indigenous people in aquaculture

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foreword

A high proportion of Australia's indigenous population reside in remote communities. By choosing to live in these locations indigenous people are not exposed to the same economic opportunities that other Australians experience in large centres. This includes access to infrastructure that supports the development of various business ventures, which then leads to financial and employment opportunities for the local community.

The Australian Government in conjunction with state and territory governments have identified a selection of industries that focus on the strengths of indigenous people. These industries generally either have a cultural connection with indigenous people or have a connection to the land and nature. Aquaculture has been identified as one of these industries.

The objective in this study is to provide a reference for indigenous people who are considering whether to enter the aquaculture industry. It provides a reliable source of information on the current state of the Australian aquaculture industry, current indigenous involvement, and the role of government. In addition, five different indigenous case studies from around Australia have been presented.

This study was undertaken by ABARE for the Australian Government Department of Agriculture, Fisheries and Forestry.

Brian S. Fisher
Executive Director

August 2006

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summary

Indigenous people reside in various locations around Australia ranging from major cities to very remote areas. They are typically more likely to live in remote locations than are nonindigenous Australians. The isolated conditions in remote areas mean that not all types of business ventures are suitable. The Australian Government in conjunction with state and territory governments have identified a selection of industries that are more likely to be appropriate for indigenous people in remote locations. The aquaculture industry has been identified as one of these industries.

It is important that indigenous people or communities are informed before making a decision on whether to proceed with investing in a new aquaculture venture. ABARE was commissioned by the Australian Government Department of Agriculture, Fisheries and Forestry to produce a document that could serve as a guide for indigenous people or communities who are considering whether to enter the aquaculture industry.

There are five main factors that need to be considered before investing in a new venture:

1. Understanding the current state of the Australian aquaculture industry and forecasting the future state (good or bad) of the industry – This includes being informed about the type of species that consumers want to buy, the source of current supply and competitors, and the location of markets to sell the aquaculture products either within Australia or exported overseas.
2. Producing the aquaculture product – This includes choosing the correct species, the correct production and culture methods, assessing the long term viability of the farm and deciding whether to invest, and completing a business plan.
3. Investigating whether alternative business and employment opportunities are more appropriate given the potential location of the business, and the skills available when hiring people from the local community. Aquaculture businesses deal with live species on a daily basis, which means that a regular

daily routine (including weekends) of taking care of the species plus regular maintenance of the farm site is required.

4. Gaining access to technical and business expertise, targeted programs for financial and training support, information source, and general development support – One approach is to work with officers from federal, state and territory governments.
5. Investigating the possibility of establishing links with other farms currently in the industry – This includes working with other indigenous and nonindigenous aquaculture ventures in the local vicinity to gain hands-on experience that can later be transferred back to the farm, and learning from the positive and negative experiences of other indigenous farms located around Australia.

After considering all these factors and an informed decision has been made to invest in an aquaculture venture, the community can gain a range of positive returns. This includes an ongoing income stream that can be reinvested for future business development, or can be used to enhance other projects in the community. The venture could also provide an independent food source, employment and training opportunities, and a sense of community pride.

1

introduction

Global aquaculture production is growing to keep pace with an increasing demand for fisheries products. Australia is no exception, with aquaculture's share of total fisheries production increasing. The industry has experienced relatively strong growth in recent decades, and continues to be seen as an expanding industry.

For indigenous communities, an investment return is not the only positive factor that an aquaculture business could provide. It could also provide an independent source of food, a source of revenue for further community development, employment and training opportunities; it could also contribute to traditional obligations of looking after the land and sea, and provide a sense of community pride and prospects for future generations.

Presently there is limited available information on indigenous involvement in the Australian aquaculture industry. One possible indication of indigenous involvement in aquaculture is through the Australian Bureau of Statistics (ABS) census, which is undertaken every five years. However, the information available on the number of indigenous aquaculture sites that are fully or partially operated by indigenous communities is limited. This occurs because there is no requirement to specify that an applicant is from an indigenous background when applying for an aquaculture licence.

Given that indigenous communities usually work closely with all levels of government when commencing an aquaculture business, this provides an avenue for estimating the number of indigenous aquaculture farms in Australia. This number is not large, but it is steadily growing. Indigenous aquaculture businesses are starting production, often with the help of federal, state and territory governments, and through industry and indigenous communities. There are many different stories, of which five are discussed in this report.

In 2000 the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) funded the development of the National Aquaculture Development Strategy for Indigenous Communities in Australia (Lee and Nel 2001).

The aim of the Development Strategy for Indigenous Communities was to:

- develop a national framework to increase indigenous involvement in the aquaculture industry and
- recommend a plan to increase the economic independence of indigenous people and provide them with the opportunity to become self reliant.

One of the key recommendations of the development strategy was the establishment of an Indigenous Aquaculture Unit within DAFF that would:

- provide advice to the indigenous community about aquaculture
- assist in the appraisal of indigenous project proposals
- promote indigenous aquaculture development within government and industry and
- help source and/or coordinate funding support from other government agencies and stakeholders.

The national strategy also identified that it was necessary for the Australian Government to better coordinate the existing indigenous programs to support indigenous aquaculture ventures. The national strategy has been used to develop similar strategies at the state and territory level.

A recommendation from the national strategy was to develop a document that could serve as a reference for indigenous people or communities who are considering whether to enter the aquaculture industry. This report was developed to provide a source of information on the current state of the Australian aquaculture industry, current indigenous involvement, and the role of government. In addition, five different indigenous experiences from around Australia are presented.

Federal, state and territory governments provide support for indigenous ventures and the greater seafood industry. In May 2006, Senator the Hon. Eric Abetz, Minister for Fisheries, Forestry and Conservation, released *FishBook II* (Abetz 2006). *FishBook II* provides a guide to the full range of Australian Government assistance available to the whole seafood industry (Fitzgerald and Kowalski 2006).

In November 2003 a review – called the Indigenous Business Review – was undertaken by the Australian Government to investigate the type of support provided to indigenous business by the public and private sectors, and to examine how the Australian Government can help the development of indigenous businesses through targeted programs (DIMIA 2003). The focus of the review was to

propose a framework to help stimulate indigenous business and to identify gaps in business support. The document noted that the association between indigenous business and economic development is important in helping to overcome disadvantage in indigenous communities and the welfare trap.

The current ABARE report is the third published report that focuses on economic opportunities for indigenous people. In 2003, ABARE released a report that examined the employment of indigenous people in the mining industry, and other economic linkages between mine sites and indigenous communities (Tedesco, Fainstein and Hogan 2003). The report found that economic conditions for indigenous people are significantly improved by having access to employment, and education and training opportunities.

In May 2006, ABARE released a report that discussed the results of a data analysis related to indigenous people employed in agriculture, fisheries and forestry in Australia (Boero Rodriguez, Puangsumalee and Griffiths 2006). The report examined characteristics of indigenous workers in these industries and compared these with both nonindigenous workers in the same industries and indigenous workers in other industries. The report used data from the 2001 Australian Bureau of Statistics census (ABS 2001b).

2

aquaculture in Australia

The Australian aquaculture industry is currently well placed to contribute to the future growth of Australia's food production and exporting industries (Love and Langenkamp 2003). Even though in recent years the growth rate of Australian aquaculture has declined, historically the industry has experienced relatively strong growth, and is still seen as an expanding industry.

value and volume of Australian aquaculture production

In 2004-05, the Australian fishing industry had a gross value of production (GVP) of $2.0 billion, representing 0.24 per cent of Australian gross domestic product (GDP). The value of aquaculture production was $611 million in 2004-05 (ABARE 2005, 2006). After a number of high growth years in the late 1990s, the real value of Australian aquaculture production remained fairly constant, with a large fall in 2004-05, driven by a fall in southern bluefin tuna production in South Australia (figure A; ABARE 2006).

fig A **real gross value of aquaculture production**

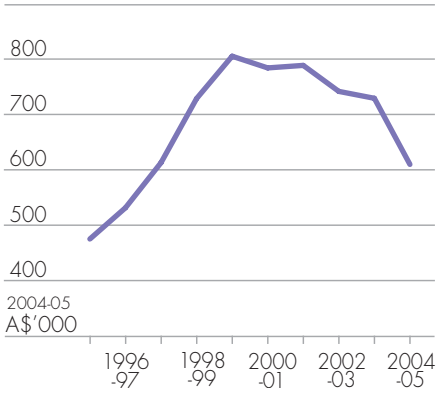
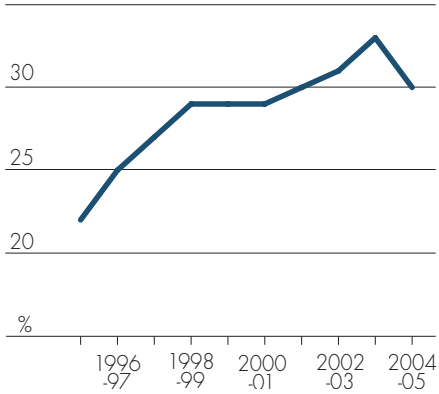


fig B **aquaculture's share of Australian fisheries gross value of production**

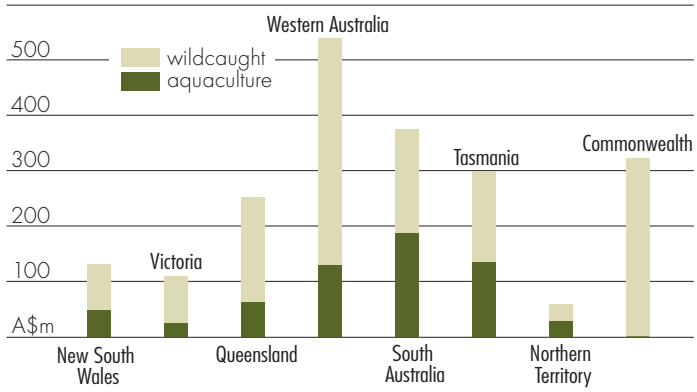


The importance of aquaculture as a percentage of total fisheries production has been increasing over the past ten years. In 1995-96, aquaculture represented 22 per cent of the total value of fisheries production, increasing to 29 per cent in 2004-05 (figure B; ABARE 2006).

aquaculture in the states and territories

In 2004-05, South Australia generated the largest value of aquaculture production – $187 million or 50 per cent of the gross value of production (GVP) of fisheries in the state. This high value of aquaculture production is driven by the production of southern bluefin tuna. Tasmania and Western Australia are the next largest aquaculture producers, with industries generating $135 million and $128 million respectively (figure C; ABARE 2006). For more information on production and trade statistics in Australia, see Australian Fisheries Statistics 2005 (ABARE 2006).

fig C **gross value of aquaculture and fisheries production, by state and territory, 2004-05**

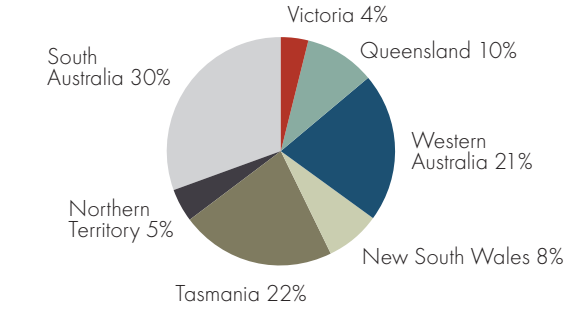


Collectively, South Australia, Western Australia and Tasmania account for approximately 73 per cent of Australian aquaculture gross value of production (figure D, ABARE 2006).

employment in Australian aquaculture

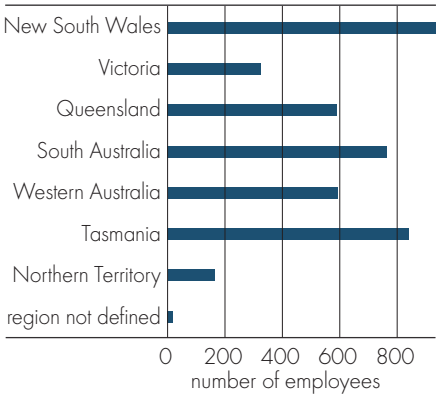
The 2001 Australian census identified almost 4500 people employed in the Australian aquaculture industry (ABS 2001b). The largest three employers were New South Wales, Tasmania and South Australia respectively (figure E).

fig D **shares in total Australian aquaculture production**



The involvement of indigenous people in aquaculture is examined in the next chapter. In particular, the characteristics and location of the indigenous population in Australia are highlighted, trends in indigenous employment are examined, by region, and an indication is given the level of indigenous involvement in the aquaculture industry.

fig E **aquaculture employment, by state and territory**

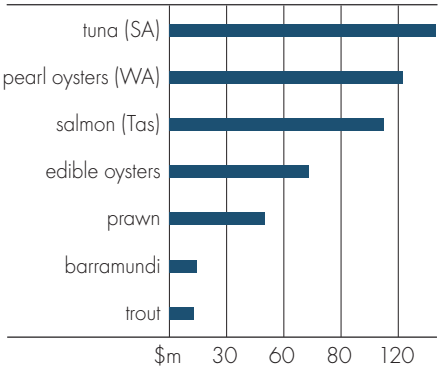


species and markets

A large variety of fish, mollusc and crustacean species are farmed in Australia. However, state based aquaculture production is typically specialised for the largest grossing species. For example, tuna is the highest grossing species in Australia and is exclusively farmed in South Australia. The next highest grossing species are pearl oysters and salmon, farmed in Western Australia and Tasmania respectively (figure F, ABARE 2006). The top five species account for almost 90 per cent of the gross value of production of aquaculture.

