

# Crocodile Farming and Ranching in Australia

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THIS chapter briefly summarizes the comparative development of the five crocodile farms and ranches in Australia. As there is no accepted national or international 'standard' in crocodile farm design, nor in the husbandry involved in raising and breeding crocodilians, Australian efforts with both *Crocodylus porosus* and *Crocodylus johnstoni* drew heavily on African and U.S. concepts and experience, which were subsequently adapted to suit local conditions.

Background information on Australian crocodiles and their management is contained in Chapters 10 to 13 of this book. In addition, a more detailed assessment of *C. porosus* conservation and management is within the proposal to CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) which succeeded in having the Australian population of *C. porosus* transferred back to Appendix II (Webb *et al.* 1984). Weaver and Taplin (1984) discuss various aspects of crocodile management in Queensland.

Attitudes about crocodile conservation and management within Australia have been steadily changing from ones of preservation and restriction to the more enlightened views of sustained yield harvesting and value-added conservation. A well planned Australian crocodile industry is beginning to emerge, and it is based largely on farming and ranching concepts. The industry at present is still in its infancy, but already many of the technical problems have been overcome and its future development can be viewed with optimism.

## THE CURRENT STATE OF THE CROCODILE INDUSTRY

There are currently five crocodile farms and ranches in Australia, three in the Northern Territory and two in Queensland. The total numbers of crocodiles held within them as of June 1984 is summarised on Table 1 (4351 *C. porosus* and 6612 *C. johnstoni*). In addition, some 300 *C. porosus* are held in a variety of zoos, wildlife parks and tourist display centres throughout the country, and on the crocodile farms alone, some 100 *C. porosus* nests are now being made annually.

Table 1. Crocodiles held on the five Australian crocodile farms and ranches as of 30 June 1984. About 300 additional *C. porosus* are in a variety of zoos and display centres. 1 yr = 1 year olds; SA = subadults; A = adults.

Farm	State	<i>C. porosus</i>				<i>C. johnstoni</i>
		1 yr	SA	A	Total	Total
Crocodile Farms	NT	331	185	108	642	2368
Janamba	NT	807	27	24	838	2389
Letaba	NT	172	49	0	221	1707
Edward River	QLD	1027	1330	200	2557	-
Koorana	QLD	13	98		111	148
Totals					4351	6612

Farms in the Northern Territory and one farm in Queensland (Koorana Farm) were restricted to obtaining their subadult and adult *C. porosus* breeding stock from the "problem" crocodiles which needed to be removed from the wild in the interests of public safety. As a consequence, these farms were stocked with animals that were "available" rather than with those that were needed, and there are serious imbalances in both the size and sex ratio of the stock. The breeding potential of such captive populations is accordingly compromised, and for purely economic reasons, excess subadult males may simply need to be destroyed if they cannot be exchanged.

The relisting of *C. porosus* from Appendix I to Appendix II of CITES was a positive step for crocodile farming in Australia. Apart from one Queensland farm (Edward River) which was established in 1969 and is now breeding *C. porosus* from adults which were themselves raised from eggs hatched in captivity, most farms were relying on wild stock in one form or another to get established. Under the provisions of Appendix I, which apply to critically endangered animals and plants, no products from these animals could ever have been traded internationally.

Provided the environment will support a crocodile population, the extent to which any management scheme which incorporates a sustainable harvest will work, will depend on the people responsible for establishing the ground-rules. A flow

