Note: this document forms Appendix 6.4 of the Australian Centre for International Agricultural Research publication *Spiny lobster aquaculture development in Indonesia, Vietnam and Australia.* The main report can be downloaded from: http://aciar.gov.au/publication/pr145.

Scoping Study

Lobster Grow-out Pilot Project Yarrabah

Prepared by Jaragun P/L

November 2010

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RECOMMENDATIONS

Recommendation 1

Members of the Department of Employment, Economic Development and Innovation (DEEDI, Cairns) and Traditional Owner project team conduct a further scientific/technical and environmental site assessment of King Beach to ascertain its suitability for the pilot project in conjunction with the Department of Environment and Resource Management and the Great Barrier Reef Marine Park Authority.

Recommendation 2

The project team organize a meeting of relevant Commonwealth and Qld state government agencies to identify and negotiate licensing/permit challenges for King Beach.

Recommendation 3

Members of the DEEDI project team obtain overall support from DEEDI to progress the project as a state priority for Far North Qld as a means of achieving resources to upgrade road access to King Beach.

Recommendation 4

The project team organise a roundtable meeting of relevant Commonwealth and state government agencies to negotiate funding and resource inputs for establishment of the pilot project at King Beach.

Recommendation 5

Traditional Owners register cultural heritage sites within the vicinity of the proposed pilot project site at King Beach.

1 EXECUTIVE SUMMARY

This report was prepared for Department of Employment, Economic Development and Innovation (DEEDI), as the lead agency for the project "Spiny Lobster Aquaculture Development in Indonesia, Vietnam and Australia". The project is funded by the Australian Centre for International Agricultural Research (ACIAR), as part of the Australian Government's development program that encourages Australia's agricultural scientists to use their skills for the benefit of developing countries and Australia. One objective of the Australian component is to establish spiny lobster (Panulirus ornatus) grow-out enterprises in Indigenous communities in North Queensland. The report addresses the first stage – a scoping study for the establishment of a pilot lobster growout enterprise at the Aboriginal community of Yarrabah.

The project team consisted of the ACIAR Lobster project staff from DEEDI, Jaragun P/L and Traditional Owners of Yarrabah.

Four sites within Yarrabah were assessed as to their suitability for establishing pilot lobster growout, using an above-ground raceway or tank aquaculture system. All sites are located on land that is designated as Deed of Grant in Trust (DoGIT), managed by the Yarrabah Aboriginal Shire Council (YASC).

Two sites, King Beach and Wungu (north end of Back Beach), were found suitable. King Beach is the preferred site, having good acreage available for later expansion to a full-scale commercial facility, access to high quality sea water, and protection from the prevailing south easterly winds. This compares with Wungu that would be restricted to a pilot project only because of the limited availability of flat land and its high usage as a recreation area. Wungu could also involve significant cost associated with the long distance to the sea water intake.

King Beach has significant licensing/permit considerations that require resolution before it can be confirmed as the site to establish the Pilot Project. Being located in a Marine National Park Zone, no aquaculture permits are permissible. While the proposed technology is a land-based system, water would indirectly discharge into the Marine National Park Zone. This would most likely be via a tidal mangrove-lined creek that provides a natural filtering system. Further site inspection is required to determine the proximity of the creek to the proposed site, i.e. its feasibility for water discharge. Commonwealth and State authorities will need confidence that the level of residue nutrient drop-out will not negatively impact on either the local ecology or the Marine Park.

King Beach will require significant infrastructure development to overcome lack of mains power supply and all year round road access. The Pilot Project can operate using generators for the supply of electricity. The project, however, will need State Government support to fund an upgrade of an existing road and longer-term maintenance.

Traditional Owners support a Pilot Project on the basis of economic, employment and training opportunities afforded to local Aboriginal people. Traditional Owners support the selection of King Beach as the preferred site. The Native Title Working Group has provided written support for the Pilot Project.

The report contains details of the project context, site selection process, site attributes and the strategies required to redress the shortcomings of individual sites. The report contains five recommendations to progress the Pilot Project at King Beach.

2 BACKGROUND

Context

DEEDI proposes to establish a pilot lobster growout enterprise for the production of spiny lobster (*Panulirus ornatus*) at the Indigenous community of Yarrabah, Qld. The Pilot Project involves the grow-out of spiny lobster from the minimum legal size to approximately one kilogram to meet an increasing demand for established markets in China. The Pilot Project is part of the international "Spiny Lobster Aquaculture Development in Indonesia, Vietnam and Australia" project, managed by the DEEDI. An overview of the Spiny Lobster Project is provided at **Attachment A**.

The Spiny Lobster Project involves complementary activities to establish sustainable 'grow-out' enterprises in rural communities of Vietnam, Indonesia and Australia. The Project includes enhancing existing small-scale, family-based sea cage enterprises in Vietnam and using similar technologies to establish enterprises in Indonesia and Australia. Of significance, the Vietnamese enterprises involve 'low-tech' solutions that make this type of aquaculture development highly suitable for communities in similar circumstances in other countries.

In February 2010, the Spiny Lobster Project received a funding commitment of $1.3 million from ACIAR for the three year period 2010-12. As a statutory authority, ACIAR operates as part of the Australian Government's development cooperation programs that encourages Australia's agricultural scientists to use their skills for the benefit of developing countries and Australia.

The Spiny Lobster Project is based on over ten years R&D by DEEDI (Cairns, Qld) and its partners in closing the species cycle and in the development of specialised artificial feeds/diets. The scientific breakthrough into closing the species cycle allows for grow-out of hatchery-reared juvenile lobster seed-stock (pueruli). This compares with the current unsustainable practice that involves the grow-out of lobster juveniles caught from the wild. The development of artificial formulated feeds promote optimal growth rates, by reducing dependence on wild caught 'trash' fish feed that is linked to the outbreak of diseases in Vietnam.

The R&D underpins the objectives of the Spiny Lobster Project to promote sustainable aquaculture in rural communities through the following key activities:

- commercialisation of the hatchery technology in Australia
- establishment of the grow-out Pilot Project at Yarrabah
- following the Pilot Project, establishment of grow-out enterprises in north Qld Indigenous communities between Bowen and the Torres Strait (the natural habitat for the spiny lobster)
- establishment of grow-out enterprises in Indonesia
- provision of hatchery-reared lobster seed-stock across the three country's grow-out enterprises, and
- introduction of artificial formulated feeds.

The Spiny Lobster Project has significant industry support. Lobster grow-out trials are being conducted in prawn ponds at Pacific Reef Fisheries, Ayr (Qld). The trials will assess the suitability of pond-based production of lobster as a potential alternative species for prawn and barramundi farmers. This is in anticipation of the availability of hatchery-reared lobster seed through the current

commercialisation of hatchery technology, which is being undertaken by DEEDI's Lobster project staff at the Northern Fisheries Centre (Cairns).

Phased Approach

Over the life of the ACIAR Lobster project (2010 – 2012), it is proposed to establish a pilot (non-commercial) scale lobster production enterprise through three successive activity phases. This report represents Phase 1, to scope the opportunity and identify preferred sites at an Indigenous community in North Queensland. Phase 2 will involve development of a business plan and completion of feasibility study which addresses constraints (including permitting) identified in Phase 1. Phase 2 will also include a training component to initiate training of a Yarrabah Traditional Owner to operate the pilot production system. Phase 3 will comprise the establishment of the pilot production facility to confirm lobster production capacity and economic assumptions.

