Darwin Initiative for the Survival of Species

Annual Report

Project title	*River dolphin conservation in Amazonia*
Country(ies)	*Brazil*
Contractor	*University of St Andrews*
Project Reference No.	*162/07/035*
Grant Value	*£69,500*
Start/Finishing dates	*01/12/98 – 01/12/01*
Reporting period	*1 April 2000 – 31 March 2001*

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1. Darwin Project Information

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2. Project Background

The Project is located in the central Brazilian Amazon, near the town of Tefe, some 500km west of Manaus. It is centred on the Mamirauá Sustainable Development Reserve, an area of 1.1 million ha of flooded forest habitat (Várzea). The study now has its own floating base and small boats. Larger river boats, used for surveying lakes and the major rivers, are provided to us at cost by the Mamirauá Society, which administers the reserve and provides logistical support for a number of research projects.

The project was set up in recognition of the fact that, among cetaceans, river dolphins are uniquely vulnerable to anthropogenic pressures and that these pressures have resulted in the decline to critical levels of all but the Amazonian species (the boto *Inia geoffrensis*). The Chinese river dolphin will soon become the first cetacean to be rendered extinct by Man, and the Indus/Ganges species are severely depleted. The Amazon dolphin is relatively numerous only because human influence on this river has not yet reached the levels existing in Asia. A fast-growing human population, coupled with the current rapid industrialisation and development of Amazonia will inevitably result in the Amazon dolphin following the demise of its Asian counterparts unless a way is found for humans and cetaceans to coexist. Part of the problem is a near-total ignorance of river dolphin biology and ecology. On the positive side, there are sufficient numbers of Amazon dolphins to facilitate a quantitative study of the species within a reasonable length of time.

3. Project Objectives

The purposes of the project are five-fold:

- to greatly improve our previously poor understanding of the biology and ecology of *Inia geoffrensis* and the sympatric delphinid *Sotalia fluviatilis*,
- to identify factors affecting the health of dolphin populations and quantify their impact

- to determine the density and status of dolphins in the the central Amazon
- to formulate management principles which will alleviate human pressures on Amazonian dolphins, recognising that the river-dependent human population is increasing and will continue to do so indefinitely.
- to bring this advice to the attention of policy makers at local and national level, and to work with local people in the implementation of such management .

4. Progress

The period preceding this reporting year covered the initial phases of the work, especially the setting up of study plots, development of appropriate study and data storage techniques, consultation with local communities and marking of study animals. During this time, staff and students were trained, and the project settled into something of an established pattern, with daily observational work punctuated by larger-scale seasonal tasks.

Progress during the reporting period continued to be excellent. Staff and students worked well together, and a highlight of the year was the acquisition of our own purpose-designed operational base. This is a raft (15m x 11m) tethered in the centre of the main study area, fitted with running water and a solar-powered electrical supply capable of supplying lighting and power for the 3 project laptop computers. It has sleeping accommodation for up to 12 people and will form part of the 'legacy' which will remain after the Darwin project has concluded.

A key feature of the year was continuation of the regular meetings of project leader with host-country partner, between project staff, and of staff with local communities. The potential for misunderstandings, disputes and hostility between people of such different backgrounds, interests and cultures should not be underestimated or treated lightly. Problems did occur at all levels, but none lasted long or affected the work significantly. The host-country partner again played the key role here, keeping her 'ear to the ground' and working with the project coordinator to nip problems in the bud before they became significant. A continuous field presence and both radio and e-mail communications to the outside world helped here.

The dolphin marking programme continued, and brought to 205 the number of Amazon river dolphins now individually recognisable. In early 2001, more than half of the dolphins seen in the core of the study area were known animals, a proportion which greatly enhances the value of the daily observation work in its contribution to our understanding of the species' biology.

Survey work included 2 6-day line- and strip-survey cruises on the Solimoes and Japurá rivers and on Lago Tefe. These cruises were timed to occur at high- and mid-water levels in order to look for seasonal variations in density and distribution. Twice-monthly small-boat surveys were carried out year-round in the channels and small lakes of the main study area. Together, these surveys covered all habitat types in the region. Results showed that, at mid water levels, the rainforest waterways hold higher densities of dolphins than have been recorded for any cetacean species worldwide. At

high water, many botos enter the flooded forest for several months, returning to the main rivers as the waters subside. It is clear that Varzea (inundated forest) is preferred habitat in this region, almost certainly because of the extraordinarily high levels of fish density and diversity which it holds. The main rivers seem to act as a dolphin 'sponge', absorbing them when they are forced out of the Varzea by dropping water levels, but releasing them again 3 months later as the forest again becomes accessible. Contrary to expectations, we also found that botos in the main rivers live almost exclusively near the edge. The few seen in mid-river are probably just transiting from one side to the other.

