

A photograph of a pond with water lilies and a crocodile swimming in the water. The crocodile is partially submerged, with its head and back visible above the water. The water lilies have large, round, green leaves and some purple flowers. The background shows more water lilies and some reeds.

Final Report

Economic Value of the
Crocodile Farming Industry to the
Northern Territory

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Glossary

Consumption effect – The flow of expenditure to all industries that results from the spending of salaries and wages by local employees.

Direct contribution - Direct economic activity in Northern Territory associated with the crocodile farming industry. This represents the sum of Gross Output (including value added).

Employment – Number of workers directly employed, expressed in terms of full time equivalent (FTE) employees.

2014/15 FY – 2014/15 Financial Year was selected as the most recent complete data set at the time of report development.

Gross output – Market value of goods and services produced.

Hatchling – Crocodiles born during the preceding nesting season and are typically less than 0.6 metres in length.

Indirect contribution - Associated indirect or flow-on impacts for the rest of the economy resulting from the direct contribution. That is, the impacts both forward and backwards along the supply chain as a result of an increased investment in an industry. For this study, the indirect contribution is the sum of both the Industrial and Consumption flow effects.

Industrial effect – The additional output created by industries that support the industry where the expenditure occurred.

Ranching – The rearing in a controlled environment of animals taken from the wild.

Regional contribution – Economic contribution retained in particular region. Regional contribution is a subset of the total economic contribution to Northern Territory.

Value add – Market value of goods and services produced, after deducting the cost of goods and services used. This represents the sum of all wages, income and profits generated.

1. Executive Summary

The Crocodile Industry is a unique industry in many respects. For example, it involves farming one of the world's oldest, least understood and most dangerous predators. It requires collecting (or 'ranching') eggs from wild crocodile nests using helicopters to drop in people, or needing to walk through unforgiving and swampy lands. It also then requires careful handling and management to ensure the crocodile eggs and then juvenile crocodiles are hatched then nurtured to minimise stress and protect their skins. Finally, the premium end product, crocodile skins, then often ends up as some of the World's most expensive and sought after fashion accessories (handbags, shoes, purses and wallets) being worn in the finest establishments throughout the world with key markets in the United States and Europe.

The Northern Territory of Australia (NT) makes an equally unique contribution to the industry, and the story, in that it:

- ▶ Is the largest producer in Australia, which is the dominant supplier of crocodile skins worldwide, and which benefits from having a native species, *Crocodylus Porosus*, that is highly sought after because of the quality of its skins
- ▶ Has a reputation for providing some of the highest value product for luxury leather market and seen significant inbound investment from the world's most famous fashion labels (e.g. Louis Vuitton, Hermes and Yves Saint Laurant), to have greater control over their supply chain and thus be able to manage raw material product quality and the environmental and animal welfare conditions under which the raw material is produced
- ▶ Combines farming with sustainable management of crocodile populations, other farming activities and public safety
- ▶ Combines farming with a major tourist industry, which provides one of the key reasons most tourists visit the NT
- ▶ Plays a key role in advancing species research, sustainable management practices, enhancing product quality and animal welfare
- ▶ Provides a source of private sector employment for traditional land owners and regional communities.

The future growth of the NT industry will, given its higher cost structure compared to crocodile farming in less developed countries, depend on its capacity to provide higher value products via processes that reflect the demands of its customers.

The end result of this process in the NT is such that a crocodile that is harvested at a direct unit cost of circa \$105¹ ends up in fresh skins that are exported at a value exceeding \$300 per raw skin, through the application of advanced farming techniques that reflect the challenges of farming a prehistoric animal.

¹ This unit cost does not account for crocodile rearing costs

1.1 Background

In August 2015, the Northern Territory Government (NTG) released *The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021*. The release of the plan follows fundamental changes in the way saltwater crocodiles are managed in the NT as reflected in a new Crocodile Management Plan and Wildlife Trade Management Plan². The strategic plan recognises a return of a healthy and sustainable level of crocodiles in the wild concurrent with the growth of the NT crocodile farming industry. This study reports on the economic value that the crocodile farming industry contributes to the Northern Territory (NT) in 2014/15.

1.2 The Economic Contribution of the Crocodile Industry

Economic contribution (or gross contribution) is a measure comprising all market-related expenditure generated by a specified industry. It focuses on capturing the direct effects of an industry (i.e. revenues or output) and applying economic multipliers to these direct effects, to estimate the flow-on (or 'indirect') effects of Industry operations. The indirect effects consist of Industrial and Consumption flow-on effects.

Industrial effects measure the additional output created by industries that support the industry where the expenditure occurred. Consumption effects measure the expenditure to all industries that results from the spending of salaries and wages by employees.

The total economic contribution includes the sum of both these direct and indirect effects. For the purposes of this study, the total Industry economic contribution is being estimated in terms of its 'value add' to the economy. Value-added accounts for the direct cost of production, that is the market value of goods and services produced minus the cost of goods and services used in their production. Essentially, this represents the sum of all wages, income and profits generated by the industry.

It is important to note that economic contribution studies do not consider substitution impacts, or what would happen if the relevant industry ceased to exist (For further information regarding the theory of economic contribution analysis, please refer to Appendix A).

During the 2014/15 FY, the total economic contribution of the Industry in value added terms was \$54.3 million (m). In total, the contribution of the Industry represented approximately 0.23 per cent of the Northern Territory GSP.³ The breakdown is represented in Figure 1.

Farming operations (capital and operational expenditure) provided the largest proportion of the economic contribution estimated at \$29.3m (in terms of total value added) across the Territory. Farm related tourism expenditure, that captures both tourism specific visitor expenditure and associated farm related costs, was estimated at approximately \$16.9m. Expenditure related to industry regulation contributed \$4.6m while vet services contributed \$1.3m of value added. The economic contribution within remote communities as a result of royalty payments to indigenous communities was \$2.1m.

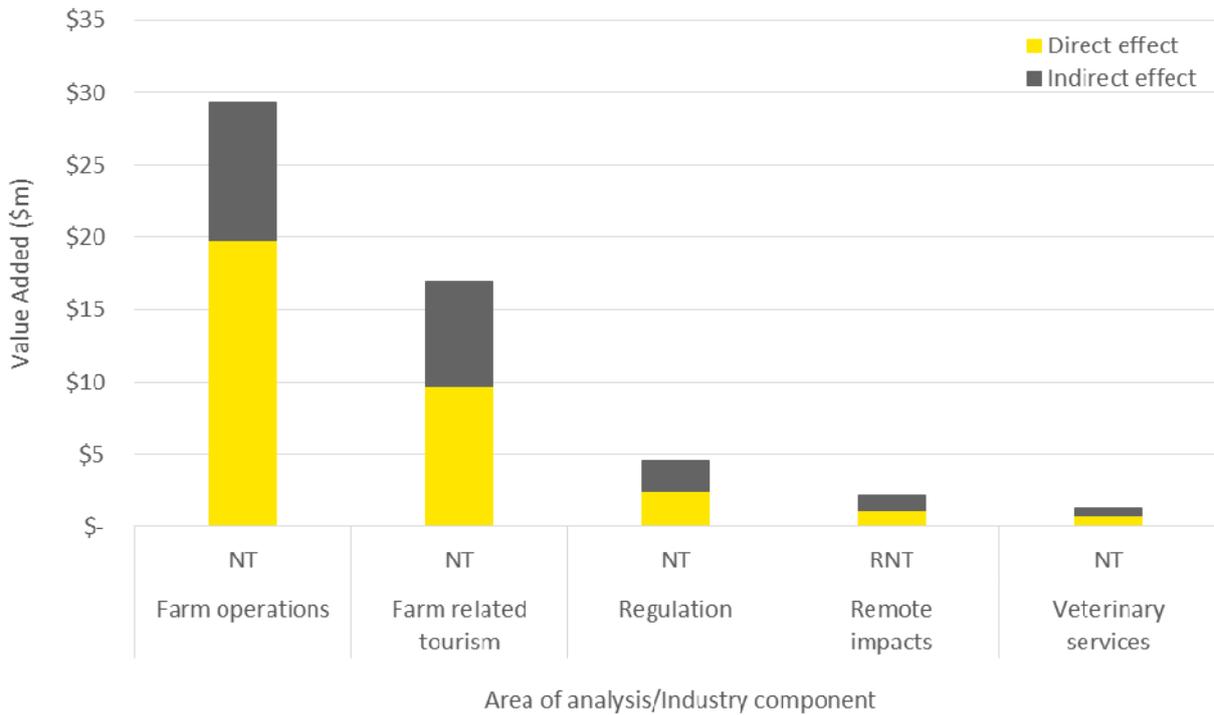
It was estimated that 96.5 per cent of value added was generated within Darwin and the surrounding area with the remainder attributable to regional areas.

Approximately 82.5 per cent (or \$44.8m) of the economic contribution was attributable to operational expenditure and 17.5 per cent (or \$9.5m) to capital works or investment.

² The Northern Territory Government Management Program for the Saltwater Crocodile 2016-2021 and Wildlife Trade Management Plan for the Saltwater Crocodile (*Crocodylus Porosus*) in the Northern Territory of Australia, 2016-2020 - respectively.

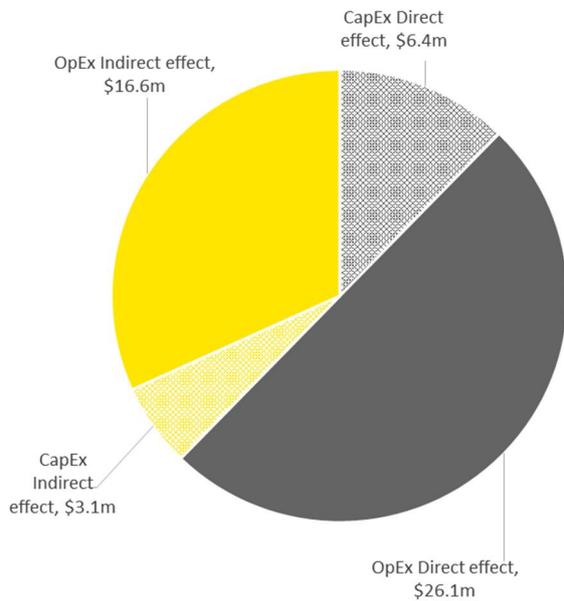
³ In 2014/15 the Gross State Product (GSP) of the Northern Territory was \$23,139m (Source: REMPLAN)

Figure 1: Value added (\$m) of Crocodile farming industry components (operational and construction), NT, 2014/15



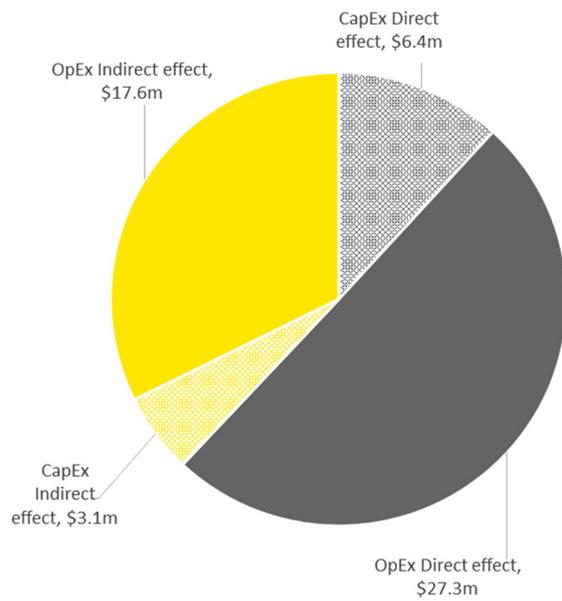
*Calculated using the Northern Territory IO table
 Source: REMPLAN, EY, 2016