Selection of Yarrabah

Several communities between Bowen and the Torres Strait were identified as possible sites to conduct the Pilot Project.[1]Yarrabah was given priority for the following reasons:

- It has access to high-quality, deep sea water all year, which is needed for optimal grow-out conditions
- It is close to the DEEDI Northern Fisheries Centre, which will facilitate project management and technical support from the Centre's lobster grow-out and hatchery research facility, and
- Jaragun P/L has established business relationships with Traditional Owners, which will ensure community protocols are followed in relation to site selection and community consultation.

The selection of Yarrabah focused the objectives of the Scoping Study on identifying a suitable site to conduct the Pilot Project.

DEEDI anticipates the Pilot Project to create approximately five employment outcomes for local Aboriginal people from Yarrabah. The Project will need to be supported through accredited and non-accredited training, and capacity building. The Centre's scientist/s will be involved directly in teaching practical animal husbandry techniques. Other initial training requirements include: vocational aquaculture; and language, literacy and numeracy skills. Additional training in small business management will be needed to establish an aquaculture enterprise following the pilot.

[1] Communities that were considered suitable for the Pilot Project included Bowen, Palm Island, Cooktown, Mornington Island, Lockhart River and Badu (Torres Strait).

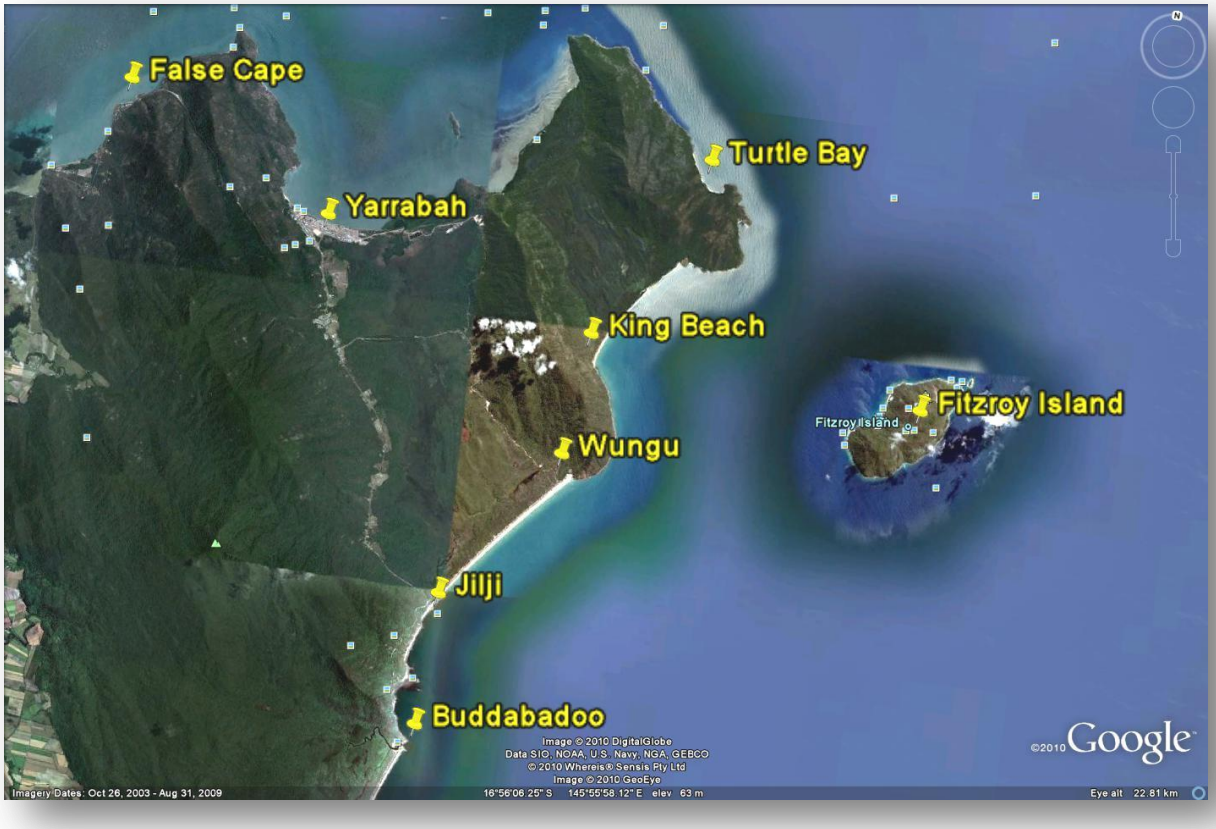
3 SITE SELECTION ASSESSMENT CRITERIA

Selection of suitable sites for inspection

Eight locations were identified as potential locations to conduct the Pilot Project at Yarrabah, including the following:

- Fitzroy Island
- Turtle Bay
- Little Turtle Bay
- East False Cape
- West False Cape
- King Beach
- Back Beach (Wungu and Jilji), and
- Buddabadoo.

Figure 1 – Map of locations



The assessments were to be conducted via road access, with boat access for those locations that were only accessible by water.

Priority was given to Fitzroy Island as the most likely suitable site. It was the preferred location of Traditional Owners, with access to deep sea water, an existing aquaculture facility and a current aquaculture permit/licence. Nevertheless, the site was excluded after preliminary research found that the current lessee had already entered into an agreement with another party, making the

facility unavailable to the Pilot Project. No other sites are available on Fitzroy Island because of restrictions on land tenure/zoning. Following completion of site assessments at Yarrabah, the leaseholder of the facility at Fitzroy Island indicated a willingness to negotiate with DEEDI. Subsequently, DEEDI has prioritised the aquaculture facility for establishment of a hatchery.

A subsequent decision initially excluded locations only accessible by water. These included Turtle Bay, Little Turtle Bay and King Beach. It was considered that inclement weather would impede accessibility by water all year round, affecting successful implementation of the Pilot Project. Further, the logistics of boat access would add significant cost and/or delay to start-up if feasibility of the Pilot Project depended on construction of a road.

Despite this, the project team expressed continuing interest in King Beach. While it may have permit challenges because of its zoning in the Great Barrier Reef Marine Park as a Marine National Park Zone (green zone), aerial views and Traditional Owner knowledge indicated potential for both a commercial grow-out facility following the Pilot Project and the establishment of a hatchery. King Beach also has a disused road that could be upgraded. As a result, a decision on the preferred site was delayed until an inspection of King Beach was conducted via boat access.

Of the locations accessible by road, the preferred location involved a property at False Cape. The property was on the market and had the advantage of cleared land. While seeking permission to conduct the site inspection, it was established that the property was already under contract. This effectively eliminated False Cape as a potential location to conduct the Pilot Project.