Another important element of the fieldwork has been the monitoring of human impacts on dolphins within the Mamirauá Reserve itself and in the surrounding rivers and lakes. The Reserve has been subject to 'sustainable development' management for several years now, and the project has monitored dolphin abundance and behaviour before and during the implementation of the Management Plan. In summary, our results to date are as follows:

- The single most damaging anthropogenic effect on dolphins is gillnetting. Dolphins are drowned in these nets, and others are killed by fishermen when they become entangled. Research is continuing to quantify the absolute and relative levels of mortality, and the age-classes of dolphins killed. The project has demonstrated that the boto is a k-selected species (slow to mature, low rate of reproduction, long-lived), so even small increases in adult mortality (e.g. due to fishery bycatch) could have a substantial impact on the population trajectory
- Both dolphin species are resilient to boat traffic at the levels occurring in this region, including within the town of Tefe. Some of the highest boto densities are found in Tefe harbour itself.
- There is some evidence that botos are wary of human dwellings on rafts in narrow channels. The establishment of a so-called 'eco-tourism' facility at a site within the study area which had routinely attracted high dolphin densities resulted in the dolphins avoiding the site subsequently. Radio telemetry demonstrated that movement past this site was differentially carried out at night when disturbance was at its lowest.
- The scale of movement we see in individual dolphins indicates that seasonal migrations ,in the sense normally associated with cetaceans, do not occur. Thus, while dams would impact dolphins by affecting their food supply (e.g. many prey species like catfish are migratory), their impact on dolphin movement would probably not be substantial except for animals living close to the dam itself.

Six new students were selected to work with the project during the year – two Brazilians, a Colombian and three Portuguese. Selection criteria are as follows:

First degree-level of education (completed or current)

Ability to speak Portuguese or Spanish

Familiarity with basic computer packages

Bright, open personality and likely ability to live happily in a small community for months at a time

Enthusiasm for the aims of the project, its study animals and the chance to live in the rainforest away from people and city life

Training includes safety briefings, understanding the mathematical basis for research techniques like density surveys, data handling and manipulation using spreadsheets, use and servicing of outboard engines and small boats, learning techniques for observing and recording behavioural data on dolphins. Most training is carried out in the field. Staff and students are selected after face-to-face interviews. We arrange a 30-day overlap between team members and their replacements. Either the UK or host-country partner are in the field at least every six weeks to supervise, problem-solve and train new people.

Progress on this project continues to be good and, as it enters its final phase, there have been no slippages against the original timetable. Besides the continuing effort of data collection, the reporting year was focussed on preliminary data analysis and taking advantage of every opportunity to get the message of dolphin conservation across to as wide and influential an audience as possible. In that context, Mamirauá was the subject of an hour-long programme on Brazil's most popular TV documentary series, watched by tens of millions across the country, and the dolphin work occupied fully half of that time. Perhaps the greatest benefit to the project was in a local context; a large screen was set up in the centre of Tefe for the broadcast, and a carnival atmosphere enveloped the town as it basked in its new-found celebrity status. Now, every member of the project team is known by name throughout the area, and there is a real pride in the Reserve and its dolphins. This one TV programme has probably given our work, and the problem we address, a higher profile and therefore more value than even the President of the Republic could achieve. It is now almost inconceivable that we would not receive the support and cooperation of local people in achieving the objectives of this project.

The objectives for the remaining eight months of the project are to continue the fieldwork programme, to complete the analysis and write-up of the data collected to the greatest extent possible, to ensure that our results, conclusions and management advice continue to reach the people who can act on them, and to plan for continuation of the work after the Darwin grant has come to an end. With new data being collected up to the last moment, it is inevitable that analysis and write-up will continue for at least a further year, but a timetable for this to be accomplished in a timely manner will be agreed by the team leaders at the conclusion of the period of Darwin support. Such is the confidence in the future of this study that a dolphin capture and marking campaign will be carried out in the final month of the Darwin project, thus providing more marked animals to be followed in the years to come.