Figure 2: Value added (\$m), Crocodile Industry, Darwin only, 2014/15



Source: REMPLAN, EY, 2016

Figure 3: Value added (\$m), Crocodile Industry, Darwin and Regional NT, 2014/15



Source: REMPLAN, EY, 2016

1.3 Employment within the Crocodile Industry

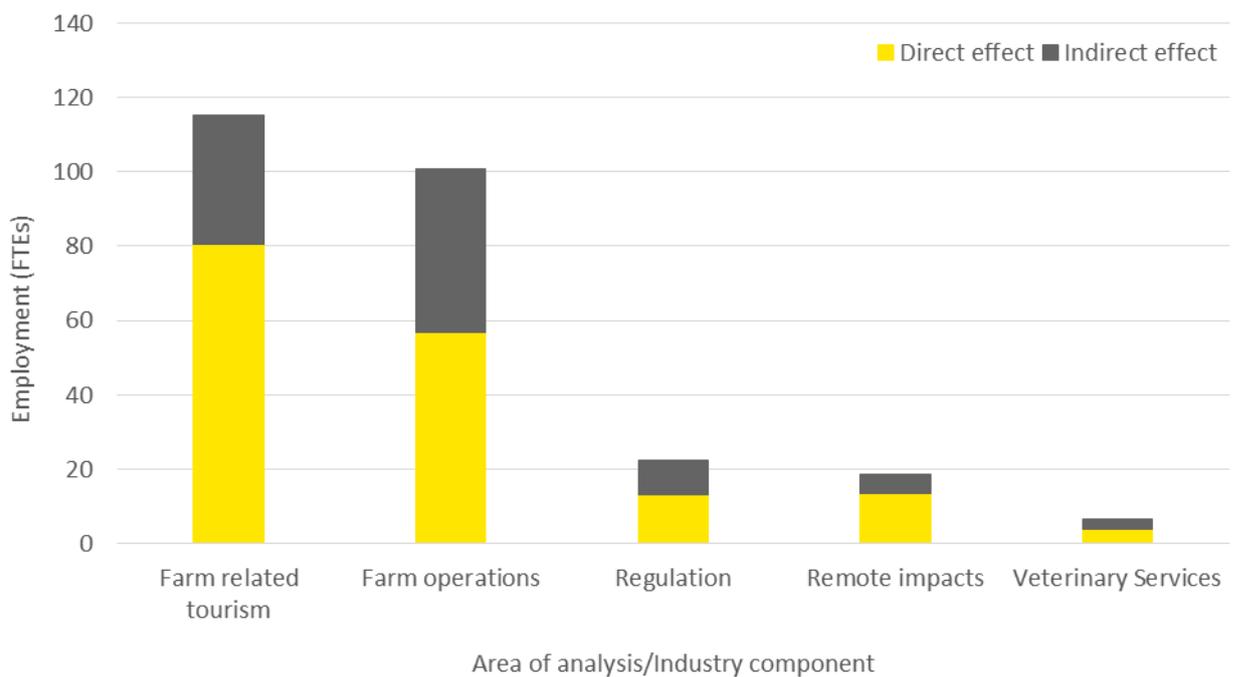
During the 2014/15FY, the total (direct and indirect) operational employment generated by the Industry was estimated at 231 Full Time Equivalent (“FTE”) workers whereas employment attributable to construction accounted for 33 FTE, totalling 264 FTE. Total public sector jobs involved with the Industry (29 FTE) accounted for 0.08% of all NT public sector jobs whereas private sector jobs in the industry (235 FTE) accounted for 0.24% of all jobs in the NT private sector.

Farm related tourism expenditure associated with tourism specific visitor expenditure and associated farm costs was the largest employing industry component, estimated to employ 115 FTE workers related to operations and 1 FTE workers in construction. Farming operations followed at 59 operational FTE workers in Darwin and surrounds and 9 FTE in regional NT, to a total of 68 workers in operations. Farming operations-construction related employment was estimated at 32 FTE across the Territory. Regulation was estimated to contribute 23 operational FTE workers and vet services 7 operational FTE. The estimated employment generated in remote communities as a result of royalty payments to indigenous communities was 19 operational FTE workers.

A share of 91.4 per cent of employment generated by the Industry is attributed to the Darwin and the surrounding area with the remainder attributable to regional areas.

Overall, approximately 88 per cent (or 231 FTE) workers were attributable to operational expenditure and 12 per cent (or 33 FTE) workers to capital works or investment.

Figure 4: Total employment within the Crocodile farming industry components (FTEs), Northern Territory, 2014/15



*Calculated using the Northern Territory IO table
 Source: REMPLAN, EY, 2016

Of interest, Figure 4 indicates that farm related tourism has a greater contribution than farm operations in terms of employment within the NT economy. However, in terms of value added (Figure 3), farming operations contributes relatively more than farm related tourism. The outcome demonstrates the higher relative worker productivity of farm operations relative to the tourism.

1.4 Regional and Remote Impacts of the Industry

The Industry has the potential to significantly impact regional and remote communities by providing employment and income opportunities. The primary impact is through the egg collection or ranching process with Traditional Owners (“TO’s”) receiving royalty payments for eggs collected on their lands and locals being employed for the egg collection itself.

The results indicate that during the 2014/15 financial year, crocodile farms spent \$2.3m on egg collection and royalty costs. This direct output is the equivalent of employing 14 employees over the course of the year. The direct value added of this activity was \$1.2m and the total value added was estimated at \$1.9m. The results are included in Table 1 below.

	Direct effect	Indirect effect	Total
Output	\$2.31	\$1.39	\$3.70
Value-added	\$1.19	\$0.74	\$1.92
Employment (Jobs)	14	4	17

Source: Stakeholder consultation, REMPLAN, 2016 (some numbers may not add due to rounding).

1.5 Broader Economic, Social and Cultural Values

Further to the values estimated for the Industry above, it is also important to understand the broader economic, social and cultural value that is generated which includes:

- ▶ *Outcomes for Aboriginal People* - annual income for TO’s and those tasked with egg collection (such as the NT Ranger Groups) provides significant economic and social benefits for regional and remote areas. The Northern Land Council (“NLC”) Caring for Country Rangers play an important part in the process. This results in less reliance on Commonwealth/state support, greater empowerment to TO groups, opportunities for Connection to Country and greater opportunities to maintain and grow social cohesion
- ▶ *Environmental conservation and species management* - The development and continued presence of the Industry (that maintains the market and demand for eggs) are a key agent in the continued sustainable management of the saltwater crocodile in the NT. Further, the environmental standards and conservation program (to which the Industry contributes) is recognised internationally as best practice that contributes to the NT being rated as a premium location to source crocodile skins worldwide
- ▶ *Value of knowledge (research and development)* - The crocodile industry (internationally) is in its infancy with research and development part of normal daily operations. The NT has world renowned researchers and farm industry experts who not only work locally (in the NT and across Western Australia and Queensland) but travel internationally to assist Industry development worldwide
- ▶ *Regulation* - Industry regulation is a common part of the ongoing sustainable management of NT crocodiles but helps to maintain appropriate environmental standards including the humane treatment of animals. The overview of the process from egg collection to the farm and then sale (of the crocodile products) is essential to maintain the NT’s premium crocodile ‘brand’. More importantly, the maintenance of these standards allows continued access to international markets (such as the United States) without which significant value would be lost (both in terms of price and volume)
- ▶ Additional tourism value:
 - ▶ *Iconic Status - Brand Recognition for the NT* - The crocodile is synonymous with the NT both at a national and international level and features strongly in many tourism promotions. The Industry contributes, to some extent, through its tourism activities and from its exposure in TV and film documentaries and features. Brand recognition adds value at the level to which it may induce further tourism and business opportunities that would not have otherwise occurred without it

- ▶ International film and television industry - The NT's crocodile farms, associated tourism venues and industry experts brings film and television makers from across the world. This generates economic value not only in terms of the direct expenditure of the film crews when they visit the NT, but also in the further development of the NT brand.

1.6 Summary

Table 2 below provides an overview of the total economic output, value added and employment generated by the NT crocodile industry during the 2014/15 financial year.

Table 2: Summary of economic output, value added and employment generated by the NT crocodile industry, 2014/15 Financial Year			
	Direct	Indirect	Total
Economic contribution - Gross output			
Remote and Regional NT (\$m)*	\$2.31	\$1.86	\$4.17
Total Northern Territory (\$m)	\$64.44	\$42.34	\$106.77
Value added (subset of Gross output)			
Remote and Regional NT (\$m)*	\$1.19	\$0.96	\$2.14
Total Northern Territory (\$m)	\$33.67	\$20.65	\$54.33
Employment (jobs)			
Remote and Regional NT*	14	5	19
Total Northern Territory	168	96	264

*Calculated using the Northern Territory IO table (some numbers may not add due to rounding)
Source: Stakeholder consultation, REMPLAN, 2016

2. Introduction

2.1 The Study

This study reports on the economic value that the crocodile farming industry contributed to the Northern Territory (NT) economy in 2014/15.

2.2 Scope of the Report

This study explores the economic contributions and the qualitative factors also contributing to the Industry's value. The Report includes an assessment of the following economic contributions:

Product	Detail
Skins	▶ Value of export for all skin types and sizes
Live products	▶ Eggs ▶ Hatchlings (small - large) ▶ Large crocodiles
Meat and products	▶ Meat (raw and processed) ▶ Teeth, skulls and claws
Knowledge	▶ Value to NT of scientific knowledge, skills and experience ▶ Veterinary knowledge, skills and experience ▶ Regulatory knowledge and experience
Tourism	▶ Tourism associated with farming, including: gate takings, retail takings and 'adventure type' activity takings

While assessing these impacts we also consider:

Employment	▶ Employment profile of the Industry ▶ Wages ▶ Employment benefits to the NT through activities including: ▶ Farming and husbandry ▶ Abattoir and butcher ▶ Tourism ▶ Ranching and crocodile catching ▶ Welfare, veterinary and zoological
Remote value	▶ Value of remote crocodile activities ▶ Value to Traditional Landowners (TO) ▶ Aboriginal employment and associated benefits
Value to the Industry of NT Government support	▶ Government support including monetary grants

The Report does not address:

- ▶ Value of conservation (accessibility for future generations)
- ▶ General wildlife tourism that includes crocodile activity (such as Adelaide River Cruises)
- ▶ The direct contribution of crocodile retail trade from non-farming or farm related operations (such as clothing/crocodile product shops or souvenir shops in the NT).

2.3 Our Approach

The value generated by the crocodile farming industry is being estimated by way of an economic contribution study. Economic contribution (or gross contribution) is a measure comprising all market-related expenditure generated by a specified industry. It focuses on capturing the direct effects of an industry (i.e. revenues or output) and applying economic multipliers to these direct effects, to estimate the flow-on (or 'indirect') effects of Industry operations. The indirect effects consist of Industrial and Consumption flow-on effects.

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It is important to note that economic contribution studies do not consider substitution impacts, or what would happen if the relevant industry ceased to exist.

Further details on our approach and methodology are included in Section 4.

2.4 Structure of the Report

The report proceeds as follows:

- ▶ Section 3 - Industry Background
- ▶ Section 4 - Approach and Methodology
- ▶ Section 5 - Economic Contribution Analysis
- ▶ Section 6 - Broader Economic, Social and Cultural Value.

3. Industry Background

3.1 Background

During the first half of the 20th Century, the saltwater crocodile was hunted to near extinction for both its skins and to eradicate what was seen as a pest species to livestock graziers. In 1971, formal protection of the species in Australia was put in practice. Since this time wild numbers of the species have recovered strongly. Today the species is considered abundant, with some groups calling for culling of wild crocodiles, due to the threats to human safety and agricultural production.⁴

From 1985, ecological responsible farming emerged allowing for use of crocodile products while managing the environmental impacts. Collaboration between farmers and regulators, NT Government and Parks and Wildlife Commission of the Northern Territory (PWCNT), balance the economic value with environmental sustainability.⁵

The crocodile farming industry in the NT is an emerging industry that captures everything from initial egg collection/breeding through to their slaughter and subsequent sale of skins (and other body parts) and also farm related tourism. Although there is some value adding carried out for skins/body parts in the NT this mainly occurs off-shore or interstate.

To date, considerable work has been carried out in developing and substantiating the Industry in the NT. Examples of this work include:

- ▶ The Northern Territory Government Management Program for the Saltwater Crocodile 2016-2021
- ▶ Wildlife Trade Management Plan for the Saltwater Crocodile (*Crocodylus Porosus*) in the Northern Territory of Australia, 2016-2020
- ▶ The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021.