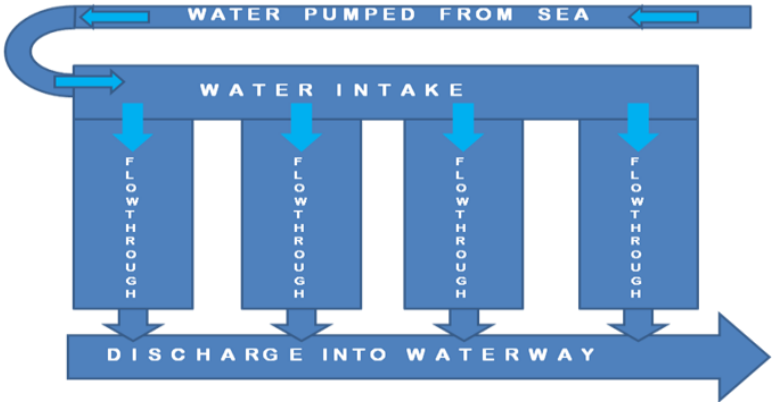
The site inspections at Back Beach were conducted at Wungu (northern end) and Jilji (southern end). The sites are within the jurisdiction of both the Qld State Parks (intertidal area between low and high water mark) and the Great Barrier Reef Marine Park Authority (GBRMPA). A fourth site was inspected after Mr Bob Patterson, a Traditional Owner, confirmed that Buddabadoo had been included as Gunghangi country during court hearings with respect to the Traditional Owner's native title determination application. As it was agreed on arriving at Buddabadoo that the location was not feasible for the Pilot Project due to lack of an available area for a site on the north side of Oombunghi River, a site assessment has not been included in this report.

As a result of the above, three site assessments are contained in this report, including those for King Beach, Wungu and Jilji.

Technology requirements

The preferred technology for conducting the Pilot Project is an above-ground raceway system. Raceway technology typically includes a simple, flow-through system where water is pumped to a holding tank and gravity fed through the raceways. The technology provides for optimal grow-out conditions of spiny lobster, i.e. maintenance of a salinity level of approximately 35 parts per thousand.

Figure2 – Above-ground raceway system



The technology is considered appropriate for Indigenous communities in Australia, and provides for the trial of an additional technology in the Spiny Lobster Project. That is, sea cages are deployed in Vietnam and Indonesia and earthen ponds in the research being conducted at Ayr. DEEDI has indicated that an above ground tank system, which requires similar ground area to the proposed raceway system, provides an alternative proven technology if required for the selected Yarrabah site.

DEEDI proposes using four x 20m^2 raceways in the Pilot Project, each raceway 2 metres wide by 10 metres long. Further information on funding, site availability and environmental specifications are required before the dimensions of both the pilot and commercial grow out systems can be clearly defined. The system will require year-round access to high volumes of clean sea water.

The presence of a tidal mangrove creek is also a favourable site characteristic. Such creeks provide a natural filtering system for water discharge. The level of reduction in 'nutrient drop-out' will be a key consideration of GBRMPA in approving an aquaculture permit in the Great Barrier Reef Marine Park. In addition, discharge into an existing tidal creek will have minimum impact on the flora/fauna.

Rating system

DEEDI determined a set of criteria to assess and rate site suitability; covering scientific, technical, environmental, economic and social considerations (see **Attachment B**)[2].The criteria were grouped into the following categories to facilitate readability:

- Technology
- Geography
- Water intake & discharge
- Infrastructure
- Permits & licensing, and
- Community.

Each criterion was given a score of "1" for Suitable, "0" for Unsuitable, or "0.5" if further investigation were required. Scores were tallied to give a total score at each site. Criteria were not weighted.

[2] The suitability for sea cages and ponds were not included in the assessment, given the preference for a raceway system. It should be noted that site characteristics would be similar for ponds and raceways.

The methodology required SWOT analysis for development of management strategies to progress the project. Cost factors were not assessed, as these will be considered in the Feasibility Study/Business Planning exercise.

4 THE PREFERRED SITE

Introduction

The set of criteria was applied to assess suitability of the three sites for conducting the Pilot Project. The locations achieved the following site scores:

- Wungu, 14
- King Beach, 10.5, and
- Jilji, 10.

King Beach had the best attributes for establishing an aquaculture facility and, for this reason, is the preferred site despite having a lower score than Wungu. King Beach scored lower because of its location within a Marine National Park Zone and absence of infrastructure. These factors will need to be resolved before King Beach can be confirmed as the site to conduct the Pilot Project.

Wungu also has potential sites available to conduct the Pilot Project. However, unlike King Beach, Wungu is perhaps less suitable due to the type of vegetation and, potentially, less flat ground for expansion to a commercial facility.

Jilji was not considered suitable for an aquaculture facility.

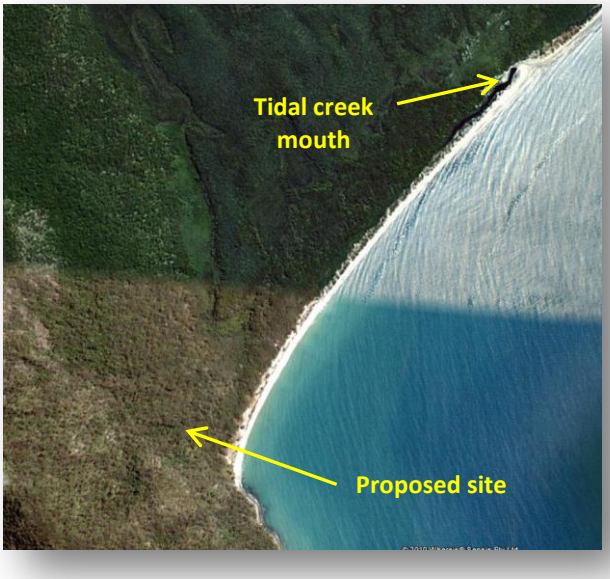
King Beach site assessment

King Beach is located east, south east of Yarrabah. It is directly opposite Fitzroy Island, which is separated from the mainland by a deep water channel. King Beach is approximately two kilometres in length and is surrounded by mountains on the southern, western and northern boundaries. A tidal mangrove creek runs along the valley and empties into the sea mid-way along the beach.

The location is not currently accessible by road, although a disused road previously provided access from Yarrabah to the southern headland.

A site at the southern end of the beach was assessed and scored for suitability to conduct the Pilot Project. The site is approximately 100 metres from the low water mark, and abuts the southern mountain face, giving it protection from the prevailing south easterly winds.

Figure 3: King Beach



Site score

King Beach achieved a site score of 10.5, based on the following assessment.

Technology

The site is suitable for a land-based system, with close proximity to a reliable source of good quality sea water.

Geography

The site has sufficient area available to construct both the Pilot Project and a commercial facility.

Water intake & discharge

Good quality sea water is accessible off the rocky headland. Further inspection is required to determine the proximity and suitability of the creek for water discharge.

Infrastructure

King Beach is approximately 12.0 kilometres from Yarrabah. The disused road would need to be upgraded for King Beach to be a viable site to conduct the Pilot Project.

YASC was approached as to the possibility of upgrading the road. Several presentations were made to YASC by Traditional Owners, Jaragun P/L and the Northern Fisheries Centre. These outlined the project benefits to the community and the project establishment challenges. While YASC initially supported the project, YASC later withdrew its support for the project. See **Attachment C**.

At a subsequent meeting with Jaragun P/L and Traditional Owners, Qld Department of Environment and Resource Management (DERM) suggested an alternative process. This requires the State Government to identify the project as a state priority for Far North Qld, based on the potential training, employment and economic development opportunities for Aboriginal people in Yarrabah. In turn, the road upgrade would be deemed a state matter rather than a local council responsibility.

The nearest electricity is at least six kilometres form King Beach. This makes the Pilot Project dependent on a generator for electricity, as the Council has no plans to extend the power grid in the foreseeable future.

Permits/licensing

There have not been any previous applications for development work or aquaculture activities at King Beach. The Pilot Project would require both Commonwealth and State Government approvals to carry out aquaculture activities and undertake the associated facilities development. Key agencies include GBRMPA, Department of Environment, Water, Heritage and the Arts (DEWHA) and DERM.