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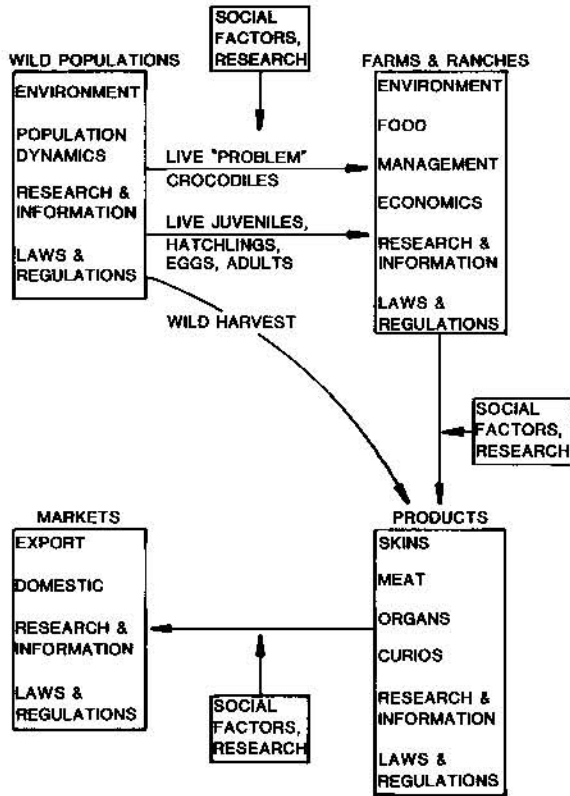


Fig. 1. A stylised management system for crocodile farming and ranching operations.

chart of a crocodile industry (Fig. 1) shows major component systems that are essentially "man-made" (for example research and information, laws, regulations and the social acceptability of crocodile utilization). If Australia is to have a successful crocodile industry, it will depend on positive attitudes and approaches by Australian scientists, wildlife management authorities, crocodile farmers and ranchers, the public at large and by individuals with the entrepreneurial abilities needed for establishing any new industry.

#### AUSTRALIAN CROCODILE FARMS

The five crocodile farms in Australia have been established with different aims, aspirations and management strategies:

Crocodile Farms (N.T.) Pty Ltd  
P.O. Box 4694, Darwin, N.T. 5794

The farm was started in 1980, primarily as a tourist facility (40,000 visitors per year by 1984), by a number of investors in association with a poultry farm. Stock of about 4500 crocodiles in January 1985 consisted mostly of *C. johnstoni* collected as hatchlings, and "problem" *C. porosus* from the Darwin area. Seventeen *C. porosus* nests (370 hatchlings) were made on the farm in 1984; 70% of eggs hatched and 60% of hatchlings survived. Thirty nests were

made during the 1984/85 wet season and hatchling survival increased to 90%. Food sources are mostly chicken, with a minced fish, chicken and meat mixture for hatchlings. Projected turn-off is 2000 skins annually. The major problem is that "problem" animals were not really suitable for the efficient establishment of a captive breeding population.

Letaba Crocodile Farm  
P.O. Box 2351, Darwin, N.T. 5794

The farm was started in 1982 in association with a large cattle station near Darwin. The concept was to use crocodile eggs from the station area as much as possible, rather than maintaining a captive breeding population. It does not cater for tourism. Stock by January 1985 consisted of about 3400 *C. johnstoni* and 150 *C. porosus*. A 91% hatch of fertile *C. johnstoni* eggs collected from the wild was achieved in 1984. Food sources are mainly beef and chicken. Projected turn-off is 2000 skins annually. The major problem initially was unidentified losses of young animals within earthen ponds (burrowing, predators, unrecorded deaths etc.).

Janamba Crocodile Farm  
P.O. Box 2672, Darwin, N.T. 5794

This farm was started in 1982 in association with a poultry farm in Darwin. It does not cater for tourism. The stock of about 2500 crocodiles in January 1985 consisted mostly of *C. johnstoni* with some problem *C. porosus* being raised as breeding stock. Earthen pens with liners did not prove suitable for high densities of *C. johnstoni* hatchlings. The major problem was a fungal infection of hatchlings, and the types of pen previously in use have been abandoned.