This report estimates the economic value that the Industry contributes to the NT with consideration also given to knowledge developed, tourism, and social impacts.

⁴ Wildlife Trade Management Plan for the Saltwater Crocodile (*Crocodylus Porosus*) in the Northern Territory of Australia, 2016-2020

⁵ The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021

3.2 The Crocodile Industry to the NT

3.2.1 Stages of the production process

Activities of the Industry over the life cycle of a farmed crocodile include:

- ▶ Ranching (egg collection), although some eggs are also sourced 'on farm' through breeding programs. The egg collection usually occurs February through March every year
- ▶ Hatching – Eggs are transferred to on-farm incubators until hatched where temperature and humidity is carefully controlled to ensure every success
- ▶ Juvenile crocodiles are typically grown for 1.5 years or until approximately 1.2m long. The size of the grown-out crocodile will depend on the intended use. For example, skins produced for a handbag are grown to a belly width of approximately 40cm (1.2m long crocodile). The size required varies with the fashion of the day (e.g. larger or smaller handbags). Very large crocodiles can be used for pants or a suit
- ▶ Crocodiles are also grown and maintained for on farm breeding and crocodile based tourism. In the NT farm associated tourism includes Crocodylus Park and Crocosaurus Cove where you can boat around and see them in natural surrounds or swim with them in a protective cage
- ▶ Once ready for slaughter the crocodiles are sent to abattoirs where skins are removed and all body parts are thereafter separated for sale or value-adding. The skins hold the highest commercial value followed by meat and other products (see Section 3.2.2 for further details)
- ▶ The majority of value adding for the skins is carried out by the worlds fashion houses such as Louis Vuitton, Hermes and Yves Saint Laurant. The skins are very carefully graded and then cured with even the smallest scrape or pinhole puncture separating a first grade skin from a second skin. Premium skins are exported primarily to France, Italy and the United States. In Australia, boutique crocodile fashions are produced by Di Croco with a range of other custom product makers working with lesser skins and byproducts

Other activities of the Industry over the life cycle of a farmed crocodile include:

- ▶ Research and development – is consistently undertaken as crocodile farming is still an emerging industry carried out primarily by farmers enhanced by Government services such as the Berrimah Vetlab
- ▶ Regulation and conservation - the Government is active throughout the entire process from initial licensing and monitoring of egg collection, monitoring of animal health and well-being through captivity and issuing of permits for export. Annual crocodile surveys are carried out in the wild to ensure the crocodile's sustainable management
- ▶ Consulting and provision of expertise – the NT contains some of the world's pre-eminent crocodile researchers who provide consultant services to other countries seeking to improve their production techniques

The cost of ranching, including the royalty payment, in the NT suggest that the costs of collecting an egg is in excess of \$105⁶ per egg. Skins can sell for \$300 or more with high quality skins typically selling for more than \$1,000. Meat and other byproducts of skin harvesting can generate up to an additional \$200 in revenue.

⁶ This unit cost does not account for crocodile rearing costs.

3.2.2 Products

Skins are the primary and most lucrative product, however the Industry also produces a range of other goods that utilise by-products. A summary of the industry products are in Table 5 below.

Product	Information
Skins	<p>Skins derived from the saltwater crocodiles are internationally regarded by fashion product manufacturers as the most desirable crocodilian skins, rivaled only by the Nile Crocodile skins.⁷ Skins are used in manufacturing of fashion accessory products, such as high-end handbags.</p> <ul style="list-style-type: none"> ▶ Large sized crocodile skin ▶ High in quality of skin ▶ Ethical and environmentally responsible framing practices ▶ As a result, reputable fashion brands have invested in NT crocodile farms, allowing them to control more of their product supply chain.
Eggs	<p>Eggs are harvested from the wild in line with Territory Regulation and close overview within the Crocodile Farm industry itself. To collect eggs, an agreement with Traditional Owners (TO's) must be in place and a valid license must be possessed. If not collected by the farmers themselves, eggs are purchased from licensed collectors.⁸</p>
Hatchlings	<p>Hatchlings are on occasion sourced from the wild, but most are hatched and reared in captivity to be used for skins. Hatchlings can be traded across Australia to other farms in Queensland or Western Australia.</p>
Meat	<p>Crocodile meat is harvested for both human and pet consumption. It is sold domestically and exported</p>
Other body parts	<p>This includes:</p> <ul style="list-style-type: none"> ▶ Teeth and bones for jewellery ▶ Chinese medicine ▶ Ornaments such as claws, skulls and skeletons. <p>Limited quantities of crocodile products that are manufactured overseas are sold via retail outlets in Australia, predominantly to tourists</p>

⁷ The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021

⁸ CFANT (2016), Pers. Comm., July

3.2.3 Industry Profile

The Industry in the NT is recognised both nationally and internationally for its consistent, high quality products. Today, the NT hosts seven farms in the Top End⁹, while Queensland hosts five and Western Australia hosts two.¹⁰

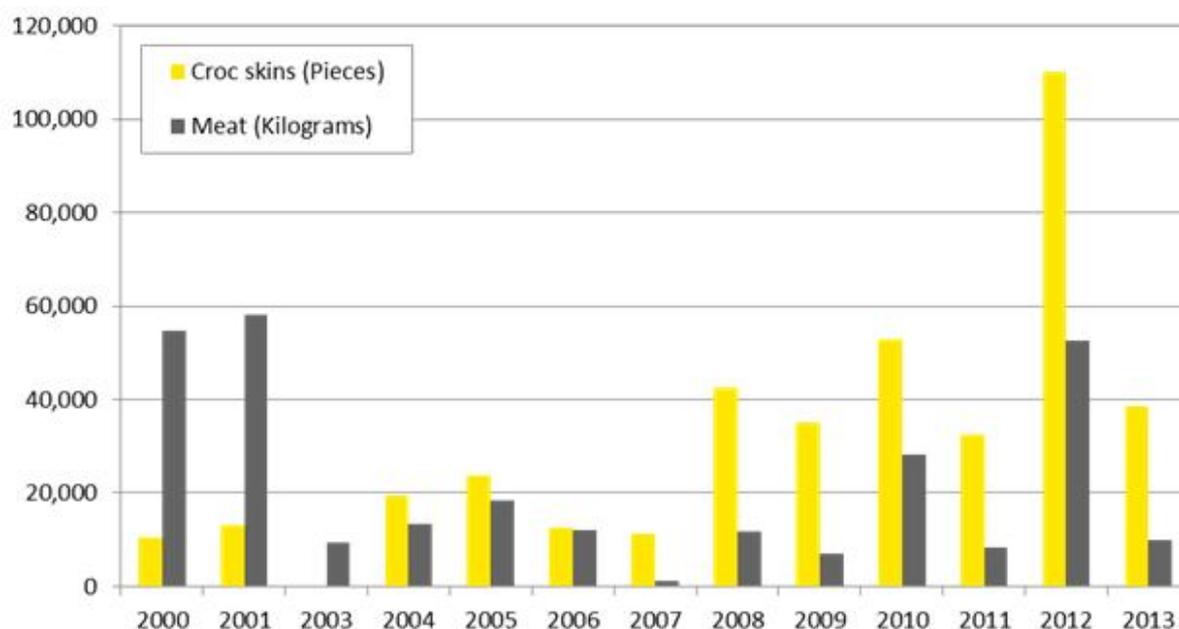
In 2011, the Industry in the NT was valued at approximately \$25million, \$19 million of which was attributable to the sale of skin products. Australian crocodile skin exports accounted for approximately 60 per cent of global trade in the product in 2012.¹¹

Whilst the core role in the Industry is that played by farmers, there are a number of spin-off and support industries that are present. These include:

- ▶ Egg collectors
- ▶ Associated tourism operations
- ▶ Northern Territory Government services:
 - ▶ Primary industries and Fisheries
 - ▶ Department of Land Resource Management
 - ▶ Parks and Wildlife Commission
 - ▶ Northern Land Council.

Overall the international demand for crocodile products has been increasing with skins and meat being the largest product type being exported. Historic export data sourced from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) indicates that the legal exportation of crocodile skins is increasing, which is associated with increasing demand driven by the international luxury goods market. This trend is evident in data from 2000 to 2013, as shown below.

Figure 5: Export quantities of select crocodile products, Australia, 2000 - 2013



Source: CITES Trade Database <http://trade.cites.org/>, 2016

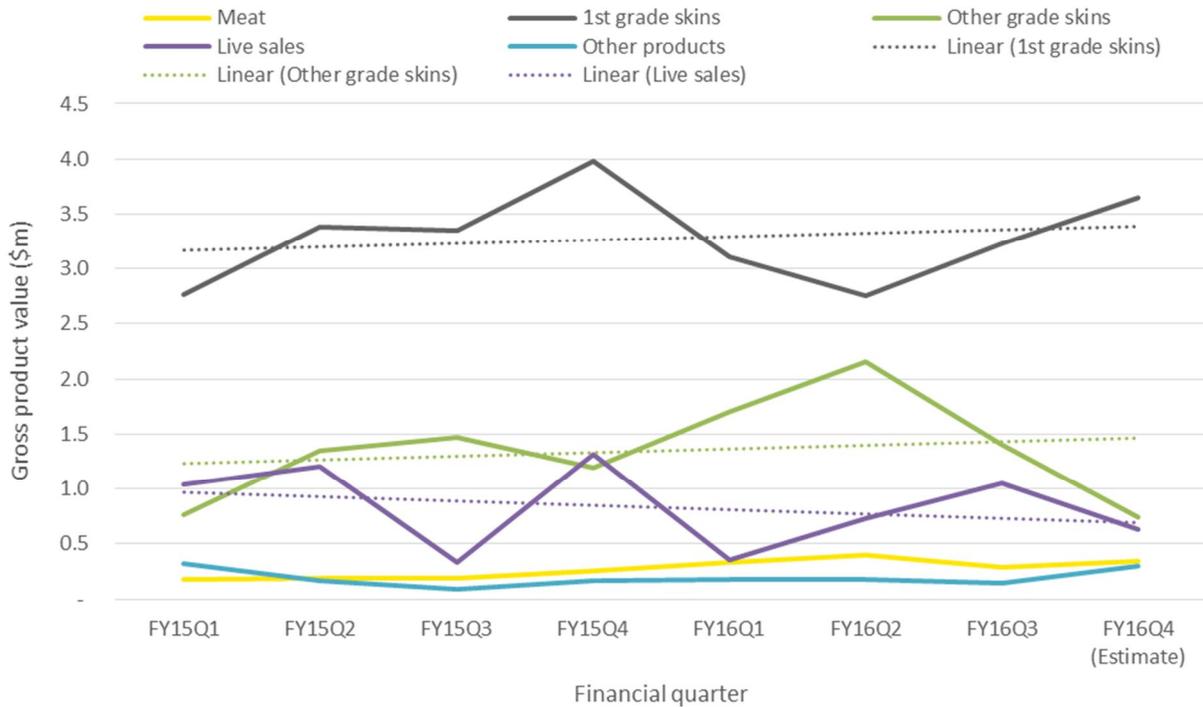
⁹ Refers to the Northern Territory

¹⁰ Northern Territory Government Factsheets

¹¹ The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021

Based on this data, the growth for skins between 2000 and 2013 is calculated at 10 per cent compound average growth per annum. Conversely the sale of crocodile meat has declined at around 12 per cent per annum. In the Northern Territory the value of all crocodile products sold in the previous two financial years (2015 and 2016) is shown below.

Figure 6: Value of crocodile products produced in the Northern Territory, Financial year 2014-15 and 2015-16



Source: Northern Territory Department of Treasury and Finance, 2016

3.2.4 Tourism

Crocodiles are viewed as an iconic part of the NT experience by domestic and international visitors alike. It has been estimated that 27 per cent of the activities undertaken by visitors to Darwin are attributed to wildlife experiences. It is assumed this figure includes visits to crocodile attractions.¹² In response to this demand, the tourism offer includes a wide range of crocodile related experiences:

- ▶ Zoos with crocodiles as the primary attraction, such as Crocosaurus Cove
- ▶ Working crocodile farms that accommodate visitors, such as Crocodylus Park
- ▶ Viewing of crocodiles in the wild:
 - ▶ River cruises such as the Adelaide River Cruises and Jumping Crocodile attractions
 - ▶ Private guided tours, often by workers in the farming/ranching industry with strong local crocodile knowledge
- ▶ Crocodile products made by local craftspeople.