An initial assessment is required by DERM to assess suitability of the site for a land-based aquaculture permit, particularly in relation to water discharge in respect of the impact of nutrient levels on the natural flora/fauna or Great Barrier Reef Marine Park.

Community

Traditional Owners support opening up access to King Beach for economic development. Access is currently restricted to boat or a 6-8 kilometer walk over rough terrain.

They further believe that improved access would enable Traditional Owners to better meet their cultural obligations on a regular basis, while providing recreation advantages for the wider community.

The headland has a burial site close to the proposed Pilot Project site. The site (and other sites in the vicinity) will need to be registered as a cultural heritage site under the *Aboriginal Cultural Heritage Act 2003* to ensure its integrity/preservation.

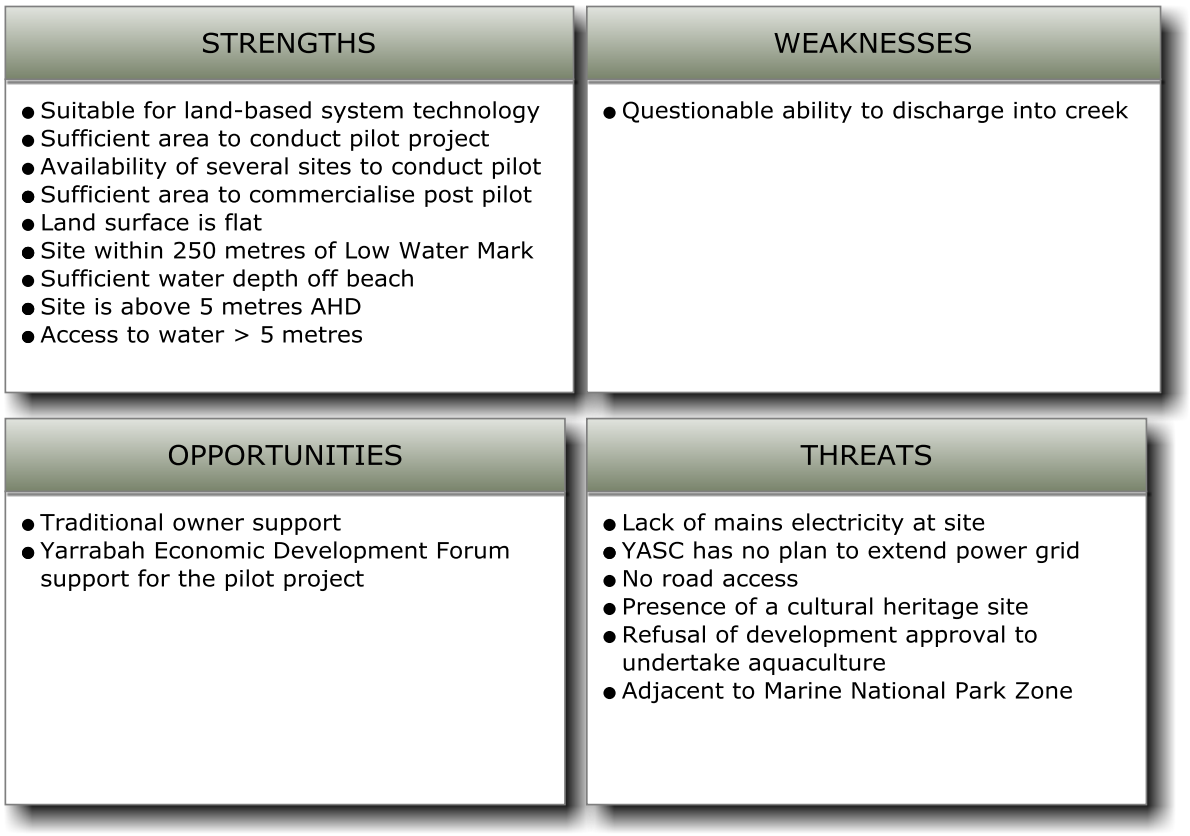
Details of the site assessment are provided at **Attachment D**.

SWOT

The SWOT indicated considerable site strengths, the most important being its suitability for land-based system technology, high quality water intake, availability of acreage to extend the Pilot Project into a commercial-size facility and protection from the prevailing south easterly winds.

However, the SWOT also shows considerable threats to the Pilot Project being conducted at King Beach. The most substantial is its designation as Marine National Park Zone, which does not permit aquaculture activities. The SWOT is provided at **Figure 4** below.

Figure 4: King Beach SWOT Analysis



The strategies arising from the site's SWOT analysis follow.

Weaknesses

While the creek is permanent, there is need to determine whether it is sufficiently close to the proposed site be feasible as a point of water discharge. A second seasonal creek that empties into the permanent creek might also provide an alternative, given its proximity to the proposed site.

Scientific advice, however, is required to determine whether there would be environmental impact from discharging salt water into what appears a fresh water environment.

Opportunities

The involvement of Traditional Owners offers the project greatest potential for success, in terms of broader community engagement and support for the Pilot Project. Traditional Owners have indicated that this project is a priority because of its potential to deliver training and employment outcomes for the Yarrabah community over the long term. The project should continue to retain Traditional Owner involvement in all project planning and implementation.

YASC waivered from its initial position of support for the project. The CEO stated the Council has unexpended funds earmarked for aquaculture purposes, which it initially indicated could contribute towards the Pilot Project. This was the basis for three presentations to the Council, at which time support was expressed for the project. A subsequent Council meeting resulted in a decision not to support the project. No reason was given.

Separately, Michael Reid, Director-General Queensland Health, recently facilitated the Yarrabah Economic Development Forum (21 October 2010), which gave the project a second priority status for Yarrabah because of the potential for economic development and employment opportunities for the community. The Forum established a Working Group to draft a Feasibility Study. The DEEDI member indicated interest in follow-up discussions.

Threats

The absence of mains electricity does not threaten the Pilot Project, as a generator has been deemed adequate for the needs of a pilot. In addition, solar power opportunities should also be thoroughly explored. The lack of mains electricity would impact on a commercial development, the project would need to garner YASC's commitment to extend the power grid to the site. This should be pursued only after successful implementation of the pilot project, as part of a reassessment of the site as the most suitable location to establish a commercial facility. At this time, the employment outcomes to the community will be proven and new councilors will have been elected.

The lack of a road to the site is a threat to the Pilot Project, as small boat access will not support the project needs. DERM has indicated that the road could be upgraded and maintained by main roads, if the project were regarded a State Government priority.[3] This is possible, given the potential employment opportunities for disadvantaged job seekers at Yarrabah, and the requirements for the Northern Fisheries Centre to include Aboriginal and Torres Strait Islander people and communities in the ACIAR project.

Traditional Owners have indicated that the Pilot Project facility can be built without interference to cultural heritage sites. Any sites in the area should be registered as cultural heritage sites and the appropriate buffer zone determined prior to mapping of the site facility requirements.

The need to discharge water from the raceway system into a Marine National Park Zone Habitat Protection Zone will impact on the likelihood of licensing/permitting approvals. The project will need

[3]YASC was consulted extensively about upgrading the road. The Council has responsibility for the area under its classification as Deed of Grant in Trust (DoGIT). As indicated, YASC is not prepared to upgrade the road on the basis that it does not support the project for reasons that have not been specified.

to include scientific and technical solutions in the design of the raceway system to address concerns of licensing and permitting agencies.

Community support for the project is critical to counter the potential for vandalism of the site facility. A communication strategy is needed to inform and consult the community about the project.