The major species farmed in each state are listed in table 1. The major species produced, by state, and the destination markets are presented in tables 2–4 for the main species groupings – crustaceans, molluscs and finfish (Love, Langenkamp and Galeano 2004).

fig F **largest grossing aquaculture species, 2004-05**



1 major species (by value) farmed in each state

	major species
New South Wales	edible oysters
	prawns
Victoria	trout
Queensland	barramundi
	prawns
Western Australia	pearl oysters
South Australia	tuna
	edible oysters
Tasmania	salmon
	edible oysters

Note: Gross value of production by aquaculture species is not available for the Northern Territory.

crustaceans

The five main crustacean species farmed in Aus-tralia are marine prawns, kuruma prawn, yabbies, redclaw and marron (table 2).

Queensland is the largest producer of both marine prawns and kuruma prawns as these species are native to tropical and subtropical waters. Queensland is also the largest producer of farmed redclaw, a fresh water crayfish found naturally in northern Australia. Yabbies, a semiaquatic freshwater crayfish, are found naturally in inland waters of central and eastern Australia (Love and Langenkamp 2003). Yabbies are predominantly farmed in the southern areas of mainland Australia in New South Wales, Victoria and South Australia, with Western Australia being the largest individual producer. Marron is a large freshwater crayfish, native to permanent rivers in the forested, high rainfall areas in the south west of Western Australia. Western Australia is the largest producer of farmed marron in Australia.

molluscs

Pearls are the most valuable non edible aquaculture product farmed in Australia (table 3). Western Australia is the largest producer followed by the Northern Territory. The main species farmed is the gold or silver lipped pearl oyster producing South Sea pearls and mother of pearl shell (Love and Langenkamp 2003).

The production of edible oysters is distributed throughout the states. Sydney rock oysters are predominantly farmed in estuarine areas and rivers of New South Wales and Queensland, in addition to Albany in Western Australia. Oysters are mainly sold on the domestic market.

2 Australian aquaculture production and markets – crustaceans

species	main producer	main markets
Marine prawns [a]	Queensland (some also in New South Wales)	25 per cent sold in Queensland, the remainder sold interstate
Kuruma prawn	Queensland	about 90 per cent exported to Japan and the remainder sold interstate
Yabby	Southern areas of Western Australia, New South Wales, Victoria, South Australia	Western Australia – some are consumed domestically and the balance exported or sold interstate. Other states – most consumed domestically
Redclaw	Queensland	about 75 per cent sold in Queensland and the remainder sold interstate
Marron	Western Australia (some also in South Australia)	some consumed domestically and the balance exported

a Mainly black tiger prawns; also includes some brown tiger and banana prawns.

3 Australian aquaculture production and markets – molluscs

species	main producer	main markets
Pearls	Western Australia and the Northern Territory	predominantly exported
Sydney rock oysters	New South Wales (some also in southern Queensland)	sold mainly within the state
Other edible native oysters	Northern Queensland	sold mainly within the state
Pacific oysters	Tasmania and South Australia	sold within the state, interstate and exported
Abalone	South Australia, Victoria and Tasmania	primarily exported to east Asia
Blue mussels	Victoria, southern areas of Western Australia, New South Wales and Tasmania	sold within the state and interstate

finfish

By value, southern bluefin tuna, salmon and barramundi are the most important species of finfish farmed in Australia (table 4). Production of southern bluefin tuna is concentrated in South Australia, with the majority of production being exported to Japan. Salmon production is concentrated in Tasmania and is produced mainly for the domestic market.

4 Australian aquaculture production and markets – finfish

species	main producer	main markets
Southern bluefin tuna	South Australia	primarily exported to Japan
Atlantic salmon and ocean trout [a]	Tasmania (some also in South Australia)	around 85 per cent sold within Australia; the rest is exported
Freshwater trout	Victoria South Australia and Tasmania	sold within the state and interstate
Barramundi – pond	Queensland	about 10 per cent sold in Queensland and the rest sold interstate
Barramundi – recirculation tank	South Australia and New South Wales (some also in Victoria)	sold mainly within the state
Barramundi – sea cage	Northern Territory	sold mainly on domestic market; increasing exports likely
Other native fresh water finfish [b]	Victoria, New South Wales, South Australia, southern areas of Western Australia, and Queensland	sold within the states and interstate
Yellowtail kingfish	South Australia	sold within the state, interstate and exported
Snapper	New South Wales and South Australia	all sold within the state
Eels	Victoria and Queensland	primarily exported to Asia
Aquarium and ornamental fish	all states and Northern Territory	sold within the state, interstate and exported
Fresh water fingerling fish [bc]	all states and Northern Territory	used or sold mainly within the state in which they are produced

a Marine. Some fresh water Atlantic salmon is produced in Victoria. b Includes silver perch, murray cod, golden perch, jade perch (barcoo grunter) and Australian bass. c For restocking and growout.

Barramundi is a tropical fish native to the northern areas of Australia's coastal systems. The main methods of farming barramundi are purpose built freshwater ponds, sea cages offshore and in estuarine waters and intensive recirculation tanks. The barramundi farms located in Queensland and the Northern Territory are predominantly either sea cage or pond systems. Production in South Australia and New South Wales use intensive recirculation tank systems to ensure the water temperature is high enough in these cooler climate areas (Love and Langenkamp 2003). In the Northern Territory, it is predicted that black tiger prawns and barramundi are the main species that aquaculture investors will be focusing on for future developments (NT DEET 2004).

The main ornamental species farmed in Australia are goldfish and koi carp, with the demand for tropical aquarium fish also increasing. The majority of ornamental fish production in Australia is sold to the domestic market. Some forecasts have suggested that the domestic market is reaching saturation (Aquaculture Association of Queensland) and that producers will soon need to look toward overseas markets to sell their products. However, the outlook for aquarium fish appears to be positive, with increasing international demand and slight increases in the number of producers (Love and Langenkamp 2003).

production methods

The aquaculture industry uses different production methods, depending on the location of the farm and the type of species produced. A brief description of the various production methods currently used in Australia is provided in table 5. A summary of the production systems and culture methods is provided in table 6 for the main aquaculture species produced in Australia. Currently, in Australia, marine (saltwater), brackish water and fresh water aquaculture processes are used. Marine processes are divided into offshore or onshore operations and fresh water processes are conducted in either pond systems or recirculation tanks (Love et al. 2004). Aquaculture methods are usually targeted specifically at the species being farmed.

5 description of common aquaculture methods

method	description
Flowthrough systems (raceways)	Water flows through the fish enclosures at a rapid rate to clean waste products and ensure that the water remains oxygenated.
Tanks	Usually constructed out of food grade plastic or fibreglass, tank production is typically a closed system of water recirculating through filters and back into the tanks. There may be some level of mixing fresh water with recirculated water.
Cages	Farmed species are cultured in cages and used predominantly in marine environments but also in ponds, lakes, rivers and estuaries.
Ponds	The most common method of aquaculture production is pond production. Large earthmoving equipment is used to dig dams to hold the water.
Ropes	Mussels are predominantly farmed on a system of submerged ropes where spat can attach themselves to the rope to grow.
Racks/rafts (stick and tray)	The main method of culturing rock oysters, oyster spat are allowed to settle on intertidal racks which are then moved up river to grow.

Sources: Love, Langenkamp and Galeano (2004); Lee and Nel (2001).

farm viability

To decide whether to proceed with investing in a new aquaculture venture, it is important to understand the risks associated with entering into this type of business and whether the business can in the long term sustain these risks and continue to remain viable. When developing the original business plan for the venture it is important to undertake this type of assessment.

In 2001, ABARE carried out research that examined the viability of investing in the commercial production of selected aquaculture species in Australia (Weston, Hardcastle and Davies 2001). The species assessed were abalone, murray cod, mussels, silver perch, snapper and yabbies. Data on the level of farm production, farmgate price, farm income, capital costs and annual operating costs, and cash flows are used to calculate benefit–cost ratios and the payback period (the time period it will take for the business to reach breakeven) for each project.

To understand the key risks and their likely impacts, specific parameters in the analysis can be varied by undertaking a sensitivity analysis. For example, if the farmgate price fell by 1 per cent, this analysis may suggest that business profit-

6 main species produced and culture methods [a]

species	production system	culture method
Prawns [b]	marine onshore	purpose built static ponds [c]
Yabby	inland freshwater ponds	farm dams and purpose built static ponds
Redclaw	inland freshwater ponds	purpose built static ponds
Marron	inland freshwater ponds	purpose built static ponds
Pearls	marine offshore	longlines or intertidal rack
Sydney rock oysters	marine offshore	intertidal racks, trays and sticks
Other edible native oysters	marine offshore	rotational harvest from natural stocks on rocky headlands
Pacific oysters	marine offshore	intertidal racks, trays and sticks, intertidal longlines
Abalone	predominantly marine onshore, with some offshore	flowthrough tanks on land, also sea cages, and flowthrough tanks on a ship
Blue lip mussels	marine offshore	longlines
Southern bluefin tuna [d]	marine offshore	cages
Atlantic salmon and ocean trout [e]	marine offshore	cages
Freshwater salmonoids (primarily trout)	inland freshwater ponds	flowthrough ponds
Barramundi – pond	inland ponds	cages in static ponds, and free swimmers in static ponds
Barramundi – recirculation tank	freshwater enclosed systems	tank based recirculation systems
Barramundi – sea cage	marine offshore	cages
Other native fresh-water finfish [f]	inland ponds and enclosed systems	flowthrough ponds and tank based recirculation systems
Yellowtail kingfish	marine offshore	cages
Snapper	marine offshore	cages
Eels	inland ponds, and enclosed systems	flowthrough ponds and tank based recirculation systems
Freshwater fingerling fish [fg]	inland ponds, and enclosed systems	flowthrough ponds and tank based recirculation systems

a Growout methods only. **b** Mainly black tiger prawns; also includes some brown tiger, banana and kuruma prawns. **c** Prawn ponds do have discharges, particularly in the latter part of the season, and may be more aptly termed 'semi-flowthrough systems'. **d** Wild caught as juveniles then grown out in cages. **e** Freshwater Atlantic salmon are cultured in small quantities in Victoria in dams, ponds and recirculation systems. **f** Mainly silver perch, murray cod, golden perch, jade perch (barcoo grunter) and Australian bass. **g** For restocking and growout.

ability is sensitive to this price fall. This may lead to the benefit–cost analysis suggesting that the benefit to the farm could also decrease, and that there was a risk to the farm if there was a fall in product price. Similar analyses can also be undertaken by varying other parameters in the analysis, such as variable feed and labor costs, the availability of juvenile stock, and the length of lead time to grow the selected species.

If, after undertaking this type of analysis, it is considered that it will take several years for the business to reach breakeven and that the long term viability of the business may have potentially unmanageable risks, further expert advice should be sought.

investing in aquaculture

Once the decision has been made to invest in the aquaculture industry, funding sources need to be found to help finance the venture. Love (2003) provides a detailed discussion of the most widely used sources of finance and the type of information that operators may need when seeking finance, plus the problems associated with attracting investment in aquaculture. A summary of the main sources of finance are provided below.

- Startup or early expansion phase – Usually finance is provided by the operators themselves. It is obtained from private sources, such as their own funds, borrowings from family and friends, or an attempt is made to borrow from banks or other financial institutions. To apply for a loan will require detailed information about the proposed investment.
- Access to venture capital – Venture capital companies usually need incentives to invest in small and medium sized Australian businesses. If they are interested they may provide funds for business expansion, but they will want to obtain a return on these funds not through the repayment of interest on a loan but through the eventual sale of the business by public listing or to a third party.
- Australian, state and territory governments – Governments usually have a number of programs designed to assist small and medium businesses. People interested in entering the aquaculture industry should be informed about what programs are available and therefore potentially increase their chances of obtaining investment finance.