The crocodile features strongly in national and international promotions, advertising campaigns and media. Released by Tourism NT, a recent advertising campaign of print, digital and TV based ads invites people to 'Do the NT'.¹³ The campaign features images of crocodiles and the farming-based tourism adventures available to visitors. National Geographic have also leveraged the crocodile brand of the NT, producing a reality series, *The Croc Catchers NT*.¹⁴ The series follows the activities of the Problem Crocodile Team, including the transfer of captured crocodiles to NT crocodile farms.

3.2.5 Knowledge

The private and public sector both play important roles in the storage, provision and further development of species knowledge in the NT. In addition to this there is also substantial, and yet untapped, knowledge that the Traditional Owners hold with their Connection to Country.¹⁵ In general the knowledge that is known can be generally categorised as research and development, regulatory and animal care (veterinary).

In terms of research and development the economic and financial value of the species has mainly focused on:

- ▶ Skin quality improvement and consistency, which is critical to the provision of premium product
- ▶ Egg laying and hatching techniques in captivity
- ▶ General disease associated with high density farming
- ▶ Animal care and handling.

Research is undertaken through a number of avenues. The primary NT research is:

- ▶ Crocodile farm research – this is undertaken by all crocodile farms and is an integral part of the development of an emerging industry
- ▶ Government veterinary research, specifically the NT Primary Industries and Fisheries Berrimah Veterinary Laboratories (“BVL”) - (further details in Section 5.2)
- ▶ Local universities, including Charles Darwin University and universities from other jurisdictions¹⁶.

¹² Aus Govt Austrade – tourism research Australia – NT Visitor Touch Points August 2014

¹³ <http://www.tourismnt.com.au/en/marketing/domestic-marketing/current-campaigns/its-about-time>

¹⁴ <http://www.nationalgeographic.com.au/tv/the-croc-catchers-nt/>

¹⁵ NLC/WMI (2016), Pers. Comm., July

¹⁶ WMI/NT DPIF (2016), Pers. Comm., July

3.2.6 Remote

The Industry also makes an important contribution to remote economic development in some cases leveraging local knowledge of crocodile handling and management also augmented through farming industry research and on the job learning. Aside from employment, TOs receive royalties for ranching on their lands that is often distributed amongst the community and leads to wider community benefits. TOs also play an active role in the maintenance and upkeep of the key breeding groups today and into the future.

The crocodile farming industry also provides for significant new opportunities and with it associated economic and social benefits. In remote areas, new innovative ideas are particularly welcomed where there are (currently) limited other opportunities.¹⁷ The 'Croc in a Box' initiative is an example where the industry is making this a reality. Initially introduced into Ramingining in 2014, it is now the focus of a substantial investment to commercialise the opportunity. The initiative offers an opportunity to those in remote communities to collect and hatch eggs, raise and sell juvenile crocodiles to farms.

To ensure benefits are realised locally, and to reduce risk for those participating in the project, crocodile farmers cover the full cost and give a guarantee to purchase the crocodiles. Future potential for the initiative will be realised if it then expands to other communities. The initiative provides Aboriginal people and communities with work on country that generates an economic return and reinforces cultural connection with the land (see Box 1 for further details).¹⁸

Box 1: ASRAC Rangers Crocodile Farm

The Arafura Swamp Rangers Aboriginal Corporation ("ASRAC") has been working with Darwin Crocodile Farm on a pilot program for the past two years to develop a small crocodile farm at Ramingining (NT). The so called 'Croc in a Box' pilot program involved two tanks and the growing-out of a 100 plus crocodiles each year. The successful pilot is currently being commercialized and has received a \$400,000 grant from the NT Government to take the next step. Key benefits from the developed project include:

- ▶ Local economic development with the provision of immediate secure employment and provision of facilities including housing and support.
- ▶ Non-use of antibiotics due to the processes involved and the animal care
- ▶ Workforce development - generating local employment from caring for the swamp areas, feral animal eradication (providing food for the crocodiles and also improving the potential for nests for egg collection), egg collection, incubation and growing out of hatchlings
- ▶ Increased skills based training delivered at a community level to grow the capacity of employees
- ▶ Minimising the risk to the industry through having a satellite supplier of crocodiles who is remote from the Darwin Region
- ▶ Development of associated economic opportunities of tourism and the potential to leverage waste products for associated orchard agricultural production (oranges and melons).

Significant benefit is the development of a strong, mutually beneficial relationship, between Traditional Owners, Arafura Rangers (carers of the country) and commercial producers. The Traditional Owners are to benefit through a range of areas including payment for crocodile eggs collected, removal of feral animals and payment for those feral animals, through on-going training and through the creation of local employment.

Source: ASRAC Rangers business plan (2016-2022)

¹⁷ NLC (2016), Pers. Comm., July

¹⁸ The Northern Territory Crocodile Farming Industry: Strategic Plan 2015-2021

3.3 Key Stakeholders

A number of stakeholders have played a key role in the development of the industry. These are outlined below in Table 6.

Stakeholder	Description
Northern Territory Government	<p>The NT Government has invested in the industry to support growth through its infancy. Today, NT Government continues to support, govern and regulate the Industry to maximise investment, commercial activity and employment in urban and remote areas. The departments actively involved in the Industry are:</p> <ul style="list-style-type: none"> ▶ Department of Business (DTBI) ▶ Department of Primary Industry and Fisheries (DPIF) ▶ Department of Land Resource Management (DLRM) ▶ Tourism NT. <p>The NT Government releases the Management Program for the Saltwater Crocodile on an annual basis. The Program directs activities toward the vision for the NT to proliferate as a national and international leader in the consistent and efficient production of high quality skins.</p>
Crocodile Farmers Association of the Northern Territory (CFANT)	<p>CFANT is a membership forum for those directly involved in the Industry. CFANT works closely with the NT Government, based on a common interest in developing and maintaining a sustainable industry. CFANT promotes responsible practices in which the commercial use of wild populations is sustainable and where landowners directly benefit from the Industry.¹⁹</p> <p>The organisation developed the NT Crocodile Farming Industry – Strategic Plan 2015-21, which profiles the Industry and highlights issues and opportunities. CFANT endeavors to secure the future of the Industry through sustainable growth.</p>
Traditional Owners and the Northern Land Council (NLC)	<p>The NLC acts in the interest of the TO's groups to negotiate appropriate and equitable arrangements for the use of their lands and its resources. A key part of this role is to work as an intermediary between the TO's and business operators who wish to utilise land or employ the expertise of TO's. In the past the NLC has facilitated ranching agreements ranging from two to ten years.²⁰</p> <p>Ranger groups operate under the authority of the NLC. These rangers undertake various activities relating to land and sea management and protection. In some cases, rangers are involved in the management of farming productions, such as those in Ramingining.²¹</p>

¹⁹ NT Crocodile Farming Industry – Strategic Plan 2015-21

²⁰ NLC (2016), Pers. Comm., July

²¹ NT Crocodile Farming Industry – Strategic Plan 2015-21

Table 6: Key Industry stakeholders

Stakeholder	Description
Crocodile farmers	<ul style="list-style-type: none"> ▶ Crocodile farms in the NT breed, wild harvest and/or grow crocodiles for commercial purposes. Activities include ranching, rearing of hatchlings and/or juveniles and breeding. ▶ The NT crocodile farms that have been included in the study include: ▶ Crocodile Farms NT (Porosus Pty Ltd) ▶ Crocodylus Park ▶ Coolibah Crocodile Farm ▶ Elizabeth Valley Crocodile Farm ▶ Janamba Crocodile Farm ▶ Lagoon Crocodile Farm ▶ BA Crocodile Farms <p>Crocodile farmers are integral to the Industry and its growth. Farmers have invested significant resources into infrastructure, research and development, and social projects ²².</p>
NT Primary Industries and Fisheries- Berrimah Veterinary Laboratories (BVL)	<p>BVL, under the DPIF, provide quality assured services to support industry and deliver upon Government policies to ensure product integrity. BVL undertakes:</p> <ul style="list-style-type: none"> ▶ Diagnostic work as animal health problems emerge. This service is provided free of charge to farmers and is funded by the NT Government ▶ Targeted research projects which are afforded through State and Federal funding grants. <p>BVL has undertaken targeted studies principally concerned with crocodile skin conditions that affect the quality of skin products for export. Staff at BVL often work alongside academic and private researchers, such as those from Charles Darwin University and Crocodylus Park.</p>
Parks and Wildlife Commission of the Northern Territory (PWCNT)	<p>The Problem Crocodile Team (PCT), within PWCNT, is tasked with protecting the public from saltwater crocodile interaction. This is done through trapping, patrols and by responding to reports from businesses and residents. Crocodile farms are crucial to the operations of the PCT. When a crocodile is captured by the team, scientific data is collected and the crocodile is transported to a participating farm. The PWCNT have ongoing contractual arrangements with any farmer that wishes to be involved to receive problem crocs from the team and be paid a nominal, predetermined fee to accept the crocodiles. The team repeats this process for between 250 to 300 saltwater crocodiles per annum. As at July 2016, the PCT consisted of five full time staff. The PWCNT is dependent on the farms to take the problem crocodiles as there are no other viable or ecologically sound options available for relocation.²³</p>

²² Department of Land Resource Management (2016). Pers. Comm., July

²³ NT Problem Croc Team (2016). Pers. Comm., July

4. Methodology

The methodology for this economic contribution study is presented below.

Figure 7: Economic contribution method



Source: EY, 2016

4.2 Define Key Measures

Economic contribution is a measure comprising all market-related expenditure generated by a specified industry or an activity.

Three common indicators of an industry or economic size or value are:

- ▶ Gross output – Market value of goods and services produced, often measured by turnover/revenue. Gross output is also referred to as ‘gross economic contribution’
- ▶ Value added – Market value of goods and services produced, after deducting the cost of goods and services used
- ▶ Jobs – Number of jobs generated by an industry or attraction.

All three measures are valuable in their own right. Industry output is a measure of production, value add is a measure of wealth generation, and employment is a measure of the human capital used in the production process (i.e. its labour intensity)

In comparing the size of an industry against others, it is generally accepted to discuss this in terms of its industry value add. Industry value add measures net of the costs of production (that is, inputs sourced from other sectors) from the industry’s outputs. This avoids the inclusion of revenues to other industries and any associated double counting. In practice, industry value add largely comprises wages, salaries and the operating surplus of an industry (i.e. the industry’s income). This study considers all three measures, with attention placed on industry value add measures when making comparisons to other industries. The value add measure is commonly put forward as the most appropriate measure of an industry’s contribution to the national economy.

It is important to note that economic contribution studies do not consider the substitution impacts to other industries (i.e. what might happen to expenditures if the specific industry or activity were lost). As such economic contribution is a gross measure rather than a net measure.

4.3 Establish Contribution Analysis Geography

Two geographical regions were selected for this study:

- ▶ Primary region - Northern Territory (NT)
- ▶ Secondary region - Regional and remote Northern Territory (RRNT) – areas used for the supply of crocodile eggs excluding the Darwin metropolitan and fringe areas.

The primary area for analysis was the NT as a whole. However given the size and dominance of the Darwin economy in the NT, a secondary region was created to more effectively assess the economic contribution of regional and remote expenditure. Particular focus was given to expenditure applicable to the Katherine surrounds and remote Aboriginal communities. The boundaries of the regions and the relative position are shown below.

Figure 8: Contribution analysis geography – Northern Territory and Remote Areas



Source: EY, 2016/REMPPLAN

4.4 Collect Data and Define Assumptions

Initial project stages involved collecting expenditure (both capital and operation) and employment figures from the various crocodile farms, with the addition of Crocosaurus Cove given the interactions with farming operations in the Industry. To ensure consistency, data was collected for the 2014/15 financial year. Stakeholders consulted in the data collection process include:

- ▶ Crocodile farms
- ▶ Crocodile attraction operators with a direct link to the farming sector, specifically Crocosaurus Cove located in Darwin
- ▶ Northern Territory Government departments, including:
 - ▶ Department of Land Resource Management
 - ▶ Department of Business
 - ▶ Parks and Wildlife Commission
 - ▶ Department of Primary Industries (including BVL)
- ▶ Universities and researchers
- ▶ Northern Land Council.