Back Beach – Wungu site assessment

Wungu is located at the northern end of Back Beach, directly south of Fitzroy Island and separated from King Beach to the north by a rocky headland. The headland drops off steeply into a deep water channel formed between the mainland and Fitzroy Island. A permanent, mangrove-lined tidal creek runs behind the sand dune and empties into the sea at the base of the headland. The creek, which is fed by an inland spring, flows most of the year.

The location is a recreation area for locals during the dry season, with road access and a car park at the beach proper. Two basic beach shelters and a camping area have been constructed, which are located on either side of the car park. Three residences have been built in the bush between the road access and the headland, two of which are inhabited.

A site close to the beach was assessed and scored for suitability to conduct the Pilot Project. The site is approximately 150 metres from the low water mark, and is situated between a recreation shelter and a seasonal drain that feeds into the tidal creek.

Figure 5: Wungu

Site score

Wungu achieved a site score of 14, based on the following assessment.

Technology

The site is suitable for a land-based system, with close proximity to a reliable source of good quality sea water.

Geography

The site has sufficient area available to construct a Pilot Project facility. More detailed inspection is required to assess whether the site has sufficient space to establish a commercial facility following the Pilot Project.

Wungu has several other area/s that may be suitable either to conduct the Pilot Project or to establish a commercial facility. These area/s are located further inland from the site inspected, sharing similar characteristics apart from a greater distance to the sea water intake point.

Water intake & discharge

Good quality sea water is available off the headland or beach. The headland is more favourable in terms of access to deep water, but could be a greater distance to pump/pipe. A water intake pipe off the beach would be more costly to install and maintain, as the pipe would need to be buried and require ongoing stabilization works to address shifting sands.

Infrastructure

Wungu is some 11.1 kilometres from Yarrabah township by road(measured from the Post Office). This includes7.6 kilometres of unsealed road from the Murigan Creek turnoff. The road is in reasonable condition, although it is only accessible at times by 4WD during the wet season. Previous attempts by the YASC to permanently stabilize the road surface for year round access have been unsuccessful.

The site would require a generator for power, as the nearest electricity is 6.4 kilometres from Wungu. The Council has no plans to extend the power grid from Yarrabah.

Permits/licensing

There have not been any previous applications for development work or aquaculture activities at Back Beach. The Pilot Project will require both Commonwealth and State Government approvals to carry out aquaculture activities and undertake the associated facilities development. Key agencies include GBRMPA, DEWHA and DERM.

DERM's initial response was favourable. A site assessment would be required with DERM and GBRMPA to assess likely outcomes of applications for site development and an aquaculture permit.

Community

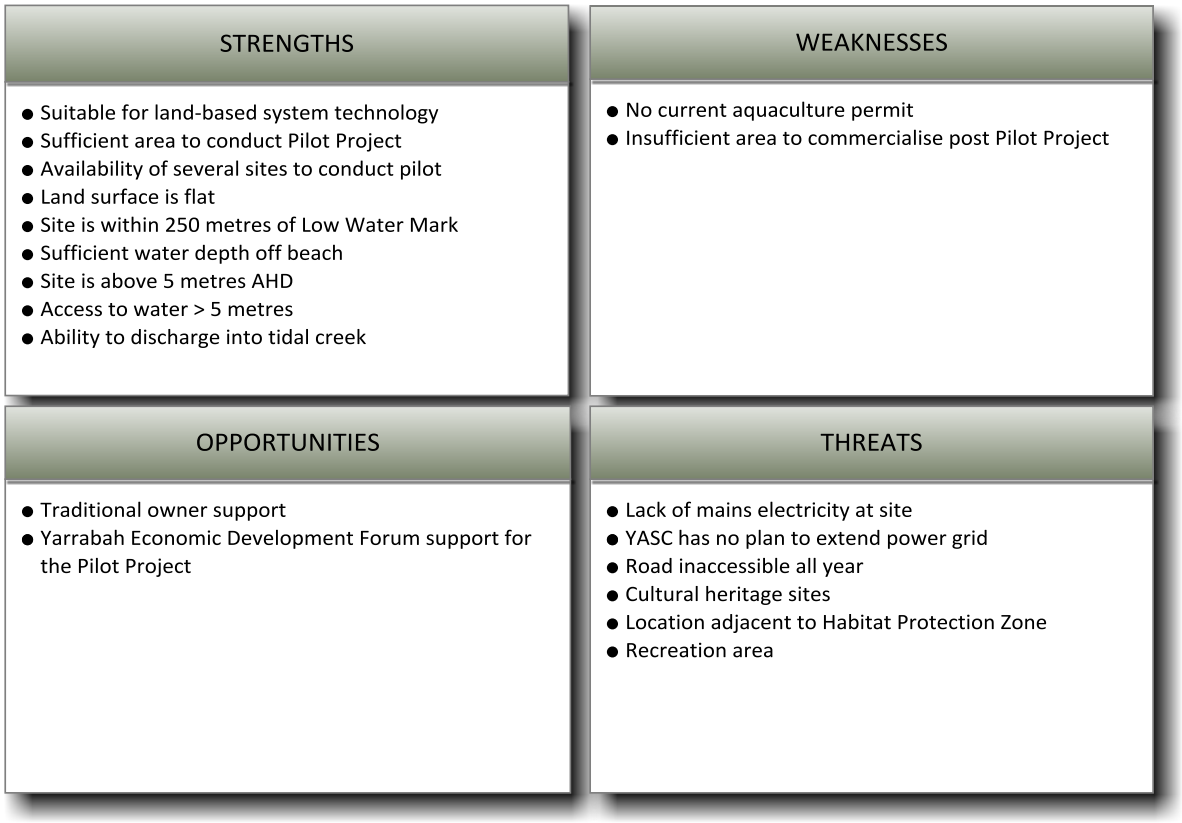
The headland has cultural heritage sites consisting of three shell middens. The sites would need to be registered under the *Aboriginal Cultural Heritage Act 2003*to protect their integrity/preservation.

Details of the site assessment are provided at **Attachment E**.

SWOT

The SWOT indicated considerable site strengths, the most important being its suitability for land-based system technology, high quality water intake and the availability of multiple sites that could house/accommodate a commercial-size facility in future. The SWOT analysis is provided at **Figure 6** below.

Figure 6: Wungu SWOT Analysis



The strategies arising from the site's SWOT analysis follow.

Weaknesses

The lack of an existing aquaculture permit is a project weakness that needs to be addressed through application to Commonwealth/State agencies. It is a priority to confirm that securing an aquaculture permit is achievable, given that the Pilot Project cannot proceed without a permit.

Opportunities

The involvement of Traditional Owners offers the project greatest potential for success, in terms of broader community engagement and support for the Pilot Project. Traditional Owners have indicated that this project is a priority because of its potential to deliver training and employment outcomes for the Yarrabah community over the long term. The project should continue to retain Traditional Owners involvement in all project planning and implementation.

As with King Beach, the Yarrabah Economic Development Forum supported the Pilot Project at Wungu because of the potential for economic development and employment opportunities for the community.

Threats

The absence of mains electricity does not threaten the Pilot, as a generator has been deemed adequate for the project needs. However, as lack of mains electricity would impact on a commercial development, the project would need to garner YASC's commitment to extend the power grid to the

site. This should be pursued only after successful implementation of the Pilot Project, as part of a reassessment of the site as the most suitable location to establish a commercial facility.