Love (2003) also discussed the main problems associated with attracting investment to the aquaculture industry. The majority of these problems primarily can only be addressed at the industry rather than at the farm level. These include:

- Aquaculture is often characterised as a 'young' industry compared with other rural industries, so may be viewed as risky.
- The aquaculture industry has typically concentrated on producing a selection of species, where production methods and outcomes are well documented. When new species are tried, there is uncertainty about the potential success of the business.
- There is a combination of institutional, physical and/or commercial, and structural impediments that exist that need to be reduced. These include:
  - Institutional – Federal, state and territory governments need to work together and with industry to agree on a realistic balance between environmental protection and aquaculture industry development.
  - Physical and/or commercial – This includes factors such as lack of suitable farm sites and falling product prices. Farms having access to better information and research, through industry bodies and governments, may reduce the impact of this impediment.
  - Structural – The aquaculture industry needs to have an appropriate industry strategy, and a promotion and marketing plan to help reduce this impediment.

3

economic statistics on indigenous Australians

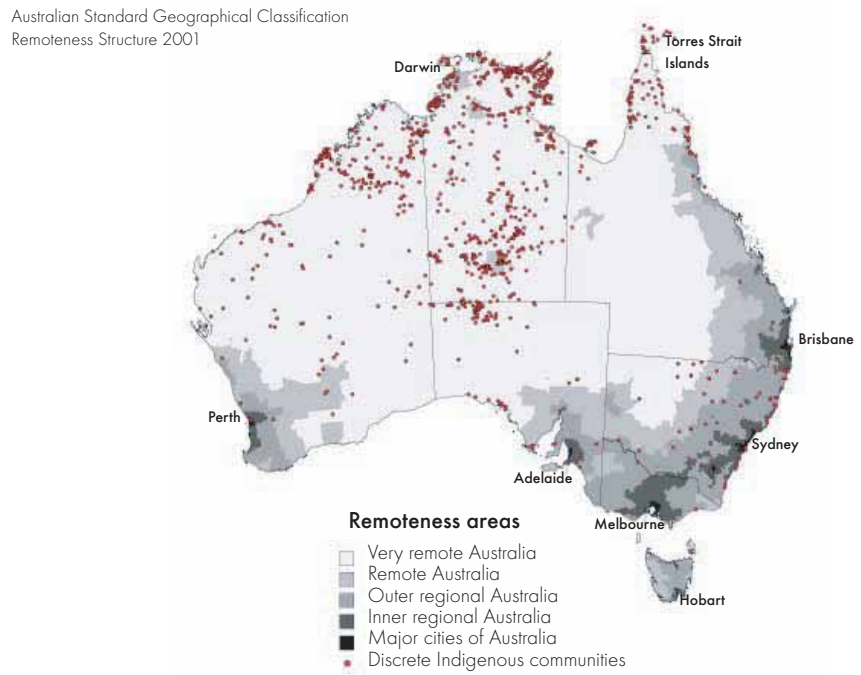
Indigenous people are more likely to live in regional and remote areas compared with nonindigenous Australians. By doing so the choices to enter into usual business and employment opportunities are more limiting, as access to supply chains and infrastructure are more restrictive in these isolated regions of Australia. However, there are some specific industries that already provide these opportunities to indigenous people. Federal, state and territory governments have also identified a selection of key industries that are suitable for indigenous Australians, including aquaculture. These identified industries are discussed in more detail in chapter 4.

location of indigenous communities

The location and size of indigenous communities have wide ranging impacts on the availability and type of employment and training opportunities. Indigenous communities are more likely to be located in regional and remote areas of Australia than nonindigenous communities (map 1). Of the almost 495 000 people identified as indigenous in the 2001 Australian census, 27 per cent were classified as living in remote and very remote locations (figure G). This is in contrast to only 2 per cent of the nonindigenous population living in remote or very remote locations (ABS 2001a). The Australian Bureau of Statistics define a set of area classifications that summarise the goods and services, training, education and social interactions that are available or accessible to the population.

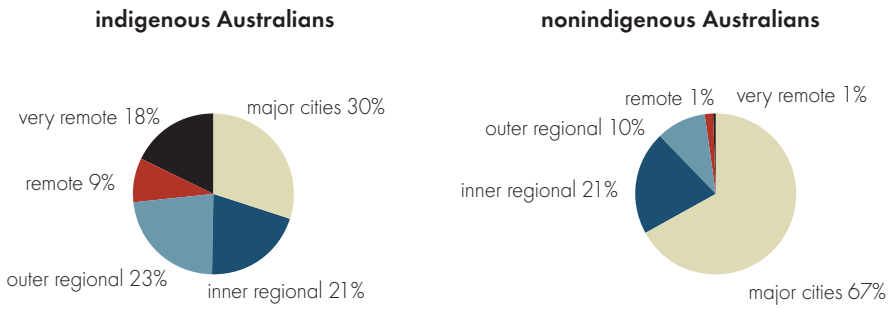
In the 2001 Community Housing and Infrastructure Needs Survey, 1216 discrete indigenous communities were identified. A total of 85 per cent or 1030 of these communities were located in very remote regions (ABS 2001a). Over 50 per cent of these indigenous communities were located in the Northern Territory, with a further 23 per cent in Western Australia.

map 1 location of discrete indigenous communities, by remoteness area



A discrete indigenous community is defined as: A geographic location with a physical or legal boundary that is inhabited or intended to be inhabited predominantly (more than 50%) by indigenous persons, with housing or infrastructure that is either owned or managed on a community basis (ABS 2001a).

fig G location of indigenous versus nonindigenous Australians, 2001



Source: Population Characteristics, Aboriginal and Torres Strait Islanders, ABS 2001.

Many indigenous communities in remote and very remote locations are small (ABS 2001a) – the 52 per cent of indigenous communities in the Northern Territory represents only 14 per cent of the total indigenous population within Australia. Over half of the indigenous population within Australia resided in New South Wales (29 per cent) and Queensland (27 per cent) (ABS 2001b).

indigenous employment

According to the 2001 Australian population census (ABS 2001b), the main industries that employed indigenous people were: government administration and defence (20 per cent), health and community services (12 per cent) and retail trade (9 per cent). The large percentage of government administration and defence sector employees predominantly reflects employment by the Community Development and Employment Projects (CDEP) program being classified in this industry. Agriculture, forestry and fishing was the ninth largest sector, employing 5 per cent of all employed indigenous Australians.

In the Northern Territory, where nearly half of the indigenous population resides in remote and very remote areas, 46 per cent of the employed indigenous population were working in the government administration and defence sector (figure H). This industry was also a large indigenous employer in Queensland, Western Australia, and South Australia. Agriculture, forestry and fishing employed 5 per cent or less of indigenous people in most state or territories, with the exception being Tasmania where this figure was closer to 10 per cent.

fig H **indigenous employment by industry and state and territory, 2001**

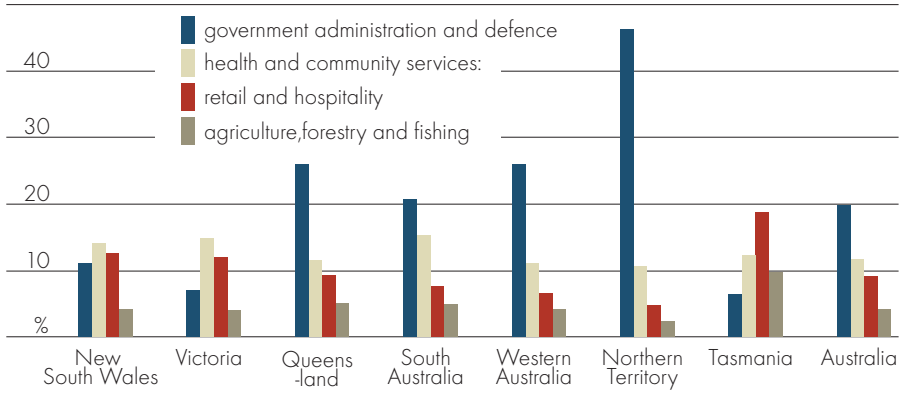
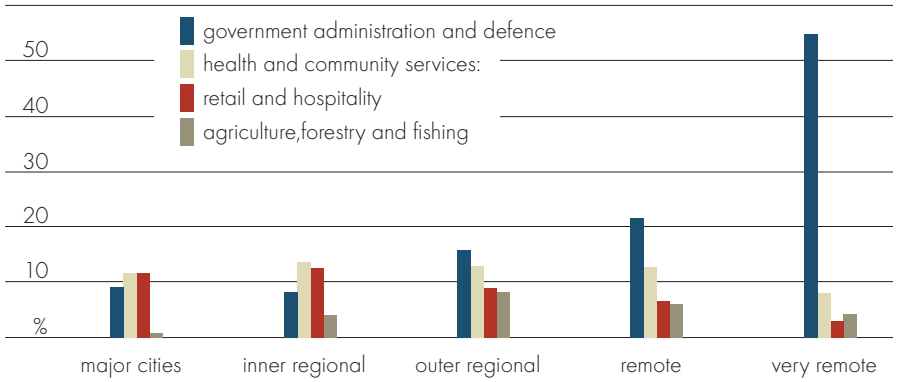


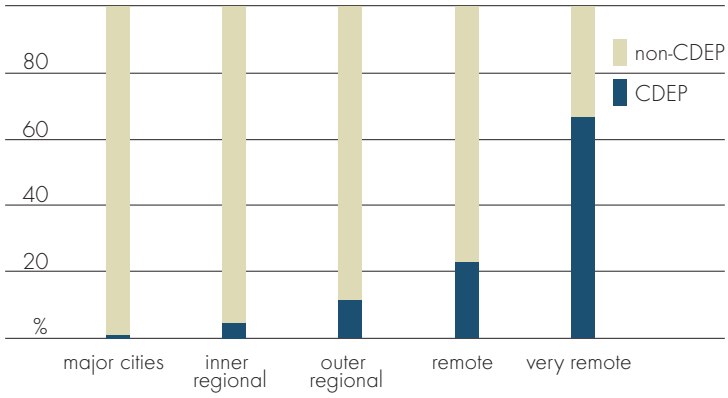
fig I **indigenous employment by industry and type of area, 2001**



In major city, inner regional and, to a certain extent, outer regional areas, employment figures were fairly even across the five major sectors (figure I). This reflects a certain level of accessibility to a broad range of employment options in these areas. However, in remote and very remote locations, the importance of the government administration and defence industry becomes obvious.

The government administration and defence industry accounts for 22 per cent and 55 per cent of all indigenous jobs in remote and very remote locations respectively (ABS 2001b). Even given these figures, 78 per cent and 45 per cent of

fig J **regional breakup of CDEP and non-CDEP employment, 2001**



indigenous Australians are employed in other activities in remote and very remote locations respectively.

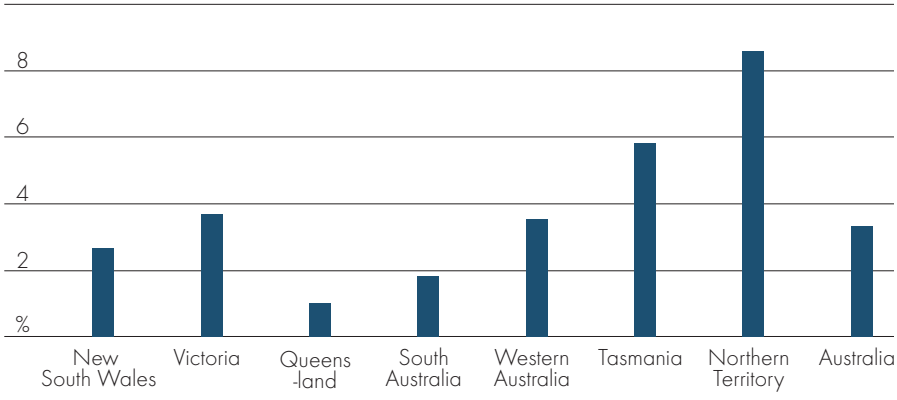
A regional breakup of sectoral employment figures also showed clear differences between very remote locations and the rest of Australia (figure J). In all areas of Australia, except very remote locations, indigenous people are more likely to not be employed by CDEP. However, in very remote locations, CDEP employment accounts for 67 per cent of all indigenous employment (ABS 2001b). These people work in both the public and private sectors.