A more comprehensive list of these assumptions is provided in Appendix A.

Analysis Note: Two farms declined to provide data for the analysis. As a result, the economic contribution of these farms has been estimated by taking the expenditure data of comparable farms and adjusting this expenditure based on relative output. This approach effectively assumes that the two farms indicated produce the same value add in proportional terms as the rest of the Industry.

4.5 Estimate the Economic Contribution

This report estimates the direct and indirect economic contribution of the Industry the NT and RRNT economy by estimating the direct contribution associated with the Industry as outlined below.

Contribution	Explanation
Direct crocodile farming operations	Economic contribution and employment generated by crocodile farm operations, including construction of farming infrastructure.
Tourism (and associated retail component)	Contribution from visitors specifically coming to, or extending their stay, in the NT to visit a crocodile attraction (associated with farm operations). Included retail is only that which is directly associated with a tourism attraction and does not include standalone businesses trading crocodile products (see Appendix B for detail).
Scientific research/product research and development	Contribution of research activities focusing on crocodile disease mitigation or skin improvement research.

Once data was collected from stakeholders, it was analysed and expenditure items were allocated to the approximate 114 Input Output (IO) industry classification. In the case of this study, crocodile farm spend and employment was allocated in the following manner:

Activity	114 IO Industry Classification
Crocodile farming	Aquaculture
Crocodile meat works	Meat and Meat Product Manufacturing
Zoological park operation	Heritage, Creative and Performing Arts
Sale of crocodile products to tourists	Retail Trade
Scientific research/product research and development	Professional, Scientific and Technical Services

Source: EY, 2016

Next, an estimate of the indirect or flow-on effect²⁴ for the rest of the economy resulting from the direct expenditure is completed. This study adopts an input/output approach to the calculation of indirect (wider) economic impacts. EY engaged REMPLAN to develop a tailored input/output table that contains multipliers that reflect the specific characteristics of the NT and RRNT economy²⁵.

The REMPLAN model accounts for 'leakage' of direct expenditure from the economy in its multipliers. Input output models are often criticized when used in economic impact assessments as they do not consider capacity constraints in the economy (e.g. full employment). Such constraints limit the extent to which economic impacts can increase in a linear fashion with changes in demand. The alternative CGE approach²⁶ addresses some of these issues, although the nature and scale of this Project did not warrant the use a detailed CGE analysis.

Further details on the IO approach are provided in Appendix A.

4.6 Discuss Intangible Economic Benefits

There are a number of ways the Industry contributes to the NT economy that are intangible. Examples of these contributions are:

- ▶ Outcomes for Aboriginal People - including social inclusion, higher income in communities with reduced reliance on Government support leading to increased empowerment of TO groups
- ▶ Environmental conservation and species management - including the preservation of the species for future generations, biodiversity and reversing the extinction of the species in the NT
- ▶ Value of knowledge through research and development - including patents, cures for crocodile farming related disease and education
- ▶ Regulation - including industry sustainability, environmental standards to maintain high quality operations and outputs, avoidance of live export issues and ensuring optimal levels of regulation
- ▶ Additional tourism value - including brand recognition for the NT and spend by television production companies utilising the wealth of knowledge among crocodile farmers and other industry professionals.

These elements are discussed in greater detail in Section 6.

²⁴ For instance, injections in tourism expenditures will have downstream impacts (output and employment) through an increase in expenditure in connected industries (e.g. hospitality and accommodation)

²⁵ REMPLAN modelling provides the ability to calculate the value of gross regional product and to assess likely economic impacts of proposed changes. REMPLAN can foster an understanding of the interdependent nature of the local economy.

²⁶ These complex models are based on theoretical concepts and account for profit maximisation, household consumption functions, terms of trade effects, labour market adjustments etc. These models take into account changes in prices and wages with increases in demand. As such, their economic impact results are generally more conservative relative to input-output analysis as capacity constraints are taken into account by increases in prices and wages.

5. Economic Contribution Analysis

Economic contribution

The Industry contributed \$106.8²⁷ million to the NT economy in 2014/15, including \$54.3 million value added. The total economic contribution to:

- ▶ Darwin and surrounds was \$102.6 million, including \$52.2 million value added
- ▶ Remote Northern Territory was \$4.2 million, including \$2.1 million value added

Employment

The Industry generated 264 jobs (combination of part time and casual and full time direct and indirect jobs) including:

- ▶ Darwin and surrounds:
 - ▶ 154 direct jobs (direct contribution)
 - ▶ 91 indirect jobs (indirect contribution).
- ▶ Remote NT:
 - ▶ 14 jobs (direct contribution)
 - ▶ 5 indirect jobs (indirect contribution).

General study assumptions:

- ▶ Given the central position and distance from other states, all expenditure occurs within the NT
- ▶ Darwin multipliers were approximated using the IO table for the NT
- ▶ See general IO assumptions in Appendix A.

²⁷ Note that total may vary slightly from the sum of component costs due to rounding.

5.1 Summary of Categories

Table 9 below summarises the gross output, value added and employment for the Industry.

Table 9: Economic contribution analysis key output summary, 2014/15 Financial Year			
	Direct	Indirect	Total
Economic contribution – Gross output			
Farm Operations	\$24.49	\$14.03	\$38.52
Farm Construction	\$11.60	\$6.65	\$18.25
Farm Related Tourism ²⁸	\$20.33	\$14.41	\$34.74
Regulation	\$4.30	\$4.13	\$8.43
Veterinarian/Scientific Services	\$1.41	\$1.25	\$2.66
Remote Impacts*	\$2.31	\$1.86	\$4.17
Total Northern Territory	\$64.44	\$42.34	\$106.77
Value added (subset of Gross output)			
Farm Operations	\$13.42	\$6.47	\$19.89
Farm Construction	\$6.36	\$3.06	\$9.42
Farm Related Tourism	\$9.61	\$7.33	\$16.95
Regulation	\$2.40	\$2.17	\$4.57
Veterinarian/Scientific Services	\$0.69	\$0.65	\$1.35
Remote Impacts*	\$1.19	\$0.96	\$2.14
Total Northern Territory	\$33.67	\$20.65	\$54.33
Employment (jobs)			
Farm Operations	39	30	68
Farm Construction	18	14	32
Farm related tourism	80	35	115
Regulation	13	10	23
Veterinarian/Scientific Services	4	3	7
Remote Impacts*	14	5	19
Total Northern Territory	168	96	264

*Calculated using the Northern Territory IO table (some numbers may not add due to rounding)_

Source: Stakeholder consultation, REMPLAN, 2016

²⁸ Includes operational and capital expenditure.

5.2 Farm Operations

5.2.1 Operational Expenditure

During the 2014/15 financial year, the total direct operation expenditure of the crocodile farming component (aquaculture) accounted for \$24.5m direct spend into the NT economy. The operational expenditure data collected from the crocodile farming businesses was comprehensive and included the following costs:

- ▶ Salaries, Wages and On-Costs
- ▶ Animal Care
- ▶ Maintenance Consumables
- ▶ Cost of Sales
- ▶ Conservation & Research Projects
- ▶ Utilities
- ▶ Marketing and Promotion
- ▶ Safari and Other Tour Costs
- ▶ Depreciation
- ▶ Loss on Disposal of Asset
- ▶ Printing
- ▶ Other Expenses.

Applying the multipliers from the NT regional IO table, this annual gross direct expenditure of \$24.5m is estimated to generate \$19.9m of total value added, specifically:

- ▶ \$13.4m direct effect
- ▶ \$6.5m indirect effect
- ▶ This direct operational expenditure is estimated to support a total of 68 jobs, including:
 - ▶ 39 as a result of the direct expenditure
 - ▶ 30 indirect jobs.

These details and others are contained in Table 10 below.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$24.49	\$14.03	\$38.52
Value-added (\$M)	\$13.42	\$6.47	\$19.89
Employment (Jobs)	38	30	68

Source: Stakeholder consultation, REMPLAN, 2016 (some numbers may not add due to rounding).

Specific key assumptions:

- ▶ Multipliers from the aquaculture industry were used to estimate the contribution of operational expenditure
- ▶ The contribution was estimated using the expenditure approach

5.2.2 Capital Expenditure (1 year)

Crocodile farms and related tourism operators were initially asked to provide a single year of capital expenditure to inform this analysis. During the 2014/15 financial year, NT crocodile farms declared directly spending \$11.6m on capital works to improve farm facilities. These works included, but were not limited to:

- ▶ Investment in plant and equipment
- ▶ Computer programme and equipment
- ▶ Pen and pond construction and renovations
- ▶ Fencing
- ▶ Construction of incubators
- ▶ Bitumen service roads
- ▶ Construction of bores, dams and installation of associated pumping equipment.

This \$11.6m of direct capital expenditure (output) was used to estimate the resulting flow on economic activity. The approach estimated that this expenditure supported \$9.4m total value added, which comprised:

- ▶ \$6.4m of value added from the direct expenditure
- ▶ \$1.5m of value added from the indirect effect.

In terms of employment, this expenditure generated a total employment amount of 32 FTE:

- ▶ 18 direct jobs (directly involved in capital works)
- ▶ 14 indirect effect jobs.

These details and others are outlined in Table 11.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$11.60	\$6.65	\$18.25
Value-added (\$M)	\$6.36	\$3.06	\$9.42
Employment (Jobs)	18	14	32

Source: Stakeholder consultation, REMPLAN, 2016

Specific key assumptions:

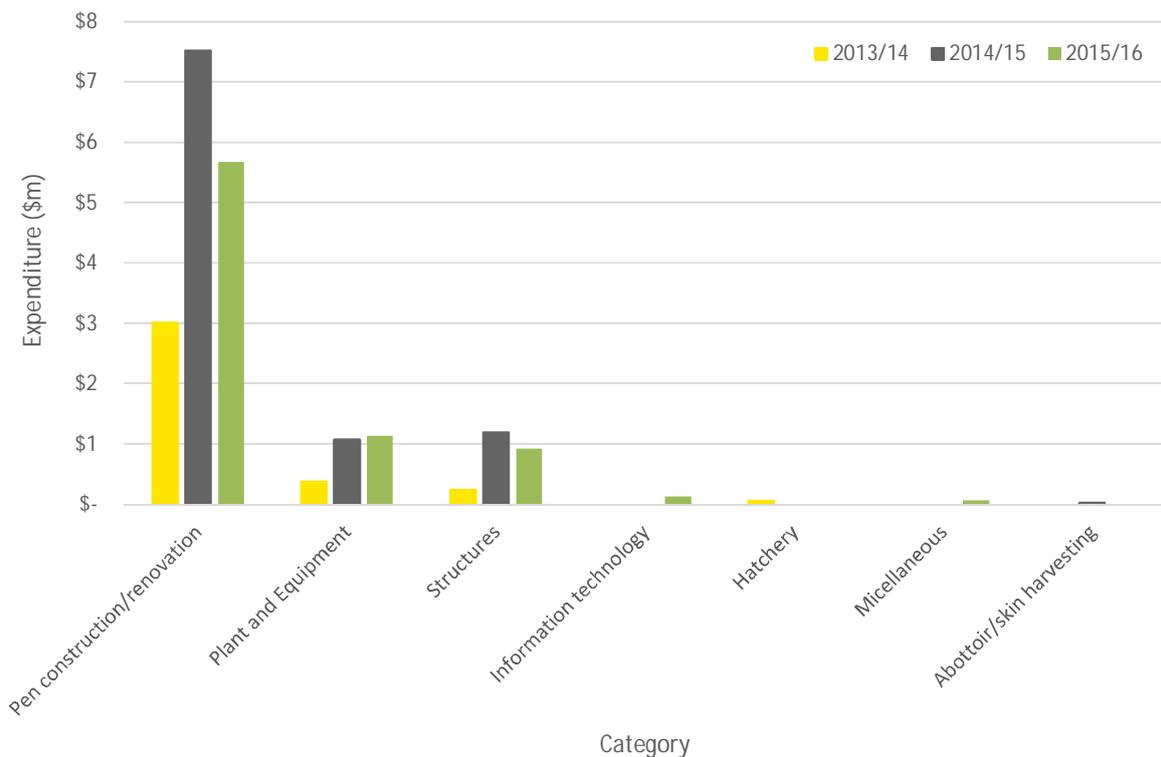
- ▶ Multipliers from the aquaculture industry were used to estimate the contribution of capital expenditure
- ▶ The contribution was estimated using the expenditure approach

5.2.3 Capital Expenditure (3 year)

The capital expenditure analysis undertaken in this section seeks to better represent the investment occurring in the Industry that may not be adequately represented by the expenditure of a single year. Description of capital expenditure and expenditure amounts were collected from farmers for the 2014, 2015 and 2016 financial years respectively. These were then broadly categorised as being general investment or investment in research and development facilities.