The condition of the road is a manageable threat to the Pilot Project. It is expected to be countered by use of 4WD transport in order to provide year round access to the site, particularly during the wet season. The Council has already shown commitment to stabilizing the road surface to meet its obligations to provide for the recreation needs of the community.

Traditional Owners have indicated that the Pilot Project facility can be built without interference to heritage sites. A consultation process will nevertheless be required to define the perimeter of the cultural heritage sites and to establish an appropriate buffer zone.

Discharge of nutrients into a Habitat Protection Zone will impact on licensing/permitting approvals. The project will need to include scientific and technical solutions in the design of the raceway system to address concerns of licensing and permitting agencies.

Community support for the project is critical to counter the potential for vandalism of the site facility. A communication strategy is needed to inform and consult the community about the project.

Back Beach – Jilji site assessment

Jilji is located towards the southern end of Back Beach. The location is situated between a permanent, fresh water creek (north) and a small rocky outcrop(south). The creek, which runs from north to south, drains a large swampy area behind the beach. The creek empties large volumes of water onto the beach, causing the mouth to change course amid shifting sands throughout the year.

The location includes residential zoning on the southern side, and is a high use recreation area by locals. The location is accessible by road and car park behind the beach. The car park includes two shelters.

A site at the northern car park shelter was assessed and scored for suitability to conduct the Pilot Project. The site is approximately 150 metres from the low water mark, on an elevated area that sits between the swamp and mouth of the creek.

Figure 7 – Jilji

Site score

Jilji achieved a site score of 10, based on the following assessment.

Technology

The site was assessed as unsuitable for a land-based system due to the influence of the fresh water creek. The high volumes of fresh water flowing into the sea during the wet season would impact on the quality of the water intake, by reducing salinity to unacceptable levels.

Geography

The site has sufficient area available to conduct a Pilot Project, with space available for expansion to a commercial facility. There are no alternative sites at the location.

Water intake & discharge

There is insufficient depth of sea water off the beach to counter the large volumes of fresh creek water during the wet. It would be difficult and costly to install and maintain a water intake pipe off the beach, as the pipe would need to be buried and require ongoing stabilization works to address shifting sands. The need for a navigation buoy for large scale pumping would add to the difficulty of obtaining an aquaculture permit.

Infrastructure

Jilji is some 10.2 kilometres from Yarrabah by road (measured from the Post Office). This includes sealed road and power to Oombunghi, which is 1.6 kilometres from Jilji. The road is in good condition, with all year round access. The Council has plans to extend the power grid as part of the future residential development. This would take the power to the perimeter of Jilji.

Permits/licensing

As with Wungu, there have not been any previous applications for development work or aquaculture activities at Jilji. Approval of an aquaculture permit might be possible for the Pilot Project but not a commercial facility due to the need for a navigation buoy on the water intake pipe.

Community

The swamp has cultural heritage sites, although Mr Patterson indicated that there would be no interference from development associated with a Pilot Project.

Details of the site assessment are provided at **Attachment F**.

SWOT

The SWOT analysis shows that Jilji is unsuitable to conduct the Pilot Project. The threat of poor water quality during the wet season is unable to be countered in a cost-effective manner. As such, no further assessment of the site is required. The SWOT analysis is provided at **Figure 6** below.

Figure 8: Jilji SWOT Analysis

5 ADDITIONAL REQUIREMENTS/CONSTRAINTS

Local and state government development permit/s

The Traditional Owners will require several development permit/s from Queensland state planning authorities to proceed with the Pilot Project at King Beach. Development applications are assessed under the Integrated Development Assessment System (IDAS), which incorporates all state and local government assessment and approval processes for development in Queensland.

Relevant legislation includes:

- The *Coastal Protection and Management Act 1995* and the associated *State Coastal Management Plan – Queensland's Coastal Policy* (SCMP). Development applications for coastal work may be required if the Pilot Project falls within the definition of Prescribed Tidal Work, which applies to development between the high and low water mark and/or work that is an integral part of the development work that falls outside the tidal area
- The *Sustainable Planning Act 2009* (SPA) and the *Sustainable Planning Regulation 2009*[4](SPR). These require "development" applications for "assessable development" in terms of work carried out completely or partly on land adjacent to the western boundary of the Great Barrier Reef Marine Park[5], and
- The *Fisheries Act 1994*. The Pilot Project falls within the definition of aquaculture under the *Fisheries Act 1994* which covers the cultivation of live fisheries resources for sale.

The SPA also points to other processes and legislation that may be relevant, for instance:

- An Environmental Impact Statement (EIS) requirement for development prescribed under a regulation, where the development is subject to a development application[6], and
- Vegetation clearing on Indigenous land[7], under the *Vegetation Management Act 1999*.

The relevant development applications will need to be clarified/confirmed following confirmation of King Beach to conduct the Pilot Project. This should include the role of state and local government authorities.[8]

Federal Government approvals

GBRMPA, as the agency responsible for managing the Great Barrier Reef Marine Park, is responsible for issuing permits.

[4]SPA. See Section 238 Assessable development and Section 240 Types of approval, p. 176.
[5] SPA Chapter 9 Miscellaneous, Part 7 Notification stage for particular aquaculture development, Section 744(1)(b)(ii)
[6] SPA, Chapter 9 Miscellaneous, Part 2 Environmental impact statements, Section 688 When EIS process applies, p. 454.
[7] See SPA, Sections 38, 4.3.1(1), 4.3.3(1), 4.3.3(5) and 4.3.15(1).
[8] SPA, Schedule 6 Assessment manager for development applications. Compare: Table 1, Item 1, involving Local government being the assessment manager for tidal areas; Table 3, Item 6, involving the Chief executive of *Coastal Protection and Management Act* being the assessment manager for tidal areas; and, Table 3, Item 13, involving Chief executive of the *Environment Protection Act* being the assessment manager for the Great Barrier Reef wetland protection area.

As indicated above, aquaculture may not permissible at King Beach due to its location adjacent to a Marine National Park Zone. As the preferred site, the project team would need to consult DERM and GBRMPA. GBRMPA and Traditional Owners have previously discussed economic development in the Wet Tropics.

Wungu is located adjacent to a Habitat Protection (Dark Blue) Zone. The Zone provides for the conservation of area, by giving protection to sensitive habitats. This includes that the habitat is generally free from potentially damaging activities. Despite the sensitivity of the area, GBRMPA is able to issue permits for 'reasonable use' in Habitat Protection Zones. This includes aquaculture.

A key consideration relating to permit approvals in the Great Barrier Reef Marine Park is discharge from the aquaculture facility. As the Marine Park is also part of the World Heritage Area, GBRMPA must consider the effect on the Park's World Heritage Values. In the event the proposal is considered to have a significant impact on a matter of National Environmental Significance, referral is required under the *Environment Protection and Biodiversity Conservation Act 1999*(EPBC Act)to DEWHA as the agency responsible for administering that Act.

The EPBC Act regulates actions that have, will have or are likely to have, a significant impact on matters of national environmental significance. Matters of national environmental significance include the Great Barrier Reef Marine Park, the World Heritage Values of a declared World Heritage property, listed threatened species and migratory species, and the environment of a Commonwealth marine area.

In November 2009, the Great Barrier Reef Marine Park was inserted into the EPBC Act as a matter of national environmental significance. As a consequence, the environmental impact assessment and approval requirements under the EPBC Act will apply where an action in the Marine Park has, will have or is likely to have, a significant impact on the environment; and where an action outside the Marine Park has, will have or is likely to have, a significant impact on the environment in the Marine Park.