ABS estimates of indigenous employment in aquaculture

The 2001 ABS census reported 141 people working in the aquaculture industry who identified themselves as being of indigenous descent. Although there are no recent official government estimates of the size of the industry, based on information obtained from state and territory governments, it is estimated that employment of indigenous people in aquaculture has increased over the past five years.

In the Northern Territory, 8 per cent of the aquaculture workforce was identified as indigenous, followed by 6 per cent in Tasmania (figure K). However, in the whole Australian aquaculture workforce, only 3 per cent were from an indigenous background.

fig K **percentage of aquaculture employees identifying as indigenous, 2001**



farm level indigenous involvement

Reflecting a lack of available data, it is difficult to compile current information on the level of indigenous involvement in aquaculture. Unless the federal, state or territory governments or industry are notified, there is no way of knowing the extent of indigenous involvement in the industry. This occurs as there is no government requirement to compile this level of farm detail. However, in the cases where farms (including hatcheries) have significant indigenous involvement – either through management, financial investment, or where the proportion of indigenous employees is large – federal, state or territory governments are more likely to be informed.

By contacting state and territory departments, ABARE has compiled a set of statistics that provide an indication of the number of aquaculture farms with a significant level of indigenous involvement. These figures are provided in table *7*.

7 aquaculture farms in Australia with significant indigenous involvement

	farms with an approved licence	farms with a licence waiting to be approved	farms close to applying for a licence	expressions of interest
	no.	no.	no.	no.
New South Wales **a**	12	0	0	3
Victoria	2	0	0	2
Queensland	2	1	1	*7*
South Australia	na	na	na	na
Western Australia	24	2	3	3
Tasmania	5	0	0	0
Northern Territory	3	0	2	9
Australia	48	3	6	24

a Does not include the Australian Capital Territory. Definition: A farm that has significant indigenous involvement, either through management, financial investment, or a large proportion of indigenous employees. Also includes hatcheries. **na** No information available.
Note: Data current as at 1 June 2006.

In Australia, there are an estimated 48 indigenous farms that have an approved aquaculture licence, three farms are awaiting approval, six farms are close to applying for a licence, and 24 farms have expressed an interest in entering the aquaculture industry (table *7*).

Western Australia has the largest representation of indigenous people in the industry, with 32 farms at various stages of development (table 7). The majority of the farms in Western Australia are involved in intertidal reef reseeding of trochus. This is followed by New South Wales (15 farms), Northern Territory (14 farms), and Queensland (11 farms). Tasmania (5 farms) and Victoria (4 farms) have lower levels of indigenous involvement in the industry, and currently the South Australian Government does not record the number of farms with significant indigenous involvement.

4

government programs for indigenous people in aquaculture

A commitment has been made by the Australian Government and each of the state and territory governments to improve the social and economic well-being of indigenous Australians.

In November 2000, representatives of the Council of Australian Governments (COAG) – a collaboration of all government levels – signed an agreement to reduce the level of indigenous disadvantage (among other indigenous related priorities). This set the agenda for all state and territory governments to develop initiatives that would encourage the economic independence of indigenous Australians. The creation of a Commonwealth indigenous economic development strategy set the direction for a whole of government solution to help make this possible (COAG 2005).

indigenous economic development strategies

Australian Government

The Australian Government has recognised that economic development is a key factor in improving the livelihood of indigenous Australians. This has prompted the government to develop an indigenous economic development strategy that aims to reduce dependence on welfare, increase home ownership, and encourage employment and business development opportunities for all indigenous Australians.

There are two main elements of the indigenous economic development strategy, and twelve associated initiatives that will be implemented to support this process (COAG 2005):

1. employment and business opportunities

To help establish an environment that will see the creation of both employment and business opportunities for indigenous Australians in urban, rural and remote regions

throughout Australia. This includes government support for initiatives that will enable opportunities for either direct employment in the public and private sectors, plus the creation of initiatives to stimulate growth of established and new business ventures.

The eight associated initiatives to be implemented are:

- local jobs for local people
- targeted industry strategies
- community Development and Employment Projects (CDEP) reform
- employment service performance
- vocational Education and Training (VET) linkages
- developing enterprise opportunities
- business leader initiatives and
- general business support.

2. asset and wealth management

To remove barriers that will provide greater access to economic development opportunities, including more effective asset and wealth management arrangements, improved methods for land use, and increased home ownership opportunities.

The four associated initiatives to be implemented are:

- private sector involvement in home ownership and business development
- coordinated economic development on land
- investment rules to improve returns from trusts and encourage investment of income from land and
- skills to realise economic outcomes.

indigenous programs

The Indigenous Employment Policy of the Australian Government Department of Employment and Workplace Relations (DEWR) is focused on creating employment and business opportunities for indigenous people in the private sector by designing a range of targeted programs. These programs include:

- Structured Training and Employment Projects (STEP)
- Corporate Leaders for Indigenous Employment Project
- National Indigenous Cadetship Project (NICP)
- Wage Assistance
- CDEP Placement Incentive
- Indigenous Community Volunteers
- Indigenous Self Employment Program (ISEP)
- Indigenous Small Business Fund (ISBF)
- Indigenous Capital Assistance Scheme (ICAS)
- Community Development Employment Projects (CDEP)
- Indigenous Business Development Program (IBDP).

DEWR also provides other services to support indigenous people find employment. These include Indigenous Employment Centres, specialist services within Job Network, and the availability of indigenous youth employment consultants. Indigenous Business Australia was also created to assist indigenous people gain economic independence and to assist in advancing indigenous business interests.

The most widely used indigenous program is the Community Development Employment Projects (CDEP). All the case studies discussed in chapter 5 use this program to help create employment and business opportunities for people in the local indigenous community. An outline of the main features of the CDEP program is given in box 1.

More information on all of these indigenous programs can be found on the web site for the Australian Government Department of Employment and Workplace Relations (www.workplace.gov.au/workplace/Individual/IndigenousAustralians/).

state and territory governments

Currently there is a range of indigenous economic strategies and programs across Australia that are administered by state and territory governments. All of these initiatives have similar objectives and generally focus on the improvement of economic aspects related to indigenous communities either through a broad economic development strategy, better employment opportunities, or growth in indigenous businesses.

box 1: community development and employment projects

The Community Development and Employment Projects (CDEP) scheme is an active or activity based welfare program that has been operating mainly in remote and very remote indigenous communities since 1977. Participants in the CDEP scheme forgo any welfare or unemployment benefits that they may be entitled to and instead become an employee of the CDEP organisation. CDEP employees are paid a wage for their work under a 'no work, no pay' arrangement and in return are provided with skills and experience necessary to increase their opportunities in the workforce (Altman 2005; Altman, Gray and Levitus 2005).

The CDEP program is focused on three main elements – employment, business and community development (DEWR 2005). Participants receive assistance in finding employment outside of the CDEP program through a close association with Job Network, access to funding for further training, job search support as well as strong links between the CDEP program and government departments. Activities undertaken through the CDEP program are strongly linked with the needs and priorities of the local indigenous community, while still building job opportunities in the local area and providing useful skills and experience for participants. Finally, the business development focus of the program works to identify commercial opportunities in community activities. Support provided by the CDEP program can assist in developing community activities into commercially viable businesses through developing business skills of participants and providing increased access to business services and finance.

To be eligible for the CDEP program, an applicant must be at least one of the following:

- aged 16 years or over
- aged 15 years and over and receive payments of youth allowance and not be a full time student
- part of the community and/or living within the locality served by the CDEP organisation or
- willing, able and available to take up an offer of non-CDEP work.

CDEP is an important factor in encouraging and providing employment for indigenous people in remote communities, with CDEP participants receiving greater access to vocational education and training programs than unemployed people. Currently there are an estimated 36 000 participants in the CDEP program, over 70 per cent of whom are located in very remote areas (Altman 2005). In 2002, CDEP accounted for one in four jobs held by indigenous people (ABS 2002).

These initiatives recognise that indigenous people and communities have a strong cultural identity that needs to be maintained, and that can be used as an advantage to pursue economic independence. They also recognise a need for government support to help indigenous people integrate easily into new employment and/or business environments, whether this is through direct employment in the public or private sector, or through new business developments.

Business information kits have been specifically developed for indigenous people wanting to start a small business, such as the development of a business kit called 'Turning your idea into a business' by the Queensland Government (Qld DSDTI 2005a). This kit provides interested parties with practical information to consider when assessing the viability of a business, and discusses the advantages and disadvantages of entering into a business venture. To make the process more hands on, it includes three modules that are supported by a video and three workbooks.

Some state and territory governments have identified target industry sectors where possible economic opportunities exist for indigenous people. These industries are focused on using current strengths of indigenous people to develop future opportunities. The Northern Territory Government, for instance, has identified thirteen different industry sectors that it feels are appropriate for indigenous people to pursue. These include: aquaculture and fisheries; arts; community services; construction; forestry and agribusiness; government; horticulture; knowledge and culture; mining and production; natural resource management; pastoral; retail and services; and tourism (NT DCM 2005).

In particular, aquaculture has been identified as a suitable industry for indigenous participation, as it has the capability of being pursued in typically more isolated locations where indigenous people live. It also has the potential to provide the community with a regular source of income and food, while maintaining a connection with the environment. As a result, indigenous aquaculture development strategies have been created at the federal, state and territory government levels.

indigenous aquaculture development strategies

Australian Government

Aquaculture Action Agenda

Action agendas are a major element of the Australian Government's long term strategy to develop Australian industry. They are designed to build a dynamic partnership between industry and government, with the goal of promoting sustainable economic growth. More information can be found on the web site for the Australian Government Department of Industry, Tourism and Resources (www.industry.gov.au/agendas).

The Aquaculture Action Agenda was announced on 24 May 2000 by the Hon. Warren Truss MP, the then Minister for Agriculture, Fisheries and Forestry, and by Senator the Hon. Nick Minchin, the then Minister for Industry, Science and Resources (Truss and Minchin 2000). The key objective of this action agenda was to develop an agreed framework for action by industry and government to improve the competitiveness of the Australian aquaculture industry in the global marketplace. A National Aquaculture Development Committee was established to provide advice to industry and government on the development of the Aquaculture Action Agenda.

The vision for the Aquaculture Action Agenda was for a sustainable, growing and competitive aquaculture industry to achieve at least $2.5 billion a year in sales by 2010 (DAFF 2002).

In particular, the National Aquaculture Development Committee proposed ten key initiatives to achieve the vision of the Action Agenda, to ensure the continuing sustainable development of the aquaculture industry, and to maintain cooperation between industry and government (NADC 2002). The proposed initiatives were:

- making a National Aquaculture Policy Statement
- promoting a regulatory and business environment that supports aquaculture
- implementing an industry driven action agenda
- growing aquaculture within an ecologically sustainable framework
- protecting the aquaculture industry from aquatic diseases and pests
- investing for growth

- promoting aquaculture products in Australia and globally
- tackling the research and innovation challenges
- making the most of education, training and workplace opportunities and
- creating an aquaculture industry for all Australians (including indigenous aquaculture).

National Aquaculture Development Strategy

The objective of the final proposed initiative – creating an industry for all Australians – was 'to enhance the growth of the aquaculture industry by improving the opportunities for indigenous Australians to contribute to, and participate in, its sustainable development'. To achieve this objective the National Aquaculture Development Committee recommended the development of the National Aquaculture Development Strategy for Indigenous Communities in Australia (Lee and Nel 2001).

The aim of the development strategy was to:

- develop a national framework to increase indigenous involvement in the aquaculture industry and
- recommend a plan to increase the economic independence of indigenous people and provide them with the opportunity to become self reliant.

The national strategy also identified that it was necessary for the Australian Government to better coordinate existing indigenous programs to support indigenous aquaculture ventures. This involved creating a new specialist unit in the Australian Government Department of Agriculture, Fisheries and Forestry that would provide advice, investment assistance, and promote the development of indigenous aquaculture (NADC 2002).

It noted that even though the Australian Government could become involved in the development of indigenous aquaculture opportunities, the driving force for any aquaculture venture must come from within the indigenous community. In the next chapter, five indigenous case studies are discussed in detail. A common theme emerging is that operations are successful when motivation and ambition is displayed from within the indigenous community.