Capital expenditure in pen construction and renovation was the largest spend category across all three financial years, accounting for between \$3m and \$7.5m. Plant equipment and buildings were the next two significant categories. Overall 2014/15 saw the greatest capital expenditure of \$9.81m followed by \$7.91m in 2015/16 and 3.7m in 2013/14. A comparison of expenditure as per these categories is provided in Figure 9.

Figure 9: Capital expenditure, All crocodile farms, 2013/14, 2014/15 and 2015/16



Source: Stakeholder consultation, 2016

5.3 Knowledge

This report values knowledge in terms of the net contribution from Government and private organisations pre-dominantly made up of time and expense involved in participating and supporting the Industry. However, it is acknowledged that these services are most likely a significant under-representation of the value due to the Industry's farming status and the value this has at an international level²⁹. This does not capture the significant knowledge of the Aboriginal people within the community. Much of today's recognised monetary value is in terms of the sustainable management of crocodiles across the NT.

5.3.1 Veterinarian/Scientific Services

The extent of BVL's direct involvement in the Industry was determined through direct consultation with the DPIF. These discussions determined the size and ranks of the team. Adjustments were necessary to reflect that the crocodile farming industry was not the full time focus of DPIF staff and was estimated to be, on average, 15 per cent of relevant staff's time. Appropriate multipliers were then applied to this amount to determine economic contribution. For the purposes of this analysis, the staff involved in crocodile monitoring and scientific monitoring within the NT Department of Land Resource Management were also included within this category.

Under the ANSIC06 industry classification system, veterinarian services are included under Professional, Scientist and Technical services (excluding Computer System Design and Related Services) and so the appropriate multipliers for salary and wages from this industry were applied to determine economic contribution.

Based on this approach, Vet services contributed 4 FTE that was estimated to be \$1.4m of gross direct output. In terms of value added, this equates to a total amount of \$1.4m, including:

- ▶ \$0.7m direct effect
- ▶ \$0.7m indirect effect.

Indirect employment was estimated at 3 FTE, which when added to direct employment equates to 7 FTE. Details are contained in Table 12 below.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$1.41	\$1.25	\$2.66
Value-added (\$M)	\$0.69	\$0.65	\$1.35
Employment (Jobs)	4	3	7

Source: Stakeholder consultation, REMPLAN, 2016 (some numbers may not add due to rounding).

Specific key assumptions:

- ▶ Multipliers from the Professional, Scientific and Technical Services industry were used to estimate the contribution of veterinarian and scientific services
- ▶ The contribution was estimated using the employment approach
- ▶ The contribution estimate was based on the demand for vet services that would not occur if the Industry did not exist in the NT.
- ▶ BVL and NTDLRM were assumed to all reside in the NT (no Fly-In-Fly-Out (FIFO))

²⁹ DLRM (2016), Pers. Comm. August

5.3.2 Regulation

The NT Government employs staff to regulate the industry, addressing issues such as species protection, export management and other regulatory activities that in turn promote the brand and image of the Industry. The extent of this industry activity is estimated by valuing what would not exist in its absence also considering the wild crocodile populations would still be served by this regulation. This was determined based on conversations with key Government stakeholders. For the purposes of this study, Northern Land Council (NLC) staff are also included within regulation due to the role they play in administering egg ranching and subsequent royalty payments.

During 2014/15, there were 13 full-time employees within the NT Government or the NLC directly responsible for the regulation of crocodile farming. In addition to this direct employment, government regulation also created 10 indirect jobs. In terms of total value added, regulation contribution \$4.6m, specifically:

- ▶ \$2.4m direct effect
- ▶ \$2.2m indirect effect.

These details and others are contained in Table 13 below.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$4.30	\$4.13	\$8.43
Value-added (\$M)	\$2.40	\$2.17	\$4.57
Employment (Jobs)	13	10	23

Source: Stakeholder consultation, REMPLAN, 2016

Specific key assumptions:

- ▶ Multipliers from the Public Administration and Regulatory Services industry were used to estimate the contribution of regulating the crocodile industry
- ▶ The contribution was estimated using the employment approach
- ▶ Employees work entirely in crocodile regulation

5.3.3 Research and Development

Expenditure attributable to research and development generated by the crocodile farming industry can be counted in number of ways:

- ▶ Expenditure to private institutions such as universities to undertake studies
- ▶ Consulting services offered by government departments on behalf of farm operators
- ▶ Internal farm research and development by dedicated or semi dedicated staff and students (carrying out their doctoral studies).

Internal farm research and development is difficult to quantify as the nature and size of the industry means that operators are regularly conducting passive research and development in how they operate and plan new infrastructure. In most instances farms did not differentiate distinct research and development expenditure from normal operations (that could then be used to easily estimate this contribution).

However, due to the progressive nature of the Industry, farm owners do sell their expertise to other crocodile farmers nationally and internationally.³⁰ Crocodile farmers and NT Government Veterinarians alike make a substantial scientific contribution to international specialist groups, such as to the Veterinary Group of the International Union for the Conservation of Nature (IUCN)-Species Survival Commission (SSC) Crocodile Specialist Group. This is also difficult to quantify as the benefit that participating and building this reputation generates is not a direct benefit in a traditional contribution sense.

³⁰ Northern Territory Crocodile Farming Industry Strategic Plan 2015-21

5.4 Farm Related Tourism

5.4.1 Visitor Expenditure

Crocosaurus Cove and Crocodylus Park are the two tourism businesses related directly to crocodile farming and provide zoological services available to tourists. The combined attendance visitor data and place of origin for the 2014/15 financial year is included in Table 14. Details for all the tourism value estimates are included in Appendix B.

Origin	Visitor Numbers
NT	55,000
Interstate	46,000
International	13,000
Total	114,000

Source: Industry data, 2016 (Crocosaurus Cove and Crocodylus Park)

Specific key assumptions:

- ▶ The NT visitor spend is representative of visitors who attend crocodile parks
- ▶ Split of tourists from the NT by day and overnight: 90 per cent of tourists from the NT were considered to be day visitors, the remainder overnight
- ▶ All interstate tourists were overnight visitors
- ▶ No visitors were assumed to visit both parks in a single day

The Visitor Average Expenditure Profile produced by Tourism Research Australia is also a key dataset used in the calculation of the tourism contribution component and is shown below in Table 15.

Visitor Profile	Domestic Day	Domestic Overnight	International
Average Stay (nights)	N/A	6.9	16.7
Average Spend per trip (\$)	\$152	\$1,313	\$1,598
Average Spend per night (\$)	N/A	\$189	\$95

Source: Tourism Research Australia (TRA), National and International Visitor Surveys June 2015; Northern Territory

As indicated in Section 3.2.4, the ability to see crocodiles is a strong attractor for NT tourism. As such, it is reasonable to assume that for a proportion of NT tourists, the primary driver is to see crocodiles (in the wild or through farm related tourism). Similarly, if it was not possible to see crocodiles, then those tourists would not visit (or stay as long) in the NT. For the purpose of this study, and without specific surveys carried out, we have assumed that 5% of interstate and international tourists visit the NT specifically for farm related tourism. Where this is the case our calculations capture the full trip spend of these visitors. Otherwise, the study assumes a casual visit and attributes only a half-of- one day's expenditure to this. Further details are included in Appendix B.

The total visitor expenditure attributable to the crocodile industry is outlined in Table 16.

	Domestic Day	Domestic Overnight	International	Total
Specific visitors	\$7.5	\$3.4	\$1.0	\$11.9
Casual visitors	\$-	\$4.6	\$0.6	\$5.2
Total expenditure	\$7.5	\$8.0	\$1.6	\$17.1

Source: EY, 2016

Quantifying the economic tourism contribution using economic multipliers for the NT is difficult as the tourism industry does not have its own category but rather contributes to a range of other industries, such as retail and accommodation and food services, to varying extents. A proxy, based on REMPLAN's tourism module, was used to attribute tourism spend across these industries specific to the NT economy.

5.4.2 Farm Related Tourism – Operational Expenditure

During the 2014/15 financial year, the tourism component of farms and croc-related attractions expended \$4.94m on their operations (direct expenditure). This accounted for money spent to operate the tourist facing facilities at both Crocosaurus Cove and Crocodylus Park. This direct expenditure generated a total value added value of \$4.6m, including:

- ▶ \$2.5m direct effect
- ▶ \$2.1m indirect effect.

We note that an adjustment was made to the tourism expenditure component (below) to avoid double counting of operational expenditure and tourism based expenditure³¹.

Specific key assumptions:

- ▶ Multipliers from the Heritage, Creative and Performing Arts to calculate these effects.
- ▶ The contribution was estimated using the expenditure approach.

5.4.3 Farm Related Tourism – Capital Expenditure

During the 2014/15 financial year the tourism component of farms spent \$84,000 on building and renovating tourist serving infrastructure (direct expenditure). This accounted for capital works that occurred solely within the zoo and tourist areas of either Crocosaurus Cove or Crocodylus Park. This direct expenditure generated a total value added value of \$78,000, including:

- ▶ \$43,100 direct effect
- ▶ \$34,900 indirect effect.

Specific key assumptions:

- ▶ Multipliers from the Heritage, Creative and Performing Arts to calculate these effects.
- ▶ The contribution was estimated using the expenditure approach.

³¹ This was done by reducing the assumed daily expenditure of each visitor by the entrance fee attributed to each at the tourism facilities.

5.4.4 Total Farm Related Tourism

The total farm related tourism economic contribution was estimated as the sum of visitor expenditure along with related operational and capital expenditure. The result was an estimated total value added amount of \$17.0m³², which could be broken down into:

- ▶ \$9.6m direct effect
- ▶ \$7.3m indirect effect

Table 17 summarises the key economic contribution indicators for visitor expenditure during the 2014/15 financial year.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$20.33	\$14.41	\$34.74
Value-added (\$M)	\$9.61	\$7.33	\$16.95
Employment (Jobs)	80	35	115

Source: Stakeholder consultation, REMPLAN, 2016

³² We note this figure may not exactly total the component totals below due to rounding.

5.5 Estimation of Regional/Remote Impacts (Regional IO Assessment)

As outlined in section 3.2.5, the crocodile farming industry has the potential for significant impacts in regional and remote areas particularly when there are, in many cases, limited alternate opportunities for income/employment. Primary economic opportunities are derived from the egg ranching operations that may soon become hatching and juvenile crocodile grow-out (see also Section 6.1 for more details).

This section of the report has been developed to emphasise the specific regional impacts recognising that in regional areas that the flow on impacts will be more limited than in the metropolitan areas. In technical terms, there is a greater chance of expenditure 'leakage' where goods and services consumed will be sourced outside of the region. As such, specific remote and regional IO multipliers were estimated and applied (details of the regional distribution are included in Section 4.3). As a consequence, the results shown here will be slightly different than those shown in Table 9, which was calculated using the Northern Territory multipliers.

The main source of income is associated with payments for egg collection. A request was made to the NLC for egg collection and royalty distribution data, however due to the confidentiality provisions within agreements with TO's and the substantial cost to seek agreement within these agreements, data was not provided for this report. In the absence of exact historical data, farmer expenditure on egg collection was used to represent the impact on the remote communities who perform these services.