Koorana Crocodile Farm  
MSF 76 Coowanga, Rockhampton MC, Qld. 4702

This farm was started in 1981, with the aim of producing skins, meat and a facility for tourism and public education. The farm is in part underwritten by a novel 'Lease a Crocodile' investment scheme. Stock to January 1985 was 251 animals, made up of 160 *C. johnstoni* and 91 *C. porosus*. Two *C. porosus* nests were made on the farm in 1984. Food sources are poultry, fish and beef. Projected turn-off is 1000 skins annually. The major problems have been sources of stock, which were limited to problem *C. porosus* in the Rockhampton area and limited numbers from the Edward River Crocodile Farm.

Edward River Crocodile Farm  
P.O. Box 669, Cairns, Qld. 4870

This farm was started in 1969 with the dual purposes of conserving juvenile *C. porosus* that would otherwise have been taken by hunters and providing employment (12 people) in the Aboriginal Community at Edward River, in North Queensland. The farm is a project funded by the Federal Department of Aboriginal Affairs. Stock in January

1985 consisted of about 2500 *C. porosus*, of which over 2200 were farm bred. In 1984, 64 *C. porosus* nests were made in captivity, yielding 1034 hatchlings (40% hatch rate and 85% survival). Food sources are mainly beef, wild pig and fish. Edward River exported its first 100 skins in November 1984. Projected turn-off is 2000 skins per year, with additional hatchlings for raising elsewhere. Major problems are that hatching success rates are low (this is in part due to young females just starting to breed), and food supplies are difficult to obtain in the "wet" season.

Collectively the Australian crocodile farms represent some \$2.5 million of capital investment and provide full-time employment for 25 people. The most important problems being encountered by all farms to some extent are:

1. Supplies of breeding stock, eggs and/or hatchlings are too limited to allow farm stocks to build up in a realistic time frame;
2. A significant proportion of crocodile hatchlings are runts;
3. Wild "problem" crocodiles have a number of difficulties as breeding stock, and some farms are maintaining "problem" animals which have little or no potential as breeding stock; and,
4. Losses of crocodiles through escapes, predators and unexplained mortality, particularly during the first year of life.

#### CONTRIBUTION TO CONSERVATION

The numbers of crocodiles maintained on the farms, particularly of *C. porosus*, represent a significant percentage of the estimated wild population. This is clearly conservation "insurance". To date, the farms have also housed large numbers of "problem" *C. porosus* which would otherwise have been shot. Crocodile farms are a public example of the real value of wildlife. Through the media attention that they attract and through tourism at some farms, they are playing a very significant role in public education about crocodiles and conservation in general.

#### GOVERNMENT CONTROL OF FARMS AND RANCHES

Any crocodile farming or ranching activity within Australia is controlled at both the Federal and State levels. To comply with the export requirements of CITES, the Federal authorities must be assured that no wild animals can be exported through the farms unless they have been obtained under the conditions of approved management plans. Penalties are severe for violations of the Federal Act (\$100,000 and/or five years imprisonment for individuals; \$200,000 for companies), so it is highly unlikely that improprieties will occur. Federal requirements

within Australia are in fact more stringent than are required by CITES — a situation which may superficially seem ideal to some people, but which in reality is undermining the very essence of the CITES agreement. CITES was enacted to control trade in endangered species — not to stop it.

The extent of Federal and State efforts that are needed to "control" crocodile farming operations within Australia is far from clear. There are only five farms, and each of them works closely with the relevant State wildlife authorities — it is a tiny, stringently controlled developing industry. Yet some argue that every single animal should be tagged with an identifying number such that each is "accountable" to the Federal authorities, and thus CITES, throughout its life. Crocodile farmers concede that regulation is necessary, and it is clearly in their own best interests to encourage reasonable levels of control. However, crocodile farms will soon have a population of at least 20,000 individuals, of two species, and there will be thousands of animals entering the farms each year and thousands leaving after three years of raising: not to mention natural mortality; the odd nest that hatches undetected in a grassed pen; escapes; and the need to shift animals between pens in order to keep them graded for size. A tagging system with a level of resolution down to a single hatchling may be needed for a research project, but is nonsense in a commercially operated farm. Crocodile conservation would gain far more if the equivalent effort were directed at some of the other more pressing problems, rather than at cosmetic efforts which will simply waste time and effort.