5. Partnerships

Elements of the relationship between the UK and host-country partners have been mentioned elsewhere in this report. The collaboration continues to be excellent. One problem which has occurred, however, is the difference in approach to data analysis and write-up. There is a substantial cultural difference between us here. UK academics are accustomed to being required to publish their results; failure to do so will likely affect future research income, salary level and job security. This is not the case in the host-country institute (INPA), and I perceive that INPA is little different to many other South American institutes in this respect. The consequence of this

difference between the partners is an asymmetry in effort to produce the published outputs of the project, and a tension brought about by the 'nagging' of the UK partner. Furthermore, analysis carried out during the year has demonstrated weaknesses in data entry and validation which analytically-minded personnel would have detected and cured very early in the process. All these problems are solvable, however, and are arguably part of the reason why UK expertise is being employed in the host country rather than the other way round!

Our project has no formal collaborative links with other studies, but we have been routinely providing advice to river dolphin researchers in Pakistan and Colombia, and the project coordinator has helped WWF set up a research project along similar lines in Pakistan. Two Brazilian students who worked with us in the field for 6 months have now set up their own boto study in an area near the southern extent of the species' range, and it is likely that the host-country partner (Dr da Silva) will undertake a formal supervising role as the work there develops and expands under the auspices of a local university.

6. Impact and Sustainability

As a result of the President's visit at the end of the previous reporting year, and numerous features of the project on TV, radio and the printed media, the boto study has enjoyed a very high profile this year. Our work is known at local, State and National level by both the public and legislators. It is difficult to assess at this early stage exactly how this publicity will translate into concrete progress with regard to biodiversity conservation, but it would be hard to envisage a more promising foundation from which to start.

A clear exit strategy is in place, and Brazilian personnel are already trained in all necessary fields to assume responsibility for the work once the Darwin support lapses. An application to G.E.F. for funding to continue where Darwin leaves off has a good chance of success.

7. Outputs, Outcomes and Dissemination

Table 1. Project Outputs (According to Standard Output Measures)

Code	Description	n
4a	*Number of undergraduate students receiving training*	*2*
4b	*Number of training weeks provided to undergraduate students*	*5*
4c	*Number of postgraduate students receiving training (not 1-3 above)*	*4*
4d	*No. training weeks provided*	*100*
6a	*Number of people receiving other forms of education/training (not falling into categories 1-5 above)*	*1*
6b	*Number of training weeks provided*	*50*
8	*Number of weeks spend by UK project staff on project work in host country(s)*	*9*
11a	*Number of papers published or accepted for publication in peer reviewed journals*	*0*
14c	*Numbers of conferences/seminars/workshops **attended** at which finding from Darwin project work have been presented/disseminated in the **host country***	

1

14d

*Numbers of conferences/seminars/workshops **attended** at which finding from Darwin project work have been presented/disseminated **elsewhere***

1

15a

*Number of **nationa**l press releases or publicity articles **in host country**(s)*

2

16a

*Number of issues of newsletters produced in the **host country**(s)*

2

16b

*Estimated circulation of each newsletter in the **host country**(s)*

500

18a

*Number of national TV programmes/features in **host country**(s)*

1

18c

*Number of local TV programme/features in **host country***

2

19c

*Number of local radio interviews/features in **host country** (s)*

2

Dissemination activities in the host country included the TV documentary mentioned above (Globo reporter), two national magazine articles about the host-country partner's work in this project, two State-wide TV articles, two features on radio Tefe and two articles in the quarterly Mamirauá newsletter. Because the study will be continued beyond the conclusion of Darwin financial support, and there is a great deal of media interest in this work, we anticipate that such publicity will continue well into the future. With regard to reaching legislative authorities, we believe that contacts already made will continue and develop. The visit of the Federal President and the Governor of the State to our project a little over a year ago ensured that every relevant legislator in the country was aware of our work and objectives, and the problems we seek to address.

8. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Budget	Expenditure

9. Monitoring, Evaluation and Lessons

We monitor progress largely by comparing actual performance against expected, as defined by the workplan and timetable agreed at the outset. Formal twice-yearly meetings between the project leader and host-country partner are held to review progress and modify procedures and direction if appropriate. In practice, the daily e-mail contact and weekly telephone conversations between the two identify and deal with problems as they occur. We see the ultimate success of the project being seen in three different areas – knowledge, advice and implementation. We control and can quantify progress in the first two areas, but implementation of appropriate management measures cannot be expected immediately other than at a local level.

10. Author(s) / Date

Dr Anthony R. Martin

15 May 2001