Government involvement in indigenous aquaculture is through the provision of funding assistance, and by supplying business and technical expertise during the

setup and growth phase of the venture. It has also designed various indigenous programs that focus on assisting indigenous people gain access to facilities that help to improve their level of education and training.

state and territory governments

State and territory governments have closely aligned indigenous aquaculture development strategies, but these strategies have been implemented in various ways. They generally all focus on providing support for aquaculture opportunities for indigenous people by making technical, business and financial advice available, including assisting with the development of funding proposals. Each government also has designated an area to be a point of contact to facilitate these services. A list of government web sites for indigenous aquaculture issues is provided in box 2. A brief description of the available state and territory indigenous initiatives are outlined below.

box 2: relevant federal, state and territory government web sites

Australian
www.daff.gov.au

New South Wales
www.nsw.fish.gov.au

Victoria
www.dpi.vic.gov.au
www.diird.vic.gov.au

Queensland
www.dpi.qld.gov.au

South Australia
www.pir.sa.gov.au

Western Australia
www.fish.wa.gov.au

Tasmania
www.dpiwe.tas.gov.au

Northern Territory
www.fisheries.nt.gov.au

New South Wales

In December 2002 the New South Wales Government Department of Fisheries implemented the Indigenous Fisheries Strategy and Implementation Plan (NSW Fisheries 2002). This plan identifies areas and actions to encourage, facilitate and promote indigenous involvement in all aspects of fisheries management in New South Wales. Part of the strategy includes actively promoting indigenous involvement in aquaculture by offering professional advice, helping to develop and deliver training programs, and running community based workshops. It also supports and promotes the employment of indigenous staff in NSW Fisheries, in the aquaculture and commercial fishing industries, and in natural resource management in general.

Victoria

The Victorian Government through the Department of Innovation, Industry and Regional Development (DIIRD) established the Koori Business Network to help address indigenous disadvantage by providing programs, initiatives, business support and mentoring services, to drive economic and social growth of Koori communities and businesses throughout Victoria.

In 2005 the Koori Business Network introduced an indigenous aquaculture strategy (Vic DIIRD 2005a) as part of the state government's indigenous business development strategy (Vic DIIRD 2005b). The business strategy was designed to encourage and support collaborative partnerships between the Victorian Government and indigenous communities to increase the number of indigenous businesses in the state. The strategy showcased a selection of industries that currently involve indigenous businesses, and highlighted possible industries that would be appropriate for indigenous participation.

One of these identified industries was aquaculture. The resulting indigenous aquaculture strategy was designed to provide a plan that will help to encourage, assist and support new indigenous aquaculture businesses from the initial phase of expressing an interest in the industry, to business implementation, and finally to commercial independence (Vic DIIRD 2005a).

The Koori Business Network employs an officer who is dedicated to help develop indigenous aquaculture opportunities within the state. Until now, the Koori Business Network has been actively involved in providing assistance with the implementation of a number of indigenous aquaculture pilot programs.

Queensland

The Queensland Government has a dedicated Indigenous Aquaculture Extension Officer to deal specifically with aquaculture opportunities. This person is located in the Cairns office to enable them to assist indigenous communities that are located in both remote and regional Queensland. The Queensland Government, through the Department of State Development, has also entered into a partnership arrangement with the Torres Strait Regional Authority to provide business advice to the Torres Strait region for aquaculture and a range of other industries.

The Queensland Government has also designed a general aquaculture investor kit that provides a detailed discussion of the major issues that need to be considered when investing in an aquaculture business (Qld DSDTI 2005b). The information

covered includes government contacts, species level data, legislation and regulation, management, research, and education and training.

South Australia

In 2006 the South Australian Government Department of Trade and Economic Development completed a draft Aboriginal Economic Development Strategy (SA DTEC 2006). This strategy is currently being distributed for comment. The strategy is focused on helping indigenous people to develop business opportunities that will be owned and managed by indigenous people, plus economic and employment opportunities in general. It targets specific industries such as natural resource management, the arts, tourism, mining, and fishing and aquaculture.

In particular, the South Australian Department of Primary Industries and Resources (PIRSA) is currently using this strategy to help drive initiatives related to indigenous aquaculture. These initiatives include providing mechanisms for consultation, developing appropriate commercial structures, developing partnerships with people or companies with proven commercial aquaculture experience, identifying appropriate capital raising strategies for indigenous aquaculture developments, and providing training and employment opportunities in all aspects of the industry from research and development through to farming, marketing and processing (SA DTEC 2006).

Western Australia

Reflecting the location and concentration of indigenous communities, some of the state and territory governments in northern Australia have created aquaculture networks at the regional level. The Western Australian Government has developed a Kimberley Aquaculture Development Plan that focuses on the Kimberley region – an area in the northern part of the state where a significant number of indigenous communities reside (WA Fish 1996). This plan provides region specific information on potential aquaculture sites, candidate species and associated production technologies. Similarly, the Gascoyne Aquaculture Development Plan (WA Fish 1997) has been created for the area located on the Tropic of Capricorn in the north west of Western Australia.

The Kimberley Aboriginal Aquaculture Corporation has also developed an indigenous aquaculture pack that contains information for indigenous communities interested in entering the aquaculture industry (IADWG 2003). It defines aquaculture, provides a general discussion on available aquaculture species, and also provides a specific discussion on suitable species for indigenous aquaculture.

box 3: steps to develop an indigenous aquaculture business

1. idea

objective: Identify project for development.
focus: Select the most appropriate species, site, production system(s), and to consult with the community.

2. preliminary study

objective: A more detailed evaluation of step 1.
focus: Assess the suitability of species and requirements, suitability of site and availability, production system(s), human resource requirements, infrastructure and technology, and community attitude.
time period: 2–3 months

3. skills development and training

objective: Identify and address training and development requirements of prospective workers.
focus: Investigate the need and source for training and development opportunities to develop practical skills. This includes certificate aquaculture courses obtained through TAFE, business and management courses, and on the job experience.
time period: 6–18 months

4. feasibility study and business plan

objective: Assess the viability of the venture and produce a business plan.
focus: This important stage requires engaging an external consultant with technical and financial qualifications. The consultant will prepare a financial plan and budget, develop a marketing strategy and risk management framework, assess infrastructure and technology requirements, and

continued ...

box 3: steps to develop an indigenous aquaculture business *continued*

4. feasibility study and business plan *continued*

undertake a detailed assessment of species and site suitability. This expert evaluation will then be documented into a business plan. As part of this step applications for an aquaculture licence and Environmental Protection Agency (EPA) approval should be submitted with the relevant authorities.
time period: 6–18 months

5. community consultation and funding sources

objective: Consult with the community to define commitment and long term objectives for the aquaculture venture, and to identify potential funding sources.
focus: Organise discussions within the community and other interested parties to gain support for the venture. Identify and apply for funding to reach the pilot stage of the venture. Funding should cover construction and infrastructure, the purchase of equipment, project management, and employment and training.
time period: 3–18 months. Community consultation can take up to 6 months.

6. pilot project

objective: Develop a pilot production facility.
focus: Construct a facility to gather information on production, marketing and training for research purposes.

7. commercial stage

objective: Develop a commercial production facility.
focus: By using the feasibility study and business plan from step 4, funding and community consultation from step 5, and research on the pilot project from step 6, the aquaculture venture is ready to commercialise.

Other information includes growing different species, ongoing maintenance, and some important scientific and animal health aspects that are required for this type of business. It also contains information and contact details of groups of interest in Western Australia that can provide help with various aspects of the business, including technical and financial advice, education and training providers, and indigenous organisations.

Based on the answers of a short questionnaire the pack also assesses whether an aquaculture venture is suitable for the reader. If the answer is either 'yes' or 'no' the reader is directed to a contact to obtain further advice. One of the main features of the pack is that it provides a detailed step by step outline of the development pathway for an indigenous aquaculture venture. The information for each step includes the objective, associated process, contact details, and an estimated time period to complete each step. This pathway has been reproduced in box 3.

During the seven step process, external consultants should be engaged to provide expert advice and guidance to workers from the indigenous community – to ensure that the aquaculture farm remains a viable business until indigenous workers have obtained the necessary training to be self sufficient. When it is evident that the required technical and financial skills have been transferred and that the community can operate a successful business, the expert consultants should exit the venture. The aquaculture venture will then be operated fully by the indigenous community. However, expert consultants should still be engaged at regular intervals to monitor the performance of the business and to provide ongoing expert advice. An exit strategy should be negotiated during this seven step process.

The estimated time periods given in the flowchart (box 3) provide a general indication of the time it takes to successfully complete each step. Some of these steps can be undertaken at the same time. This implies that it can take up to three years to complete the pilot project (step 6) for a small to medium size venture and up to four years for a large venture. This shows that it is not a short process to develop an aquaculture venture, but in fact requires a long term commitment to get the business operational.

Tasmania

The Tasmanian Government Department of Primary Industries, Water and Environment (DPIWE) currently does not have a specific strategy implemented that outlines the state government's position on indigenous involvement in aquaculture. However, DPIWE has staff that can provide assistance to help indigenous people or companies that are interested in developing business opportunities related to

this industry.

Northern Territory

The Fisheries group in the Northern Territory Government Department of Primary Industry, Fisheries and Mines (DPIFM) – formerly the Department of Business, Industry and Resource Development (DBIRD) – has an aboriginal liaison officer who is the first point of contact for indigenous communities that are considering entering the aquaculture industry. General advice and assistance are provided on areas such as management and legal issues. The duties of this position also include visiting primary and secondary schools to promote the benefits of participating in the aquaculture and fisheries industries.

In addition, four indigenous apprentices have been employed by the Fisheries group to liaise with indigenous communities, plus undertake research, resource management and aquaculture duties. The aim in the program is to give these four individuals the necessary skills to eventually pursue a career in the aquaculture industry.

education and training for the aquaculture industry

When establishing an aquaculture business, it is essential that the workers have the necessary skills and training to ensure that the business complies with government regulations. There are various education and training programs targeting aquaculture that are available in educational institutions across Australia. These programs provide training for workers entering the aquaculture industry for the first time and for more experienced workers looking to keep their knowledge up to date.

In 2004 the Australian Government Department of Agriculture, Fisheries and Forestry released a report on education and training opportunities for the Australian aquaculture industry (McShane 2004). This report examined current education, training and workplace opportunities and identified strategies to address the industry's future needs. It also contained information relevant to the training requirements of indigenous people in the industry, and discussed four indigenous case studies.

By collating information from a range of sources, McShane (2004) provided a list of general observations and successful approaches that aquaculture businesses have used to train indigenous workers. These include:

> Farm managers showing an interest in training indigenous workers and using

the work on the farm to help build self-confidence.

- Ensuring that there are adequate funds available to cover education and training expenses, including course fees, learning resources, transport, accommodation and other everyday living requirements such as access to food. Funds can be obtained through various sources including federal, state and territory governments.
- Training is more successful if it occurs both in the classroom and on the farm site, including experienced trainers making regular visits to the farm to help ensure the knowledge is successfully transferred.
- Indigenous workers that attend classes close to home are more likely to complete the training than those that need to relocate away from home.
- There is a greater success rate when a farm has a small number of workers training at the one time rather than a large number of workers.
- Younger workers are more likely to complete their training than are older workers.

available aquaculture courses

There is a range of aquaculture courses available in various educational institutions across Australia. A selection of these courses are provided in appendix A. This list is not complete, but provides an indication of what is available.

The seafood industry has designed a certificate series course called 'Certificates in the seafood industry – aquaculture'. This series of courses involves a set of four certificates – Certificates I, II, III and IV – that provide a broad range of skills and qualifications depending on the needs of the student.

The introductory Certificates I and II provide basic introductions to the industry, including areas such as handling and harvesting of stock, water quality issues and chemical application. The higher level Certificates III and IV provide more detailed training and skills for participants wishing to undertake more senior or specialised roles in either a management or technical stream.

Bachelor degree programs are also available. These are university programs that generally require between three and four years of full time study, and provide a broad and detailed introduction to the aquaculture industry. Common topics that are studied include introduction to aquaculture systems, health and nutrition of fish stocks, introductory biology, management of aquaculture sites and occasionally

an individual research project. Entry requirements to a degree program are more stringent than for the certificate series.

More information on training in the aquaculture industry can be found by contacting Seafood Training Australia directly or by visiting their web site (www.seafoodtraining.com.au).

5

indigenous case studies in aquaculture

In the second half of 2005, an ABARE and a DAFF representative completed a two week tour of several indigenous aquaculture sites around Australia. From these visits five sites were selected as case studies to be included in this report.

Each of the selected case studies has some feature that makes it unique, so that interested indigenous communities can learn from the experience of others.