This data indicates that during the 2014/15 financial year, crocodile farms spent \$2.31m on egg collection and royalty costs. This direct output is the equivalent of employing 14 employees over the course of the year. The direct value added of this activity was \$1.19m.

The Heritage, Creative and Performing Arts³³ industry was chosen to represent this expenditure due to the relative similarities of this activity with Nature Reserves and Conservation Parks Operation. This output is estimated to have generated a total value added of \$1.92m which can be broken down as follows:

- ▶ \$1.19m direct effect
- ▶ \$0.74m indirect effect

Key economic contribution indicators for remote/regional impacts are shown below in Table 18.

	Direct effect	Indirect effect	Total
Gross Output (\$M)	\$2.31	\$1.39	\$3.70
Value-added (\$M)	\$1.19	\$0.74	\$1.92
Employment (Jobs)	14	4	17

Source: Stakeholder consultation, REMPLAN, 2016 (some numbers may not add due to rounding).

³³ This 114 Input Output industry classification was chosen to represent ranching as it is considered an equivalent to the Australian and New Zealand Standard Industry classification 06 4 digit industry of 8922 Nature Reserves and Conservation Parks Operation as per the concordance outlined in 5215055001 Australian National Accounts: Input-Output Tables (Product Details) - 2012-13

Heritage, Creative and Performing Arts is a broad industry and it is not immediately apparent as to whether ranching would generate the same demand for intermediate inputs (industrial effect) as per the representative industry. Similarly, it is difficult to say whether consumption patterns from typical industry workers spending salaries and wages is consistent with remote communities. These issues should be considered when interpreting this estimation.

Specific key assumptions:

- ▶ Industrial inputs into the industry are the same the representative industry Heritage, Creative and Performing Arts
- ▶ Industrial production and consumption characteristics in remote communities are assumed to be consistent with the same characteristics for the NT excluding Darwin and surrounds.

6. Broader Economic, Social and Cultural Values

This section addresses the intangible contribution elements that cannot be measured using traditional means. The key elements include:

- ▶ Outcomes for Aboriginal people
- ▶ Environmental conservation and species management
- ▶ Value of knowledge – research and development
- ▶ Regulation
- ▶ Additional tourism value
- ▶ Each of these is outlined below.

6.1 Outcomes for Aboriginal People

The Industry represents opportunities for Aboriginal people in communities in RRNT providing support to six different regions across the NT from annual ranching operations. As such, the Industry has the potential to provide significant economic and social benefits

As outlined in Section 5.5, in 2014/15 over \$2.3million was paid directly to TOs and those tasked with egg collection (such as the NT Ranger Groups). This regular annual contribution adds income and employment opportunities for the regional areas that then result in less reliance on Commonwealth/state support, greater empowerment to TO groups, opportunities for connection to country and greater opportunities to maintain and grow social cohesion.

The ranching, or gathering of the eggs from the nests, occurs either on farming leases or TO lands. Part of the success of the operation comes from the support of the NLC Ranger Program.

'Caring for Country' rangers operate across almost 200,000 square kilometres of land owned by Aboriginal peoples in the Land Council's area. Ranger groups provide a formalised structure for the transfer of traditional knowledge from old to young, as well as being a vehicle for the training and employment of young Aboriginal people living in remote areas (NLC 2016)¹

Around 20,000eggs a season are harvested with the assistance of Ranger groups who also have the wider responsibilities for 'care of country'.³⁴ The crocodile farming practices provide an avenue for Rangers to put into practice the training, skills and knowledge that they have. In some instances the opportunity to collect eggs also provides the associated benefit of carrying out other roles including feral animal control (such as buffalo culls) and reconnaissance for burning operations.³⁵

As such, the crocodile farming industry is a key mainstay of the Ranger program in a number of areas. Further, the value of a dollar earned in these regional and remote area is far greater than the individual dollar itself.

For example, a recent report prepared for the Commonwealth Department of Prime Minister and Cabinet recently estimated the social return on investment of the Ranger program itself, working in conjunction with the Indigenous Protected Area program, was in the order of 3.4:1. The study also exemplified the importance of providing the ability to reconnect to country, culture and language³⁶ (see Box 2 for further details).

³⁴ DPLW (2016), Pers. Comm., Sept

³⁵ NLC (2016), Pers. Comm., July

³⁶ See the Department of Prime Minister and Cabinet report – prepared by Social Ventures Australia – Consolidate report on Indigenous Protected Areas following Social Return on Investment analyses – Feb 2016.

Box 2: Value of the involvement of the Ranger Program and the Indigenous Protected Area Program.

In January 2016, the Department of the Prime Minister and Cabinet released a study (prepared by Social Ventures Australia (SVA)) that reported on consolidated findings of social return on investment analysis for four separate areas. The SVA (2016) study emphasised that the Ranger program was seen to provide opportunities for remote and regional areas to enhance cultural ties to the land and facilitate the passing on of skills and knowledge through the generations. The more time spent on country, *the greater the value created for the local community and government* (that the crocodile industry contributes to). The Government, and society as a whole, are also key beneficiaries from:

- ▶ An increase in local indigenous community members undertaking training for other jobs who were also working as Rangers
- ▶ A reduction in income support payments and an increase in income tax where more indigenous people were working
- ▶ Reduced violence and safer communities
- ▶ A greater respect for traditional elder knowledge in the broader community
- ▶ A change in Government engagement with indigenous communities leading to better and more innovative partnering models

The greatest reported benefit of the program was the associated reduced cost of land management.

Interestingly, the study estimated the social return on investment across four different indigenous protected areas across Australia.⁴ The Wardekkian IPA, north east of Darwin (that happens to include crocodile ranching), and the associated indigenous Ranger program was found to create the greatest value with a Social Return on Investment of 3.4:1.

Source: SVA (2016)

In the remote and regional areas of the NT there are limited opportunities for employment, much less those that are connected to country (that are highly sought after). To date the main focus has been on ranching with any collected eggs carefully transported back to crocodile farms closer to Darwin. Work is currently underway within the Industry to provide further economic opportunities out closer to where the egg collection occurs. The 'Croc in a Box' concept was developed within the Industry to enable communities not only to collect the eggs but to incubate and then grow out from hatchlings for later transfer back to the farms as small crocodiles (up to one metre long). The ability to do this increases the value of the egg (collected) by up to 10 times. Once fully developed this concept has the potential to be pushed out to many communities consolidating and significantly enhancing the outcomes. Further details on the 'Croc in a Box' concept are included in Section 6.3.

6.2 Environmental Conservation and Species Management

As outlined in Section 3, the saltwater crocodiles of the NT were almost hunted until their extinction in the 1960s. The crocodiles were brought back during a conservation phase³⁷ (1971 to 1984) with management by PWCNT under the Territory Parks and Wildlife Conservation Act (TPWC Act). During the 1990s the crocodile management regime changed as wild stocks replenished and the responsibility for their continued management was divided between P&W for wild stocks and the Department of Primary Industry and Fisheries (DPIF) for farm production. The Industry played an important part in the change process and benefitted from the introduction of economic incentives for land owners to maintain crocodile populations with payments for the sustainable collection of crocodile eggs on their land. As of 2014 the crocodile populations in the wild were no longer a problem and are now considered to have recovered.³⁸

The development and continued presence of the Industry (that maintains the market and demand for eggs) is a key agent in the continued sustainable management of the saltwater crocodile in the NT. Further, the environmental standards and conservation program (of which the Industry contributes) is recognised internationally as best practice contributing to NT skins being rated as one premium locations worldwide to source crocodile skins.³⁹

6.3 Value of Knowledge – Research and Development

Research and development is essential in the development of an emerging industry. Until recently, much of the research focused on other species. Ongoing research into the saltwater crocodile species is being undertaken to build species specific knowledge and, as such, the Industry is in a constant state of change. Each day more knowledge is generated of the crocodiles and improved methods of growing and handling crocodiles is developed.

The NT has internationally recognised researchers, such as Graham Webb and Charlie Manolis, but also farm industry experts (such as Mick Burns) who are leading the way in approaches and methods to improve crocodile farming. This combination attracts much interest including visiting researchers and academics similarly carrying out work in this area (itself creating an increase in local economic activity).

The NT is not unique to being the home of saltwater crocodiles around the world with others such as Vietnam, Indonesia and Papua New Guinea also home to *Crocodylus Porosus*. These countries compete with Australia to produce crocodile products with many having lower relative production costs based on lower wage rates and improved growing climatic conditions⁴⁰. However, Australia maintains a higher quality differential based on a premium grade and greater consistency of skin quality and environmental controls. Maintaining this position pushes research and development constantly. The 'Croc in a Box' project is an example of one such activity (see Section 3.2.5 – Box 1 for more details). The initial and ongoing benefits of this development are expected to add significant value to the local and surrounding areas.

³⁷ CFANT (2014) - Northern Territory Crocodile Industry Management Program: Perspectives from the Crocodile Farming Industry

³⁸ CFANT (2014) - Northern Territory Crocodile Industry Management Program: Perspectives from the Crocodile Farming Industry

³⁹ CFANT (2016), Pers. Comm., Sept

⁴⁰ Webb (2013)

6.4 Regulation

Regulation of the Industry is essential as part of the ongoing sustainable management of the industry but also for maintaining appropriate environmental standards, including the humane treatment of animals. As mentioned in Section 6.2, the NT crocodiles are currently managed jointly by the P&W and DPIF and NT farmers are world leaders in the production of quality crocodile products. The regulation/standards ensure NT producers are known as ethical providers and have encouraged high end fashion producers such as Hermes and Louis Vuitton to purchase local NT farms to secure their supply chain.

Maintaining the standard is essential as world markets of animal farmed products are highly susceptible to external interest groups particularly through social media. Suboptimal regulation can result in significant current and future impacts. Where mistreatment or mishandling arises in the production process industries can be quickly shut down or severely limited. Issues arising from the live export of Australian beef is a good example where offshore processing of Australian sourced stock resulted in an Australian Government live export ban that had significant financial (and economic) costs that included drops in sale yard prices, a reduction in property prices and potential increase in interest margins.⁴¹

For the Industry, access to the US market for Australian produced skins is essential. Crocodile skins, that then become high-end value-added products such as handbags, wallets, shoes, and so forth. The quality of NT environmental standards and handling of animals advocated for the crocodile farming industry is the reason why this market remains open. Without the ability to access the US market the value of the Industry would be significantly reduced through major reductions in price and volumes.

6.5 Additional Tourism Value

6.5.1 Iconic Status – Brand Recognition for the NT

The crocodile is synonymous with the NT on both a national and international level and features strongly in many tourism promotions. The Industry contributes, to some extent, through its tourism activities and from its exposure in TV and film documentaries and features (see Section 6.5.2 below). Further exposure is gained through the export of the Industry's expertise to other crocodile farming areas (national and international) and the premium quality products known to come from the NT. The test for the Industry in this respect, and brand recognition that comes with it, is the level to which it may induce further tourism and business opportunities that would not have otherwise occurred without it.

While it is difficult to directly value additional tourism visits or business opportunities specifically to the crocodile farming industry itself (along with the many other quality natural offerings of the NT), it is an integral contributor to the bigger picture NT brand.

6.5.2 International Film and Television Industry

The ability to easily access and film crocodiles in the NT regularly brings international film and television crews to Australia.⁴² Some filming occurs in the natural environment, although the ability to capture the desired footage can on occasion be difficult. Accessing crocodiles on farms, particularly in natural settings reduces the risk, time and cost for the film crews. This film industry interest brings with it economic value not only in terms of the direct expenditure of the film crews when they visit the NT, but also in the further development of the NT brand.

⁴¹ Hydros Consulting (2011)

⁴² WMI (2016), Pers. Comm., July

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Appendix A - Overview of IO Modelling

Economic contribution is a measure comprising all market-related expenditure generated by a specified industry or an activity. Input Output modelling calculates how the impacts created by activity in one industry effects the broader economy through established inter-industry relationships.