Initial discussions with DEWHA indicated their focus on risks from disease and discharge into the Marine Park, based on the proposed technology. In particular, there should be no net increase in the background levels of nutrients, consistent with the Great Barrier Reef Marine Park Zoning Plan 2003.

It should be also noted that GBRMPA charges Permit Application Assessment Fees. In particular, an activity that requires GBRMPA's preparation of an EIS would attract a fee of $99,250.

Training and employment

The Northern Fisheries Centre expects the Pilot Project to employ up to ten local Aboriginal people. This will require vocational training and skills development in seafood/aquaculture.

The Northern Fisheries Centre has indicated that an opportunity exists for a member of the Yarrabah community to learn animal husbandry prior to establishment of the Pilot Project. This would involve working alongside scientists in the Centre's lobster grow-out and hatchery research facility. The project team has identified a suitable individual, a job seeker who has already completed a Certificate I in Seafood Industry (Aquaculture).

The Scoping Study conducted some preliminary research on training/employment options for job seekers, given that the Northern Fisheries Centre does not currently have a suitable staff position to employ the individual. The project team identified the following employment options, if funding were sourced to engage the individual:

(i) Unpaid work experience for up to four weeks, with guarantee of an employment outcome if the individual is found suitable,
(ii) Wage subsidies, for a salaried position, or
(iii) Traineeship over 12 months.

The Job Services Australia provider can also provide assistance with the individual's costs of relocating from Yarrabah to Cairns to take up the position.

A project priority is to identify a source of funding to employ the individual as soon as possible to maximize the individual's skills development prior to the establishment of the Pilot Project facility.

6 POTENTIAL SOURCES OF FUNDING

Discussions have been held with a range of stakeholders to canvas funding opportunities for the Pilot Project.

Two organisations indicated the availability of funds that are earmarked/designated for Indigenous aquaculture purposes. The CEO of YASC indicated that the Council has unexpended funds from previous proposals for aquaculture development at Yarrabah. As indicated, several presentations were made to the Council, including a written briefing at the request of the CEO. A community information session was also held at the Council's request, and several letters sought and received confirming various Traditional Owner support for the project. However, given YASC's subsequent decision not to support the Pilot Project, the project team no longer considers Council funding a possibility at this time. The project team notes that the Working Group associated with the Yarrabah Economic Development Forum may produce change, as the Forum ranked the project as a second priority for Yarrabah.

At the time this report was prepared, the Department of Agriculture, Fisheries and Forestry (DAFF) indicated that it has uncommitted funds remaining from the Indigenous Aquaculture Unit. The funds, which are quarantined, are subject to Ministerial decision. At DAFF's request, Jaragun P/L prepared a brief for DAFF to inform the Minister about the Project, including the economic and employment benefits to accrue for Yarrabah[and other Indigenous communities in future].

The project team has also explored options to fund a position in the Northern Fisheries Centre's lobster grow-out and hatchery research facility. Such a position would increase the chance of project success by enabling a member of the Yarrabah community to learn animal husbandry techniques prior to the establishment of the Pilot Project. The position is earmarked for a Traditional Owner, Mr Wyndham Ludwick, who has a Certificate I in aquaculture .Initial representation was made to YASC, on the basis that it could access subsidised traineeships from the Qld State Government. The withdrawal of Council support meant that the traineeship could not be pursued. The Northern Fisheries Centre has since made a request to ACIAR to fund the position, which is pending.

The project team also applied to the Fisheries Research Development Corporation (FRDC) for a $10,000 Indigenous Development Scholarship to support Mr Ludwick's traineeship. The purpose of the scholarship is for individuals to undertake a personalised and supported program to further develop their skills, knowledge and networks in the fishing industry. It was anticipated that Mr Ludwick would have been able to see firsthand the broader project in Vietnam and Indonesia, and better understand the project's community development objectives in terms of its applicability to Yarrabah. The Northern Fisheries Centre will be in a position to reapply for the Indigenous Development Scholarship in 2011 should ACIAR fund Mr Ludwick's position.

Various Commonwealth and state government agencies have expressed interest in holding discussions to progress the Pilot Project. The timing should follow confirmation of King Beach as the location of the Pilot Project and focus on funding commitments, project processes and timing.

ATTACHMENT A – Spiny Lobster Aquaculture Development in Indonesia, Vietnam and Australia

ATTACHMENT B – Site assessment criteria

Is the location suitable for sea cages?

Are land sites available within 250m of sea?

Is there more than one potential site at the location?

Is there a creek or river mouth within 1km of the site?

Is area available for a land-based system?

Is the site suitable for ponds?

Does the site comprise clay, soil or sand?

Is the site suitable for tanks?

Is electricity available?

What is the distance to nearest power (m)?

Is there deep water off the beach?

What is the distance to deep water (>5m depth)?

Is there road access to the site?

Is the site covered by an existing aquaculture permit?

Are there native title issues?

Are there Marine Parks / GBRMPA issues?

ATTACHMENT C – Traditional Owners letter to Yarrabah Aboriginal Shire Council

ATTACHMENT D – King Beach site assessment

Site inspection: King Beach			
Criterion	**Meets criterion Yes/No**	**Comment**	**Rating 0 or 1**
Technology			
Suitability for land-based system, i.e. raceway or tank	Yes	Suitable for above-ground raceway or tank system. Proposed location is less than 100 metres from low water mark. Good water quality (salinity), with access to deep sea water intake off the southern headland/beach.	1
Geography			
Availability of area for land-based system	Yes	The site has more than 20^2 metres available for the requirements of raceway system, involving 4 raceways each with a dimension of 5 metres x 2 metres.	1
Suitability for expansion	Yes	The site has considerable additional ground area suitable for expansion to a commercial-sized facility.	1
Topography, including slope	Yes	Site location is flat and has protection from prevailing south easterly winds.	1
Soil type, i.e. clay, soil or sand	N/A	Sand/soil mix.	-
Other potential site/s	Yes	The northern end of the beach has potential. The suitability of the southern site did not warrant further inspection at King Beach.	1
Water intake & discharge			
Proximity to sea water, i.e. within 250m of sea	Yes	Site is approximately 100 metres (or less) from low water mark.	1
Height above or below 5m AHD[1]	Yes	Location is not subject to flooding, being above the 10 – 25 metre AHD	1
Depth of water off beach	Yes	Deep water off the beach provides access to high quality sea water.	-
Distance to deep water (>5m depth)	Yes	Approximate 550–600m from the proposed site (directly into the National Marine Park Zone (green).	1
Proximity of a creek/river mouth within 1km of site	Yes	Presence of permanent tidal creek that drains onto beach less than 0.5 kilometres north of the site. Following the site inspection, Traditional Owners indicated the creek runs close to proposed site. A further inspection is required to determine the feasibility of using the creek for water discharge, i.e. to filter nutrient drop-out to minimise impact on flora/fauna.	0.5
Infrastructure			
Road access	No	Location is approximately 12 kms from Yarrabah. Disused road would need to be upgraded and maintained for all-year-round access.	0
Electrical supply	No	Nil electricity at site. The Council has no plans to extend the power grid, meaning that the Pilot Project would be dependent on generator for power.	0
Distance to nearest power (m)	No	Approximately 10 kilometres to mains power.	0
Permits & licensing			
Existing aquaculture permits	No	No aquaculture permits are available for the	0

		location. Negotiations will be required with relevant authorities.	
DERM / GBRMPA issues	No	King Beach is located adjacent to the Great Barrier Reef Marine Park. The sea is designated Marine National Park Zone (Green), which does not provide for aquaculture. The zoning, however, provides for research permits.	0
Community			
Cultural heritage sites	Yes	A cultural heritage site is located in the vicinity of the proposed site. Traditional Owners have indicated the facility would not interfere with the sites.	1
Traditional Owners	Yes	Traditional Owners support economic development, and selected King Beach as the most suitable of all the sites inspected to conduct the Pilot Project.	1
Yarrabah Economic Development Forum	Yes	The Forum supports the Pilot Project as one of Yarrabah's priorities economic development initiatives.	1
Total			**10.5**