For each case study most of the information was collected by directly speaking to people (indigenous and nonindigenous) connected to the aquaculture site, and from other documents such as business plans, feasibility studies, funding applications, native title tribunal documents, and articles in magazines or bulletins. These references can be found in the reference list at the back of this report.

case study 1: mud crab aquaculture venture at Kulaluk in Darwin, Northern Territory

The information for this case study has been taken from a variety of sources. These include personal communication with the Gwalwa Daraniki Association (GDA), Robert Rose (Kulaluk farm manager) and Ian Ruscoe and Bill Flaherty (Northern Territory Government Department of Primary Industry, Fisheries and Mines), and from the publication by the Gwalwa Daraniki Association and Northern Territory Government Department of Business, Industry and Resource Development (2005).

vision – *to establish a long term sustainable indigenous owned and operated mud crab aquaculture venture on land owned by the Gwalwa Daraniki Association at Kulaluk in Darwin in the Northern Territory. The aquaculture farm is intended to provide economic and social development opportunities for the local indigenous community, and inspiration for other indigenous communities around Australia.*

structure of business

During the developmental phase of the business, a joint venture partnership has been established with the Northern Territory Government Department of Primary Industries, Fisheries and Mines (DPIFM). The venture is managed by a project board consisting of members of the GDA and DPIFM. The project has been separated into the following stages:

> stage 1: Appointment of members of the project board, consisting of two members from the GDA, at least one independent member, and two members of DPIFM's Fisheries group. This stage will be for an estimated length of two years. During this stage, a farm manager (and a training mentor) will manage

the farm, and DPIFM's Darwin Aquaculture Centre will provide technical advice for the mud crab aquaculture venture. Community members will be engaged in accredited training in aquaculture and business management.

- stage 2: When the farm becomes fully established, full control of the business and operations will revert to the Gwalwa Daraniki Association.

farm site and infrastructure

Before the GDA mud crab venture, the land was set aside for a prawn farm. Even though the site was developed, the business operated for only a short period, and with minimal participation or benefits to the community. The site had four established ponds covering an area of 2.5 hectares, with an established intake water channel. There was also approval to develop a further 0.5 hectares of the site that, when developed, would produce an extra 3 tonnes of mud crabs a year. This setup has helped the GDA to reduce its startup costs, as funding was not required to lease or purchase the land, and significant progress had already been made with the development infrastructure on the site.

However, the site still required the following infrastructure before it could start operating:

- restoration of the current facilities, including a small building for processing and packing, and adjustments to the plumbing in the ponds
- construction of a demountable wet-lab and living quarters
- a large water pump to supply water to the ponds
- re-establishment of power to aerate the ponds, for processing and other normal utilities
- fencing around the site for farm security
- redevelopment works on ponds and
- re-establishment of the freshwater supply to the site.

source of funds

The development of the farm was dependent on receiving funding from public and private sources to fund different aspects of the farm. These include:

- Gwalwa Daraniki Association – to fund infrastructure, business resources, site maintenance and staff costs

- Northern Territory Government Department of Primary Industries, Fisheries and Mines – to fund extension staff, some training, and the maintenance and operation of the crab hatchery and crablet production
- Australian Government Department of Agriculture, Fisheries and Forestry – to provide funds for the startup phase of farm development
- Australian Government Department of Employment and Workplace Relations – to fund the cost of traineeships through programs such as the Community Development Employment Program and the Structured Training and Employment Projects program
- Office of Indigenous Policy Coordination within the Australian Government Department of Immigration, Multicultural and Indigenous Affairs – to provide funds for the startup phase of farm development
- Aboriginal Benefits Account – to provide funds for ongoing farm development and operations
- Northern Territory Area Consultative Committee – to provide funds for farm development in the second year of production (application pending).

produce

The project is forecast to produce in excess of 15 tonnes of mud crabs a year once fully stocked, generating revenue estimated between $200 000 and $300 000 (based on previous on-farm research). The mud crabs will be harvested when they reach a minimum size of 350 grams. Market analysis has shown that harvesting the mud crabs at this size represents a market advantage, since they are smaller than those caught in the wild and can provide an appropriate single serve portion in restaurants.

If the business proves profitable, future plans include an expansion of the farm. Within ten years the farm is projected to have ponds covering 10 hectares of land, producing 72 tonnes of mud crabs, employing nine people and several trainees, and generating an estimated $1.4 million in annual revenue.

It is expected that the farm will attract annual operating costs of around $110 000 for the 2.5 hectare farm in the first year, and around $152 000 for the 3 hectare farm in the second year. Capital costs are estimated at $411 000 in the first year and a further $100 000 to fund the expansion in the second year and to initiate best practice techniques. Funding of around $400 000 will be required to cover training and labor costs for the eight trainees.

customers

The mud crabs will primarily be sold directly to restaurants and wholesalers in the local Darwin market to keep transport costs to a minimum. Some produce may also be sent directly to other Australian capital cities using air freight.

additional business opportunities

Other business opportunities could develop alongside the mud crab aquaculture business. This may include an integrated tourism venture, involving guided tours, crab pot pulls and product sampling –this is a viable option given the close proximity of the Kulaluk site to the centre of Darwin.

indigenous development opportunities

The farm will focus on providing development opportunities for people from the indigenous community located on Kulaluk land, and other indigenous people located in the Darwin area. These opportunities include:

- education and training for the indigenous community – such as undertaking courses in aquaculture and business management at Charles Darwin University
- employment options working for a commercial aquaculture venture – such as research assistants, farm hands, office workers and
- building community capacity for the indigenous community – such as allocating revenue to support other indigenous businesses or community development initiatives identified under the Community Development Plan.

The venture is also acting as a demonstration farm for other indigenous communities, with knowledge exchanges already taking place.

current status

Several agencies have committed cash funds to the project including the Office of Indigenous Policy Coordination, the Australian Government Department of Agriculture, Fisheries and Forestry, the Australian Government Department of Employment and Workplace Relations and the Aboriginal Benefits Account. An application has also been lodged with the Northern Territory Area Consultative Committee for some 'regional partnerships' funding.

All licences and approvals have been granted, including the approval of the Environmental Management Plan by the Northern Territory Environmental Protection Agency. Recently the aquaculture licence was issued by the Fisheries Group in DPIFM.

Site infrastructure has been redeveloped and the ponds were first refilled in early December 2005. The first trial batch of crablets was stocked in late December as 5–10 mm wide juveniles. These crabs were harvested in May and June 2006 and averaged $17 a kilogram in local wholesale markets.

A second batch of crablets was stocked in March 2006, which bought the total number of crablets stocked to 45 000. The majority of these will be available for sale in October 2006.

case study 2: blue mussel aquaculture venture at Port Lincoln, South Australia

The information for this case study has been taken from a variety of sources, including personal communication with Port Lincoln Aboriginal Community Council Incorporated, and from the publication by Collins Anderson Management (2004).

vision – *To establish a profitable and sustainable subtidal shellfish venture owned and operated by the Port Lincoln Aboriginal Community. This venture aims to commercially produce high quality mussels and shellfish to provide economic and social benefits for the indigenous community of Port Lincoln, South Australia.*

background

The Port Lincoln Aboriginal Community Council (PLACC) is the peak representative body for the indigenous community in Port Lincoln. PLACC currently owns the company SA Indigenous Industries Pty Ltd (SAII), which supports a variety of income generating businesses that provide development opportunities for the local indigenous community.

The aquaculture venture began when the South Australian Government approached PLACC with the opportunity to apply for a 20 hectare subtidal shellfish lease located in Boston Bay in Port Lincoln near other existing subtidal shellfish leases. With the state government granting this lease (rather than PLACC purchasing the lease), PLACC minimised the amount of startup costs required for the venture. The application was successful, with the lease being granted by the state government.

structure of business

In the initial business plan, three different business structures were proposed. The three options included:

- wholly indigenous owned and operated
- indigenous owned and operated by a private company and
- a joint venture arrangement between PLACC, a private company and Indigenous Business Australia.

PLACC has a strong preference for the first option to be implemented, as the business will remain fully under indigenous control, with the aim being to direct all benefits straight back into the indigenous community.

In the early phases of development, it was acknowledged that expert and technical input was required to advance the business. At the time this type of specialist knowledge was unavailable in the indigenous community, and therefore was obtained by developing strong relationships with existing farmers around the region.

In all three options, it has been suggested that a board be appointed, consisting of representatives from PLACC, technical specialists that are nonexecutive members, and others that have a financial interest in the venture.

development of business

There are many different factors that need to be considered when developing a business, especially when it is dependent on external parties participating. Over time, conditions change, so the way the business is developed and conducted also needs to change. During the past couple of years, PLACC has been faced with changing conditions, and as a consequence has needed to find a way to adapt in order to keep the business viable.

initial strategy

In 2004 an initial business plan was developed. It was estimated that $1.4 million in funding was required for the initial three year period of operation – the majority as repayable loan funds. This included $870 000 in the first year, $330 000 in the second year, and a further $200 000 in the third year. This money was required for potentially forty 110 metre growout lines on the lease site, with a gross output of 480 tonnes by the fifth year of operation.

revised strategy

In December 2005 it became clear to SAII directors that the initial project development strategy needed to be adjusted, because, according to conditions at the time, it was considered too risky. Rising concern within SAII plus advice from key industry personnel, other mussel farms and developments in the industry suggested that:

- predicted production levels were ambitious
- the amount of major capital outlays on a large boat and equipment was too high for a 20 hectare site
- other mussel farms were having their own difficulties in finding profitable markets
- too much confusion and lack of focus between the enterprise operating commercially (economically) versus being a site suitable for indigenous training and employment and
- there was too much time and energy being expended on seeking major external funding – this funding issue was hindering the commencement of the project, as the funding requirements were not responsive enough to the day to day decisions needed to get the project under way.

Together, these factors highlighted that a more conservative and cautious approach was required.

Limiting the dependence on external funding meant that SAII decided to use the small amount of internal funds available to focus first on developing the site economically, with access to indigenous training and employment opportunities to follow in time.

In the first half of 2006, SAII used these internal funds to get the business under way, by purchasing ropes and floats for six growout lines (170 metres in length) and two spat lines. The backbones were positioned on site in April 2006 and the spat lines were installed in June 2006 – when spat count levels were at their peak. These tasks were undertaken by contracting existing mussel farmers and overseen by SAII.

source of funds

The initial business plan identified the following external parties as potential sources of funding.

- Australian Government Department of Agriculture, Fisheries and Forestry
- Australian Government Department of Employment and Workplace Relations
- Australian Government Indigenous Business Australia
- South Australia Department of Primary Industries and Resources.

These external parties were not used to commence operations, but may still be considered to help expand the capacity of the business in the future.

produce

Mussels were selected as the preferred shellfish for production, as there is local industry knowledge and existing indigenous expertise. For this species, it is a simple process to obtain a large volume of spat, and once established it has high growth and low mortality rates. In the future there is the potential to diversify into higher value shellfish (such as scallops and abalone).

customers

The mussels will primarily be sold to the Australian domestic market as live, fresh or chilled product. Markets include local restaurants, wholesalers, and interstate fish markets. More research is required to locate the most appropriate export markets to target. The experience of existing mussel growers is that economically viable markets are hard to identify and sustain. Therefore, SAII needs to investigate opportunities to undertake joint marketing of products with existing mussel operators and/or relevant industry associations as well as to develop its own niche markets.

indigenous development opportunities

Once it becomes clear that the business can operate financially, development opportunities for the local indigenous community will be created. These include:

- direct employment in a commercial aquaculture venture and the potential to participate in the wider aquaculture industry
- indirect employment flowing into the indigenous community

- business and aquaculture based training
- sharing and transfer of knowledge to other local indigenous businesses, increasing the capacity and skill level of the community
- community ownership, enhanced community pride and self belief and
- working in an outdoor environment – a preferred location for indigenous people.

There may be opportunities for employment (on a casual basis initially) and traineeships (including apprenticeships) that could use funding through programs such as the Community Development Employment Program and Structure Training and Employment Project. These schemes are administered by the Australian Government Department of Employment and Workplace Relations. Discussions with this department have already commenced, but it is dependent on SAII reaching agreement with PLACC and the Department of Employment and Workplace Relations on gaining access to funding required to get it through to its first harvest/sales in mid-2007.

current status

Over the next three to six months, the project is focused on the physical and human resources required for maintaining spat lines – seeding the growout lines plus maintaining the lines until harvest in mid to late 2007. A target harvest has been set at around 70 tonnes with a gross sale value of around $210,000, which will realise a small operating profit for the business.