There are many advantages of using IO modelling as the basis for economic contribution studies. These include:

- ▶ The approach produces relatively simple outputs that are easy to understand and communicate
- ▶ It can be used to estimate the sectorial impact of industry-specific changes in final demand
- ▶ The process is transparent; not a 'black box' where the method of calculation is unknown.

However, there are also limitations of the IO approach that result from the use of critical assumptions and these should be well understood when interpreting the results of the analysis. Typically these limitations are more pronounced when attempting to use I-O to analyse complicated policy impacts which affect many industries, taxes, resource allocation etc. on a large, national scale. Given that this work involves a relatively simpler contribution analysis on a relatively small scale, the use of IO modelling is appropriate. However it is still important to be mindful of the most significant limitations, which in this context include:

- ▶ The approach assumes fixed production coefficients and subsequently constant returns to scale. This means that no matter how much production occurs the per-unit costs of required inputs remains the same
- ▶ The approach assumes that unlimited supplies of production inputs such as labour (lack of supply side constraints) are available
- ▶ It does not account for price changes that may result from increased competition for scarce resources
- ▶ The analysis is built on a static picture of the economy that does not consider dynamic adjustments that occur from a shock (fixed coefficients)
- ▶ Regional performance matches national and state average performance
- ▶ The effect of technology on the improvement of production efficiency is not considered
- ▶ Products are only sold in a single industry (Homogeneity of product)
- ▶ It considers the average effects rather than the marginal effects, meaning that IO models do not take into account economies of scale, unused capacity or technological change

Economic contribution studies do not consider the substitution impacts to other industries (i.e. what might happen to expenditures if the specific industry or activity were lost). As such economic contribution is a gross measure rather than a net measure.

As mentioned above, IO modelling takes into account established inter-industry relationships. These relationships are represented in matrix form, which position industries as being both suppliers and consumers of their output. For example, a retail business sources products to sell from a wholesaler who in turn sources their stock from the manufacturer. Of course there are many other inputs into the operation of the retailer, such as electricity (sourced from distributors and generators) and construction of the premises (by the construction industry). The degree to which each industry requires input from other industries is expressed in the form of coefficients. The same coefficients serve to distribute expenditure of an industry throughout the economy and the effect is then measured. These effects are measured in a number of ways, including:

- ▶ Total Output – the (final) value of transactions for goods and services generated in the economy

- ▶ Value-add or gross regional product – the value of outputs produced in a region or industry less the cost of inputs sourced from other regions. The sum of value-add across all industry sectors in a specific region is a core component of Gross Regional Product (GRP)
- ▶ Employment – number of jobs or value of wages generated in the economy to service increased demand.

Total effects consist of two components: direct effects of an organisation (i.e. revenues or output) and the flow-on (or “indirect”) effects of the organisation’s operations. Indirect effects are calculated through the use of multipliers and can be further broken down into the following sub components:

- ▶ Industrial effect – the additional output created by industries that support the industry where the expenditure occurred
- ▶ Consumption effect – the flow of expenditure to all industries that results from the spending of salaries and wages by local employees.

The total effect (output) is the sum of the direct and indirect effects. These components are explained in the table below.

Table 19: Components of a multiplier		
Economic contribution item	Corresponding source	Applicability to The NT crocodile industry
Direct economic contribution	Total revenues (including any value added taxes) and employment generated by an organisation	Total expenditure and employment generated by the operations of The NT crocodile industry.
Flow-on (Indirect) economic contribution – industrial effect	Indirect contribution generated by an industry as it purchases input goods and services generating revenue for other businesses and requiring these businesses to employ additional personnel	The NT crocodile industry represents an important customer for some other industries.
Flow-on (Indirect) economic contribution – consumption effect	Indirect contribution generated by an industry as its employees spend their wages and salaries on household consumption, providing revenue for other businesses and incentive for these businesses to hire more personnel	By employing hundreds of Australians, The NT crocodile industry induces increased consumption of goods and services in Australia.
Total direct and indirect economic contribution	Sum of direct and indirect economic contribution	

IO modelling results are also expressed as multipliers, which are two ratios that provide further insights into the contribution of these effects to demand. There are two types of multipliers typically produced in this type of analysis. These are:

- ▶ Type I:
 - ▶ A ratio that shows the amount of direct and indirect effect (from industry support) that results from the spend of \$1 in a given industry/regional economy
 - ▶ $(\text{Direct effect} + \text{industrial effect} + \text{indirect}) / \text{Direct effect}$.
- ▶ Type II:
 - ▶ A ratio of total output (including both types of indirect effect) to direct effect
 - ▶ Total output/direct effect.

A variety of sources of information can be used to access the economic multipliers (e.g. the Australian Bureau of Statistics or macro-economic models of the Australian economy).

Value-added can be calculated by one of either two methods:

- ▶ Subtracting local expenditure and expenditure on regional imports from the output generated by an industry sector, or
- ▶ Adding wages and salaries paid to local employees with the gross operating surplus and taxes on products and production.

Appendix B – Tourism Calculation Assumptions

In order to determine the economic contribution the following process was followed:

1. Identify which farms or closely associated businesses offer tourism experiences
2. Profile the average expenditure of Northern Territory tourists
3. Based on visitation data from the farms, determine the type of tourists that visit in terms of domestic day, domestic overnight and international
4. Calculate total expenditure by visitor type
5. Attribute spend to crocodile attraction visitation and use assumptions to determine whether the purpose of their trip is to specifically see crocodiles in a farm or zoo environment or whether this is incidental
6. Subtract the entry fee component of tourist spend estimate to avoid double counting expenditure with zoo operations revenue
7. Generate an estimate of total tourism expenditure
8. Apply to economic multipliers
9. Present key contribution results.

Crocosaurus Cove and Crocodylus Park are the two businesses related to crocodile farming are assumed to provide zoological services to tourists, based on discussions with farm operators and industry stakeholders. The combined attendance visitor data and place of origin for the 2014/15 financial year is included in Table 20.

Origin	Visitor Numbers
NT	55,000
Interstate	46,000
International	13,000
Total	114,000

Source: Industry data, 2016 (Crocosaurus Cove and Crocodylus Park)

Specific key assumptions:

- ▶ The NT visitor spend is representative of visitors who attend crocodile parks
- ▶ Split of tourists from the NT by day and overnight: 90 per cent of tourists from the NT were considered to be day visitors, the remainder overnight
- ▶ All interstate tourists were overnight visitors
- ▶ Casual visitor seeing more than one (or the same) park: 5 per cent of each visitor type

The Visitor Average Expenditure Profile produced by Tourism Research Australia is also a key dataset used in the calculation of the tourism contribution component and is shown below in Table 21.

Visitor Profile	Domestic Day	Domestic Overnight	International
Average Stay (nights)	N/A	6.9	16.7
Average Spend per trip (\$)	\$152	\$1,313	\$1,598
Average Spend per night (\$)	N/A	\$189	\$95

Source: Tourism Research Australia (TRA), National and International Visitor Surveys June 2015; Northern Territory

Given that the crocodile parks do not collect data regarding the type (length of stay) of their visitors, an assumption was needed to reconcile tourist origins with visitor types. In the absence of actual data and the concentration of the NT population in Darwin within close proximity of the two tourist parks, it was assumed that 90 per cent of NT tourists were domestic day visitors and 10 per cent were domestic overnight visitors.⁴³ With park visitors counted in this way, average expenditure ratios per visitor could be applied and an overall expenditure amount determined.

As indicated in Section 3.2.4, the ability to see crocodiles is a strong attractor for NT tourism. As such, it is reasonable to assume that for a proportion of NT tourists, the primary driver is to see crocodiles (in the wild or through farm related tourism). Similarly, if it was not possible to see crocodiles, then those tourists would not visit (or stay as long) in the NT. For the purpose of this study, and without specific surveys carried out, we have assumed that 5% of interstate and international tourists visit the NT specifically for farm related tourism. Where this is the case our calculations capture the full trip spend of these visitors. Otherwise, the study assumes a casual visit and attributes only a half-of- one day's expenditure to this.

The value of these assumptions is outlined in Table 22.

	Domestic Day	Domestic Overnight	International
Specific crocodile visitors	100 per cent	5 per cent	5 per cent
Casual crocodile visitors	0 per cent	95 per cent	95 per cent

Source: EY, 2016

The total visitor expenditure attributable to the crocodile industry calculated from the aforementioned assumptions is outlined in Table 23.

	Domestic Day	Domestic Overnight	International	Total
Specific visitors	\$7.5	\$3.4	\$1.0	\$11.9
Casual visitors	\$-	\$4.5	\$0.6	\$5.2
Total expenditure	\$7.5	\$8.0	\$1.6	\$17.1

Source: EY, 2016 (some numbers may not add due to rounding).

⁴³ This 10 per cent of NT tourists was added to all interstate visitors to comprise the domestic overnight count with international tourists remaining in that same category.

Quantifying the economic tourism contribution using economic multipliers for the NT is difficult as the tourism industry does not have its own category but rather contributes to a range of other industries, such as retail and accommodation and food services, to varying extents. However REMPLAN's tourism module can be used to attribute tourism spend across these industries specific to the NT economy.

Table 24 outlines the split between industries that results from a single dollar spent in the 'tourism' industry.

Input Output Industry	Breakdown of expenditure in the 'tourism' industry	Domestic Day (\$M)	Domestic Overnight (\$M)	International (\$M)	Total (\$M)
Accommodation and Food Services	49 per cent	\$2.884	\$3.888	\$0.780	\$7.551
Transport, Postal and Warehousing	21 per cent	\$1.228	\$1.655	\$0.332	\$3.215
Ownership of Dwellings	7 per cent	\$0.432	\$0.582	\$0.117	\$1.131
Retail Trade	5 per cent	\$0.309	\$0.416	\$0.083	\$0.808
Arts & Recreation Services	5 per cent	\$0.269	\$0.363	\$0.073	\$0.705
Administrative and Support Services	5 per cent	\$0.265	\$0.358	\$0.072	\$0.694
Manufacturing	2 per cent	\$0.121	\$0.164	\$0.033	\$0.318
Education and Training	2 per cent	\$0.115	\$0.155	\$0.031	\$0.301
Rental, Hiring and Real Estate Services	1 per cent	\$0.081	\$0.109	\$0.022	\$0.212
Wholesale Trade	1 per cent	\$0.049	\$0.066	\$0.013	\$0.129
Health Care and Social Assistance	0 per cent	\$0.026	\$0.035	\$0.007	\$0.069
Information Media and Telecommunications	0 per cent	\$0.025	\$0.033	\$0.007	\$0.065
Agriculture, Forestry and Fishing	0 per cent	\$0.022	\$0.030	\$0.006	\$0.058
Other Services	0 per cent	\$0.016	\$0.022	\$0.004	\$0.042
Financial and Insurance Services	0 per cent	\$0.002	\$0.002	\$0.000	\$0.004
Professional, Scientific and Technical Services	0 per cent	\$-	\$-	\$-	\$-
Public Administration and Safety	0 per cent	\$-	\$-	\$-	\$-
Construction	0 per cent	\$-	\$-	\$-	\$-
Electricity, Gas, Water and Waste Services	0 per cent	\$-	\$-	\$-	\$-
Mining	0 per cent	\$-	\$-	\$-	\$-
Total	100 per cent	\$5.844	\$7.879	\$1.580	\$15.302

Source: REMPLAN, 2016 (some numbers may not add due to rounding).

Based on this distribution the economic contribution can be calculated the same as any other industry. The result was an estimated total value added amount of \$12.28m⁴⁴, which could be broken down into:

- ▶ \$7.03m direct effect
- ▶ \$5.25m indirect effect.

⁴⁴ We note this figure may not exactly total the component totals below due to rounding.

Table 25 summarises the key economic contribution indicators for visitor expenditure during the 2014/15 financial year.

Table 25: Economic contribution from NT crocodile farming related tourism, 2014/15 Financial Year				
	Direct effect	Industrial flow on effect	Consumption flow on effect	Total
Output (\$M)	\$15.30	\$10.35	\$25.65	\$51.30
Value-added (\$M)	\$7.03	\$5.25	\$12.28	\$24.56
Employment (Jobs)	51	24	75	150

Source: Stakeholder consultation, REMPLAN, 2016

About EY

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