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Aboriginal Harvest of Long-Necked Turtles in Arnhem Land, Australia

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The Aboriginal people of northwest Arnhem Land, Northern Territory, Australia use freshwater turtles as a significant source of protein. They have accumulated a wealth of knowledge of wildlife and how it can be exploited on a subsistence basis. The Bawinanga Aboriginal Corporation (BAC), a support agency for Aboriginal people who live at outstations on their traditional clan estates, is keen to see this knowledge put to use in developing local industries that contribute to economic self-sufficiency while at the same time maintaining and reinforcing links to traditional Aboriginal culture. The harvest of adults and eggs of the northern long-necked turtle (*Chelodina rugosa*) is seen to provide such an opportunity. This note reports on a project to establish an indigenous industry focused on the harvest of long-necked turtle eggs in the Maningrida region of Arnhem Land.

As the outstation population has grown to about 800 people on 32 outstations, the BAC's role has expanded beyond just housing and services to include land management and employment. The major focus of their employment program is economically, culturally and socially appropriate commercial use of wildlife. The project has been established in conjunction with the Djelk Rangers, an indigenous land management group which cares for lands in the Maningrida region, and the Applied Ecology Research Group at the University of Canberra.

In February 2000, the Djelk ranger program in collaboration with the Applied Ecology Research Group and the Key Centre For Tropical Wildlife Management (Northern Territory University) undertook the first step towards establishing this new indigenous enterprise. With full community involvement, the team has established how to

·efficiently capture, mark and release turtles in floodplain billabongs (Figure 1);

·determine if females are carrying eggs, and how many;

·induce females to lay their eggs;

·transport and care for eggs (Figure 2); and

·care for hatchlings until they are dispatched for sale.

A modest market has been established and all hatchlings produced in 2001 and 2002 were legally sold into the pet trade. A proportion of income is returned to outstation communities in the form of an initial payment per gravid turtle.

This year Bawinanga and the University of Canberra with a grant from the Australian Research Council have started research in support of this aboriginal industry. The research aims to provide fundamental knowledge for the sustainable harvest of *C. rugosa* eggs and adults in Maningrida, Arnhem Land. At the same time, the project aims to capitalize on the opportunity to investigate density-dependent mechanisms that drive a compensatory response to harvest in these long-lived vertebrates by



Figure 1. During the wet season Djelk Rangers, Kim and Clinton, use baited traps to catch gravid turtles.



Figure 2. Djelk Ranger, Dean Cooper, checks to see if any eggs have hatched.

1) examining the impact of current Aboriginal harvest on turtle populations by comparing the population

dynamics of harvested populations with those of populations subjected to little or no harvest pressure;

2) developing a model of the population dynamics to assess the resilience of turtle populations to mortality of eggs and adults, taking into account any density-dependent interactions with growth rate, age/size at maturity, fecundity and population structure;

3) using the model to predict the impact of egg and adult harvests of varying intensity, and to estimate the degree to which this impact can be offset by head-starting and release of captive-reared turtles.

Incubation experiments and captive rearing experiments will determine the optimal conditions for incubation of eggs and rearing of hatchlings, research of fundamental importance to Bawinanga.

Damien Fordham and David Feier have enrolled in postgraduate degrees and will be conducting the research under the supervision of Arthur Georges and Ray Hall. In a related project, Erica Alacs will be working on the conservation genetics of the northern long-necked turtle. With funding from the Australian Federal Police and the Linnaeus Fund of Chelonian Research Foundation, she will be looking at a range of issues from developing techniques for verifying the source of animals entering the legal and illegal trade to more esoteric questions of historical origins of long-neck turtle populations.

Success of this project depends on active involvement of the Maningrida community in all aspects of the work. The Djelk Rangers assigned to this project will be taught how to provide appropriate field and experimental support for the research. Eventually, the Djelk rangers would like to monitor and evaluate their own wildlife production systems. Some have already completed training in crocodile and trepang survey techniques. Their training will play a critical part in meeting the learning objectives of the project, and in communicating the techniques, skills and attitudes to the community so that the benefits can continue when the formal research project terminates.

Involvement of the outstation communities is pivotal to the success of the project, and considerable effort has gone into communicating the objectives of the project and obtaining an appreciation of the views of the outstation communities as to the potential benefits of the project. Training aspects for outstation residents include how to capture turtles, assess whether or not they contain eggs, and house the

turtles in satisfactory conditions awaiting collection by Djelk Rangers. The autonomy of outstation communities in this aspect of the project would be a major achievement.

Rock paintings and ceremonial stories indicate that Aboriginal people in the Maningrida region have been harvesting northern long-necked turtles, known locally as *wammarra*, *burnda* and *gomdow*, for many generations (Figure 3). Another aspect of the project is to reinforce the link between the long-standing cultural traditions with the turtles and the current project. This is being accomplished by visiting outstations, by interacting with outstation school programs, and by bringing school children from Maningrida to the Djinkarr Ranger Station and the incubation facilities to see the project in action.

Indigenous social issues have been high on Australian government agendas for many decades. It is widely recognized that adverse social disruption results from disconnecting indigenous people and communities from their language, culture and traditions. The BAC recognizes this and is developing a local economy that will achieve a measure of self-sufficiency for Aboriginal people, a continued connection to traditional values, and conservation of natural resources through sustainable exploitation. As the aboriginal people move from a subsistence approach to natural resource utilization based on servicing a market that extends beyond their local community, they are seeking practical assistance in ensuring that their activities are sustainable. This assistance is also needed to gain the necessary approvals at state and national level for the local industry to proceed.



Figure 3. Rock paintings reveal the cultural importance of turtles for the people of Arnhem Land.

Turtle Presentations at the 2003 Joint Meeting of Ichthyologists and Herpetologists in Manaus, Brazil

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Akre, Thomas S.B.; Mittermeier, Russell A.; and Buhlmann, Kurt A. The role of biodiversity hotspots in tortoise and freshwater turtle conservation.

Lima, Aldeniza Cardoso; Vogt, Richard; Monjeló, Luis A.; and Andrade, Paulo C. M. Social, economic and envi-

ronmental characterization of rearing and breeding Amazonian Giant Turtle in captivity.

Allman, Phil; Place, Allen; & Roosenburg, Willem. The dynamics of sex differentiation in three populations of *Malaclemys*: a turtle with temperature-dependent sex determination.