Farming tasks at the lease site is continuing by contracting existing mussel farm operators. SAII is currently considering a strategy that looks at engaging local indigenous people in these activities. Two broad options being considered are:

- place indigenous trainees/CDEP participants on existing mussel farm vessels and contract these vessels for activities on the lease site; or
- purchase or lease a vessel and undertake the majority of the tasks using existing indigenous people who are known to have the skills to operate the vessel, plus teach and supervise new indigenous trainees.

The second option is the preferred choice, provided a suitable vessel can be secured and appropriate funding can be found from both internal and external sources.

case study 3: trochus hatchery at One Arm Point, Western Australia

The information for this case study has been taken from a variety of sources, including personal communication with Ardyloon Incorporated, and from publications by Ardyloon Incorporated (2004), Lee et al. (2004) and Fisher (2004).

> vision – *To establish a viable business in a remote indigenous community that provides employment and training outcomes for the local residents. Also, to instil in the local community a sense of pride of maintaining and working for a sustainable and profitable enterprise on Aboriginal land. By creating a business venture within the community, indigenous families are able to work to become self reliant, while maintaining their cultural traditions.*

location

One Arm Point is located on Aboriginal land in a remote area north of Broome (Western Australia), close to Cape Leveque on the Dampier Peninsula. To get to this small township requires a three and a half hour drive over 200 kilometres of mainly unsealed road characterised by corrugations and sandy sections. In recent times, some parts of the road have been updated to bitumen, making it easier to gain access to the community. However, this road is still best traveled with a four wheel drive vehicle, and on occasions during the summer wet season (November–April) the road is impassable and closed to traffic.

background

Ardyaloon Incorporated represents the indigenous people living in the community at One Arm Point. There are currently between three and four hundred residents

living in around ninety houses spread over a large area. The One Arm Point Community Council operates as Ardyaloon Incorporated which manages the One Arm Point hatchery.

In 1999 the Bardi Community was presented with an opportunity to participate in a government funded project to grow trochus. Financial support was obtained from a joint Australian Centre for International Agricultural Research (ACIAR) research grant with Samoa, Vanuatu and other agencies in Australia. This funding provided the support necessary for the hatchery to begin operating. The aim was to breed an amount of trochus that would be used to reseed nearby reefs off One Arm Point and Cunningham Point in order to replenish the existing trochus populations.

Within twelve weeks the hatchery was designed and constructed. Even though the original setup of the operation was basic, the business has had several successful trochus harvests. Since commencing operations in 1999, the hatchery has had two upgrades and is looking to commence its third. To proceed further will require an additional injection of funds.

produce

The business currently produces a maximum of 10 tonnes (dry processed weight) of produce per season, which equates to an estimated 70 000 trochus shells and 1750 kilograms of processed trochus meat, yielding around $120 000 in revenue (before costs are deducted).

The hatchery is looking to expand its capacity to produce an additional 12 000 trochus for the aquarium trade and around 26 000 trochus for reseeding the nearby intertidal reefs. This will provide additional income of a minimum of $36 000 – more if a different marketing approach is employed.

customers

The trochus product is sold in two separate parts – the outside shell and the meat inside the shell. Markets for the shell are easier to find than markets for the meat. Every year through a Perth based marketing agent, the business exports over ten tonnes of shell to the Italian fashion industry to make buttons for clothing. Other uses for the shell include using it as an input to make jewellery and pearl based paints.

The second part of the product, the trochus meat, is more valuable, but an acquired taste. Currently the meat is sold to local markets, but may in the future

be exported to Asia – in particular to Japan where the meat sells for a high price – depending on the outcome of market research.

source of funds

Over the lifetime of the project, the hatchery has required funding and support for the startup phase of the business, the expansion phases, and for ongoing business operations. This support has come from the following sources:

- Ardyaloon Incorporated
- Kullari Regional Community Development Employment Program
- Kimberley Aquaculture Aboriginal Corporation
- Australian Centre for International Agricultural Research
- Australian Government Department of Employment and Workplace Relations
- Western Australian Government Department of Fisheries
- Office of Aboriginal Economic Development within the Western Australian Government Department of Industry and Resources.

additional businesses within the community

There are other businesses that have been created by reinvesting revenue from community businesses (including the hatchery) into other local ventures, leading to further development of the local community. These include:

- In a light industrial area of One Arm Point, the harvested trochus shells from the hatchery are cleaned and sorted before selling them to the market, creating additional employment opportunities.
- A tourism venture, where people can visit the touch tank to view a variety of marine creatures at a short distance, creating additional income for the hatchery.
- By diversifying into other marine species, the hatchery has developed a market for tropical fish (including clown fish) in the aquarium trade.
- As part of a self reliant community, the Bardi Community currently manages the community store, which provides essential services to the local residents.
- The indigenous communities of One Arm Point and Djarindjin jointly own the nearby Kooljaman Resort. In February 2005, the resort won the National

Tourism Award for Aboriginal and Torres Strait Island Tourism – the second time the resort has won this award. It has also won numerous other Western Australian Tourism Awards. Currently the complex is managed by nonaboriginal staff, under the guidance of a board of directors, but it is hoped that in the future the resort will be fully operated by the local indigenous communities.

indigenous development opportunities

The hatchery will focus on providing development opportunities for indigenous people located on Aboriginal land at One Arm Point. These opportunities include:

- employment in a commercial aquaculture venture
- aquaculture based training, including trainees undertaking certificate courses in aquaculture at the Broome Aquaculture Centre at the Kimberley College of TAFE
- an income stream that will also support other initiatives in the Ardyaloon community
- using the hatchery as a teaching aid for the local Ardyaloon school to promote interest in the venture at the school level and
- community pride and ownership.

Employment and traineeships are currently funded through the Community Development Employment Program (CDEP). For people undergoing training, top-ups for CDEP have been paid by training agencies. The CDEP scheme is administered by the Australian Government Department of Employment and Workplace Relations.

current status

Ardyaloon Incorporated is in the process of submitting funding applications to different agencies (mainly government) to obtain funds to upgrade the current operation and for further site expansion. At the same time the hatchery is looking to diversify into other marine species, such as barramundi, clown fish and other types of tropical fish.

case study 4: Coolgaree Bay sea sponge farms at Palm Island, Queensland

The information for this case study has been taken from a variety of sources. These include personal communication with the Coolgaree Community Development Employment Program, and from publications by the National Native Title Tribunal of Queensland (2005) and BABEL-sbf (2002).

vision – *To establish the first commercial sea sponge farm in Australia. The business will be owned and operated by a new charitable trust established by April 2006. This venture aims to commercially produce high quality sea sponges to provide economic and social benefits for the Palm Island residents – in particular the provision of employment and training opportunities where current employment options are limited.*

location

Palm Island is the largest island in the Palm Islands group. It is located within the Great Barrier Reef Marine Park, about 56 kilometres north west of Townsville off the Queensland coast. Access to the island is either by ferry or by a twenty minute aeroplane trip from the mainland.

social structure

The traditional owners of Palm Island are the Manbarra people and residents are predominantly indigenous. The island is home to the largest indigenous community in Australia, originally derived from more than forty different mainland tribes. It has a history of social challenges, including a high unemployment rate – a consequence of limited employment opportunities on the island.

background

In 1998 the Australian Institute of Marine Sciences (AIMS) identified two species of fast growing sponges located around the Palm Islands that would be suitable for culture. This initiated a set of successful experimental sponge aquaculture trials, which marked the beginning of a collaboration between AIMS (scientific advice), Coolgaree (indigenous owner and operator, and labor force), and the Queensland Government Department of State Development, Trade and Innovation (DSDTI) (business and management advice).

In the initial development stages of the business, external experts (such as AIMS, DSDTI, marketing experts) have been engaged to provide specialist advice, but in the long term the business will be managed and operated by indigenous people. This means that all profits generated by the business will be transferred directly to the Palm Island community to stimulate local development.

This venture will see the development of a new business, Coolgaree Bay Sponge Farms, that will consist of three divisions – farming, processing and marketing. The business will have a board of seven trustees – two representing the Coolgaree Community Development Employment Program, one representing the Manbarra traditional owners, three appointed by the project's financiers and an independent chair.

Over a five year period, fifteen farms each covering a four hectare site will be developed. Coolgaree Bay Sponge Farms will employ twenty-nine full time employees for various positions in the business, including chief executive officer, administrative staff, divers, boat crew, and sponge processors.

produce

It is projected that this business venture will produce 500 000 sponges or an estimated $4.3 million a year in sales revenue by the sixth year of production. At least half of this revenue will be generated from export sales of the sponges to international markets.

Choosing to farm sponges is a good business venture for remote locations such as Palm Island, as less maintenance is required to produce commercial size sponges compared with many other marine species. The sponges can be grown on lines or panels from small cuttings using filter feeders that require no feeding, and the final product does not require refrigeration, making transport easier and less costly.

The sponge species to be produced on Palm Island will be suitable for sale to the cosmetic or bath sponge market. Research undertaken by AIMS has also discovered that in the future this type of sponge may be used in the development of anticancer and antiviral drugs.

customers

Currently in Australia there are two sponge traders residing in Adelaide and Sydney. It is anticipated that 80 per cent of the sponges will be sold through these traders to Kalymnos in Greece, a major sponge supplier to the global market. The remaining 20 per cent of the sponges will be sold on the east coast of Australia to the cosmetic or bath sponge market.

source of funds

The venture will require the largest injection of funds during the startup phase of the business. Its development is dependent on receiving startup funding from a selection of public sources, such as:

- Australian Government Department of Agriculture, Fisheries and Forestry
- Australian Government Department of Employment and Workplace Relations
- Australian Government Department of Transport and Regional Services
- Australian Government Indigenous Business Australia
- Queensland Government Department of State Development, Trade and Innovation.

Before the venture begins operations, it is estimated that $100 000 is required to pay for aquaculture permit application assessment fees, $500 000 is required to undertake an environmental impact assessment, plus the business will have to obtain a surety for a $1.5 million bond. Once operations commence, it is estimated that around $7.3 million in capital expenditure and operating capital over five years will be required to run the business.

indigenous development opportunities

The sponge venture will focus on providing development opportunities for indigenous people located within the Palm Islands group. These opportunities include:

- By working alongside scientists from AIMS, indigenous workers can gain hands on experience in aquaculture research.

- Employment in a commercial aquaculture venture, since the aim is for the operation to be fully staffed by indigenous people from Palm Island.
- Education and training for the local indigenous community. Funds from the budget will be allocated to provide training opportunities for both land based and sea based employees. Different types of training will be made available, including aquaculture based training, diving courses and administrative courses.
- An income stream that will be transferred directly to the Palm Island community to stimulate other local development.
- Using the sponge farm as a teaching aid for the local Palm Island school to promote interest in the venture at the school level.
- Community pride and ownership.

Employment and traineeships are currently funded through the Community Development Employment Program, which is administered by the Australian Government Department of Employment and Workplace Relations.

To create enthusiasm for this aquaculture venture in the local community, the local school (primary level through to year 10) has provided year 10 students with the opportunity to be exposed to fisheries and aquaculture based work. The Australian Government Department of Agriculture, Fisheries and Forestry has provided an amount of funding to purchase equipment such as fish tanks, pumps and larger tanks, which offers the local indigenous students the opportunity for hands-on experience. Other indigenous people who are not enrolled in the local school are also given the opportunity to undertake this training. In addition, the local school owns a boat that is used for field trips to stimulate interest in the marine environment.

current status

On 26 July 2005, the indigenous land use agreement was signed by the Manbarra people and Coolgaree. This agreement provides formal authorisation from the

traditional owners for the development of the sponge venture to proceed on traditional land. The agreement was formally certified by the National Native Title Tribunal in December 2005.

This signing represents a major step forward in the approval process, and Coolgaree will now proceed to obtain the other required approvals to commence farm operations. For instance, since the Palm Islands group is located within the Great Barrier Reef Marine Park, a detailed environmental impact assessment will need to be undertaken to ensure that the venture is deemed an ecologically sustainable development. However, it is anticipated that the scope of the assessment will be mitigated by the significant body of research into sea sponge mariculture already collected by AIMS. This process will take between six and twelve months to complete.

case study 5: multispecies aquaculture venture at Pandanus Park in the West Kimberley, Western Australia

The information for this case study has been taken from a variety of sources, including personal communication with Pandanus Park Aboriginal Corporation, and from publications by Lambert and Rehbein (2003) and Pandanus Park (2006).

vision – *To establish a successful multi-species commercial aquaculture operation in a remote indigenous community that will provide a source of revenue for economic independence and also provide development opportunities for the local community. By creating a business venture within the community, indigenous families are able to work toward a common goal, while maintaining their cultural traditions.*

background

Cherabin (freshwater prawns) spends the majority of its life in freshwater rivers and historically has been fished as a recreational species in tropical regions in Northern Australia. Originally the aquaculture venture was to only focus on producing cherabin. Cherabin is of cultural importance to the small Pandanus Park community (less than 150 residents), since residents have a long history of fishing and consuming cherabin from the nearby Fitzroy River. This association, coupled with the likelihood of this being a hardy aquaculture species, has led the community to select cherabin as one of the preferred species to produce.