As pointed out by Hollands (see Chapter 8), there has often been a tendency for individuals within management authorities to basically oppose those who attempt to utilize wildlife commercially. Yet the success of any management programme which incorporates the sustained utilization of wildlife will depend far more on the economics of utilization than it will on the ecology of the animal constrained by unnecessary antagonism, which was overcome by the concerned parties getting together and aiming at a common goal — the success of the management programme.

Within Australia, there is a need for closer liaison between crocodile farmers and the various management authorities. There will be many aspects of the developing crocodile industry that will need to be reviewed with a view to making the industry as a whole function efficiently and economically. For example, stringent export permit restrictions and equivalents are perhaps bureaucratic "overkill" in this early stage of development, but they are not conducive to good commercial practice, and if proven redundant, should be relaxed.

### MARKETING

It is estimated that the world market demand is for some 300,000 quality skins annually, yet only 40,000 were produced in 1984 from managed sources (Ashley, pers. comm.). This is expected to rise to an estimated 100,000 in the near future. With the development of numerous farms and ranches in several countries, especially within Africa (where foreign exchange is of critical importance) an over-supply situation is a real possibility. In the meantime, more market information is needed; the price per inch per belly skin for *Crocodylus porosus* has dropped from US\$13 to US\$4 and then risen back to US\$14 in the past four years — few farms or ranches could cope with such fluctuations. Is this caused by supply and demand, buyer manipulation or the dictates of fashion? Apart from information on *C. porosus* and *C. johnstoni* skin markets, and the market in general, we need to evaluate markets for crocodile meat, crocodile parts and the potential for tanning skins in Australia.

### ECONOMICS

The economic viability of crocodile farming in Australia is yet to be thoroughly evaluated. There is a range of crocodile farming and ranching concepts in operation, but in most cases an annual off-take of skins has not yet been possible. It is reasonable to conclude from the experiences at Edward River and Crocodile Farms (N.T.) that crocodiles are a viable investment, when compared with other primary industry options, but the finer analysis will not be possible until a regular annual income from skins is achieved.

Given minimum skin prices for *C. porosus* of US\$10-11 per inch and adequate stock numbers each year to meet projected farm needs, the farms can develop a cash flow in a reasonable time frame. Throughput and cash flow are vital for any production business, including crocodile farms. Tourism is a potentially valuable supporting industry, but the numbers of tourists in northern Australia are simply not large enough to sustain the development of a major crocodile enterprise.

### RESEARCH

Research and information are the major components at every stage of crocodile management. The Northern Territory Government and the Universities of Sydney and New South Wales have put considerable resources into crocodile research, the development of the crocodile farms and the submission to CITES for the relisting of *C. porosus*, all of which are essential to the developing crocodile industry.

In terms of continuing research and research needs, the following seem particularly important:

1. Population studies and monitoring are essential for management schemes which involve the utilization of wild populations of crocodilians;
2. Research into eggs and hatchlings has already yielded direct benefits to the crocodile industry and this would be enhanced with additional data on hatchling survival and performance;
3. The requirements of captive adults for successful breeding;
4. Practical identification methods, especially for individuals in breeding groups;
5. Disease, while not a great problem to date in the Australian farms, needs to be monitored and action taken when needed;
6. The economics of crocodile farming and ranching need to be reviewed and current markets explored in more depth.

### FUTURE OF THE INDUSTRY

Much has been achieved in developing crocodile farms in Australia to their present state; there have been major advances in on-farm experience, construction, investment confidence, government support and research, and a change in attitude from preservation to management with utilization. All of this gives confidence for the future. However, the highest priority should still be to get the current farms operating on a sound economic basis. Once this is achieved, the industry can look forward to expanding in a number of directions. In overview, there is every reason to be optimistic about the future of a crocodile industry within Australia.

### ACKNOWLEDGEMENTS

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