ATTACHMENT E – Wungu site assessment

Site inspection: Wungu, Site 1			
Criterion	**Meets criterion Yes/No**	**Comment**	**Rating 0 or 1**
Technology			
Suitability for land-based system, i.e. raceway or tank	Yes	Suitable for above-ground raceway or tank system. Proposed location is 100 metres from low water mark. Good water quality (salinity), with access to deep sea water intake off the headland/beach.	1
Geography			
Availability of area for land-based system	Yes	Initial site inspected is approximately 20^2 metres. This is against the requirements of raceway system, involving 4 raceways each with a dimension of 5 metres x 2 metres.	1
Suitability for expansion	Yes	The site has some potential for expansion of the Pilot Project, although more detailed inspection is required to assess whether the area is sufficient to meet the needs of a commercial facility.	1
Topography, including slope	Yes	Site locations are flat.	1
Soil type, i.e. clay, soil or sand	N/A	Sand/soil mix.	-
Other potential site/s	Yes	At least two sites at the location are suitable for above ground land-based systems. One site has sufficient area to construct a commercial facility.	1
Water intake & discharge			
Proximity to sea water, i.e. within 250m of sea	Yes	Site is approximately 100-150 metres from low water mark.	1
Height above or below 5m AHD[1]	Yes	Location is not subject to flooding, being above the 10 -15 meters AHD.	1
Depth of water off beach	Yes	Approximately 800-850m from the proposed site.	-
Distance to deep water (>5m depth)	Yes	200-300 metres to access deep water off headland or 150 metres from beach low water mark.	1
Proximity of a creek/river mouth within 1km of site	Yes	Presence of permanent mangrove-lined tidal creek that drains onto beach. The creek would act as a filter for nutrient drop-out, while fluctuations in water levels from discharge would not affect flora/fauna.	1
Infrastructure			
Road access	Yes	The location is 11.1 kms from Yarrabah, involving 7.6 kms of unsealed road. Access during the wet season (up to three months) is often only by 4WD. The Council has previously attempted to upgrade the road but has experienced difficulty in achieving permanent stabilisation. The road access is not expected to cause disruption to provision of supplies/technical support due to the 4WD access.	1
Electrical supply	No	Nil electricity at site, with a distance of 6.4 kilometres to power near Murigan Creek turn-off (1.2k along unsealed road).The Council has no plans to extend the power grid, meaning that the Pilot Project would be dependent on generator for power.	0

Distance to nearest power (m)	No	6.4 kilometres to mains power.	0
Permits & licensing			
Existing aquaculture permits	No	There has not been any previous application for an aquaculture permit for the location. Negotiations will be required with relevant authorities.	0
DERM / GBRMPA issues	Yes	Wungu is located adjacent to the Great Barrier Reef Marine Park. The sea is zoned Habitat Protection (Dark Blue) Zone. The zoning allows reasonable use of the area, including possibility of aquaculture permits.	1
Community			
Cultural heritage sites	Yes	Significant cultural heritage sites are located at the headland. The proposed construction would not interfere with these site/s.	1
Traditional Owners	Yes	Traditional Owners support economic development, and selected the site/s as suitable for the proposed development. However, the site is part of a recreation area that would require community consultation.	1
Yarrabah Economic Development Forum	Yes	The Forum supports the Pilot Project as one of Yarrabah's priorities economic development initiatives.	1
Total			**14**

ATTACHMENT F – Jilji site assessment

Site inspection: Jilji			
Criterion	**Meets criterion Yes/No**	**Comment**	**Rating 0 / 1**
Technology			
Suitability for land-based system, i.e. raceway or tank	No	A fresh water influence is likely on the quality of the sea water intake. High volumes of fresh creek water draining into the sea during the wet season would reduce salinity (intake) to unacceptable levels. The intake pipe would need to extend a considerable distance at sea to access optimal salinity levels. This would increase the exposure of the intake pipe to shifting sands, increasing maintenance costs. The need for a navigation buoy would increase the difficulty of obtaining an aquaculture permit.	0
Geography			
Availability of area for land-based system (Pilot Project)	Yes	Site is sufficient size, being approximately 10^2 metres against the requirements of raceway system, i.e. four raceways, each with a dimension of 5m x 2m. Additional area is available for support facilities.	1
Suitability for expansion (Pilot Project)	No	The location has limited area to expand to commercial scale. The site is sandwiched between beach and swamp at rear.	0
Height above or below 5m AHD[1]	Yes	The location is above the 5 metre AHD.	1
Topography, including slope	Yes	Site location is flat.	1
Soil type, i.e. clay, soil or sand	N/A	Sand/soil mix.	-
Other potential site/s	No	Location has only one site suitable for construction of the Pilot Project.	0
Water intake & discharge			
Proximity to sea water, i.e. within 250m	Yes	Site is approximately 150 metres from low water mark.	1
Depth of water off beach	Yes	The depth of water is possibly sufficient off the beach for access to good quality water. However, water salinity levels are reduced by fresh water drainage from the creek.	1
Distance to deep water (>5m depth)	Yes/No	Approximately 550 – 600m from the proposed site.	-
Proximity of a creek/river mouth, i.e. within 1km of site	Yes	Presence of permanent mangrove-lined tidal creek. The mangroves would filter nutrient drop-out. Discharge from the Pilot Project would not affect creek flora/fauna, as the creek has naturally occurring fluctuation in water levels from tidal influence.	1
Infrastructure			
Road access	Yes	The location is 10.2 kms from Yarrabah, with all year round road access. The road is sealed, apart from the last 1.5 kms.	1
Electrical supply	No	Nil electricity at site, with a distance of 5.1 kilometres to power at Oombunghi. The Council's	0

		plans to extend the power grid would take power close to the site in future. The Pilot Project, however, would be dependent on a generator.	
Distance to nearest power	No	1.6 kilometres to mains power.	0
Permits & licensing			
Existing aquaculture permits	No	There has not been any previous application for an aquaculture permit for the location. Negotiations would be required with relevant authorities.	0
DERM / GBRMPA issues	No	The need for a navigation buoy would reduce the possibility of obtaining an aquaculture permit, given Jilji's location adjacent to a Habitat Protection (Dark Blue) Zone of the Great Barrier Reef Marine Park.	0
Community			
Cultural heritage sites	Yes	Traditional Owners have indicated the tidal creek has a significant cultural heritage site, although this would not interfere with the proposed development.	1
Traditional Owners	Yes	Traditional Owners support economic development, and selected the site/s as suitable for the proposed development. However, the site is part of a recreation area that would require community consultation.	1
Yarrabah Economic Development Forum	Yes	The Forum supports the Pilot Project as one of Yarrabah's priorities economic development initiatives.	1
Total			**10**