By setting up a small pilot project to further investigate the commercial production of cherabin it was found that more investigation and trials are needed to establish and learn from the cherabin operations. In the meantime to continue to move forward with the aquaculture venture it was decided to diversify into a second

species – barramundi. Barramundi is an easier species to farm and will produce a quicker financial return than cherabin in the short term.

Recognising that the indigenous community does not have all the necessary business and technical expertise to set up and progress this venture alone, the community is working in conjunction with the Western Australian Government Department of Fisheries and the Kimberley Aquaculture Aboriginal Corporation (KAAC).

The aquaculture venture has attracted a lot of interest from the local community, not just for the opportunity to participate in a commercial business venture, but more for the flow-on benefits available to the local residents. Several residents have also enrolled in certificate courses in aquaculture at the Broome Aquaculture Centre at the Kimberley College of TAFE.

farm site and infrastructure

The two species that will be farmed are cherabin and barramundi. There are plans to develop the farm in three stages, as follows:

- stage 1 (training): A shed has been equipped with recirculating systems for training purposes facilitated by the Kimberley College of TAFE. This stage has already been completed.
- stage 2 (pilot): The farm will have four by 0.1 hectare ponds constructed as a pilot to test and develop appropriate technology for cherabin and barramundi culture prior to commercial stage development.

  cherabin – a limited number of wild caught cherabin juveniles (25 000) will be taken during the annual migration in the nearby Fitzroy River – by the Kimberly Aquaculture Aboriginal Corporation, on behalf of Pandanus Park Aboriginal Corporation. They will be housed in 0.4 hectares of ponds, with a stocking density at three per square metre (10 gram cherabin). They will be grown to a harvest size of 50 grams over approximately five months. This equates to an estimated annual harvest of 1080 kilograms.

  barramundi – these will most likely come from the hatchery at Broome TAFE. The fish will be housed in eight by 6 cubic metre cages suspended in cherabin production ponds (two cages per pond), with 200 fish per cage and a stocking density of 18.5 kilograms per cubic metre. They will be grown to a harvest size of 400–500 grams over approximately five months. This equates to an estimated annual harvest of 1776 kilograms over two crops a year.

- stage 3 (commercial phase): The farm will have seventeen 0.1 hectare ponds constructed for commercial production. Stage 3 will commence once stage 2 has been deemed financially and logistically successful.

  cherabin – the cherabin will be stocked in 1.7 hectares of ponds, with a stocking density at six per square metre (10 gram cherabin). They will be grown to a harvest size of 50 grams over approximately five months. This equates to an estimated annual harvest of 8160 kilograms.

  barramundi – the fish will be stocked in thirty-four 6 cubic metre cages suspended in cherabin production ponds (two cages per pond), with 200 fish per cage and a stocking density of 18.5 kilograms per cubic metre. They will be grown to a harvest size of 400– 500 grams over approximately five months. This equates to an estimated annual harvest of 7548 kilograms over two crops a year.

The ponds will be earthen lined with high density polyethylene plastic, and netting will be required to protect the ponds from predators such as birds.

source of funds

The development of the aquaculture venture is dependent on receiving startup funding from a selection of public sources, such as:

- Australian Government Department of Agriculture, Fisheries and Forestry
- Australian Government Department of Employment and Workplace Relations
- Australian Government Indigenous Business Australia
- Western Australian Government Department of Fisheries.

produce

Both the cherabin and the barramundi will be harvested after approximately five months. The cherabin will weigh around 50 grams, and the barramundi will weigh 400–500g. The price of cherabin is estimated to be $20 a kilogram, and $8 a

kilogram for barramundi. This translates to obtaining revenue of over $35 000 a year during the pilot stage, and over $223 000 a year during the commercial stage of the venture.

customers

Initially, the produce will be sold directly to local restaurants (including the nearby roadhouse) or directly from Pandanus Park. The produce will also be supplied frozen to local markets in larger centres nearby, such as Broome and Derby. As the operation expands, more market research needs to be undertaken to understand where market demand for these products exists – both within Australia and overseas.

additional business opportunities

In the future other business opportunities could develop alongside the aquaculture business. This includes the possibility of a tourism venture, which will provide a catch and release type operation in partnership with a local land based operator. This is a viable option given that the farm is located 500 metres from the main highway where large numbers of tourists traveling around the Dampier Peninsula pass on a regular basis.

indigenous development opportunities

The farm will focus on providing development opportunities for indigenous people located in the local community. These opportunities include:

- Ongoing community involvement in establishing a successful commercial operation that will help to focus community activity toward a common goal.
- A source of revenue that will support initiatives in the local indigenous community and promote economic independence.
- Direct employment in a commercial aquaculture venture.
- Skills development and aquaculture based training.
- Community ownership, enhanced community pride and self belief.
- Working with a product that the community has some cultural attachment and association.

Employment and traineeships are currently funded through the Community Development Employment Program (CDEP). For people undergoing training, top-ups for

CDEP have been paid by the Australian Government Department of Employment and Workplace Relations. The CDEP scheme is also administered by DEWR.

current status

In the first half of 2006, Pandanus Park decided to follow a new direction by also introducing barramundi into the aquaculture venture. As a result, the community has made some changes to licence applications and these will be resubmitted to the relevant authorities for processing. Due to the length of the wet season over the past year, the farm has not made as much progress as anticipated, but once the dry season commences work on the site will move forward.

6

conclusion

Currently in Australia there are many indigenous aquaculture farms at various stages of development. These include: expressing an interest in entering the industry, being close to applying for an aquaculture licence, waiting for a licence to be approved, and already having an approved licence.

Before deciding whether to invest in a new aquaculture venture, it is important to understand the risks associated with entering into this type of business and whether the business can in the long term sustain these risks and continue to remain viable. When developing the original business plan for the venture it is important to undertake this type of assessment. If after undertaking this assessment it is considered that it will take several years for the business to reach breakeven and that the long term viability of the business may have potentially unmanagable risks, further expert advice should be sought.

However, if the assessment suggests to proceed with the venture, the estimated time required to develop a farm into a commercial venture can take around three to four years, assuming everything progresses at a steady pace. However, not all indigenous farms get to the commercial stage within this time period. Some take several years longer as they are faced with problems such as obtaining appropriate funding levels, and finding motivated workers in the local indigenous community that are willing to make a commitment to obtain specialised aquaculture training and to work a regular daily routine, including weekends.

Every indigenous and nonindigenous farm has a different experience and is faced with different challenges. For any new starter in the industry, it is usually recommended that they speak with other farm owners so that they can learn from their experience, and can investigate the possibility of an alliance with another farm so that hands-on experience can be gained. There are several current examples of where this has been done and where both parties have benefited from the exchange of information.

In the case studies discussed in this report, it has been suggested that some link be formed between the farm and the Australian, state or territory governments. This link is important so that the farm can be kept informed of new and existing indigenous programs, new funding sources, changes to the industry, and access to business and technical support.

To begin an aquaculture venture requires a commitment of time and money. Even though it takes a lot of work to establish and maintain once operational, the farm provides opportunities to the local indigenous community that it otherwise may not have.

education and training courses for the aquaculture industry

There are many aquaculture courses available in various educational institutions across Australia. A selection of these courses is found below. The list is not complete, but provides an indication of what is available.

To obtain more information on education and training courses for aquaculture contact the relevant educational institution listed below directly or Seafood Training Australia through their web site (www.seafoodtraining.com.au/contact.html).

institution	campus	qualifications
New South Wales		
Southern Cross University www.scu.edu.au	Lismore	Bachelor of Applied Science (Fisheries and Aquaculture Management) – 3 years full time
North Coast Institute of TAFE www.nci.tafensw.edu.au	Trenayr	Certificates II, III and IV in the Seafood Industry (Aquaculture) Certificates II and III Seafood Industry (Seafood Processing) Certificates II and III Seafood Industry (Seafood Sales and Distribution)
Queensland		
James Cook University (School of Marine Biology and Aquaculture) www.jcu.edu.au/school/mbiolaq/	Townsville	Bachelor of Science (Aquaculture), 3 years full time Bachelor of Applied Science (Aquaculture) – 4 years full time
Central Queensland University www.cqu.edu.au	Rockhampton	Bachelor of Science (Aquatic Resource Management) – 3 years full time Advanced Diploma of Aquatic Resource Management – 2 years
Cooloola Sunshine Institute of TAFE www.csit.tafe.qld.gov.au	Nambour	Certificate IV in the Seafood Industry (Aquaculture) Certificates II and III in Aquaculture
Tropical North Queensland Institute of TAFE www.tnqit.tafe.qld.gov.au	Innisfail	Certificate III in the Seafood Industry (Aquaculture) – 841 hours

institution	campus	qualifications
Northern Territory		
Charles Darwin University www.cdu.edu.au	Casuarina, Darwin	Certificate II in Seafood Industry (Aquaculture) – 6 months full time Certificate III in Seafood Industry (Aquaculture) – 1 year full time
Western Australia		
Curtin University (Muresk Institute) www.muresk.curtin.edu.au	Perth	Bachelor of Science (Aquatic Resources and Fisheries Management) – 3 years full time Bachelor of Agribusiness (Aquaculture) – 3 years full time
Curtin University www.kalg.curtin.edu.au	Kalgoorlie	Certificate II in Seafood Industry (Aquaculture) – 465 hours
	Esperance	Certificate III in Seafood Industry (Aquaculture) – 595 hours
Kimberley Tafe www.kimberley.tafe.wa.edu.au	Kununurra and Wyndham	Certificate II Seafood Industry (Aquaculture)
	Broome	Certificates II, III and IV Seafood Industry (Aquaculture)
South West Regional College of Tafe www.swrc.wa.edu.au	Collie Manjimup	Certificates I, II and III Seafood Industry (Aquaculture)
C Y O'Connor College	Kellerberrin campus Merredin campus Moora campus Narrogin campus Northam campus	Certificate II Seafood Industry (Aquaculture)
Central West TAFE	Carnarvon campus Exmouth technical centre Geraldton campus	Certificate II Seafood Industry (Aquaculture) Diploma Seafood Industry (Aquaculture)
Challenger TAFE	Fremantle maritime centre	Certificate III Seafood Industry (Aquaculture) Diploma Seafood Industry (Aquaculture)
Great Southern TAFE	Albany campus	Certificate III Seafood Industry (Aquaculture)
South Australia		
Flinders University www.scieng.flinders.edu.au	Adelaide	Bachelor of Technology (Aquaculture) – 3 years full time, 4 years with honors

institution	campus	qualifications
Victoria		
Northern Melbourne Institute of TAFE (NMIT) www.nmit.edu.au	Epping	Certificate II in the Seafood Industry (Aquaculture) Certificate III in the Seafood Industry (Aquaculture) Certificate IV in the Seafood Industry (Aquaculture) Diploma in the Seafood Industry (Aquaculture) Bachelor of Applied Aquaculture – 3 years full time
Tasmania		
University of Tasmania www.scieng.utas.edu.au/aqua/	Launceston	Associate degree in Aquaculture – 2 years full time Bachelor of Aquaculture – 3 years full time Bachelor of Aquaculture and Bachelor of Business – 4 years minimum Diploma of Aquaculture – 2 years Graduate Diploma in Aquaculture – 1 year full time or 2 years part time Master of Applied Science in Aquaculture – 1 year full time or 2 years part time
Australian Maritime College www.amc.edu.au	Launceston (Newnham campus) Beauty Point campus	Certificate II in the Seafood Industry (Aquaculture) Certificate III in the Seafood Industry (Aquaculture) Certificate I in the Seafood Industry (Fishing Operations) Certificate II in the Seafood Industry (Fishing Operations) Certificate III in the Seafood Industry (Fishing Operations) Certificate IV in the Seafood Industry (Fishing Operations) Graduate Certificate in Applied Science (Fisheries) Graduate Certificate/Diploma or MBA (Marine Resource Management) Bachelor of Administration (Aquaculture Management) Bachelor of Applied Science (Fisheries)

Sources: University web sites; also psc.tafe.wa.edu.au/TAFEWACourseSearch/courseSearch.aspx – search for 'aquaculture'.

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