AMCS are strong advocates for the pursuit of environmentally and socially sensitive

aquaculture developments in the NT. These systems should be locally owned and operated. They should be land-based, located on already disturbed lands and be strictly closed system.

It is our strong view that sea cage aquaculture development is environmentally and socially inappropriate. They are high risk ventures with high economic risks, social impacts when they fail, and substantial environmental impacts.

We believe that in light of all the well-documented problems associated with 'open' fish farms and aquaculture developments, only 'closed loop', non-polluting, on-land aquaculture facilities that do not release pollutants into the sea or rivers should be considered. Further, feed regimes and sources need to be reconsidered and move towards non-carnivorous farmed species.

### **Conclusion**

The proposed locations are far too precious to the community, economy and nature itself to be exposed to inappropriate aquaculture development. These local values are far too important to risk.